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Integration of climate measures into urban regeneration, using the case of Seoul

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DECLARATION OF CONFORMITY

I hereby confirm the accordance of this copy with the original dissertation on the topic:

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STATEMENT OF AUTHORSHIP

I, Jiyoon Song, declare that this dissertation, titled 'Integration of climate measures into urban regeneration, using the case of Seoul', and the work presented in it is my own. I confirm that:

- This work was done wholly or mainly while in candidature for a research degree at Technische Universität Dresden.
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- I have acknowledged all main sources of help.
- Where the thesis is based on work done by myself jointly with others, I have made clear exactly what was done by others and what I have contributed myself.

6 January 2023

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ABSTRACT

Urban regeneration plays a significant role in the creation of climate-friendly urban areas. Urban regeneration strategies such as (1) the creation of open spaces and green infrastructure, (2) the effective use of inner-city land, (3) changes in land-use structure and elements through regeneration of inner-city areas, and (4) changes in building stock through retrofitting existing buildings and the construction of green buildings can all help with climate mitigation and adaptation efforts. Many cities throughout the world have enacted urban regeneration policies, plans, and programmes, highlighting the significance of implementing climate measures into urban regeneration policies and initiatives at the supranational, national, regional, and municipal levels.

The government of the Republic of Korea has made urban regeneration a primary priority, investing a significant amount of public funds in the process. Korea's urban regeneration initiative has made tremendous progress, with projects in numerous cities around the country currently underway. However, Korea's urban regeneration rarely takes up the opportunities to incorporate climate measures into its policy and plans. As a result of these fragmented policy approaches, both urban regeneration and climate change policies may become inefficient in terms of inefficient budget execution and staff management.

Although recent Korean studies have emphasised the significance of incorporating climate change measures into urban regeneration areas, these studies do not provide empirical evidence of specific institutional hurdles and only provide a limited amount of recommendations for successful climate policy integration in urban regeneration policies and plans. According to the literature on environmental policy integration and climate mainstreaming in worldwide academic discussion, there is a lack of empirical information on the factors that influence policy implementation phases. Identification of variables influencing the integration of climate change policies into urban regeneration—at both the policy development and implementation stages—is crucial to understanding effective climate policy integration in this policy domain.

The goals of this dissertation are to (1) investigate the current urban regeneration process and how it incorporates climate measures, (2) identify the relevant internal and external factors[1] that influence the integration of climate measures into urban regeneration policy during the policy development and implementation stages, and (3) identify implementation gaps in the integration

[1] The study adopts the definition of internal and external factors from Persson and Runhaar (2018). Internal factors are directly affected by the government in the process of policy integration; external factors are beyond direct control in the process of policy integration.

of climate measures into urban regeneration projects during the policy development and implementation stages.

This study develops a conceptual framework based on earlier studies that examine (1) the assessment of climate policy integration levels and (2) the factors that influence climate policy integration across policy domains. This dissertation takes a qualitative case study method, integrating content analysis, process tracing, and document analysis with data from semi-structured interviews with relevant stakeholder representatives, as well as a collection of relevant documents. Seoul was chosen as the case study area because it is a densely populated city with active urban regeneration and climate change policies. The case study provides empirical evidence of relevant factors for the climate policy integration in urban regeneration for cities that are pursuing successful integration of climate measures into urban regeneration policy.

Throughout the policy cycle, this study gives a detailed list of internal and external factors that influence the incorporation of climate measures into urban regeneration. Political factors, organisational factors, and resources are critical factors in both policy development and policy implementation, as previous studies have shown. However, in the policy development and policy implementation stages, this dissertation studies more detailed aspects within these categories and examines them closely by categorising them into internal and external factors. According to existing research in this field, implementation gaps are caused by a lack of sustained political support and cooperation among key stakeholders, rather than a lack of knowledge or financial resources. Other factors related to implementation gaps, such as (1) a lack/absence of information about climate measures, (2) residents' pecuniary focus, (3) public awareness and support, and (4) spatial issues such as lack of facilities/spaces for adopting climate measures, are all significant impacts in the case study of Seoul. This study suggests that sharing information and research about the effectiveness of climate measures is a good place to start when it comes to improving the level of climate policy integration in urban regeneration policies; urban regeneration stakeholders should have enough information on potential climate measure strategies that can be integrated into urban regeneration projects, as well as the benefits of doing so for the neighbourhood (e.g. climate-related businesses which support community cooperation and profit generation, community-based climate activities, and more diverse ways of measuring the success of climate measures in order to educate the public better).

Keywords: urban regeneration, climate change, policy integration, climate policy integration

ZUSAMMENFASSUNG (GERMAN VERSION)

Die Stadterneuerung spielt eine entscheidende Rolle bei der Schaffung klimafreundlicher städtischer Gebiete. Stadterneuerungsstrategien, wie z. B. (1) die Schaffung von Freiflächen und grüner Infrastruktur, (2) die effektive Nutzung innerstädtischer Grundstücke, (3) Veränderungen der Flächennutzungsstruktur und Flächenelemente durch die Erneuerung, Sanierung und Neuentwicklung innerstädtischer Gebiete und (4) Veränderungen des Gebäudebestands durch die Nachrüstung bestehender Gebäude und den Bau von grünen Gebäuden, können Klimaschutz- und Anpassungsbemühungen unterstützen. Zahlreiche Städte auf der ganzen Welt haben Stadterneuerungsprogramme, -politiken und -pläne durchgeführt, was die Bedeutung der Einbeziehung von Maßnahmen zur Eindämmung des Klimawandels in Stadterneuerungspolitiken und -projekten auf supranationaler, nationaler, regionaler und lokaler Ebene unterstreicht.

Die Regierung der Republik Korea hat die Stadterneuerung zu einer ihrer obersten Prioritäten gemacht und investiert einen großen Teil der staatlichen Mittel in diesen Prozess. Die koreanische Stadterneuerungspolitik hat erhebliche Fortschritte gemacht, mit laufenden Projekten in vielen Städten des Landes. Das koreanische Stadterneuerungsprogramm nutzt jedoch nur selten die Gelegenheit, Klimamaßnahmen in seine Politik und Planung einzubeziehen. Bedingt durch diesen fragmentierten Politikansatz könnten sowohl die Stadterneuerungs- als auch die Klimawandelstrategien ineffizient in Bezug auf Budgets- und Arbeitsplanung werden.

Neuere koreanische Studien haben die Bedeutung der Integration von Klimaschutzmaßnahmen in Stadterneuerungsgebiete hervorgehoben und auf die fehlenden institutionellen Voraussetzungen für die Verknüpfung von Klimaschutzmaßnahmen mit der Stadterneuerung hingewiesen. Diese Studien liefern jedoch keine empirischen Belege für konkrete institutionelle Hindernisse und geben nur begrenzte Hinweise darauf, wie Klimamaßnahmen in Stadterneuerungsstrategien und -pläne integriert werden können. Darüber hinaus fehlt es an empirischen Belegen für die Faktoren, die sich auf die Umsetzungsphasen auswirken, wie die Literatur zur Integration von Umweltpolitik und Klimaanpassung in der weltweiten wissenschaftlichen Diskussion zeigt. Um eine erfolreiche Integration der Klimapolitik in die Stadtplanung zu erreichen, ist es entscheidend, die Variablen zu identifizieren, die die Integration von Klimaschutzmaßnahmen in die aktuelle Stadterneuerung beeinflussen - sowohl in der Phase der Entwicklung als auch in der Phase der Umsetzung.

Die Ziele der Studie sind (1) die Untersuchung des aktuellen Stadterneuerungsprozesses und die Einbeziehung von Klimamaßnahmen in diesen Prozess, (2) die Identifizierung der relevanten

internen und externen Faktoren [2], die die Integration von Klimamaßnahmen in die Stadterneuerungspolitik in der Phase der Politikentwicklung und -umsetzung beeinflussen, und (3) die Identifizierung von Umsetzungslücken bei der Integration von Klimamaßnahmen in Stadterneuerungsprojekte in der Phase der Politikentwicklung und -umsetzung.

Diese Studie entwickelt einen konzeptionellen Rahmen, der auf früheren Studien basiert, die (1) die Bewertung des Integrationsgrads der Klimapolitik und (2) die Faktoren, die die Integration der Klimapolitik in verschiedenen Politikbereichen beeinflussen, untersuchen. Diese Dissertation wählt einen qualitativen Fallstudienansatz, indem sie Inhaltsanalyse, Prozessverfolgung und Dokumentenanalyse mit Daten aus halbstrukturierten Interviews mit Vertretern relevanter Interessengruppen und einer Reihe von anderen Dokumenten kombiniert. Seoul, eine bevölkerungsreiche Stadt mit aktiver Umsetzung von Maßnahmen zur Stadterneuerung und zum Klimawandel, wurde als Fallstudiengebiet ausgewählt. Die Fallstudie liefert Anhaltspunkte für ähnliche Städte wie Seoul, die eine erfolgreiche Integration von Klimamaßnahmen in die Stadterneuerungspolitik anstreben.

Diese Studie enthält eine detaillierte Liste interner und externer Faktoren, die die Integration von Klimamaßnahmen in die Stadterneuerung während des gesamten Politikzyklus beeinflussen. Wie in bestehenden Studien bereits hervorgehoben wurde, sind politische Faktoren, organisatorische Faktoren und Ressourcen entscheidende Faktoren sowohl bei der Entwicklung als auch bei der Umsetzung von Politiken. In dieser Dissertation werden diese Faktoren jedoch genauer untersucht, indem sie in interne und externe Faktoren in den Phasen der Politikentwicklung und -umsetzung unterteilt werden. Bestehende Studien in diesem Bereich gehen davon aus, dass die Umsetzungslücken auf einen Mangel an nachhaltigem politischem Engagement und Zusammenarbeit zwischen den wichtigsten Akteuren zurückzuführen sind und dass sie nicht eng mit einem Mangel an Wissen oder finanziellen Ressourcen zusammenhängen. In dieser Fallstudie über Seoul wird die Bedeutung politischer und organisatorischer Faktoren hervorgehoben, aber es wird auch festgestellt, dass andere Faktoren, die mit Umsetzungslücken zusammenhängen, ebenfalls erhebliche Auswirkungen haben; dazu gehören (1) fehlende/unzureichende Informationen über Klimamaßnahmen, (2) der finanzielle Schwerpunkt der Bewohner, (3) das öffentliche Bewusstsein und die Unterstützung sowie (4) räumliche Aspekte wie fehlende Einrichtungen/Räume für die Umsetzung von Klimamaßnahmen. Diese Studie legt nahe, dass der Ausgangspunkt für eine bessere Integration von Klimamaßnahmen in die Stadterneuerung der Austausch von Informationen und Forschungsergebnissen über die Wirksamkeit von

[2] In der Studie wird die Definition der internen und externen Faktoren von Persson und Runhaar (2018) übernommen. Interne Faktoren werden von der Regierung im Prozess der politischen Integration direkt beeinflusst; externe Faktoren entziehen sich der direkten Kontrolle über den Prozess der politischen Integration.

Klimamaßnahmen ist. Die Akteure der Stadterneuerung sollten Zugang zu ausreichenden Informationen über potenzielle Strategien für Klimamaßnahmen haben, die in Stadterneuerungsprojekte integriert werden können, sowie über die Vorteile dieser Integration für das Viertel (z. B. klimabezogene Unternehmen, die die Zusammenarbeit in der Gemeinschaft und die Erwirtschaftung von Gewinnen unterstützen, gemeinschaftsbasierte Klimaaktivitäten und vielfältigere Möglichkeiten zur Messung des Erfolgs von Klimamaßnahmen, um die Öffentlichkeit besser aufzuklären).

초록 (KOREAN VERSION)

도시재생은 기후 친화적인 도시지역 조성에 중요한 역할을 한다. 기후변화 감축 및 적응 노력에 기여할 수 있는 도시재생의 전략으로는 (1) 오픈스페이스와 녹색 기반 시설의 조성, (2) 도심 토지의 효율적인 활용, (3) 도시 내부의 재생을 통한 토지이용 구조 및 요소 변화, (4) 기존 건물의 개보수 및 녹색 건축물의 건설에 의한 건물들의 변화 등이 있다. 전 세계 많은 초국가, 국가, 지역, 도시 단위에서 도시재생 정책, 계획, 프로그램을 수립할 때 기후정책을 통합하는 것을 강조하고 있다.

대한민국 정부는 도시재생을 우선 과제로 삼고 있고 그 과정에 상당한 양의 공공자금을 투자하고 있다. 현재 전국에 수많은 도시에서 사업이 진행되어 한국의 도시재생 계획은 막대한 진전을 보였다. 그러나 한국의 도시재생은 정책과 계획에 기후요소를 포함하는 기회를 거의 활용하지 않았다. 이러한 단편적인 정책 접근은 도시재생과 기후변화 정책의 재정 집행과 인력 관리 면에서 비효율적일 수 있다.

최근 한국의 연구들은 기후변화 대책을 도시재생 분야에 통합하는 것의 중요성을 강조하고 있지만, 이러한 연구들은 특정 제도적 장애물에 대한 실증적 증거를 제공하지는 않는다. 또한 도시재생 정책 및 계획에 성공적으로 기후정책을 통합하기 위한 구체적인 방안에 관한 연구가 부족한 실정이다. 전 세계 학계에서 논의되고 있는 환경정책 통합 및 기후 주류화에 관한 문헌에 따르면 이 연구 분야에서는 정책 이행 단계에 영향을 미치는 요인에 대한 실증적 정보도 부족하다. 효과적인 기후 정책 통합을 이해하기 위해서는 정책 개발 및 이행 단계 모두에서 기후변화 정책을 도시재생에 통합하는 데 영향을 미치는 요인을 식별하는 것이 중요하다.

이 논문의 목적은 (1) 현재 도시재생의 정책 과정을 살펴본 후, 그 정책 과정에서 기후정책을 통합하는 현황을 조사하고, (2) 정책 개발 및 이행 과정에서 기후정책을 도시재생 정책에 통합하는 데 영향을 미치는 내부 및 외부 요인 [3]을 식별하며, (3) 정책 수립 및 이행 단계에서 기후정책을 도시재생 사업에 통합하는 데 있어 이행 격차 [4]를 분석하는 것이다.

이 연구에서 제시하는 개념적 체계는 기존의 연구 (정책 영역 전반에 걸쳐 기후정책 통합에 영향을 미치는 요인과 관련한 연구와 기후정책 통합 정도의 평가와 관련한 연구)를 기반으로 발전시켰다. 이 논문은 관련 이해관계자들과의 반 구조화된 인터뷰를 수행하여 데이터 및 관련

[3] 이 연구는 Persson&Runhaar(2018)의 내부 및 외부 요인의 정의를 채택하였다. 내부요인은 정책통합과정에서 정부의 직접적인 영향을 받는 요인이고 외부 요인은 정책 통합 과정에서 직접 통제할 수 없는 요인을 의미한다.

[4] 이행 격차 (implementation gap)는 정책 목표와 정책 이행 결과에 대한 차이를 의미한다.

문서를 확보하였고, 내용 분석 (content analysis), 과정 추적 (process tracing), 문서 분석 (document analysis)을 통합한 질적 사례 연구 방법을 활용하여 수행하였다. 서울은 도시재생과 기후변화 정책이 활발한 인구밀도가 높은 도시로서 사례 연구 지역으로서 선정되었다. 본 사례 연구는 기후정책을 도시재생 정책에 성공적으로 통합하고자 하는 도시의 정책결정자 등 이해관계자들에게 도시재생 정책에 기후정책을 통합할 때 영향을 미치는 요인에 대한 실증적 증거를 제공한다.

이 연구는 정책 주기 전반에 걸쳐 기후정책을 도시재생에 통합하는 데 영향을 미치는 내부 및 외부 요인의 세부 목록을 제공한다. 정치적 요인, 조직적 요인 및 자원은 이전 연구에서 보이듯이 정책 개발과 정책 이행 모든 과정에서 중요한 요소이다. 그러나 본 논문은 정책 개발 및 이행 과정에서 이러한 범주 내에서 더 세부적인 측면을 연구하고 내부 요인과 외부 요인으로 분류하여 자세히 검토한다. 본 연구 분야 기존 연구에 따르면 정책 이행 격차는 지식이나 재정 자원의 부족보다는 지속적인 정치적 지원과 주요 이해관계자 간의 협력의 부족으로 인해 발생한다. 서울의 사례에서는 (1) 기후정책에 대한 정보 부족/부재, (2) 주민들의 금전적 관심, (3) 대중의 인식 및 지원, (4) 기후 관련 시설을 설치하기 위한 공간의 부족이 정책 이행에 있어서 주요 이행 격차 요인으로 도출되었다. 본 연구는 도시재생 정책에 기후정책을 통합하기 위해서 중요한 출발점은 기후정책의 효과에 대한 정보 공유 및 연구가 될 수 있음을 시사한다. 도시재생 이해관계자는 도시재생 사업에 통합할 수 있는 잠재적인 기후정책 전략과 이러한 통합으로 주민이 얻는 이점에 대한 정보를 충분히 확보해야 한다. 예를 들어, 커뮤니티 협력 및 수익 창출을 지원하는 기후 관련 사업, 커뮤니티 기반의 기후 활동, 대중을 교육하기 위한 기후정책 및 사업의 성과측정 방법과 같은 정보가 이해관계자에게 제공되어야 한다.

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Note:

In this dissertation, Korea refers only to the Republic of Korea (South Korea), not the Democratic People's Republic of Korea (North Korea). The administrative structure of Korea is presented in Appendix 1.

1 INTRODUCTION

Climate change is regarded as one of the most threatening issues in the world today (World Economic Forum, 2019), and urgent actions are required to mitigate and adapt to climate change impacts. The damage caused by climate change in urban areas is immense and severe (Balaban, 2013). People living in urban areas account for 55 percent of the world's population in 2018 and this figure is expected to rise to 68 percent by 2050 (United Nations, Department of Economic and Social Affairs, and Population Division, 2019). Urban areas, which contain a large part of the world population, economic activities, and manufactured resources, can be severely affected by climate change-related events (Bilska, 2017). Researchers and policy makers in the field of urban planning and climate change stress the need for investigation of efficient and successful policy for climate mitigation and adaptation in urban areas. One of the highlighted strategies in this regard is climate policy integration in different policy domains, especially in urban regeneration policy. This dissertation presents a variety of relevant factors that affect the integration of climate measures in urban regeneration using the case of Seoul in the Republic of Korea. This chapter serves as an introduction to the dissertation by describing the research background and the purpose of the research, the research questions and design, and the structure of the dissertation.

1.1 RESEARCH BACKGROUND

Urban areas play an important role in mitigating and adapting to climate change impacts because they contribute to the causes of climate change in terms of greenhouse gas emissions, land-use change, and deforestation (Balaban and Puppim de Oliveira, 2014). Therefore, it is wise to incorporate climate change measures into urban development to mitigate and become resilient to climate change threats. Researchers highlight how spatial policies play significant roles in tackling climate change because they offer opportunities to create long-term effects and allow cities to achieve mitigation and adaptation goals simultaneously (e.g. green spaces mitigate emissions through carbon sequestration and reduce the effects of climate change impacts like heat stress, air pollution, and flooding) (Nowak and Crane, 2002; Gill *et al.*, 2007; Puppim de Oliveira *et al.*, 2011; Balaban and Puppim de Oliveira, 2014). These spatial policies involve certain interventions in existing urban areas which may include urban regeneration, renewal, rehabilitation, and redevelopment.

Different countries use different terms for ‘urban regeneration’, such as ‘urban renewal’, ‘urban rehabilitation’, and ‘urban redevelopment’ (Zheng, Shen and Wang, 2014). The concept of urban regeneration began to see significant development in the 1970s when cities in Western countries started to transition derelict zones into livable and usable zones (Healey, 1995). Today, urban

regeneration is generally defined as comprehensive and integrated visions and actions that pursue economic, social, and environmental conditions improvements in urban areas. As a form of urban policy, urban regeneration is initiated by government funds and programmes in many cases in the world, which involves not only physical improvement such as infrastructure provision and building retrofitting but also economic revitalisation, social justice, public participation, and environmental protection (Healey, 1995; Couch and Fraser, 2003; Balaban and Puppim de Oliveira, 2014).

Urban regeneration measures can contribute to climate change mitigation and adaptation. For example, urban regeneration projects on abandoned land in inner cities can promote compact urban forms (Couch and Dennemann, 2000). Furthermore, urban regeneration measures, such as the creation of open spaces and green infrastructure, can promote climate adaptation (Balaban, 2011, 2013; Balaban and Puppim de Oliveira, 2014). Balaban (2014) argues that urban regeneration contributes significantly to the creation of climate-friendly environments. The deliverables of urban regeneration for climate-friendly urban development include (1) effective utilisation of inner-city land, (2) changes in land-use structure and elements through renewal, rehabilitation, and redevelopment of inner-city areas, and (3) changes in building stock through retrofitting existing buildings and construction of green buildings.

Urban regeneration has been carried out by innumerable cities worldwide—urban regeneration programmes, policies, and plans deployed across the world state the importance of integration of climate change measures into urban regeneration policy/projects at supra-national, national, regional, and local levels worldwide. The European Union (EU) proposed the integration of climate change measures in urban regeneration for European municipalities (Climate Adaptation Partnership in EU, 2018). The EU programme and action plan; Germany's national policy, building code, and research; Spain's national urban regeneration act; and a variety of urban regeneration projects funded by city and national governments in Hamburg and Dresden in Germany, Malmö in Sweden, Portsmouth in England, Copenhagen in Denmark, Melbourne in Australia, and Hong Kong in China exemplify good practices in terms of incorporating climate measures in their urban regeneration programme, policy, or plan (BBSR, 2016; City of Melbourne, 2017; Climate Adaptation Partnership in EU, 2018; 'Ekostaden Augustenborg', n.d.; 'Guidelines on Environmental Provisions', n.d.; Environment Bureau of Hong Kong, 2017; German Federal Ministry of Justice and Consumer Protection, n.d.; German Federal Ministry of Transport, Building and Urban Development, 2012; Molina *et al*., 2015; Müller *et al*., 2006, 2019; Portsmouth City Council, 2012; ROCKWOOL Group, 2018; The City of Rotterdam in the Netherlands, 2016; UK Ministry of Housing, Communities & Local Government, 2021; URBACT II programme, 2015; Victorian Planning Authority, 2018).

The current government of the Republic of Korea has made urban regeneration policy a top priority and has invested a significant amount of public funds in the process (National Planning Advisory Committee, 2017). It has designated numerous declining neighbourhoods as 'urban regeneration revitalisation areas'; these are neighbourhoods suffering from the impacts of depopulation, change of industrial structure, indiscriminate expansion of cities, deterioration of dwelling conditions, and so on (Ministry of Land, Infrastructure and Transport, 2013). Urban regeneration revitalisation areas have been granted pump-priming project budgets that extend for approximately five years.

Urban regeneration policy should aim to integrate a variety of policy sectors in principle; one of the strategies of urban regeneration stated in the Basic Policy for National Urban Regeneration of Korea is the integration of different fields through cooperation between different government ministries and departments. However, researchers indicated that urban regeneration policy in Korea does not engage with opportunities for incorporating climate measures into policy and plans (Wang, 2013; Lee *et al.*, 2017; Han, Park and Jung, 2018). Researchers argue that the urban regeneration revitalisation areas in Korea are vulnerable to climate change impacts including heatwaves, coldwaves, and floods (Wang, 2013); urban regeneration revitalisation areas frequently have poor-quality built environments with issues such as high proportions of deteriorated housing and a lack of urban infrastructure and lack institutional foundations to incorporate climate change measures (Han, Park and Jung, 2018).

The Government of Korea has begun to highlight the lack of incorporation of climate change measures in urban development (the Republic of Korea, Joint Corporation of Relevant Ministries, 2015) and consider the potential contributions it can have to climate mitigation and adaptation. However, in-depth scientific investigations on factors causing this lack of incorporation and resolutions to the challenges in incorporating climate change measures have not been undertaken in Korea. The First Measures for Adaptation to Climate Change—formulated in 2011 based on the law Framework Act on Low Carbon, Green Growth (2010)—recommends considering that climate change adaptation measures be incorporated into the National Land Planning and Utilisation Act. However, after five years of implementation, The Second Measures for Adaptation to Climate Change (2015) pointed out the limitation of efforts on integrative plans due to inefficient adaptation-governance systems (the Republic of Korea, Joint Corporation of Relevant Ministries, 2015).

These fragmented policies may make both urban regeneration and climate change policy inefficient. As both policies involve public projects that can take place in neighbourhoods with poor-quality built environments and that lack essential infrastructure, different projects from

different sectors can generate inefficient budget executions and personnel management (e.g. after the urban regeneration department carries out a pavement improvement project, the climate change department replaces water and sewage pipelines situated underground at the same site, ruining the results of the pavement improvement project) (Lee *et al.*, 2017).

Korea has seen significant development in its urban regeneration policy on the whole and projects have been ongoing in many cities across the country, but Seoul particularly exemplifies one of the most innovative, leading, and active urban regeneration policies and strategies considering the diversity of project types and planning strategies (Cho, 2015). The Seoul Metropolitan Government has adopted the concept of urban regeneration in urban redevelopment projects since 2000. Initially, the concept of urban regeneration focused on revitalising urban areas by restoring the existing architecture, landfills, or streams (Seoul Metropolitan Government, 2018b). The city government actively promoted the concept of urban regeneration within the needs of paradigm shifts of urban development from 'urban redevelopment' to 'urban regeneration' in residential areas.[5] The vision and purpose of urban development shifted from 'urban redevelopment and new town construction', which involves rapid urban growth, demolition and new construction, and gentrification, to 'urban regeneration' that considers historic values, quality of life, and community revitalisation (Seoul Metropolitan Government, 2018b). Funded by the Korean national government or/and Seoul Metropolitan Government, since 2014, designated neighbourhoods—called 'urban regeneration revitalisation areas'—have formulated urban regeneration revitalisation plans to solve problems in the neighbourhoods based on the demands of residents. The projects in the plan—five-year projects funded by public funds—pursue the sustainability of the urban regeneration activities that are driven by private companies established as a result of urban regeneration budgets and activities.

Although the opportunity of integrating climate change measures in urban regeneration policy/plans has been discussed in both academic and practice discussions, urban regeneration projects in Korea seem to lack climate change measures in their urban regeneration revitalisation plans (Balaban, 2013; Balaban and Puppim de Oliveira, 2014; Setiadi and Nalau, 2015a; The Republic of Korea, Joint Corporation of Relevant Ministries, 2015).

Recently, studies in Korea highlight the necessity of the integration of climate change measures into urban regeneration areas, pointing out a lack of institutional foundations to link climate measures to urban regeneration (Wang, 2013; Han, Park and Jung, 2018). However, these studies do not provide empirical evidence that identifies specific institutional constraints and climate

[5] Although there are two types of urban regeneration under the urban regeneration policy in Korea—economy-based regeneration type and neighbourhood regeneration type—this dissertation focuses only on neighbourhood regeneration type.

measures. Furthermore, available studies provide limited direction on integrating climate measures in urban regeneration policy/plans.

Runhaar *et al*. (2018) argue that there are implementation gaps when translating climate policy to the specific plan on the ground (Runhaar *et al.*, 2018). The literature on environmental policy integration and climate adaptation mainstreaming points out that there is a lack of empirical evidence of factors that affect implementation stages (Smit and Wandel, 2006; Persson and Runhaar, 2018; Runhaar *et al.*, 2018; Price, 2019). In this regard, it is crucial to identify factors affecting the integration of climate change measures into existing urban regeneration—at both policy development and implementation stages—to understand effective climate policy integration. Persson and Runhaar (2018) present a framework of factors affecting environmental policy integration organised along the policy cycle (policy development and policy implementation stages). In the framework, the factors are categorised into internal and external factors; 'internal factors' are those that are directly affected by the government in the process of policy integration (e.g. political will, leadership, and knowledge) and 'external factors' are those that are beyond direct control in the process of policy integration (e.g. geographical focus, public awareness and support, and stakeholder support). Categorising factors into internal and external factors helps to understand detailed circumstances of climate policy integration affected by both inside and outside government. Therefore, this dissertation pursues to adopt the classification of factors into internal and external factors as the framework of Persson and Runhaar (2018).

1.2 RESEARCH QUESTIONS AND DESIGN

This study aims to contribute to the academic discussion about factors that affect the integration of climate measures into urban regeneration. It intends to investigate internal and external factors for the integration of climate measures into urban regeneration. The identification of these factors will contribute to further theory development on climate policy integration in urban regeneration policy. By using the case of Seoul, this study will provide policy implications regarding relevant factors to enhance the level of integration of climate measures in the process of the urban regeneration policy cycle.

Identifying the relevant factors to increase the level of integration of climate measures into urban regeneration can offer opportunities for cities to implement climate measures successfully and effectively through urban regeneration. This dissertation aims to provide empirical evidence for the development of a framework that explains the relevant factors for the integration of climate measures in urban regeneration throughout the policy cycle.

The main research question is: Which main factors affect the integration of climate measures into urban regeneration and how do factors affect the integration of climate measures into urban regeneration in Seoul?

Four sub research questions support the answering of the main research question, which are:

1. What is the existing urban regeneration process and how does it incorporate climate measures in Korea?
2. Which are the relevant internal factors for integrating climate measures in urban regeneration policy and plans?
3. Which are the relevant external factors for integrating climate measures in urban regeneration policy and plans?
4. Which are the most important factors and gaps regarding factors in the conceptual framework of policy development, and what are the implementation gaps of the integration of climate measures in urban regeneration projects?

To answer these research questions, the dissertation adopts a qualitative case study approach. Seoul has been chosen as it represents highly populated cities with active implementation of both urban regeneration and climate change policies from the government in a top-down government structure. This case study approach allows empirical evidence of relevant internal and external factors for the integration of climate measures in urban regeneration policy not only for cities with similar characteristics as stated but also for cities that pursue the integrations of climate measures in urban regeneration policy in the future. Primary data comes from semi-structured interviews with policymakers and stakeholder representatives of urban regeneration policy, plans, and projects as well as a variety of documents available online and on-site. Methods for qualitative analyses of this dissertation include content analysis using MAXQDA software, process tracing, and document analysis.

This study focuses on Seoul as a case study for three reasons. First, the Seoul metropolitan government has implemented both urban regeneration and climate change policies for a long time. This long timeframe is conducive to informative research on these policies. Seoul Government adopted the concept of urban regeneration in 2000 and Seoul's urban regeneration concept has been regarded as a model for the formulation of the Urban Regeneration New Deal Policy as the primary policy agenda of the Korean national government in 2017 (Ministry of Land, Infrastructure and Transport, 2018b). Second, the city's government started to recognise the lack of coherence between both policies (Seoul Metropolitan Government, 2018b). Third, Seoul—the highest populated city in the country—is highly vulnerable to climate change impacts, necessitating advanced and effective climate change measures.

Four specific study areas are chosen based on the following criteria. The selection of study areas aims to have a comparative examination of different communities in order to investigate factors that lead to good/bad practice in terms of the level of the integration of climate measures in urban regeneration revitalisation plans. Furthermore, scrutinising different areas allows for the defining of the main enabling and inhibiting factors that affect the integration of climate measures in urban regeneration projects.

1.3 STRUCTURE

This chapter has described the research background and the aims that consist of a problem overview, the background of the study area, the relevance of the study, and the research aims. It then further introduced research questions and research design. The remainder of this section provides the structure of the dissertation.

Chapter Two investigates the theoretical/conceptual background of this dissertation. This chapter—in accordance with the problem statement described in Chapter One—introduces a theoretical discussion to build an analytical concept. It first introduces the state of the art in the topic, responses to climate change, the concept of urban regeneration, the background of environmental/climate policy integration and mainstreaming, and international trends and academic discussion on the opportunities of climate policy integration in urban regeneration policy. To formulate the conceptual framework of this dissertation, three frameworks are introduced in the following sections. These frameworks include the structure of the framework of climate policy integration, detailed factors of the climate policy integration, and detailed policy cycles and the definition of the levels of climate policy integration. The chapter then provides the conceptual framework developed based on the three frameworks. As the framework still has gaps regarding factors, these gaps are discussed. The chapter is concluded by formulating research questions.

Chapter Three reveals the research design and methods. This chapter starts by explaining the research design. It then explains the justification for using a single case study approach and the criteria for choosing study areas. The methodology for data collection and analysis is explained later in the chapter.

Chapter Four explores the context of Seoul and its neighbourhoods. As this dissertation uses the case of Seoul, this chapter helps the leaders to understand the context of Seoul and study areas. It describes features of the city in general and the evolution of urban regeneration in the city, climate change issues, and characteristics of residential areas in Seoul. It then further investigates features of four study areas in Seoul, Jangwi-dong, Sangdo 4-dong, Amsa-dong, and Garibong-dong.

Chapter Five describes two policy sectors of urban regeneration and climate change as well as the integration of climate measures in the process of urban regeneration. As urban regeneration policy involves complex processes and stakeholders at national, city, and community levels, this chapter first provides detailed explanations of the processes and stakeholders of urban regeneration at different levels of government. It then introduces climate change policy at national, city, and community levels. After examining these two policy domains, the next section examines the integration of climate measures in the process of urban regeneration policy and planning at national, city, and community levels. It evaluates the level of integration in each policy cycle and the process and/or stakeholders that affected the integration. This chapter serves to answer the first research question—'What is the existing urban regeneration process and how does it incorporate climate measures?'

The next chapters, Chapter Six and Seven explain the internal and external factors that affect the integration of climate measures in urban regeneration policy development (Chapter Six) and policy implementation (Chapter Seven). These chapters answer the remaining research questions which are related to the investigation of relevant internal and external factors for integrating climate measures in urban regeneration policy and plans (the second and third research questions). They also discuss the most important factors for the integration of climate measures in urban regeneration policy and plan as well as implementation gaps of the integration between policy development and implementation (the fourth research question).

Chapter Six examines the policy development stage. Internal factors for integrating climate measures in urban regeneration policy are organised into five categories: political factors, organisational factors, resources, cognitive factors, and characterisation of the problem at hand. External factors for integrating climate measures in urban regeneration policy are categorised as public awareness and support and lack of private sector support. The chapter then identifies the most important factors and gaps regarding factors in the conceptual framework.

Chapter Seven examines the policy implementation stage. Similar to policy development, internal factors are organised into five categories: political factors, organisational factors, resources, cognitive factors, and characterisation of the problem at hand. In the policy implementation stage, external factors are more diverse, including residents' support, characterisation of the problem at hand, lack of private sector support, and cognitive factors. This chapter also discusses the most important factors and gaps regarding factors in the conceptual framework. The chapter further discusses implementation gaps between policy development and policy implementation.

Chapter Eight concludes the dissertation. It first synthesises the dissertation, and it then identifies the limitations of the research and proposes further research. The chapter also elaborates on the

implications of this dissertation for academic discussion and practices. The last point of this chapter is to propose practical recommendations to enhance the degree and effectiveness of the integration of climate measures in urban regeneration.

2 THEORETICAL/CONCEPTUAL BACKGROUND

This section examines the theoretical and conceptual foundations that support the development of this dissertation. It discusses the state of the art concerning the integration of climate measures in urban regeneration and factors for climate policy integration in urban regeneration, followed by a conceptual framework developed by the author, research gaps regarding factors, and research questions.

The state of the art of integration of climate measures in urban regeneration is discussed in Sections 2.1 to 2.5. Section 2.1 introduces approaches to climate change, mitigation, adaptation, and resilience. Then, the concept of urban regeneration is discussed in Section 2.2. As the study aims to explain policy integration, literature on environmental policy integration, climate policy integration, and mainstreaming is also discussed (Section 2.3). After examining approaches to climate change, urban regeneration policy, and policy integration, it continues to articulate international trends and academic discussions of opportunities for climate policy integration in urban regeneration (Section 2.4). Here, various urban regeneration cases that planned to integrate or already integrated climate measures worldwide are presented. In Section 2.5, three frameworks from different studies which provide the main basis to formulate a conceptual framework for this dissertation are discussed: (1) the structure of the climate policy integration from Persson and Runhaar (2018); (2) detailed factors of the climate policy integration from Runhaar *et al*. (2018) and additional literature; and (3) the level of climate policy integration in different stages of the policy cycle from Roeck, Orbie and Delputte (2018). Section 2.6 then introduces a conceptual framework that is developed by the author, based on the three frameworks discussed in Section 2.5. The empirical results of the dissertation are presented and are based on the structure of the conceptual framework discussed in this section. Section 2.7 highlights research gaps regarding factors; this leads to the formulation of research questions of the dissertation discussed in Section 2.8.

2.1 RESPONSES TO CLIMATE CHANGE

There are three approaches to climate change, mitigation, adaptation, and climate resilience in academic discussion and practices. The definitions of these terms differ among researchers and practitioners, and the relationship among these terms is seen differently in different research. The United Nations Framework Convention on Climate Change (UNFCCC) defined these three approaches as the three pillars of the response to global warming ('Mitigation, Adaptation and Resilience', 2017). Although there are critics of academic trends that use the term 'resilience' vaguely in various disciplines (Brand, 2007), Morchain and Robrecht (2012) propose that climate change mitigation and adaptation can be embedded in the context of resilience, and resilience

should be embedded in sustainability. While the term 'climate measure'—used in this dissertation—can be interpreted in different ways, the dissertation defines climate measure as a measure to foster mitigation, adaptation, and/or resilience. This section introduces these terms to provide an understanding of the scope of climate measures.

To respond to climate change, the common strategies that national and city governments adopt are: (1) climate mitigation which involves long-term adjustments that decrease greenhouse gases emissions and (2) climate adaptation which involves short-term adjustments to decrease the climate change impacts (Zsamboky *et al.*, 2011; Young and Essex, 2019). Mitigation means 'a human intervention to reduce the sources or enhance the sinks of greenhouse gases (GHGs)' (IPCC, 2014). Some countries and cities set targets for GHG emission reductions with mitigation plans and strategies, such as increasing energy efficiency, generating renewable energy, and implementing energy-saving measures (Reckien *et al.*, 2014). Although these efforts are necessary to minimise the climate change impacts in the future, climate change continues due to GHGs emitted in the past, which requires adaptation to the inevitable climate change impacts (Intergovernmental Panel on Climate Change, 2001; Huq and Reid, 2009; European Environment Agency, 2016). Adaptation is defined as 'the process of adjustment to actual or expected climate and its effects. In human systems, adaptation seeks to moderate or avoid harm or exploit beneficial opportunities. In some natural systems, human intervention may facilitate adjustment to expected climate and its effects' (IPCC, 2014). Some countries and cities pursue the establishment of climate adaptation policies and/or plans—mostly on the topics of urban planning and development, water management, health aspects, flood protection, forest management, and agriculture (Reckien *et al.*, 2014). The adaptation strategies that city governments adopt consist of building measures, research projects for controlling the risks of flooding and/or heatwaves, and green infrastructure (European Environment Agency, 2016).

Reckien *et al*. (2014) analyses adaptation and mitigation plans from 200 urban areas in Europe. The analysis results show that mitigation measures of study areas are related to individual sectors such as the expansion of bike lanes and energy efficiency (heating systems and building insulation). It argues that the mitigation measures lack approaches involving zoning regulation and urban planning sectors. On the other hand, the results show that adaptation measures are more related to the fields of urban planning and development, while adaptation plans are generally vaguer than mitigation strategies—they include calls for scientific studies or enhanced cooperation of stakeholders (Reckien *et al.*, 2014).

The United Nations Framework Convention on Climate Change (2017) introduces policy and technology that can be implemented in urban environments, highlighting the mitigation measures

in sectors of building, transportation, energy, waste, and urban forms. It is helpful to discuss mitigation measures in this dissertation because they can be considered as climate measures to be integrated into urban regeneration. The measures that are discussed in the report are presented in Table 2-1.

Table 2-1 Mitigation measures in five sectors, building, transportation, energy, waste, and urban forms

Sector	Measures
Building	• Building energy codes and standards to improve the energy efficiency of buildings • Financial incentives for improving the energy efficiency of buildings (tax credits, rebates, loans, grants, green mortgages, and bridging loans) • Education, training, and leadership in the green building sector
Transportation	• Increasing petrol prices, congestion charges, and parking fees • Public transport (buses, underground railway, BRT, and light rail systems); non-motorised transport (such as cycling and walking); electric vehicles
Energy	• Net-zero energy buildings that produce on-site energy through solar photovoltaics and micro-wind turbines • Waste-to-energy plants • District heating systems that use energy from renewable sources, such as municipal waste; waste biomass; heat recovery from sewage systems or buildings such as grocery stores; or cold storage facilities or ice rinks that produce relatively large amounts of wasted heat as a result of their cooling needs • The installation of micro-hydro systems that generate on-site energy at wastewater treatment plants • Building codes (e.g. a requirement for the inclusion of solar hot water systems) • Incentives for the expansion of the renewable energy market
Waste	• Using a life cycle approach that includes better waste management—such as sanitary landfills and waste-to-energy technologies—as well as one that avoids resource extraction and reduces the energy consumed in production processes and the use of recycled materials • Education on waste reduction, recycling, and composting of organic waste • Use of waste-to-energy facilities
Urban forms	• Dense, mixed-use, and well-connected cities (high-density development with medium-rise buildings and mixed-use developments and smaller blocks with finer-grained streets) • Integrated spatial planning at regional, city, district, corridor, neighbourhood, community, and street level

Source: own compilation based on United Nations Framework Convention on Climate Change (2017)

Adaptation measures with a classification of different timescales (e.g. before, during, and after climate change impacts occur) and spatial scales (e.g. building, street, and city levels) are useful for urban planners who are formulating urban regeneration plans because these measures provide options to apply specifically to urban regeneration areas. Runhaar *et al*. (2012) present adaptation measures for heat stress and flooding in urban areas at city, street, and building levels. They categorise the measures as proactive and reactive measures: measures taken before climate change impacts occur ('proactive') and measures taken during or after such impacts occur ('reactive') (See table 2-2 and 2-3).

Table 2-2 Adaptation measures for heat stress in urban areas

	Building	**Street/quarter**	**City level**
Proactive measures	• Insulate buildings • Cooling systems (e.g. heat pumps) • Sun screens, blinds, and shutters • Provisions for heat disposal (e.g. chimneys) • Building orientation (reduce sun exposure) • Heavy building materials (high solar thermal mass) • Green roofs (e.g. plant cover) • Green facades (e.g. plant cover) • Increased reflecting levels of roofs (albedo) • Insurance (building owner)	• Open water, fountains, etc. • Vegetation (cooling due to evaporation) • High-albedo pavement instead of asphalt • Creating optimal shading via building orientation, compact building, and (big leaf) trees • Orientation and profile of streets regarding wind direction (affecting wind speed and urban ventilation) • Replacement of vulnerable groups • Monitoring and inspection • Warning and inspection • Warning systems and disaster contingency plans	• Conduct research on heat stress • Anticipate possible peaks in deaths and hospitalisations (access to medical care and capacity of care) • Further: see under 'Street/quarter'
Reactive measures	• Cooling (air conditioning) • Medical care (building owner)	• Wetting streets and roofs	• Information campaigns • Move to cooler areas • Further: see under 'Street/quarter'

Source: own compilation based on Runhaar *et al*. (2012)

Table 2-3 Adaptation measures for flooding in urban areas

	Building	Street/quarter	City level
Proactive measures	*Downpours* • Waterproof building e.g. build ground floor above street level, high thresholds, no crawl spaces, use waterproof plaster and membranes on walls, and waterproof floors • Green roofs (i.e. plant cover) • Green facades (i.e. plant cover) • Water drainage (drainage in gardens, gutters etc.) • Unpaved gardens (infiltration, water retention) *River flooding* • 'Floating' buildings • Pole-dwellings River flooding and downpours • Insurance (building owner)	*Downpours* • Seeping water 'screens' • Water permeable pavement instead of asphalt and other measures for better infiltration and water outlet • Lower water tables • Separation of rainwater and sewage water plumbing *River flooding* • Enhancing capacity of sluices and weirs • Elevate urban areas • Additional flood defences (dykes or buildings) or reinforcing existing ones • Replacement of vulnerable buildings and infrastructure • Disaster contingency plans (e.g. temporary dykes) *River flooding and downpours* • Monitoring and inspections • Warning systems • Evacuation plans • Extra green space • Water storage facilities (open water such as pools) • Increase sewer capacity or enhanced maintenance • Drainage systems • Dry pumps and other provisions for water discharge and clean-up	*River flooding* • Options for water storage and retention in or near city • Evacuation plans • Ban on building in flood-prone areas • Compartmentalisation *River flooding and downpours* • Conduct research • Information campaigns • Further: see under 'Street/quarter'

Reactive measures	*Downpours* • Clean-up and damage remedy River flooding and downpours • Clean-up and damage remedy • Medical care (building owner)	*River flooding and downpours* • Warning and information • Clean-up and damage remedy • Recovery plans	*River flooding and downpours* • See under 'Street/quarter'

Source: own compilation based on Runhaar *et al*. (2012)

The concept of resilience has gained popularity in multidisciplinary academic fields. New definitions for different approaches have emerged for over three decades (Davoudi *et al.*, 2012; Schiappacasse and Müller, 2018). It was mainly the ecology field that significantly influenced resilience thinking in the context of climate change, disaster, and development (Bahadur and Tanner, 2014). The concept of resilience was dominated in the field of ecology by Holling's seminal article in 1973 (Holling, 1973; Alexander, 2013). It defined resilience as 'a measure of the persistence of systems and of their ability to absorb change and disturbance and still maintain the same relationship between populations or state variables' (Holling, 1973).

The notion has been used in various interdisciplinary research projects related to the interaction between people and the environment (Carpenter *et al.*, 2001). Particularly, the notions of social resilience and social-ecological resilience have been highlighted. Adger (2000) emphasises that social and ecological systems are linked. He defined social resilience as the ability of human communities to withstand external shocks to their social infrastructure, such as environmental variability or social, economic, and political changes (Adger, 2000). Folke (2006) focuses on resilience in a social-ecological context. Resilience in this context was referred to as 'a capacity of a social-ecological system to continually change and adapt yet remain within critical thresholds.' Social resilience has been highlighted because it helps to understand dynamic systems of interaction between people and the environment (Folke, 2006). It is from this background that the concept of urban climate resilience has arisen.

A growing number of studies concerned with urban climate resilience focus on its definition, significance, and how it can be achieved (Bahadur and Tanner, 2014). The concept of resilience that takes into account learning and adaptive capacity has been regarded as a social objective that can be applied to the urban context (Klein, Nicholls and Thomalla, 2003). Carpenter *et al* (2001) is one of the frequently cited studies that emphasises the necessity for 'clearly defining resilience in terms of what to what' (Carpenter *et al.*, 2001). Understanding the resilience of urban systems

is one of the major discussions in urban planning and environmental policy research areas. Urban resilience is defined as 'the capacity of a city to rebound from destruction' (Vale and Campanella, 2005). Another frequently cited definition is 'the ability of a social system to respond and recover from disasters and includes those inherent conditions that allow the system to absorb impacts and cope with an event adaptive processes that facilitate the ability of the social system to re-organize, change, and learn in response to a threat' (Cutter *et al.*, 2008). They viewed communities as the totality of social system interactions within a defined geographic space such as a neighbourhood, census tract, city, or county and provided frameworks and possible indicators for community resilience (see Table 2-4).

Table 2-4 The framework of place-based urban resilience

Dimension	Candidate variables	
Ecological	• Wetlands acreage and loss • Erosion rates • Percent impervious surface area	• Biodiversity • Number of defence structure
Social	• Demographics (age, race, class, gender, occupation) • Social networks and social embeddedness	• Community values-cohesion • Faith-based organisations
Economic	• Employment • Value of the property	• Wealth generation • Municipal finance/revenues
Institutional	• Participation in hazard reduction programmes • Hazard mitigation plans • Emergency services • Zoning and building standards	• Emergency response plans • Interoperable communications • Continuity of operations plans
Infrastructure	• Lifelines and critical infrastructure • Transportation network	• Residential housing stock and age • Commercial and manufacturing establishments
Community competence	• Local understanding of risk • Counseling services • Absence of psychopathologies (alcohol, drug, spousal abuse)	• Health and wellness (low rates of mental illness, stress-related outcomes) • Quality of life (high satisfaction)

Source: own compilation based on Cutter *et al*. (2008)

Enhancing resilience as a strategic approach plays a significant role for practitioners to recover from dynamic and unpredictable stresses and shocks (Walker *et al.*, 2006; Tyler and Moench, 2012). The need for urban climate resilience has been highlighted in that the practice allows urban areas to prepare for climate change with high uncertainty (Tyler and Moench, 2012). Tyler and

Moench (2012) identified three elements of urban climate resilience—systems, agents, and institutions. These elements are: (1) systems—strengthening infrastructure and ecosystems to reduce their fragility in the face of climate change impacts and to reduce the risk of cascading failures; (2) agents (people and organisations)—building the capacities of social agents to anticipate and develop adaptive responses and to access and maintain supportive urban systems; and (3) institutions—addressing the institutional factors that constrain effective responses to system fragility or undermine the ability of agents to take action (Tyler and Moench, 2012) (See Table 2-5).

Table 2-5 The framework of urban climate resilience

	Characteristics	**Performance description**
System	Flexibility and diversity	The system can meet service needs under a wide range of climate conditions. Key elements are spatially distributed and can substitute for each other but are functionally linked
	Safe failure	Failure in one part of the system will not lead to cascading failures of other elements or related systems. Key service delivery can be maintained even under failures
Institutions	Rights and entitlements	Structures of rights and entitlements do not systematically exclude specific groups from access to critical systems or capacities. They enable groups to form and act and foster access to basic resources
	Decision making	Decision-making processes related to key urban systems are transparent, representative, and accountable. Diverse stakeholders have a way to provide input to decisions. Dispute resolution processes are accessible and fair
	Information	Agents have access to relevant information in order to determine effective actions and make strategic choices for adaptation
	Application of new knowledge	Institutions encourage inquiry, application of evidence, critical assessment, and application of new knowledge
Agent	Responsiveness	Ability to organise, or reorganise in a timely manner; ability to identify, anticipate, plan and prepare for a threat, disruptive event or organisational failure; and to respond quickly in its aftermath
	Resourcefulness	Capacity to mobilise assets and resources for action. This includes the ability to access financial and other assets, including those of other agents and systems, through collaboration
	Capacity to learn	Ability to internalise past experiences, avoid repeated failures and innovate to improve performance. This includes the capacity to build and retain knowledge over time

Source: own compilation based on Tyler and Moench (2012)

The complex nature of urban resilience is explored by researchers in the field of urban planning to investigate what makes cities and communities resilient. One of the frequently cited frameworks is the Resilient City Planning Framework developed by Jabareen (2013). It contains four dimensions for a resilient city framework: (1) vulnerability analysis matrix, (2) prevention, (3) urban governance, and (4) uncertainty-oriented planning. Among these four dimensions, urban governance highlights the integrative approach, equity, and ecological economics. It is crucial for urban governance to integrate institutional, legal, social, economic, and environmental aspects and to incorporate many different stakeholders in the decision-making and planning process (Jabareen, 2013).

2.2 CONCEPT OF URBAN REGENERATION

Cities reflect many processes that drive physical, social, environmental, and economic transition and generate many of these changes (Roberts, Sykes and Granger, 2017). Urban policy has evolved to solve a variety of problems that cities possess over time. As one of the approaches that seek to solve these problems, urban regeneration has also evolved. This paragraph introduces the evolution of the urban regeneration concept which began in Western European countries and the USA. The main strategies of urban policy that were dominant in Britain and the USA before the 1970s were reconstruction and revitalisation which involved the reconstruction and extension of old town areas based on a master plan (Healey, 1995; Roberts, Sykes and Granger, 2017). Collectively, many cities in Europe and the USA started to work on the physical change of derelict zones in the 1970s (Healey, 1995). This can be defined as urban renewal which focuses on '*in situ* renewal and neighbourhood schemes' [6] (Roberts, Sykes and Granger, 2017). Germany, for example, passed the 1971 Urban Planning Funding Act which was the foundation for systematic and legally structured urban renewal (Federal Ministry of the Interior, Building and Community, 2020). In the 1980s, property-led projects and flagship projects became popular, which were defined as 'urban redevelopment' or 'property-led urban regeneration' (Healey, 1995; Roberts, Sykes and Granger, 2017). Cities performing these strategies were relying on the assumption that the supply of property-led projects invested in by the private sector combined with the public sector's support (e.g. land reclamation, infrastructure provision, and urban marketing) would facilitate local economic transformation (Healey, 1995; Balaban and Puppim de Oliveira, 2014). During the 1990s, a more comprehensive approach to urban policy was adopted by many cities, supported by partnerships with a growing number of government agencies (Roberts, Sykes and Granger, 2017). In this period, the importance of other aspects such as economic revitalisation, social justice, environmental protection, and public participation was recognised (Healey, 1995;

[6] The terms urban renewal, regeneration, rehabilitation, and redevelopment will be discussed later in this section.

Couch and Fraser, 2003; Balaban and Puppim de Oliveira, 2014). In Europe, roughly since 1990, urban regeneration policies have been continually created to supplement existing national plans, programmes, and approaches. The Urban Pilot Projects were established in 1989 to fund small-scale actions to assist urban regeneration innovation while also building economic and social cohesion in the former EU member states (Müller *et al.*, 2021). Consecutively, European funding programmes such as the Urban I & II, URBACT I, II, & III took an integrative approach to solve economic, social, and environmental problems—the measures included infrastructure and housing upgrades with economic and employment measures, as well as initiatives to reduce social exclusion and enhance environmental quality (Müller *et al.*, 2021). Consideration of climate policy in urban regeneration has recently been discussed in academic discussion and practices (this will be elaborated on in Section 2.4). Especially, sustainable urban regeneration has been highlighted in European cities with three thematic clusters of challenges—physical perspective (climate change, carbon emissions, and resource use), socio-economic perspective (social justice, inequality and health-related challenges), and institutional perspectives (governance and geographical differences) (URBACT II Capitalisation, 2015).

Although the terms urban renewal, urban redevelopment, urban rehabilitation, and urban regeneration are used differently by different scholars and across geographical settings (e.g. countries), they share similar meanings (Zheng, Shen and Wang, 2014). Urban renewal, which is commonly used synonymously with urban regeneration, is defined as 'the process of slum clearance physical redevelopment of an urban area' (Couch, Sykes and Börstinghaus, 2011). Other related terms such as urban redevelopment, urban reconstruction, reuse, urban rehabilitation, and conservation are within the boundary of urban renewal, while urban regeneration is a more comprehensive approach compared to these related terms (Müller *et al.*, 2019). The boundary and scope of these terms are presented in the work of Müller *et al*. (2019) as presented in Figure 2-1.

Figure 2-1 Terms and definition of urban regeneration's related terms

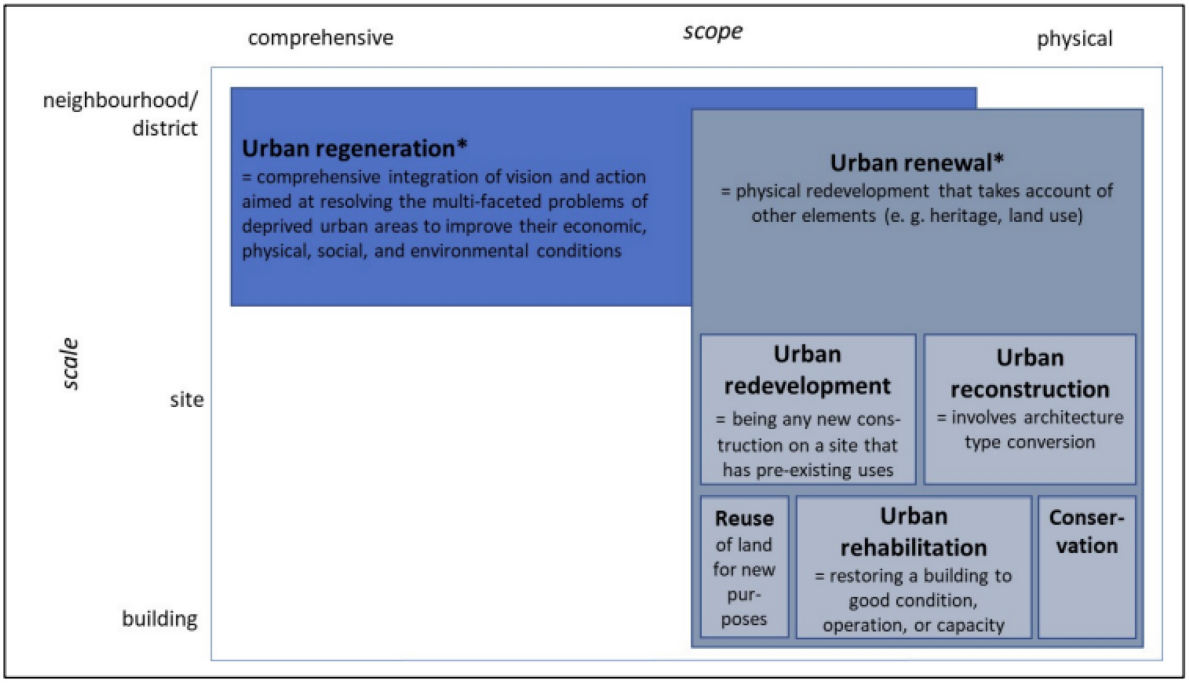


Figure 4: Terms and definitions (own compilation after: Zheng et al., 2014, Xue et al., 2015, Couch et al., 2011, Wu, 2011, Colantonio and Dixon, 2009, added by https://www.britannica.com/topic/urban-renewal). * Some authors/sources don't differentiate these two approaches

Source: Müller (2019)

A commonly used definition of urban regeneration is:

> Comprehensive and integrated vision and action which seeks to resolve urban problems and bring about a lasting improvement in the economic, physical, social and environmental condition of an area that has been subject to change or offers opportunities for improvement (Roberts, Sykes and Granger, 2017, p. 18).

The purpose of urban regeneration is not only physical improvements but also changes in vision and institutional change that allows social, economic, and environmental issues to be solved (Setiadi and Nalau, 2015b). Based on economic, social, and environmental analyses of urban areas, urban regeneration produces a variety of outputs in terms of strategies and actions. Robert *et al.* (2017) presents examples of urban regeneration outputs categorised into five aspects: (1) neighbourhood strategies (e.g. community action, inner area renewal, local social facilities, community-led planning, and local environmental schemes); (2) training and education (e.g. skills enhancement, community training, enhanced R&D, support for schools and school-based facilities); (3) physical improvement (e.g. city-centre improvement, estate action, housing improvement, enhanced urban design and quality, and heritage); (4) economic development (e.g. support for new and existing firms, improved infrastructure, innovation, economic

diversification); and (5) environmental action (e.g. waste management, energy efficiency, urban greening, company based action, and stimulating green growth).

Other important aspects of urban regeneration are related to its institutional and organisational features. The features of urban regeneration include an activity that involves the public, private, and voluntary sectors; an activity that might experience significant changes in its institutional structures; a means that requires collective effort and provides a foundation for the negotiation of suitable solutions; a means that develops institutional structures needed to support the preparation of plans; and a means of developing and maintaining a sustainable and resilient urban system (Pearson, Newton and Roberts, 2014; Roberts, Sykes and Granger, 2017).

2.3 BACKGROUND OF ENVIRONMENTAL/CLIMATE POLICY INTEGRATION AND MAINSTREAMING

Environmental policy integration, climate policy integration, and climate mainstreaming are policy approaches that pursue the implementation of environmental and climate policies in different domains of policy (Uittenbroek, 2014). Another stream of policy approaches—so-called dedicated approaches—develop stand-alone policies and programmes to implement environmental and climate policies (Uittenbroek, 2014; Runhaar *et al.*, 2018). Although there are still ongoing discussions as to which approach is more effective, many researchers point out the advantages of climate policy integration/mainstreaming e.g. increasing the effectiveness and efficiency of the climate regime (Kok and Coninck, 2007; Uittenbroek, 2014; Runhaar *et al.*, 2018). Recently, the integration approach has been suggested by the United Nations and the European Union; for example, the Sustainable Development Goals and the New Urban Agenda for the EU highlight the importance of integrated approaches in urban planning (Tosun and Leininger, 2017; Climate Adaptation Partnership in EU, 2018).

Environmental policy integration was already suggested internationally by the World Commission on Environment and Development in 'Our common future' (1987), which stated that:

> The integrated and interdependent nature of the new challenges and issues today contrasts sharply with the nature of the institutions that exist today. These institutions tend to be independent, fragmented, and working to relatively narrow mandates with closed decision processes. Those responsible for managing natural resources and protecting the environment are institutionally separated from those responsible for managing the economy. The real world of interlocked economic and ecological systems will not change; the policies and institutions must. (World Commission on Environment and Development, 1987, p. 257).

Environmental policy integration refers to the incorporation of environmental objectives/concerns in non-environmental policy sectors (Runhaar, Driessen and Uittenbroek,

2014; Persson and Runhaar, 2018). The concept of climate policy integration emerged in the last decade as a response to climate change issues and as a particular form of environmental policy integration (Adelle and Russel, 2013; Runhaar, Driessen and Uittenbroek, 2014). Mickwitz *et al*. (2009) defines climate policy integration as:

> The incorporation of the aims of climate change mitigation and adaptation into all stages of policy-making in other policy sectors (non-environmental as well as environmental); and complemented by an attempt to aggregate expected consequences for climate change mitigation and adaptation into an overall evaluation of policy, and a commitment to minimise contradictions between climate policies and other policies (Mickwitz *et al*., 2009, p. 19).

Some researchers use climate policy integration and mainstreaming in different contexts—mainstreaming is frequently used for the aim of adaptation and climate policy integration is used for the aim of both mitigation and adaptation (Adelle and Russel, 2013; Klein *et al*., 2007; Yamin, 2005). However, many researchers view climate policy integration and environmental policy integration as homogeneous concepts in that they propose climate concerns are mainstreamed into existing policy sectors (Adelle and Russel, 2013; Runhaar *et al*., 2014; Uittenbroek, 2014). Mainstreaming is commonly used instead of integration, for example, the EU uses 'climate mainstreaming' for both mitigation and adaptation ('Climate mainstreaming', n.d.). In this chapter, these three terms—environmental policy integration, climate policy integration, and mainstreaming—are used interchangeably to broaden the range of literature to be reviewed on the concept of integration.

2.4 INTERNATIONAL TRENDS AND ACADEMIC DISCUSSIONS ON THE OPPORTUNITIES FOR CLIMATE POLICY INTEGRATION IN URBAN REGENERATION

There are policies that appear to integrate climate change measures at supra-national, national, regional, and local levels worldwide. This section discusses various policies, plans, and projects of urban regeneration that integrate climate measures in different countries and cities in the world. Investigation of good practices in terms of a high level of integration of climate measures with urban regeneration, urban renewal, and urban redevelopment helps to understand not only the international trend but also the status of the case of Seoul through comparison. The scope of the investigation is not limited to urban regeneration but also includes urban renewal and urban redevelopment (See Section 2.2 for the definition of 'urban regeneration' and related terms). Good practices for the integration of climate measures with urban regeneration, urban renewal, and urban redevelopment are discussed in this section. There are many ways to carry out climate policy integration in various sectors. Section 2.4 primarily introduces good practices of urban regeneration, urban renewal, or urban development that integrate climate measures.

In much of Europe, there has been a significant effort to integrate climate measures with development. The Leipzig Charter on Sustainable European Cities of 2007 played a significant role in promoting integrated urban policy. Through this charter, European ministers responsible for urban development shared a vision for European cities and laid the foundations for integrated urban policy (URBACT II Capitalisation, 2015).

The Leipzig Charter has two key messages:

1. We need to strengthen integrated urban development policy all over Europe.

2. Disadvantaged urban districts do fulfil important functions within the overall urban context (German Federal Ministry of Transport, Building and Urban Development, 2012, p. 6).

Since the Leipzig Charter, a variety of policies, strategies, and actions have developed in Europe in this direction (URBACT II Capitalisation, 2015). The New Leipzig Charter, which was released in 2020, sustains the core message of the Leipzig Charter of 2007 to promote integrated and sustainable urban development, highlighting the integrated approach as one of the key principles of good urban governance ('New Leipzig Charter—The transformative power of cities for the common good', 2020). According to the New Leipzig Charter, the European cities aim to achieve urban transformation by integrating social, ecological, and economic dimensions, and these objectives are framed with names of the just city, the green city, and the productive city. Its implementing document, 'Implementing the New Leipzig Charter through Multi-level Governance—Next Steps for the Urban Agenda for the EU', emphasises the significance of three key pillars, 'better regulation, better funding, and better knowledge', to implement the New Leipzig Charter by providing programmes and documentation to support these pillars ('Implementing the New Leipzig Charter through Multi-level Governance', 2020). The European Union has highlighted the need for the integration of climate measures in urban regeneration by conducting research and programmes. One of its efforts is presented in a publication of the URBACT[7] II programme, 'Sustainable regeneration in urban areas' from 2015. As part of the URBACT II programme, experts, policymakers, and practitioners participated in research on the development of strategies for European cities 'to integrate the goals of more sustainable resource use, reduced carbon emissions and more equitable social development'. The publication introduces articles, case studies, and interviews that present these strategies. While shedding light on sustainable urban regeneration, the publication specifically introduces good practices of urban regeneration that incorporated climate measures found in 'Case study: cities tackling climate

[7] A European cooperation programme promoting sustainable urban development.

change: the case of the International Building Exhibition (IBA) Hamburg' and 'Interview: energy-efficient housing renovation and sustainable urban regeneration: looking for synergies'.

In 2018, 'the Action Plan of the Climate Adaptation Partnership, the Urban Agenda for the EU' proposed linking climate change measures and urban regeneration so that European municipalities could better deal with the complexity of urban challenges (Climate Adaptation Partnership in EU, 2018). This action plan intends to provide proposals for the revision of existing EU legislation, instruments, and initiatives concerning climate change adaptation in urban areas in the EU. It also determines important institutions and organisations and implementation systems for the proposed actions. The action plan not only insists on the significance of climate change adaptation but also its linkage with the cross-cutting issues. It specifically highlights urban regeneration, stating that:

> The implementation of adaptation measures and urban regeneration are synergistic processes that benefit significantly from a coordinated approach. Most of the processes that lead to the implementation of grey, green, and blue adaptation measures will also contribute to urban regeneration (Climate Adaptation Partnership in EU, 2018, p. 52).

At national levels, Germany presents an advanced effort to integrate climate measures into urban regeneration policy. Following the 1971 Urban Planning Funding Act and the strategy of integrated urban policy from the Leipzig Charter, Germany formulated the National Urban Development Policy in 2012—a cooperative initiative of the federal, state, and local governments (Federal Ministry of the Interior, Building and Community, 2020; *The Leipzig-Charter on Sustainable European Cities*, no date). In the line of this effort, a memorandum, titled 'Urban Energies—Urban Challenges', was formulated to specify the main tasks of sustainable urban development which are '(1) the cautious ecological renewal of buildings and neighbourhoods; (2) the technological regeneration of urban infrastructures; (3) developing a new mobility; and (4) social integration' (German Federal Ministry of Transport, Building and Urban Development, 2012).

The building code in Germany includes specific measures and requirements for urban redevelopment that take into account the concerns of climate protection and climate adaptation. To be specific, sections 136 and section 171a on urban redevelopment measures state the general regulations for urban redevelopment, including statements regarding climate protection and climate adaptation. The law (section 136) states that 'the energetic quality, the overall energy efficiency of the existing buildings and the supply facilities in the area, taking into account the general requirements for climate protection and climate adaptation' should be considered to

assess urban development (German Federal Ministry of Justice and Consumer Protection, no date). Furthermore, section 171a in the building code states that:

> Urban redevelopment measures are measures by means of which adaptations are made to create sustainable urban structures in areas affected by significant urban losses. Significant functional losses in urban development exist, in particular, if there is or is to be expected a permanent oversupply of structures for certain uses, namely for residential purposes, or if the general requirements for climate protection and climate adaptation are not met (German Federal Ministry of Justice and Consumer Protection, no date, section 171a).

Recent research performed by BBSR (Federal Institute for Building, Urban and Spatial Research in Germany) on the integration of climate measures with urban redevelopment is 'Climate protection and adaptation in urban redevelopment East and West' in 2016 (BBSR, 2016). This publication specifies challenges, fields of action, and starting points while highlighting climate protection and climate adaptation as primary tasks of urban redevelopment. It sheds light on the significance of climate protection and climate adaptation in urban redevelopment at state level and its implementation at municipal level.

Other countries, such as Spain and the United Kingdom, formulated laws/plans/strategies to consider integrating climate change measures in urban regeneration and planning. In Spain, the National Urban Refurbishment, Regeneration and Renovation Act of 2013 states that the government provides positive incentives to implement energy-efficient measures in urban regeneration (Molina *et al.*, 2015). Also, the United Kingdom's National Planning Framework of 2021 includes mitigation and adaptation measures (UK Ministry of Housing, Communities & Local Government, 2021).

Various cities have also begun efforts to integrate climate measures into urban regeneration policies. Frontrunners such as Hamburg in Germany and Melbourne in Australia particularly exemplify good practices for the integration of climate measures in urban regeneration/renewal/redevelopment.

International Building Exhibition (IBA) Hamburg in Germany is regarded as one of the good practices of sustainable urban regeneration (URBACT II Capitalisation, 2015). Germany has had eight IBA projects in various German cities. These projects have presented findings of innovative solutions for urban regeneration and communities since 1901 (URBACT II Capitalisation, 2015). IBA Hamburg aimed to transform the neighbourhood of Wilhelmsburg through innovative projects and governance approaches within seven years (2007-2013) with three main topics—'Cosmopolis', 'Metrozones', and 'Cities and Climate Change' (URBACT II Capitalisation, 2015). The vision of IBA Hamburg was to make the neighbourhood of Wilhelmsburg a climate-neutral district

through the following three approaches: (1) using renewable energy sources in and around the neighbourhood instead of fossil fuels; (2) setting high criteria of energy efficiency for existing and new buildings; and (3) inspiring residents to participate in the climate measures (URBACT II Capitalisation, 2015).

In this regard, a variety of projects from IBA were implemented. URBACT (2015) introduces detailed descriptions of these projects as stated in this paragraph. A former air-raid bunker was converted to an 'energy bunker'—a power plant that provides renewable energy from solar energy, biogas, waste heat, and wood chips. Additionally, a former toxic waste dump covered by grass called 'Georgswerder Energy Hill' also provides electricity via wind power and solar energy and offers a viewpoint area for the public. New and existing residential buildings were determined to have good energy efficiency as a result of the project. New buildings that were financially supported by the IBA were required to be built following the passive house standard and retrofitted houses that were financially supported by the IBA had to exceed the national energy standards. Furthermore, a campaign called 'Top Climate Plan' meant the houses were renovated in an energy-efficient way with effective strategies. The campaign allowed homeowners connected to the projects to gain insights from experts in energy-efficient renovation; for example, through the project, house owners and experts planned and issued energy passes and monitored the homes every three years to check if the renovations were still energy efficient. The overall results of this monitoring and the performance of energy-saving renovations, as well as an action plan, were publicised to the residents by newspaper.

IBA Hamburg exemplifies a successful strategy in governance with good multi-stakeholder partnerships between financial providers, the state and district administration, solar companies, and private homeowners (URBACT II Capitalisation, 2015). Additionally, the area of Wilhelmsburg in Hamburg worked to overcome the 'silo' approach between different departments by setting up an inter-institutional and inter-authority coordinating committee and steering group under the mayor; this group then served as mediators between stakeholders of urban regeneration.

Victorian Planning Authority published 'the Arden Vision'—an urban renewal plan for Arden in Melbourne, Australia in 2018. The plan aimed to become the standard for urban renewal (Victorian Planning Authority, 2018). The plan includes eight key directions for urban renewal and two of them are related to climate change: 'embedding sustainable change' which highlights climate change adaptation, healthy ecosystems, and sustainable building design, and 'celebrating water' which focuses on integrated water management in order to be resilient to climate change and climate change adaptation, innovative design for management and conservation of water, and

blue-green infrastructure to provide open space but also to reduce flooding risks. The main climate measures of 'embedding sustainable change' include: '(1) low-energy, low carbon buildings and infrastructure; (2) an urban structure that supports active transport; (3) integrated water and flood management; (4) high-quality open spaces and green links for people and biodiversity; (5) precinct-wide shared energy, water, and waste management systems; (6) best practice waste minimisation and conversion of waste to energy; and (7) environmentally responsive urban design'. The main climate measures of 'celebrating water' are (1) rain gardens, green roofs, water tanks, and permeable surfaces for buildings; (2) sewer mining, greywater and stormwater re-use, and third-pipe systems for precincts; and (3) tree pits, water interaction, swales and retarding basins, and creekside paths for open spaces (Victorian Planning Authority, 2018).

The City of Melbourne set out to achieve climate mainstreaming not only by integrating climate measures in its urban renewal plan but also by targeting urban renewal areas in its Climate Change Adaptation Strategy. In 2017, the City of Melbourne published 'Climate Change Adaptation Strategy Research' which includes five goals for the new vision of climate change adaptation of the city; one of these goals was to 'shape our built form and urban renewal areas to withstand future climate change impacts' (City of Melbourne, 2017).

Other cities also initiate policies, programmes, strategies, and projects regarding urban regeneration/renewal/redevelopment that integrate climate measures. Vauban, Freiburg in Germany, Malmö in Sweden, Portsmouth in England, Copenhagen in Denmark, Hong Kong, and Rotterdam in the Netherlands present advanced climate mainstreaming efforts in their urban regeneration planning/projects (Ramos, 2010; Portsmouth City Council, 2012; The City of Rotterdam in the Netherlands, 2016; City of Melbourne, 2017; Environment Bureau of Hong Kong, 2017; ROCKWOOL Group, 2018; Victorian Planning Authority, 2018; *Ekostaden Augustenborg*, no date; *Guidelines on Environmental Provisions*, no date).

Although integration of climate change measures/objectives in urban regeneration is still new in academic discussion (Balaban and Puppim de Oliveira, 2014), some research sheds light on the opportunities of integration of climate measures in urban regeneration with empirical case study approaches. Topics related to the integration of climate measures into urban regeneration include the development of indicators to assess urban regeneration performance for climate-friendly urban development and the investigation of the benefits of urban regeneration to improve health resilience in a changing climate. Balaban (2013) argues that urban regeneration projects can successfully contribute to climate change mitigation and adaptation goals (Balaban, 2013). His study assesses the performance of urban regeneration projects in Japan and develops a new

indicator framework that comprises multiple components including economy and work, buildings and land use structure, transportation and mobility, infrastructure and resource efficiency, energy consumption and efficiency, and community-based issues (Balaban, 2013). Exploring Indonesia as a case study, Setiadi and Nalau (2015) note that urban regeneration can play an important role in increasing health resilience, such as through improved housing and sanitation against climate change. They assess national policies and highlight the significance of urban regeneration in terms of increasing climate change health resilience (Setiadi and Nalau, 2015a).

Other studies examine links between urban regeneration and climate change. Balaban and Puppim de Oliveira (2014) highlight that existing built environments of urban areas play a crucial role in tackling climate change through mitigation and adaptation actions (Balaban and Puppim de Oliveira, 2014). This is a result of the fact that they contribute much to climate change, with a significant proportion of greenhouse gas emitted by existing urban areas. Existing built environments could increase the vulnerability of people concerning extreme climate events due to a high proportion of the population residing in informal settlements and slums—areas that are highly vulnerable to climate-related hazards. Balaban and Puppim de Oliveira (2014) argue that upgrading these existing built environments could help cities mitigate and adapt to climate change (Balaban and Puppim de Oliveira, 2014). Table 2-6 shows indicators for climate-friendly urban regeneration projects.

Table 2-6 The climate-friendly urban regeneration framework

Category	Indicator	
Economy and work	• Economic activity	• Employment for locals
Buildings and land use	• Brownfields utilisation • Reuse and conservation • Mixed-use development • Housing concerns	• Green space provision • Blue infrastructure provision • Building greening • Climate-friendly buildings
Transportation and mobility	• Public transport network • Public transport ridership	• Walking & cycling network
Infrastructure for resource efficiency	• Infrastructure renewal • Risk reduction • Waste recycling	• Waste generation • Water recovery
Energy consumption and efficiency	• Energy efficiency	• Renewable energy
Community-based issues	• Social inclusion	• Community participation

Source: own compilation based on Balaban and Puppim de Oliveira (2014)

There has been growing attention to the integration of climate change adaptation with urban renewal, regeneration, and development (Zevenbergen *et al.*, 2008a; van de Ven *et al.*, 2011; Gersonius, 2012; Veerbeek *et al.*, 2012; van Veelen, 2017). These studies highlight how the moments of change when urban renewal, regeneration, and development take place provide important 'windows of opportunity' to incorporate adaptation measures at low costs.

In climate change studies, the process of making adaptations part of 'the routine' in other policies, strategies and decision-making processes is known as mainstreaming (van Veelen, 2017). The concept of mainstreaming stems from development planning (Huq *et al.*, 2004; van Veelen, 2017) and has increasingly been used in the fields of resource management, community development, planning, and risk management (Smit and Wandel, 2006). Mainstreaming involves the integration of policies and measures to address climate change into existing sectoral urban development planning and decision-making (Klein, Nicholls and Thomalla, 2003). Scholars and practitioners from development and disaster risk reduction fields have continued to criticise 'stand-alone' approaches to adaptation that target only specific climate risks, as they do not appear to be effective (Adger and Kelly, 1999; Ayers *et al.*, 2014).

Although the importance of climate adaptation mainstreaming has been discussed in both academic and practice fields, climate change adaptation appears to have barriers to implementation due to institutional barriers in practice (van Veelen, 2017). Research rarely focuses on the implementation processes for adaptation (Smit and Wandel, 2006; Persson and Runhaar, 2018). It is criticised that mainstreaming is likely to remain at a strategic level and ignores the operational level of urban development (van Veelen, 2017).

Opportunities for incorporating adaptation measures in urban renewal, regeneration, and development have been investigated by academic discussion. Van Veelen (2017) argues that the time of urban change, renewal, and transition may be the most significant determinants of the success of climate adaptation mainstreaming and offer opportunities that create new ways for adaptation that are not yet identified (van Veelen, 2017). He further argues that urban change may be the main driver in adapting urban environments.

The end of the lifecycle and renewal cycle of building stock is the significant time to link adaptation in existing urban development processes (van de Ven *et al.*, 2011). In particular, renovation of buildings and neighbourhoods could offer opportunities to decrease their vulnerability by retrofitting adaptation measures for flood and heat (e.g. water retention on green roofs, heat isolation, and ventilation) (van de Ven *et al.*, 2011). Mainstreaming increases the opportunities to improve innovativeness, effectiveness, and efficiency of policymaking (Uittenbroek, Janssen-Jansen and Runhaar, 2013) and speeds up the process of adaptation (Mees and Driessen, 2011).

The absence of adaptation opportunities means that retrofitting adaptation measures usually becomes more expensive and time-consuming (van de Ven *et al.*, 2011). Therefore, integrating pro-active retrofit measures into urban regeneration projects appears to be a sound and effective strategy to implement effective climate change measures (Zevenbergen *et al.*, 2008a).

Raymond *et al*. (2017) suggests national-based solutions (NBS) impact assessment framework for different sectors. Urban regeneration, as one of these sectors, is regarded as an activity that can have positive impacts on the environment through NBS. Potential urban regeneration actions related to NBS and expected impacts are presented in Table 2-7, and examples of urban regeneration indicators and their applicability at different geographic scales are presented in Table 2-8 (Raymond *et al.*, 2017). Although NBS is not exactly a measure to respond to climate change, this and the other suggested urban regeneration actions below play significant roles in generating positive impacts on mitigation and adaptation. Thus, these actions can be adapted to urban regeneration actions that aim to integrate climate measures.

Table 2-7 Potential urban regeneration actions and expected impacts

Potential actions	Expected impacts
• Enforce micro-scale and cross-scale interactions, consider urban hinterland, and 'distant landscapes' (Andersson *et al.*, 2014) • Increase ecological connectivity across NBS sites • Enhance biodiversity and community engagement (e.g. creating community gardens or pocket parks) • Design rain gardens or greening systems	• Greater ecological connectivity across urban regeneration sites and across scales. • Increased extent of greenery on urban facades
• Support energy efficiency in building design and layout, building form, infiltrating and ventilation, insulation, heating, and lighting (Hemphill, Berry and McGreal, 2004) • Encourage re-use of building materials in new construction and promote efficient use of resources, materials, and construction techniques that maximise the effective life-cycle of the building (Hemphill, Berry and McGreal, 2004)	• More energy-efficient building designs and long-term use • Reduction in the amount of building material going to land-fill • Reduced use of energy in the production of building materials and the construction of new buildings

• Convert brownfield to green areas in urban regeneration projects (Mathey *et al.*, 2015) • Design for: · Richness in urban environments, such as the promotion of street life, natural surveillance, visual richness, pubic art, and street furniture (Biddulph, 2011); · Diversity in use, such as a mix of people, a mix of uses, appropriate densities and visual diversity (Biddulph, 2011); · Ease of movement, including through movement, priority given to public transport, priority given to innovative parking, and meeting needs of people with sensory impairments (Biddulph, 2011)	• Local citizens have a say in the design and management of homes and office buildings, contributing to social justice outcomes • Increased amount of green open space for residents • Increased cultural richness and diversity in urban areas, as well as improved ease of movement
• Provide the urban brand with a narrative and a value aimed at changing the perception of potential users or visitors, whether they are citizens, international tourists, or investors	• Changing images of the urban environment, attracting new residents, visitors, tourists and investors

Source: own compilation based on Raymond *et al*. (2017)

Table 2-8 Examples of urban regeneration indicators and their applicability at different geographic scales

Indicators	**Measurement scale**				
	mesoscale			**microscale**	
	Regional	**Metropolitan**	**Urban**	**Street**	**Building**
Urban green indicators					
• Urban green: Index of biodiversity, provision and demand of ecosystem services.	•	•	•	•	•
• Ecological connectivity (Pino and Marull, 2012).	•	•	•		
• Accessibility (Schipperijn *et al*., 2010): distribution, configuration, and diversity of green space and land-use changes (multi-scale; Goddard *et al*., 2010)	•	•	•		
• Ratio of open spaces to built-form.				•	•
• Reclamation of contaminated land: percentage of contaminated area reclaimed.			•	•	•

Building efficiency and environmental design indicators					
• Reclamation of building materials: percentage reclaimed from existing buildings.					•
• Energy efficiency: building materials/construction methods based on points awarded according to energy efficiency checklist.					•
• Incorporation of environmental design: percentage of total building stock.					•
• Land devoted to roads: percentage of site area occupied by roads.	•	•	•	•	
Socio-cultural indicators					
• Conservation of built heritage resources: percentage of built form retained for culture.					•
• Land dedicated to pedestrians: percentage of road network.	•	•	•	•	
• Public transport links: walking distance to nearest facilities.			•	•	
• Access to open space: average journey time for residents/employees by foot or average distance to sports centre, recreation area, or green space.		•	•	•	
• Access to cultural facilities: average journey time for residents on foot or average distance to cultural centre.		•	•	•	
• Access to housing: affordability and choice.	•	•	•		
• Level of devices contributing to the safety of users in the neighbourhood: lighting of common areas, access control, presence of technical, or specialised staff, etc.					•

Source: own compilation based on Raymond *et al*. (2017)

Considering the integration of climate change issues into urban regeneration in Korea, Wang (2013) highlights the absence of institutional foundations to incorporate climate change measures in urban regeneration. Wang (2013) provides suggestions for the government to establish institutional systems to integrate spatial planning, urban regeneration, and environmental

planning. Han *et al*. (2018) suggests methods to increase the hazard-prevention functions through urban regeneration projects. The researchers identified institutional foundations as necessary for integrating natural hazard response measures and urban regeneration policies (Han, Park and Jung, 2018). Although both studies highlight the necessity of incorporating climate change measures in urban regeneration projects and provide suggestions for revision of institutions, they do not identify detailed factors and causes that affect institutional impediments and external factors integrating climate measures in urban regeneration policy and plan. Recent research that investigates causes inhibiting integrative urban regeneration is 'Urban Regeneration Policy of Packaged Style for Urban and Regional Resilience', published by the Korea Research Institute for Human Settlements in 2017. The research identifies three aspects that resulted in the lack of promotion of integrative urban regeneration: (1) a limited supportive regulatory framework that supports the integration, such as the provision of a negotiation process and incentives for integration; (2) lack of cooperation between departments due to a lack of motivation and information sharing; and (3) organisational impediments—an absence of a staff evaluation system for the cooperative projects; a low level of power of the urban regeneration department in city and community governments for the cooperative projects; a lack of function of an administrative council for cooperation between departments; a low level of power of an urban regeneration on-site support centre, resulting in a lack of motivation and lack of an incentive to integrate other projects in urban regeneration projects (Lee *et al.*, 2017).

2.5 FACTORS FOR THE CLIMATE POLICY INTEGRATION IN URBAN REGENERATION IN THE POLICY CYCLE

This section consists of three sub-sections that help to develop a conceptual framework for this dissertation. Section 2.5.1 introduces a framework of factors affecting climate policy integration along the policy cycle developed by Persson and Runhaar (2018). This framework is a basis for the structure of the conceptual framework of this dissertation. As the study of Persson and Runhaar (2018) provides a limited number of factors as examples and a simplified policy cycle (policy development and policy implementation), the next sub-sections investigate factors in detail that affect climate policy integration (Section 2.5.2), detailed policy cycle and definition of the level of integration (section 2.5.3).

2.5.1 Structure of the climate policy integration

Persson and Runhaar (2018) analysed nine papers related to environmental/climate policy integration in various geographical settings and policy sectors. They provide a framework that could help to develop the theory of environmental policy integration by organising factors according to the policy cycle. The structure of this framework is adopted by the dissertation because it provides a good opportunity to identify detailed drivers and barriers that affect the

integration in different policy stages. The purpose of their study is to comprehend the performance of efforts to promote environmental policy integration and to identify important factors that affect the performance in each policy cycle, policy development, and policy implementation. The nine papers they reviewed include both climate policy integration and environmental policy integration. Persson and Runhaar (2018) acknowledges that the factors they identified do not represent environmental policy integration practices worldwide and that they are not an inventory of factors that affect environmental policy integration.

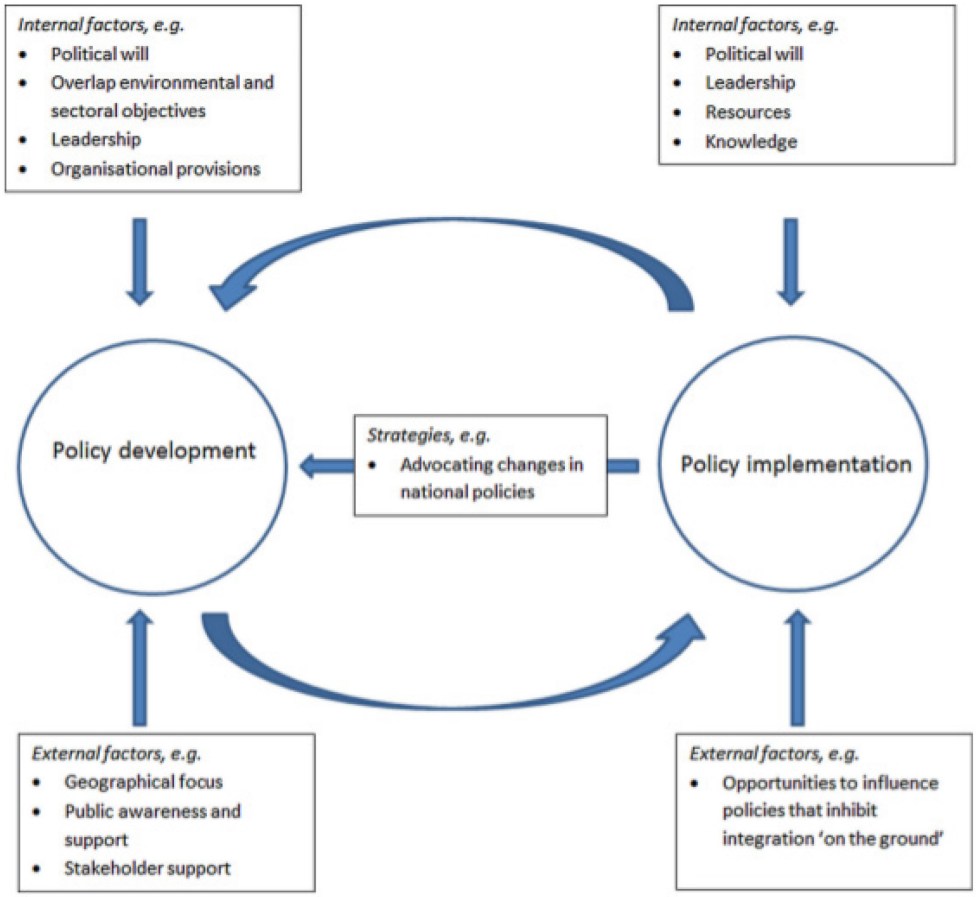
The process of environmental policy integration in the framework of Persson and Runhaar (2018) is divided into two cycles: policy development and policy implementation. This may appear to be rather simple when compared to the complexity and diversity of policy cycles defined more specifically in other studies (e.g. different phases of the policy cycles in climate change adaptation mainstreaming may include agenda-setting, policy process, policy output, and policy implementation (Roeck, Orbie and Delputte, 2018). However, this simpler framework enables more focus on the components of factors and gaps between policy development and policy implementation. In Persson and Runhaar (2018), the policy development stage is the process of 'making the initial case for the need for environmental policy integration during agenda-setting, problem framing, policy preparation and ultimately decision-making in sectoral policy sectors'; policy implementation is the stage 'how policies, and their integrated environmental objectives, are implemented in 'downstream' planning and project design on the ground.' An additional component of the policy cycle in the framework is 'strategy', defined as 'proactive approaches developed at the implementation stage to influence policy development'.

The performances of environmental policy integration practices are affected by internal and external factors. Persson and Runhaar (2018) extract the most relevant factors from their peer-reviewed literature review as examples of each policy cycle. Internal factors are defined as 'those that can be actively addressed and changed by the agents responsible for integration, such as a government'. External factors are defined as 'those that are beyond the direct control of the policy integration process' (Persson and Runhaar, 2018). The researchers determined that most of the papers they selected mainly focus on the policy development stage and there is a lack of study focusing on external factors that affect the policy implementation stage.

The internal factors affecting policy development are political will, overlap environmental and sectoral objectives, leadership, and organisational provisions. The internal factors affecting the policy implementation include political will, leadership, resources, and knowledge (Persson and Runhaar, 2018).

The external factors affecting policy development include geographical focus, public awareness and support, and stakeholder support. The only external factor affecting policy implementation is stated to be 'opportunities for creatively dealing with or even influencing external policies so as to achieve policy integration' (Persson and Runhaar, 2018) (see Figure 2-2).

Figure 2-2 Framework of factors affecting environmental policy integration along the policy cycle



Source: Persson and Runhaar (2018)

Since the framework developed by Persson and Runhaar (2018) includes only a few internal and external factors as examples, this dissertation also adopts another framework from Runhaar *et al*. (2018) that presents the most frequently reported drivers and barriers from peer-reviewed empirical analyses of climate adaptation mainstreaming (Section 2.5.2). Furthermore, the policy cycle that consists of only policy development and policy implementation can be further specified with a detailed policy cycle, which will be discussed in Section 2.5.3.

2.5.2 Detailed factors of the climate policy integration

There is a growing number of discussions about the significance of climate policy integration; climate policy integration into existing policies is widely advocated for public action. However, there is no clear agreement on what makes the integrative/mainstreaming approach effective,

when it is effective, and how this could be measured (Runhaar *et al.*, 2018). Researchers aim to assess and identify the critical factors for effective climate policy integration. The section introduces a variety of critical factors that affect climate policy integration/mainstreaming that will be reflected in the conceptual framework developed by this dissertation. Investigation of these factors is helpful in understanding relevant factors in the current academic discussion; this will allow comparison of the factors that are found in the empirical case from this dissertation and facilitate a contribution to the discussion of relevant factors and research gaps regarding the factors.

Runhaar *et al*. (2018) discusses the critical factors for effective climate change adaptation mainstreaming, found through review of peer-reviewed empirical studies both on climate change policy and climate adaptation mainstreaming practices. It reviewed 87 papers and identified 140 cases—71 within Europe and 69 outside Europe (18 developed and 51 developing countries) (Runhaar *et al.*, 2018). Based on qualitative coding and descriptive statistics, the study unveils drivers and barriers to climate adaptation mainstreaming and climate policy integration in different contexts. Drivers are factors that can promote mainstreaming and barriers are factors that inhibit mainstreaming. The drivers and barriers to mainstreaming are categorised by political factors, organisational factors, cognitive factors, resources, characteristics of the adaptation problem at issue, and timing. Table 2-9 presents the frequency of reports that highlight drivers (enabling factors) and barriers (inhibiting factors) for climate policy integration and mainstreaming.

Table 2-9 Frequency of reports that highlight drivers and barriers to climate policy integration and mainstreaming

Category	**Factors**	**No. of reports as enabling factor**	**No. of reports as inhibiting factor**
Political factors	• Political (in)stability, political patronage, or short-termism	2	1
	• (In)flexible legislative or policy contexts	0	2
	• Policy (in)consistency across levels	2	3
	• Public awareness or support	6	2
	• Political commitment	31	12
	• Conflicting interests	0	16
Organisational factors	• Leadership/policy entrepreneurs	23	1
	• Organisational structures, routines, and practices	3	14
	• Institutional fragmentation	1	8

	• Clarity about responsibilities for adaptation • Cooperation with private actors • Coordination among policy levels • Coordination/cooperation between departments • Expanded mandates or statutes • Supportive regulative framework • Formal requirements to develop adaptation plans	4 25 3 17 5 8 15	12 11 12 18 11 8 6
Cognitive factors	• Learning • Sense of urgency • Uncertainty • Awareness	19 6 1 15	6 7 12 8
Characteristics of adaptation problem at issue	• Narrowly defined adaptation objectives • Timescales (conflicting or compatible) • Framing and linking to sectoral objectives	0 1 21	1 4 5
Resources	• Information or guidance • Availability of and access to knowledge and expertise • Subsidies from higher levels of government • Financial resources • Staff	14 11 21 5 4	18 16 12 27 16
Timing	• Windows of opportunity • Focussing events • Waiting and sustaining momentum for adaptation	7 22 4	0 1 0

Source: own compilation based on Runhaar *et al*. (2018)

In the conclusion of Runhaar *et al*. (2018), it argues that mainstreaming implementation gaps are likely to arise in developing countries, although the effectiveness of policy outcomes is not different among countries (Runhaar *et al.*, 2018). The most frequently cited drivers are political commitment; cooperation with private actors; the presence of policy entrepreneurs; focusing events; and lastly, subsidies from higher levels of government. Cooperation with private actors and focusing events are also frequently mentioned in environmental policy integration studies in the context of climate adaptation mainstreaming (Runhaar *et al.*, 2018). The focusing events that were analysed resulted from urgency and enhanced public and stakeholder support for adaptation action after climate events.

GIZ (Deutsche Gesellschaft für Internationale Zusammenarbeit[8]) (2013) highlights successful factors that work to overcome several challenges related to mainstreaming adaptation. First, it

[8] German Corporation for International Cooperation.

points out that designing a comprehensive mainstreaming process requires an exact analysis of the point where changes take place and the institutions/organisations that drive the mainstreaming process. Second, the report highlights the substantial climate change information and a mix of adaptation methods/tools. Third, it proposes the design of a proper institutional setup that supports the mainstreaming objective. Fourth, a clear commitment to the need for mainstreaming, as well as financial and human resources can be crucial. Fifth, since mainstreaming incurs additional expenses and may necessitate trade-offs with other goals, it is important to deal with such resistance successfully. Ways of doing so include creating the minimum amount of additional process/structure and/or creating funds for additional costs for adaptation. Sixth, generating evidence that showcases the advantages of mainstreaming to the target group of the mainstreaming process can be beneficial. Last, adaptation mainstreaming can be implemented successfully by building capacity and creating awareness campaigns (GIZ, 2013).

Successful climate adaptation mainstreaming can be realised with several different strategies. Wamsler and Pauleit (2016) provide mainstreaming strategies at different levels: add-on mainstreaming, programmatic mainstreaming, managerial mainstreaming, intra- and inter-organisational mainstreaming, regulatory mainstreaming, and directed mainstreaming (Wamsler and Pauleit, 2016) (Table 2-10).

Table 2-10 Mainstreaming framework: overview of mainstreaming strategies

Strategies of mainstreaming[9]	
(1) Add-on mainstreaming	The establishment of specific on-the-ground projects or programmes that are not an integral part of the implementing body's sector work but directly target adaptation* or related aspects
(2) Programmatic mainstreaming	The modification of the implementing body's sector work by integrating aspects related to adaptation* into on-the-ground operations, projects, or programmes

[9] * The mainstreaming framework can be applied to overall adaptation, or specific aspects of it (e.g. ecosystem based approaches), as well as to other cross-cutting topics such as climate change mitigation. If applied to adaptation, all strategies require a comprehensive approach for climatic risk reduction (including measures of hazard reduction and avoidance, vulnerability reduction, preparedness for response, and preparedness for recovery [Wamsler and Brink 2014]). Further, note that the framework can be applied to single municipal departments or other implementing bodies at all levels. Their collaboration and networking with other stakeholders is crucial since governance and problem scales are often mismatched. Finally, internal mainstreaming was not explicitly included in this study. It can be seen as an integral component of managerial mainstreaming aimed at addressing the implementing body's own challenges, e.g. risks to premises and assets, to ensure that adaptation work can continue even during adverse events. **The combination of strategies three, five, and six can also be denoted as organisational mainstreaming. ***Directed mainstreaming can be seen as an integral component of all of the other strategies as it concerns how related changes come about (e.g. top-down versus bottom-up) (Wamsler and Pauleit, 2016).

(3) Managerial mainstreaming	The modification of managerial and working structures, including internal formal and informal norms and job descriptions, the configuration of sections or departments, as well as personnel and financial assets, to better address and institutionalise aspects related to adaptation*
(4, 6) Intra- and inter-organisational mainstreaming	The promotion of collaboration and networking with other departments, individual sections or stakeholders (i.e. other governmental and non-governmental organisations, educational and research bodies, and the general public) to generate shared understandings and knowledge, develop competence and steer collective issues of adaptation*
(5) Regulatory mainstreaming**	The modification of formal and informal planning procedures, including planning strategies and frameworks, regulations, policies and legislation, and related instruments that lead to the integration of adaptation*
(7) Directed mainstreaming***	Higher-level support to redirect the focus to aspects related to mainstreaming adaptation* e.g. by providing topic-specific funding, promoting new projects, supporting staff education, or directing responsibilities

Srouce: own compilation based on Wamsler and Pauleit (2016)

These strategies suggested by Wamsler and Pauleit (2016) have been analysed by Runhaar *et al*. (2018) with peer-reviewed empirical studies (Runhaar *et al.*, 2018). Excluding the programmatic mainstreaming strategy, four strategies were analysed. In the analysis, the most frequently mentioned strategy is regulatory mainstreaming, including taking climate change adaptation as an objective in sectoral policy, and changing strategic planning and legislative tools. Runhaar *et al*. (2018) also found that managerial and intra-/inter-organisational mainstreaming strategies were less frequently reported and that more practical approaches are still lacking. The least reported strategy in the analysis was directed mainstreaming, including higher-level support to redirect focus to aspects related to mainstreaming adaptation. This implies that mainstreaming is likely to be pushed by local needs rather than higher-level authorities (Runhaar *et al.*, 2018).

The barriers to effective mainstreaming have been investigated by several studies. The most often mentioned barriers in the peer-reviewed empirical analyses in Runhaar *et al*. (2018) are lack of financial resources, information, guidance, coordination and cooperation between departments, staff resources and access to adaptation knowledge and expertise, and conflicting interests (Runhaar *et al.*, 2018).

Some researchers investigate barriers that affect climate policy integration in urban and spatial planning at local levels. Based on their literature review, Cuevas *et al*. (2016) categorise barriers by institutional challenges, information challenges, and resource challenges (Cuevas *et al.*, 2016). They found that the institutional challenge was the primary barrier to mainstreaming, followed

by the availability of—and access to—information as second-level barriers (Cuevas *et al.*, 2016) (see Table 2-11). Furthermore, Cuevas *et al*. (2015) highlights some factors that are regarded as opportunities for mainstreaming climate adaptation in land use plans at national, provincial, and city/municipal levels, such as credibility and reliability of information, local government prioritisation, institutional incentives, and stability of funds in the context of Albay in the Philippines (Cuevas *et al.*, 2015).

Table 2-11 Barriers to mainstreaming climate change adaptation into local land use planning

Category	Barriers
Institutional challenges	• Autonomy of local governments' leadership • Commitment to climate change adaptation • Community support • Organisational cohesion • Organisational cooperation & collaboration arrangements • Local government prioritisation • Institutional issues • Institutional incentive
Information challenges	• Availability of information • Access to information • Credibility & reliability of information • Communication of information • Translation of information • Knowledge & awareness
Resource challenges	• Availability of funds • Access to funds • Stability of funds • Availability of experts • Availability of human resources

Source: own compilation from Cuevas *et al*. (2015)

Schmidt (2019) also investigates relevant barriers to climate policy integration in urban areas to highlight spatial implications with empirical evidence from the metropolitan region of Rhein-Neckar in Germany. Schmidt (2019) argues that decision-makers at the local level gave higher precedence to issues of affordable housing or mobility than climate change issues, despite climate change generally being regarded as an important agenda—decision-makers would rather opt for measures that have co-benefits to climate objectives, such as greening measures or promoting local public transportation systems (Schmidt, 2019). The main barriers to the integration of climate objectives in local-level decision-making that Schmidt (2019) points out are fragmented cooperation; lack of clear authority, finance and guidance; no distinct preference for mitigation or

adaptation; competing land-use concerns; and long-term problem and election cycles. The study of Schmidt (2019) sheds light on the challenges of climate policy integration in spatial planning in that it provides more specified descriptions of challenges stated by the local decision-makers, such as lack of available space in growing urban areas and a presence of competing issues in land-use.

The 'Urban regeneration framework report' (published as part of the framework of FosterREG[10]) was published by the EU in 2015. The report introduces barriers, drivers, and tools/instruments to the integration of energy efficiency measures in urban regeneration plans in Europe and its countries, including Spain, the Netherlands, and Croatia. Although this framework report focuses only on energy efficiency issues in urban regeneration rather than climate measures in general, it still suggests relevant factors (policies legislation, management, financial, and sociological barriers, drivers and tools/instruments) that affect climate policy integration in urban regeneration in the EU and the three countries aforementioned (Molina *et al.*, 2015).

2.5.3 The level of climate policy integration in different stages of the policy cycle

The dissertation also adopts an analytical framework from Roeck, Orbie and Delputte (2018) that allows the level of climate change adaptation mainstreaming throughout different phases of the policy cycle to be indicated. While the framework of Persson and Runhaar (2018) has a simple policy cycle (policy development and policy implementation stages), this dissertation adopts a more detailed policy cycle by adopting the classification of Roeck, Orbie and Delputte (2018) to investigate relevant and detailed factors to the climate policy integration in each stage. Additionally, they categorise the level of mainstreaming into four levels in each policy cycle: no integration, coordination, harmonisation, and prioritisation. This dissertation adopts these descriptions (Table 2-12).

2.6 DEVELOPING AN ANALYTICAL CONCEPT

In the literature on climate policy integration, various factors that influence the integration of climate change policy with existing policy are mentioned. Some are mentioned frequently both as drivers and barriers, e.g. coordination/cooperation between government departments and information and guidance both as relevant drivers and barriers (Runhaar *et al.*, 2018). The dissertation develops an analytical framework of factors that affect the effective climate policy integration throughout the policy cycle of urban regeneration.

[10] FosterREG is a Horizon 2020 research project funded by the European Union. It aims to improve public capacity at the local, regional, national, and European levels to plan, finance, and manage integrated urban regeneration for sustainable energy uptake through capacity building, promotion, and articulation of effective multilevel coordination.

Table 2-12 The level of climate policy integration throughout different phases of the policy cycle

Level of integration		**No integration**	**Weak integration**		**Principled priority**
Policy cycle			**Coordination**	**Harmonisation**	**Prioritisation**
Policy development	Agenda-setting	• No mention of CCA (climate change adaptation) mainstreaming	• CCA mainstreaming framed in guiding policy documents as an add-on component in aid activities • Focus on promoting end-of-pipe measures	• CCA mainstreaming framed in guiding policy documents stands on equal terms with aid activities • Focus on finding win-win solutions between aid activities and CCA measures	• CCA mainstreaming framed in guiding policy documents as an absolute priority within aid activities • Focus on installing CCA as overriding objective for aid practitioners
	Policy process	• No specific procedures for CCA mainstreaming	• Mainstreaming tools intended and used for climate-proofing sectoral aid activities (e.g. EIAs)	• Mainstreaming tools intended and used for finding synergies between sectoral aid activities and CCA	• Mainstreaming tools intended and used for redesigning sectoral aid activities in order to prioritise CCA (e.g. environmental profiles)
	Policy output	• No CCA mainstreaming in sectoral policy priorities	• CCA mainstreaming in outlining of sectoral activities limited to incidental mentioning. Not interlinked with sectoral policy priorities	• Clear image of how CCA affects sectoral activities and/or how sectoral activities can improve climate resilience	• CCA as a central priority along which sectoral activities are structured
Policy implementation		• No CCA mainstreaming in project designs	• CCA mainstreaming in project design limited to incidental mentioning. Not interlinked with project design	• Clear image of how CCA affects the project design and/or how the project can improve climate resilience	• CCA as a central priority along which project design is structured

Source: own compilation based on Roeck, Orbie and Delputte (2018)

This dissertation mainly refers to the framework developed by Persson and Runhaar (2018), Runhaar *et al*. (2018), and Roeck, Orbie and Delputte (2018) as discussed in Section 2.5. Based on these frameworks, the dissertation developed a conceptual framework that aims to provide a structure for the analytical concept.

The conceptual framework consists of two parts: (1) a part that presents internal and external factors that affect the climate policy integration and (2) a part that specifies a detailed policy cycle of the climate policy integration in urban regeneration policy (Figure 2-3).

The dissertation adopts the structure of the framework of Persson and Runhaar (2018) and modifies affecting factors based on the study of Runhaar *et al*. (2018). In particular, the internal factors—'cooperation between government and departments' and 'information and guidance'—have been added to the policy development stage, and an internal factor—'cooperation with private sectors'—has been added to the policy implementation stage. This is done on the basis that these factors are most frequently referred to as drivers and barriers to climate adaptation mainstreaming in the policy cycle (Runhaar *et al.*, 2018). The selected internal and external factors are regarded as important factors for climate policy integration. The dissertation developed the conceptual framework that includes these factors to investigate whether they are also relevant factors for the climate policy integration in the field of urban regeneration policy in Seoul.

The conceptual framework demonstrates a detailed policy cycle based on the existing framework from Roeck, Orbie and Delputte (2018) and policy cycles of urban regeneration and climate change in Seoul. The framework from Roeck, Orbie and Delputte (2018) discusses four stages of the policy integration—agenda-setting, policy process, policy output, and policy implementation, which are more detailed classification than the policy cycle presented in the framework from Persson and Runhaar (2018). Although the conceptual framework has two broad policy cycles—policy development and policy implementation—detailed policy cycle is embedded in each broad policy cycle. To be specific, the policy development stage consists of national and city urban regeneration policy developments. The national-level and city-level policies are linked to three sub-cycles—agenda-setting, policy process, and policy output.

In Seoul's case, both national and city governments are involved in developing urban regeneration policies. The national government formulates the Special Act on Promotion of and Support for Urban Regeneration, Basic Policy for National Urban Regeneration, Guidelines for the Formulation of Strategic Plans for Urban Regeneration, and Guidelines for the Formulation of Urban Regeneration Revitalisation Plans. Complying with these national urban regeneration policies, the city government formulate the Strategic Plans for Urban Regeneration and Guidelines for the

Formulation of Urban Regeneration Revitalisation Plans. Thus, the national and city governments are in charge of the policy development stage.

After the policy development stage at national and city levels, there is the policy implementation stage at the community level. Community governments in Seoul are involved in policy implementation of the urban regeneration policies that were established by the national and city governments by formulating urban regeneration revitalisation plans. The conceptual framework presents the policy implementation stage with four sub policy processes—agenda setting, policy process, policy output, and policy implementation.

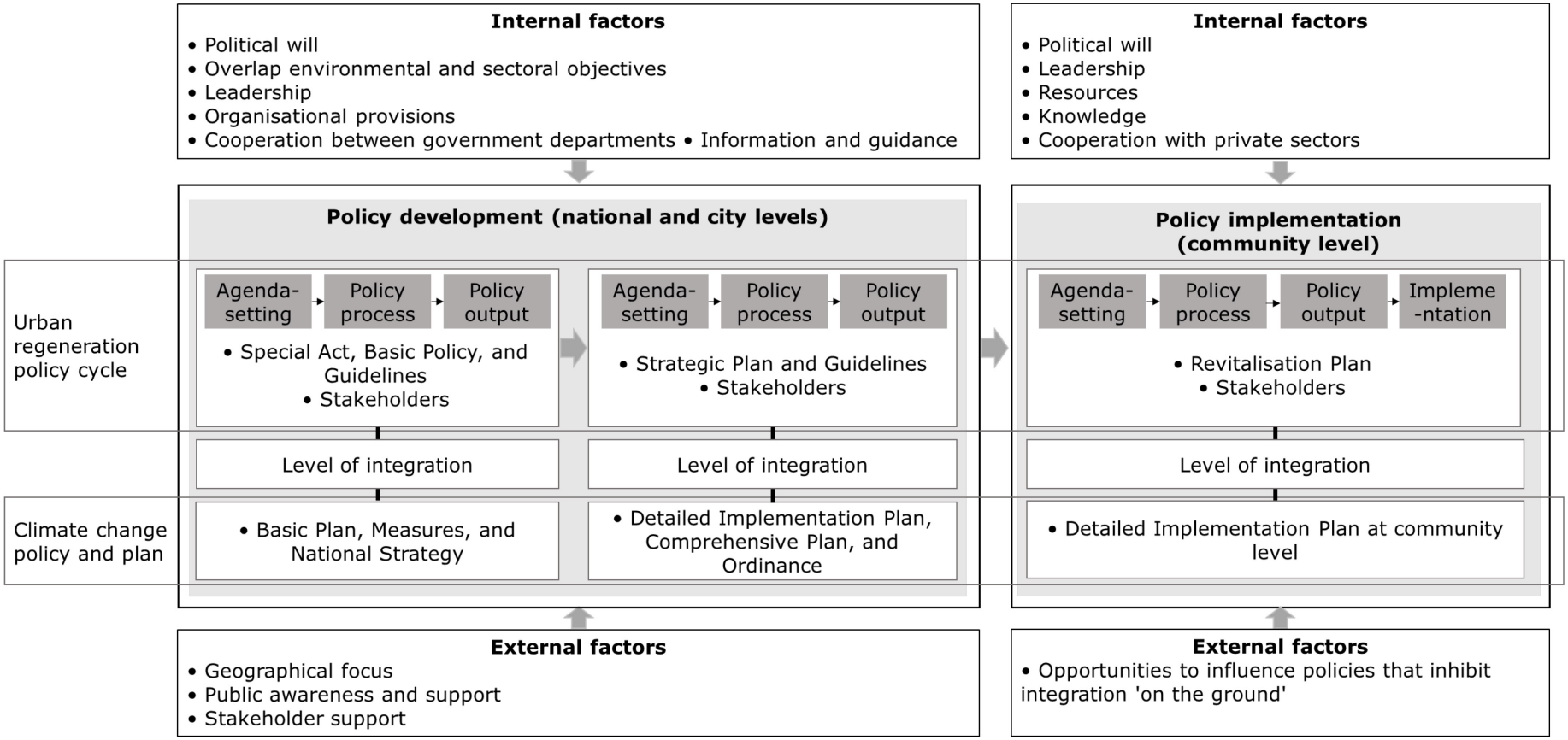
In this policy cycle of urban regeneration, different stakeholders in each level of government (e.g. policymakers, civil servants, researchers, experts, residents, and staff in urban regeneration support centres) are involved in the policy processes. The conceptual framework also presents stakeholders as parts of elements to investigate relevant factors for the climate policy integration in each policy stage.

The climate change sector is another policy sector that is presented in the conceptual framework and is developed by different levels of government—national, city, and community levels. The predominant national climate change policies include the Basic Plan for Coping with Climate Change, Measures for Adaptation to Climate Change, and the National Strategy for Low Carbon, Green Growth and Five-Year Plan for Green Growth. At city level, Seoul Metropolitan Government formulates the Detailed Implementation Plan for Measures for Adaptation to Climate Change, the Comprehensive Plan for Seoul Climate Change Response, and Seoul Metropolitan Government Ordinance on Response to Climate Change. Community governments formulate a Detailed Implementation Plan for Measures for Adaptation to Climate Change.

Based on the descriptions of the level of climate policy integration throughout different phases of the policy cycle by Roeck, Orbie and Delputte (2018), this dissertation aims to define the level of climate policy integration in the urban regeneration policy cycle in Seoul. Thus, the urban regeneration policies and plans at national, city, and community levels are linked to the applicable level of climate change policy and plans to define the level of integration between them (see Figure 2-3).

Based on the conceptual framework, the dissertation raises research questions and hypotheses about the components of internal and external factors affecting climate policy integration along the policy cycle of urban regeneration in Seoul, which will be discussed in Sections 2.7 and 2.8.

Figure 2-3 Conceptual framework



Source: own compilation based on Persson and Runhaar (2018); Runhaar *et al.* (2018); and Roeck, Orbie and Delputte (2018)

2.7 RESEARCH GAPS REGARDING FACTORS AFFECTING CLIMATE POLICY INTEGRATION ALONG THE POLICY CYCLE

The conceptual framework of the dissertation includes a limited number of factors that were highlighted in existing literature and a conceptualised process of urban regeneration and climate change policies. This section argues that there are research gaps regarding factors affecting climate policy integration along the policy cycle and implementation gaps between policy development and policy implementation regarding climate policy integration.

The literature on environmental policy integration and climate adaptation mainstreaming points out that there is a lack of empirical evidence of factors that affect implementation stages (Smit and Wandel, 2006). Particularly, Persson and Runhaar, (2018) highlight that there is a lack of research that investigates external factors affecting environmental policy integration and climate adaptation mainstreaming. They point out that there is only one explicit external factor affecting the policy implementation stage of mainstreaming among eight peer-reviewed empirical analyses. Runhaar *et al*. (2018) also indicate that climate adaptation mainstreaming has not led to policy outcomes in most cases they examined for the peer-reviewed empirical analyses. The study finds that climate adaptation mainstreaming is addressed more effectively in sectoral policy than project/activity level. This means that there are implementation gaps in translating the policy to the specific plan on the ground (Runhaar *et al.*, 2018). It is pointed out by some researchers that knowledge of what makes mainstreaming effective is scarce and fragmented (Runhaar *et al.*, 2018; Price, 2019), therefore, identification of relevant internal and external factors affecting the integration of climate change measures into existing urban regeneration at implementation stage is crucial.

Scholars and practitioners from the climate change field point out a lack of knowledge on effective climate policy integration (Rauken, Mydske and Winsvold, 2015; Roeck, Orbie and Delputte, 2018). Adopting climate measures into the process of urban regeneration planning appears to be an effective strategy for the implementation of climate policy integration, as urban regeneration also pursues integrative approaches in terms of sectors and governance (Zevenbergen *et al.*, 2008b; Gersonius, 2012; Veerbeek *et al.*, 2012). The idea is that actual moments of change in urban regeneration and development processes provide important 'windows of opportunity' for integrating climate measures at affordable costs (van Veelen, 2017). Although researchers consider the processes of urban development and change as important preconditions for a successful implementation of climate adaptation strategies, there is still a lack of study that focuses on the subject (Uittenbroek, Janssen-Jansen and Runhaar, 2013; van Veelen, 2017). To fill these research gaps, this dissertation develops research questions and hypotheses that will be discussed in the next section.

2.8 FORMULATING RESEARCH QUESTIONS

As previously discussed, it is important to identify factors that influence the integration of climate measures into the urban regeneration/development process. In this regard, the important factors discussed in existing studies are presented in the conceptual framework. However, research gaps exist concerning relevant internal and external factors affecting climate policy integration with empirical evidence. Based on the conceptual framework and research gaps discussed in the previous sections, this section sets out to formulate research questions and hypotheses. The research proposes one main research question and four sub-questions.

Although the conceptual framework provides internal and external factors affecting climate policy integration along the policy cycle of urban regeneration in Seoul, an important question of how internal and external factors affect climate policy integration in each urban regeneration policy process remains (main research question). It is assumed that different factors can be considered more important in the detailed policy process in which various stakeholders from inside and outside the government participate. To answer this question, detailed sub-questions should be answered.

First, an examination of the development and implementation process of urban regeneration policies is needed to identify whether there was a process to integrate climate measures and to identify important stakeholders who influenced the integration of each policy process. The dissertation pursues to answer the first sub-question: what is the existing urban regeneration process and how does it incorporate climate measures in Korea? This investigation helps to understand the policy process of urban regeneration and the level of integration of climate measures in urban regeneration. The majority of urban regeneration policy (e.g. Special Act on Promotion of and Support for Urban Regeneration, Basic Policy for National Urban Regeneration, Guidelines for the Formulation of Strategic Plans for Urban Regeneration, and Urban Regeneration Revitalisation Plan) rarely integrates climate measures because the national, city, and community governments lack institutional foundations to incorporate them in urban regeneration policies/plans (Wang, 2013; Han, Park and Jung, 2018). It is hypothesised that urban regeneration and climate change policies have different policy processes and stakeholders with divergent policy objectives—integrating climate measures into urban regeneration policies is challenging without a firm institutional foundation and main actors in the policy processes.

Second, after understanding the urban regeneration policy process, an in-depth investigation of relevant internal factors that have significant impacts on climate policy integration in each process is required. The dissertation raised the second sub-question: which are the relevant internal factors for integrating climate measures in urban regeneration policy and plan? Based on the theoretical and conceptual background, the following hypotheses are generated. As the majority of existing studies in the field of climate policy integration investigate, in the process of

policy development and implementation, it is hypothesised that internal factors for the policy development phase include political will, overlap environmental and regeneration objectives, leadership and organisational provisions, cooperation between government departments, and information and guidance (Persson and Runhaar, 2018; Runhaar *et al.*, 2018). Internal factors for policy implementation are political will, leadership, resources, knowledge, and cooperation with the private sector (Persson and Runhaar, 2018; Runhaar *et al.*, 2018). The research hypothesises that these factors affect the integration of climate measures into different policy fields. However, it still attempts to disclose whether these are relevant internal factors for the climate policy integration in urban regeneration policy and whether some internal factors are more relevant in a specific policy cycle.

Third, in addition to internal factors that directly affect climate policy integration, external factors can also have an important influence as suggested in the conceptual framework. Especially, it is assumed that there are relevant external factors for climate policy integration in urban regeneration policy because of the diversity of external stakeholders who are involved in the policy process of urban regeneration and a variety of policy processes to obtain opinions from different stakeholders. However, studies on external factors are insufficient in existing climate policy integration studies. Therefore, in each urban regeneration policy process, the dissertation sets out to identify important external factors for climate policy integration. The third sub-question is: which are the relevant external factors for integrating climate measures in urban regeneration policy and plan? As presented in the conceptual framework, it is hypothesised that external factors for the policy development phase include geographic focus, public awareness and support, and stakeholder support (Persson and Runhaar, 2018). An external factor for the policy implementation phase is opportunities to influence policies that inhibit integration 'on the ground' (Persson and Runhaar, 2018; Runhaar *et al.*, 2018). In addition to these discovered external factors, the dissertation hypothesises that support from different external stakeholders, such as residents and staff in urban regeneration organisations, serve as relevant external factors for the integration of climate measures in urban regeneration policy, especially in the policy implementation stage.

Fourth, among the internal and external factors for climate policy integration discovered in the process of developing and implementing urban regeneration policies, the research aims to examine the most relevant factors and implementation gaps between policy development and policy implementation. The fourth sub-question is: which are the most important factors and gaps regarding factors in the conceptual framework of policy development, and what are the implementation gaps of the integration of climate measures in urban regeneration projects? The dissertation hypothesizes that new relevant external factors will be found from the empirical case

of urban regeneration in Seoul—especially in the policy implementation stage—because urban regeneration pursues the involvement of a variety of stakeholders outside of governments. The spatial consideration and residents' needs from their communities will play a significant role in climate policy integration in urban regeneration. The research also speculates that different factors will be more highly relevant in different stages of policy development and policy implementation.

In sum, the primary research question is: Which main factors affect the integration of climate measures into urban regeneration and how do factors affect the integration of climate measures into urban regeneration in Seoul?

The four sub-questions related to the primary research question are:

1. Understand the urban regeneration policy process: What is the existing urban regeneration process and how does it incorporate climate measures in Korea?
2. Internal factors: Which are the relevant internal factors for integrating climate measures in urban regeneration policy and plan?
3. External factors: Which are the relevant external factors for integrating climate measures in urban regeneration policy and plan?
4. Analysis of factors to the process and implementation gaps: Which are the most important factors and gaps regarding factors in the conceptual framework of policy development, and what are the implementation gaps in the integration of climate measures in urban regeneration projects?

This chapter discussed the theoretical background and it contains a developed conceptual framework consistent with the state of the art. It first introduced the state of the art in terms of responses to climate change; the concept of urban regeneration; the background of environmental/climate policy integration and mainstreaming; international trends and academic discussions on the opportunities of climate policy integration in urban regeneration; and factors for climate policy integration. This chapter introduced the conceptual framework based on Persson and Runhaar (2018) as a basis to investigate internal and external factors affecting the policy cycle of integration of climate measures into urban regeneration. Literature highlighting drivers and barriers to environmental policy integration, climate policy integration, and adaptation mainstreaming was reviewed to support the conceptual framework. The chapter then indicates that there is a lack of knowledge on factors affecting the integration of climate measures into urban regeneration. Based on the theoretical and conceptual backgrounds, research questions are formulated. The next chapter describes the research design and methods that serve to answer the main research question and the four sub research questions.

3 RESEARCH DESIGN AND METHODS

This chapter introduces the research design, selection of study areas, and data collection and analysis method. The research design and methods are organised to answer the four sub research questions discussed in the previous section (2.8): (1) description of the process of urban regeneration and how it incorporates climate measures (research question 1); (2) explanation of internal and external factors that affect integration during the process (research questions 2 and 3); and (3) analysis of the important internal and external factors among the discussed factors (research question 4).

Section 3.1 describes the research design and Section 3.2 explains the process of selection of study areas. Section 3.3 discusses data collection and the analysis method. Primarily, data for the research is obtained from document analysis and semi-structured interviews. In this section, three analysis methods adopted by this study are introduced: document analysis, content analysis, and process tracing. By combining these three analysis methods, the research aims to utilise the benefits of each method and provide sufficient scientific evidence that leads to convincing results and discussions.

3.1 RESEARCH DESIGN

The study aims to answer the research questions using a case study approach with a qualitative method. This section explains the research design and methods, including a justification of using a single case study approach, the process of choosing the study areas and the data collection, and a description of analysis methods.

Case studies are widely used for in-depth investigation of a real-life phenomenon within a specific context. Also, they are most suitable for studying complex issues that contain many variables (Yin, 2009; Harrison *et al.*, 2017). The phenomenon under study in this research work is climate policy integration in urban regeneration. This dissertation adopts the case study approach to provide empirical evidence to examine the factors that affect the integration of climate measures into urban regeneration. This approach will also facilitate the analysis of the implementation gaps in integrating climate measures into urban regeneration policy and plans.

This dissertation investigates one case—the city of Seoul—with four study areas (neighbourhoods) that are being affected by the same government administrative structures and settings. Empirical evidence drawn from the case study method helps to provide patterns or policy lessons to other situations and practices (Ragin and Becker, 1992; Balaban and Puppim de Oliveira, 2014).

Seoul has been chosen on the basis that the Seoul metropolitan government first adopted the concept of urban regeneration in 2000 and the city's concept was regarded as a model of urban regeneration when formulating the Urban Regeneration New Deal Policy as the primary policy agenda of the Korean national government in 2017. Therefore, there is a sufficient period of time to study urban regeneration in Seoul because the city has implemented urban regeneration since 2000. Seoul well represents a city that has a process of policy development and implementation of urban regeneration that aims to employ a bottom-up approach—collecting opinions of residents to formulate the urban regeneration revitalisation plans—in a top-down governance structure.

Additionally, Seoul—the highest populated city in Korea—is highly vulnerable to climate change impacts, which necessitates advanced climate change policy. It stands for a highly populated and urbanised city that is required to be regenerated with an advanced climate change policy, also dealing with the economic revitalisation of communities, retrofitting deteriorated buildings, and provision of essential infrastructure. Furthermore, the Seoul metropolitan government has made efforts to integrate various other sectors into urban regeneration policy, including climate policy, which is helpful for examining internal and external factors for the integration of climate measures into urban regeneration.

The dissertation adopts mixed-method approaches, combining content analysis, document analysis, and process tracing methods to supplement the limitation of each approach and to increase the credibility of data and results.

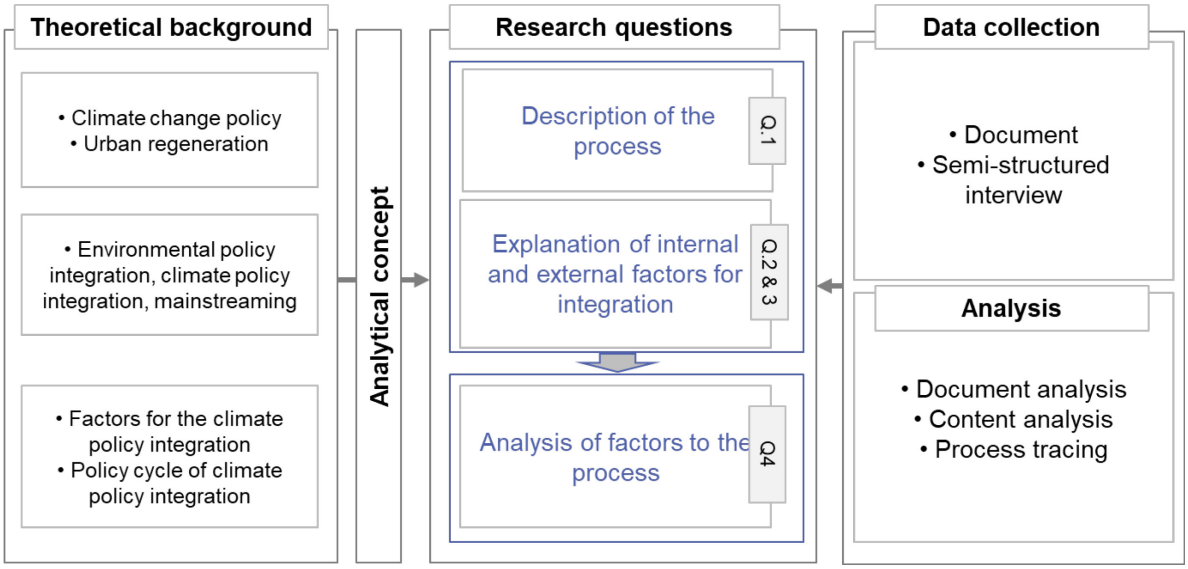
Primary data for the study is collected from two sources: documents and semi-structured interviews, with the data being analysed to answer the research questions. Document analysis was performed using a variety of documents on topics that include law, policy, guidelines, planning documents, news articles, press releases from governments, presentation documents from stakeholders, research papers conducted by the government and/or stakeholders, journal papers, dissertations, websites, books, and so on, obtained either online or from stakeholders of urban regeneration in the Republic of Korea. Semi-structured interviews were performed with stakeholder representatives of urban regeneration and climate change policy by the author from 6 July to 28 August 2020 in Seoul, Daejeon, and Sejong cities in the Republic of Korea.

The primary data were analysed with three main methods: document analysis, process-tracing, and content analysis. Document analysis was performed to analyse policy and the policy process. The study adopted the process-tracing method—a research method for tracing causal mechanisms using an in-depth single case study (Beach, 2017)—for the examination of actual causes of the integration efforts of climate measures into urban regeneration policy cycles.

Another research method used in this study is content analysis using MAXQDA—computer software for structuring and organising a large amount of data and constructing coding schemes. Detailed descriptions and processes of these analyses will be discussed in Section 3.3.

The overall structure of the research consists of three components: (1) a description of the process of integration of climate measures into urban regeneration (sub research question 1); (2) an explanation of internal and external factors for climate policy integration into urban regeneration (sub research questions 2 and 3); and (3) analysis of factors for each process (sub research question 4). Data for all three components are from documents and semi-structured interviews. Analysis methods for the three components are document analysis, process tracing, and content analysis. The structure of the research is based on the conceptual framework which is developed based on the theoretical background (Figure 3-1).

Figure 3-1 Overview of research design and methods



Source: own compilation

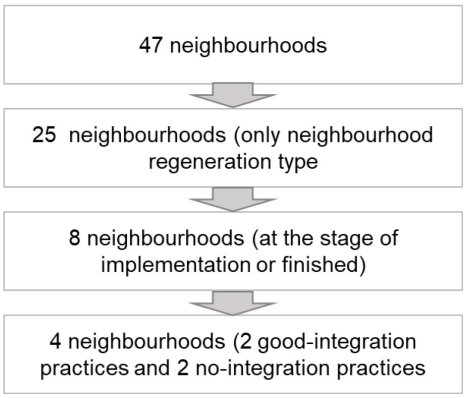
3.2 SELECTION OF STUDY AREAS

The selection of study areas aims to facilitate a comparative examination of different neighbourhoods, helping to define internal and external factors that affect the integration of climate measures in urban regeneration areas. The four neighbourhoods belong to four different community governments within Seoul metropolitan government. The different local settings with a shared governance structure allow the examination of relevant factors for the integration of climate measures in urban regeneration plans.

The research pursues to compare these four study areas because they present two extreme practices—two neighbourhoods that present a high level of integration of climate measures

in their urban regeneration projects and two neighbourhoods that do not present efforts of climate policy integration in their urban regeneration projects. Four specific study areas in Seoul are chosen based on the following criteria. First, urban regeneration areas that are under the national law—the Special Act on Promotion of and Support for Urban Regeneration, established in 2013—were selected (47 neighbourhoods) (*Status of Urban Regeneration Revitalisation Projects—Seoul Urban Regeneration Portal*, no date). Second, only areas designated as 'neighbourhood regeneration' areas were selected (25 neighbourhoods); there are two types of urban regeneration under the act—economy-based regeneration and neighbourhood regeneration. Neighbourhood regeneration areas were chosen to facilitate the examination of different institutional factors in the shared context of regeneration. Third, only neighbourhoods that were in the implementation stage or completed phase were selected to investigate the integration process in all policy cycles. At the time of this study, only eight neighbourhoods—the pilot urban regeneration areas in Seoul Metropolitan Government—were in these stages. Fourth, the urban regeneration revitalisation plans from urban regeneration areas that met all the above criteria were reviewed and climate-related measures and objectives were collated in an Excel spreadsheet. The level of integration of climate measures in the urban regeneration revitalisation plans was evaluated based on the quantity and quality of climate measures. Two cases considered to use good integration practices and two cases considered to use no integration practices were selected (Figure 3-2).

Figure 3-2 Study area selection process



Source: own compilation

Jangwi-dong and Sangdo 4-dong are considered to use good integration practices—their plans have one climate-related objective as a main objective and include climate measures. On the other hand, Amsa-dong and Garibong-dong are considered to employ no integration practices, meaning that the plans have the lowest level of integration of climate measures without any climate objective.

3.3 DATA COLLECTION AND ANALYSIS METHODS

The research adopted three main analysis methods—document analysis, content analysis, and process tracing. The primary data for these analyses consist of documents and semi-structured interviews. This section introduces the data collection and analysis methods.

Document analysis

Document analysis was performed before and after the semi-structured interviews. The primary purpose of document analysis is to provide evidence of the process of urban regeneration, to evaluate the level of integration of climate measures in urban regeneration policy, and to provide results supplementary to that obtained from semi-structured interviews (this is linked to the process-tracing method which will be discussed later in this section.).

Document analysis before the interview allowed the interviewer to have a high level of understanding of the process and contents of urban regeneration at national, city, and community levels as well as the important factors for the integration of climate measures in urban regeneration. It also helped to increase the quality of interview questions by asking critical questions. For example, questions that aim to understand the motivation for the inclusion of certain statements related to climate measures in urban regeneration policy and the roles of certain actors require sufficient knowledge and understanding of the settings and contexts of urban regeneration policy and plans.

Available relevant government documents and reports related to urban regeneration policy—including laws, policy, plans, and project documents—were collected from governments' official websites and interviewees and were analysed. Primary documents to review include the Special Act on Promotion of and Support for Urban Regeneration, Basic Policy for National Urban Regeneration, Guidelines for the Formulation of Strategic Plans for Urban Regeneration, Guidelines for the Formulation of Urban Regeneration Revitalisation Plans, The Seoul Strategic Plan for Urban Regeneration, and Urban Regeneration Revitalisation Plan. The document analysis is involved in finding out climate measures in these policy documents and the level of the integration of climate measures in these policies and plans.

In addition, a variety of documents—not limited to policy documents—were analysed; these include news articles, press releases from governments, presentation documents from stakeholders, research papers from the government and/or stakeholders, journal papers, dissertations, websites, books, and so on. This diverse analysis provided testaments to the process of urban regeneration and the causes of the integration of climate measures into urban regeneration policy.

Semi-structured interviews and content analysis

Primary data is obtained from semi-structured interviews and documents. The face-to-face interviews took place for eight weeks from 6 July to 28 August 2020 in Seoul, Daejeon, and Sejong cities in the Republic of Korea. 50 in-depth semi-structured interviews were carried out with government officials, public organisations, public-private cooperative organisations, resident groups who are familiar with urban regeneration projects in their neighbourhoods, and experts in urban regeneration and climate change. Table 3-1 details the interviewed groups and institutions.

Table 3-1 Interview groups and institutions

Group	Institution
Government officials	• Ministry of Land, Infrastructure, and Transport • Seoul Metropolitan Government • Four community governments (Seongbuk-gu, Dongjak-gu, Gandong-gu, and Guro-gu)
Public organisations	• Korea Research Institute for Human Settlement • Korea Land & Housing Corporation • Seoul Urban Regeneration Committee • The Seoul Institute
Public-private cooperative organisations	• Seoul Urban Regeneration Support Centre • Four Urban Regeneration On-Site Support Centres
Residents	• Resident Council • General residents
Experts	• Experts in urban regeneration and climate change adaptation (Korea Environment Institute, Korea Housing & Urban Guarantee Corporation)

Source: own compilation

The interview participants were selected using several criteria. It is essential to include those who have been in charge of the policy process and that have sufficient knowledge about urban regeneration in all the urban regeneration policy cycles: development of national urban regeneration policy (national level), development of the city's strategic plan for urban regeneration (city level), and urban regeneration implementation (community level). Another criterion was to interview the representatives of the group of stakeholders. For example, the representative of the resident council in the urban regeneration project or the head of the urban regeneration on-site support centre were selected. Perspectives from residents and experts in urban regeneration and climate change adaptation are also considered essential data for the study.

After reviewing the urban regeneration policy and plan that affected urban regeneration projects in the four study areas, a list of possible interviewees who participated or have participated in the process of urban regeneration policy/plans was created. The author directly contacted the possible interviewee by phone and/or email.

The subjects of the 50 conducted interviews consist of six policy stakeholders of national urban regeneration policy development, nine policy stakeholders of city urban regeneration policy development, 18 policy stakeholders of community urban regeneration plans, 13 residents who were familiar with urban regeneration projects and residing in urban regeneration areas, and four experts involved in the policy process in urban regeneration and/or climate change adaptation (see Table 3-2). The roles of urban regeneration stakeholders, planned by Seoul Metropolitan Government, are presented in Table 3-3.

Table 3-2 Role and the number of interview participants

Group	Roles	Institution	No. of interviews
Policy development (national level)	• Formulating 'Basic Policy for National Urban Regeneration' • Formulating 'Guidelines for the Formulation of Strategic Plans for Urban Regeneration' • Research on urban regeneration regulation, policy, and strategy	• Ministry of Land, Infrastructure, and Transport	1
		• Korea Research Institute for Human Settlement	2
		• Korea Land & Housing Corporation	3
Policy development (city level)	• Formulating 'The Seoul Strategic Plan for Urban Regeneration) • Decision-making for 'The Seoul Strategic Plan for Urban Regeneration' and 'Urban Regeneration Revitalisation Plan'	• Seoul Metropolitan Government	4
		• Seoul Urban Regeneration Committee	2
		• The Seoul Institute	1

	• Supporting plan development, establishing a database of promotion areas, supporting education and monitoring	• Seoul Urban Regeneration Support Centre	2
Policy implementation (community level)	• Formulating and implementing 'Urban Regeneration Revitalisation Plan' • Supporting the implementation, public relations and education for the residents, revitalising neighbourhood community • Collecting residents' opinions, negotiating residents' conflicts, bridging between public and private • Implementing and consulting for projects, collecting opinions of stakeholders, resolving conflicts between stakeholders and projects	• Community government	5
		• Master Planner (Professors, urban planning companies)	4
		• Urban Regeneration On-Site Support Centre	9
		• Residents	13
Experts	• Experts in urban regeneration and climate change		4
Total			50

Source: own compilation

Table 3-3 Roles of urban regeneration stakeholders

Stakeholder	Role
Central government (Ministry of Land, Infrastructure and Transport)	· Formulating policies and laws · Supporting budgets · Monitoring

Seoul Metropolitan Government	· Formulating Seoul urban regeneration strategies · Suggesting new policies and plans · Formulating urban regeneration revitalisation plans · Implementing plan and project · Managing whole urban regeneration areas · Monitoring and evaluation of urban regeneration revitalisation areas
Community centre	· Collecting feedback from residents · Formulating and implementing site-based plans and strategies
Urban regeneration commission	· Consultation and reviewing
Urban regeneration support centre	· Managing public-private cooperation meetings and supporting projects · Establishing governance · Counselling residents, diagnosis, education, and public relations
Residents	· Collecting feedback from residents · Adjustment of residents' conflicts · Sharing project plans and suggesting opinions
Supporting organisation (The Seoul Institute)	· Participating in projects and supporting education · Discovering policies and supporting institutions · Establishing a database of urban regeneration revitalisation areas and supporting monitoring

Source: own compilation based on Seoul Metropolitan Government (2018)

Each interview was prepared with interview guidelines. Before the interview guidelines were formulated, themes and participant groups were defined and organised by research questions. Based on the guidelines, interview questions were formulated for each interviewee. The detailed data collection and analysis method for each research question is described below.

Research question 1. What is the existing urban regeneration process and how does it incorporate climate measures in Korea?

This question was answered based on document analysis and semi-structured interviews.

The interview theme includes the understanding of the urban regeneration process and the level of the integration of climate measures in each policy cycle and the causes of the integration of climate measures in the urban regeneration policy process. Interview questions were put to key stakeholders who were in charge of formulating urban regeneration policies and plans and who were involved in the process of urban regeneration policy development and/or implementation at national, city, and/or community levels.

Research question 2. Which are the relevant internal factors for integrating climate measures in urban regeneration policy and plans?

This research question was put to stakeholders who are involved in the development and implementation of urban regeneration, including government officials at national, city, and community levels, public organisations, urban regeneration committees, urban regeneration support centres, residents, and experts. Interview themes include (1) roles of various stakeholders in developing vision, purpose, and plans for the policy/plan, (2) motivation to incorporate or not to incorporate climate measures into urban regeneration policy/plan, (3) opinion about drivers and barriers to incorporate climate measures into urban regeneration policy/plan, and (4) general knowledge and resources availability about climate measures in their organisation/group.

Research question 3. Which are the relevant external factors for integrating climate measures in urban regeneration policy and plans?

This research question is put to stakeholders who are involved in the development and implementation of urban regeneration, including government officials at national, city, and community levels, public organisations, urban regeneration committees, urban regeneration support centres, residents, and experts. Interview themes include (1) national, city, and community issues related to climate change, (2) views on the level of public awareness and support for climate change, (3) the extent of stakeholders' support for incorporating climate change measures into urban regeneration, (4) opinions about drivers and barriers to incorporate climate measures into urban regeneration, (5) motivation to incorporate vision, purpose, and plans into urban regeneration revitalisation plan as well as the barriers that inhibit the integration of climate objective/measures on the ground.

Research question 4. Which are the most important factors and gaps regarding factors in the conceptual framework of policy development, and what are the implementation gaps of the integration of climate measures in urban regeneration projects?

The research question is put to stakeholders involved in each urban regeneration policy cycle, including government officials at national, city, and community levels, public organisations, urban regeneration committees, urban regeneration support centres, residents, and experts. The interview theme includes (1) views on important drivers and barriers to incorporation and (2) views on improving the integration of climate measures with urban regeneration (see Table 3-4).

Table 3-4 Overview of interview participants and interview themes organised by research questions

Research Question 1	**What is the existing urban regeneration process and how does it incorporate climate measures in Korea?**
Document analysis	Special Act on Promotion of and Support for Urban Regeneration Basic Policy for National Urban Regeneration Guidelines for the Formulation of Strategic Plans for Urban Regeneration The Seoul Strategic Plan for Urban Regeneration Urban Regeneration Revitalisation Plan (from four neighbourhoods) Other non-policy documents (press releases, news articles, etc.)
Interviewees	Government officials at national, city, and community levels, public organisations, urban regeneration committees, urban regeneration support centres, and experts
Interview themes	· Understanding of the urban regeneration process · Level of integration of climate measures in each policy cycle
Research Question 2	**Which are the relevant internal factors for integrating climate measures in urban regeneration policy and plans?**
Interviewees	Government officials at national, city, and community levels, public organisations, urban regeneration committees, urban regeneration support centres, residents, and experts
Interview themes	· Roles of various stakeholders in developing vision, purpose, and plans for policy/plans · Motivation to incorporate/non-incorporate climate measures (to be phrased based on each circumstance) into urban regeneration policy/plans · Opinion about drivers and barriers to incorporating climate measures into urban regeneration policy/plans · General knowledge and resource availability related to climate measures
Research Question 3	**Which are the relevant external factors for integrating climate measures in urban regeneration policy and plans?**
Interviewees	Government officials at national, city, and community levels, public organisations, urban regeneration committees, urban regeneration support centres, residents, and experts
Interview themes	· National/city/community issues related to climate change · View on the level of public awareness and support for climate change · Extent of stakeholders' support for incorporating climate change measures into urban regeneration · Opinion about drivers and barriers to incorporating climate measures into urban regeneration

	· (for the stakeholders involved in the policy implementation stage) Motivation to incorporate vision, purpose, and plans into urban regeneration revitalisation plan and barriers to inhibit the integration on the ground
Research Question 4	**Which are the most important factors and gaps regarding factors in the conceptual framework of policy development, and what are the implementation gaps of the integration of climate measures in urban regeneration projects?**
Interviewees	Government officials at national, city, and community levels, public organisations, urban regeneration committees, urban regeneration support centres, residents, and experts
Interview themes	· Views on important drivers and barriers to the incorporation of climate measures into urban regeneration · View on improving the integration of climate measures into urban regeneration

Source: own compilation

Interview questions for each interviewee were developed based on the guidelines. All relevant urban regeneration policy documents were reviewed before the interview started. The interview guidelines comprise seven parts: (1) introduction of the research and purpose of the interview, (2) roles of the institute and the interviewee's responsibility, (3) understanding of the view on the level of integration in applicable urban regeneration policy/plans, (4) internal factors that affect the integration of climate measures into urban regeneration, (5) external factors that affect the integration of climate measures in urban regeneration, (6) views on the drivers and barriers of the integration of climate measures, and (7) policy implementation gaps (see Appendix 3. Interview Guide for detailed transcripts of interview questions).

The interviews were approximately one hour long on average and were conducted in the Korean language. All interviewees except one agreed to the whole interview being recorded and signed a consent form for their participation (an English version and a Korean version of the consent document are presented in Appendix 4). All recordings and field notes were transcribed using Microsoft Word and imported into MAXQDA software.

As the Korean language was used during the interviews, all transcriptions were made in Korean by the author. Coding was performed in Korean because it preserves the nuances and tones of statements as they are; translation from Korean to English sometimes distorts the original/intended meaning of the speaker and requires the translator's interpretation when presenting the meaning in the context of English. Therefore, the author decided to preserve the integrity of the transcription by coding in Korean and then translating the parts that are cited in the dissertation into English. Another reason for coding in Korean is the significant amount of time required to translate a large amount of data (50 interview transcriptions). Although most of the

statements contain important information for the research, not all of the information was ultimately used for the analysis, therefore, it was unnecessary to translate the entire transcriptions at an earlier stage.

Before beginning the coding process, coding categories were prepared. Conceptual frameworks from three studies—Persson and Runhaar (2018), Runhaar *et al*. (2018), and Roeck, Orbie and Delputte (2018)—provided the structure of the coding categories. The policy process is divided into two stages—policy development and policy implementation. Each stage has internal and external factors. The initial categories belonging to internal factors were 'political factors', 'organisational factors', 'cognitive factors', 'characterisation of adaptation problem at hand', 'resources', and 'timing'; these categories are presented in Runhaar *et al*. (2018). Since the framework from Runhaar *et al*. (2018) does not categorise the factors by internal and external factors, the external factors categories were formulated based on both Runhaar *et al*. (2018) and Persson and Runhaar (2018), and include 'geographical focus', 'public awareness and support', 'stakeholder support', and 'opportunities to influence policies that inhibit integration on the ground'. Table 3-5 presents the initial categories of factors before coding began. The preparation for coding also included creating variables for the interviewees and defining codes.

Table 3-5 Initial categories of factors before coding began

Policy cycle	**Category**	
Policy development	Internal factors	Political factors
		Organisational factors
		Cognitive factors
		Characterisation of adaptation problem at hand
		Resources
		Timing
	External factors	Geographical focus
		Public awareness and support
		Stakeholder support
Policy implementation	Internal factors	Political factors
		Organisational factors
		Cognitive factors
		Characterisation of adaptation problem at hand
		Resources
		Timing
	External factors	Opportunities to influence policies that inhibit integration on the ground

Source: own compilation based on Persson and Runhaar (2018) and Runhaar *et al*. (2018)

A preliminary review of interview scripts was performed to specify detailed factors, and then two rounds of coding were performed using MAXQDA software which can deal reasonably swiftly with a large number of interviews. The generated code systems and transcribed interview documents were imported into MAXQDA software. The software is able to manage the interview data efficiently—all interview statements under the same code system can be shown together if they were coded, and multiple code systems can be applied to the same segment. Excel files in which segments coded with the same factor are classified were extracted from MAXQDA. The author then used the data organised by each factor for the content analysis.

During the first round of coding, all relevant statements from the interviews were coded with relevant factor(s), and new factors were added. All interview data were reviewed again during the second round of coding. In this round, the author verified if all relevant segments were coded precisely, and the coded segments were categorised into either 'driver' or 'barrier' to better understand the characteristics of factors.

Since factors within the category structure sometimes affect the other factors, one segment can be coded with more than one code. For example, the following interview statements are coded with two factors, 'Cooperation with climate change departments/Ministry of Environment' and 'Budgets and resources':

> Another important problem is the lack of integrated financial resources. So you can use them here and there. For example, any ministries like the Ministry of Land, Infrastructure and Transport should be able to use the money from the Ministry of Environment, or vice versa. It should be like this, but if it's not my budget, it's not my business. It's a very common story. So, an integrated project management system is important, but an integrated project budget is also important. It seems that there is a fundamental need for common resources that can be used by any ministry in an integrated way (INT17[11]).

Although the interviewee states the absence of integrated financial resources, the interviewee points out this issue as a cause of the lack of cooperation between departments. Therefore, these statements are coded with two factors.

The number of interviewees for each factor was counted to verify the highlighted frequency which represents the level of significance of the applicable factor in the policy cycle. Therefore, the content analysis from the semi-structured interviews provides both qualitative and quantitative results.

[11] Sources of direct and indirect quotes from interviews are presented as 'INT and Number'.

The list of factors was finalised after the coding. Factors that were not regarded as important or were not mentioned at all were removed from the list and new factors that were highlighted by the interviewees were added. The finalised list of factors after coding is presented in Table 3-6. In the policy development stage, internal factors consist of political factors, organisational factors, resources, cognitive factors, and characterisation of the problem at hand. External factors consist of public awareness and support and private sector support. 'Timing' and 'geographical focus' were not included as important factors; these two factors were highlighted from the existing studies, and related questions were asked at the end of the semi-structured interviews (e.g. national/city/community issues related to climate change), however, no significant statements related to these factors were found. In the policy implementation stage, internal factors consist of political factors, organisational factors, resources, cognitive factors, and characterisation of the problem/opportunity at hand. External factors consist of residents' support, characterisation of the problem at hand, private/stakeholder support, and cognitive factors. 'Timing' was not included here for the same reason as in the policy development stage. 'Opportunities to influence policies that inhibit integration on the ground' in external factors was not included as it is a rather broad concept that was not explained thoroughly enough in Persson and Runhaar (2018), making it difficult for this dissertation to define the code.

Table 3-6 Finalised factors after coding

Policy development stage, internal factors
Political factors
• Political support of major political leaders
Organisational factors
• Cooperation with climate change departments/Ministry of Environment • Leadership/expertise of the civil servant of urban regeneration • Supportive regulatory framework • Different levels of hierarchy between climate change and urban regeneration policies • Failure to reflect opinions gained from the policy process • High turnover of civil servants leading to a lack of continuity • Routine and practice of civil servants
Resources
• Information and guidance on climate change policy, lack of relevant research • Expertise of urban regeneration support centre • Budgets and resources
Cognitive factors
• Divergent priority • Uncertainty of effectiveness/performance of climate change policy

Characterisation of the problem at hand
• Different objectives for climate change and urban regeneration policies • Difficulty to measure climate change policy/project • Timescale (Conflicting or compatible)
Policy development stage, external factors
Public awareness and support
Private sector support
Policy implementation stage, internal factors
Political factors
• Political support of the head of community government (policy direction) • Political environment in the community (e.g. political support of district delegates) • Political support of the mayor of Seoul and the general policy direction of the city government
Organisational factors
• Expertise (interest in climate issues) of the civil servant of urban regeneration in the community government • High turnover of civil servants leading to a lack of continuity • Cooperation with climate change departments • Short-termism, short-term performance-oriented system • Supportive regulatory framework • Routines and customs of civil servants • Governance and cooperation
Resources
• Expertise (interest in climate issues) of urban regeneration on-site support centre • Expertise (interest in climate issues) of urban regeneration on-site support centre and master planner • Lack/absence of information about climate measures • Expertise (interest in climate issues) of Seoul urban regeneration support centre • Budgets and resources
Cognitive factors
• Divergent priority (at the community government and urban regeneration on-site support centre)
Characterisation of problem/opportunity at hand
• Overlapped objectives for climate change and urban regeneration projects • Difficulty of measuring performance/effectiveness of climate measures • Difficulty to adopt additional projects on the already planned urban regeneration projects • Inability to regulate private property (e.g. buildings) • Existence of local features that can be integrated with urban planning theme • Lack of green spaces • Pre-existence of climate measures that lead to urban regeneration projects
Policy implementation stage, external factors

Residents' support
• Public awareness and support · (Un)certainty of effectiveness/performance of climate change issues/projects for residents · Absence of information about climate change for residents (lack of education/public relations) · Residents' inactive participation in climate change projects • Pecuniary matters of residents · Avoidance of financial loss and residents' interests in financial benefits / Pecuniary benefit/loss to adopt climate measures · Residents' financial burden to pay for climate facilities · Residents' interests in property values
Characterisation of the problem at hand
• Lack of facilities and spaces to adopt climate measures • Fear of absence of governments' financial support on climate facilities after the project
Private/stakeholder support
• Private sector support • Criticism about problems with climate change projects in mass media
Cognitive factors
• Divergent priorities

Source: own compilation

The research acknowledges that there are relationships among factors. One factor can affect the others and some factors can belong to the others. For example, some cognitive factors can also belong to the organisational or private/stakeholder support factors. As the dissertation developed the structure of factors by adopting the framework of Runhaar *et al*. (2018) and investigates relevant factors from the basis of existing studies, it does not focus on an analysis of relationships among factors. However, it still discusses these relations to explain each factor in the result part (especially in Chapters 6 and 7).

Process-tracing

Although content analysis provides the primary evidence for determining the significance of the factors for the integration of climate measures into urban regeneration and testaments to the process, the frequency of repeated statements/data from the interviews does not provide complete evidence. To mitigate the weaknesses of content analysis,[12] the research adopts a process-tracing method to provide sufficient scientific evidence for the results.

[12] 'In traditional content analysis studies, counting the number of times a particular set of codes occurs is indeed an important measure to assess the frequency of items or phenomena. But one of the caveats I propose later in this manual is that frequency of occurrence is not necessarily an indicator of significance.' (Saldaña, 2013)

‘Process tracing is a research method for tracing causal mechanisms using detailed, within-case empirical analysis of how a causal process plays out in an actual case’ (Beach, 2017). As this dissertation aims to describe the integration of climate measures in the whole process of urban regeneration and to explain factors that affect the integration, using a process-tracing method is suitable for the study.

The process-tracing method consists of three different variants: (1) theory-testing process-tracing, (2) theory-building process-tracing, and (3) explaining-outcome process-tracing (Beach and Pedersen, 2013). The first two variants are theory-centric, which means whether or not a causal mechanism is present in a case (theory-testing) or what the causal mechanism between X and Y is (theory-building), and the third variant, which this dissertation adopts, is case-centric and aims to investigate what mechanistic explanation accounts for the outcome (Beach and Pedersen, 2013). The goal of explaining-outcome process-tracing is to find a sufficient explanation for the outcome.

In the field of policy integration, recent studies adopt the process-tracing method to disclose causal mechanisms in the process of policy integration. For example, the study of Biesbroek and Candel (2020) demonstrates causal pathways for the policy (dis)integration of food and climate change adaptation policy in the Netherlands (Biesbroek and Candel, 2020), and Avoyan (2021) reveals the causal mechanism of cooperation dynamics leading to integrative output in an instance of collaborative flood risk management in the Netherlands (Avoyan, 2022).

The process-tracing serves to provide sufficient evidence to explain and analyse the process and causes of integration efforts and attempts. The data for the process-tracing method are collected from documents that include not only policy documents but also other types of documents such as news articles, press releases from governments, presentation documents from stakeholders, research papers from the government and/or stakeholders, journal papers, dissertations, websites, books, and so on. In addition, information (e.g. schedules and hosting organisations) obtained from meetings and seminars related to climate change and urban regeneration in the process of urban regeneration also serve to provide evidence that supports the results.

The method significantly supplements the results obtained from the content analysis. More data for the process-tracing method are collected from the interviews that were stated by the person who was in charge of the policy and/or plan. The interviewees obtain experience in the process of urban regeneration and have a high level of understanding of the causes (e.g. the policymaker who formulated the policy knowing the causes of including climate measures in the urban regeneration policy).

4 EXPLORING THE CONTEXT: SEOUL AND ITS NEIGHBOURHOODS

This chapter explores the case study area of Seoul and its neighbourhoods in the Republic of Korea. It first introduces the features of the city of Seoul and the evolution of urban regeneration in the city and then presents climate change issues and the main characteristics of residential areas in Seoul (Section 4.1). The next section investigates features of the four selected neighbourhoods in Seoul, Jangwi-dong, Sangdo 4-dong, Amsa-dong, and Garibong-dong, which includes general descriptions of the neighbourhoods, demographics, geographical profiles, features of buildings, public facilities and resources, and climate change issues. This chapter provides a background of the study areas, helping to understand the context of areas where urban regeneration and climate change policy are implemented. Furthermore, it provides an understanding of the empirical results that will be discussed in the following chapters.

4.1 SEOUL

4.1.1 Features of Seoul and evolution of urban regeneration in Seoul

Seoul, the capital and largest city of the Republic of Korea, is located in the middle of the Korean Peninsula in the north-western region of the Republic of Korea. The latitude and longitude of the city of Seoul is 37.5665° N, 126.9780° E (Figure 4-1).

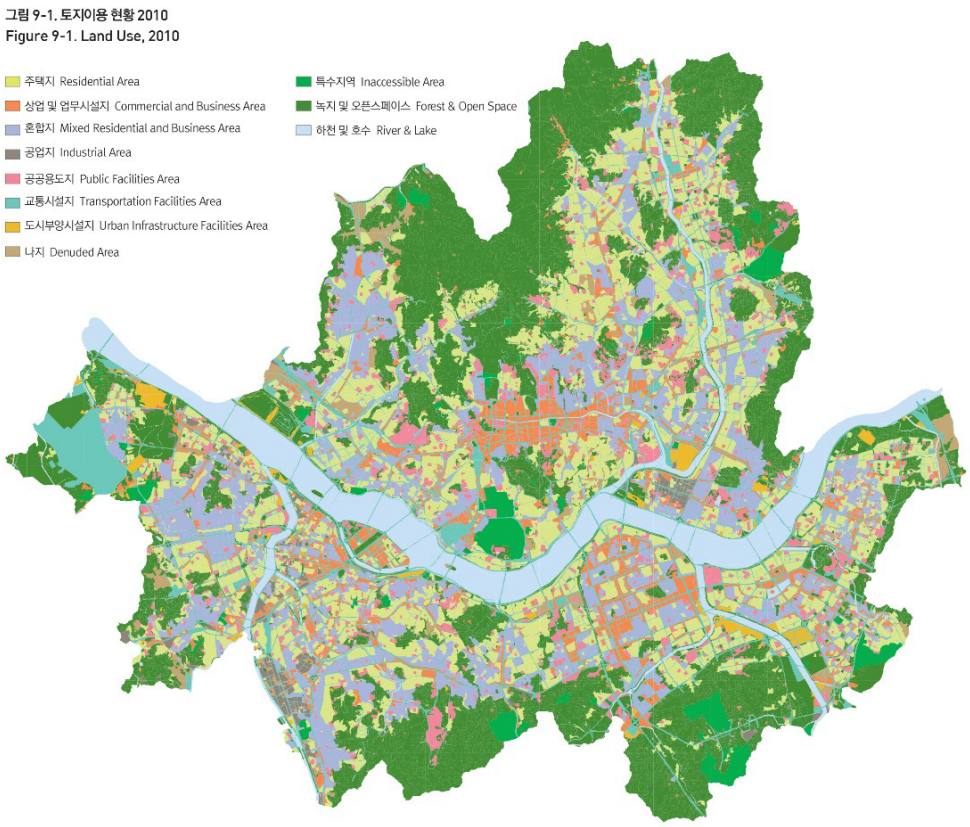
Figure 4-1 Location of the Republic of Korea and Seoul

Source: (left) Korean Geosynthetics Society; (right) ArcGIS, author, 09.24.2019

The area of the city of Seoul is 605.24 km^2 (Seoul Metropolitan Government, 2020). The city has a total of 43 rivers and streams (Seoul Metropolitan Government, 2020), and the Han River flows in

an east-west direction in the centre of Seoul. The Han River is 481.7 km in length and 75.5 km in width on average. As the length of the river is rather short for the total area of the river, the peak rate of runoff is high, which results in a high level of flood damage (Seoul Metropolitan Government and The Seoul Institute, 2017). There is a mountain in the centre of Seoul, called Namsan, and the city is surrounded by mountains, forming a basin, with hills in places. Regarding land-use types in Seoul, forest and open space account for the largest area at 29.2 percent. This is followed by 20.3 percent of residential area; 12.6 percent of mixed residential and business area; 11.4 percent of transportation facilities area; 8.2 percent of river, stream, or wetland; 6 percent of commercial and business area; and 5.4 percent of public facilities area (Seoul Metropolitan Government and The Seoul Institute, 2017). The biggest change in land use in Seoul over the past 10 years is the increase in residential and transportation facilities area, the decrease in green and open spaces, and the decrease in some industrial and residential mixed-use areas in urbanised areas (see Figure 4-2) (Seoul Metropolitan Government and The Seoul Institute, 2017).

Figure 4-2 Land use in Seoul, 2010



Source: 'Seoul Research Data Service—Land Use Status' (n.d.)

According to the 60th (2020) Seoul Statistical Yearbook, Seoul is a large city with a population of around 10 million—20 percent of the total population of the Republic of Korea. The city's population had been continuously increasing since records began until 1990, seeing its first

decline in 1995, followed by a relatively small overall decrease up to the present day. The population density and population per household have also seen a relatively small overall decrease since 1995 (see Table 4-1) (Seoul Metropolitan Government, 2020).

Table 4-1 Change in population, population density, area, and persons per household in Seoul

Year	Population	Population density (person/km²)	Area (Km2)	Persons per household
1940	935464	*	*	5.67
1950	1693224	*	*	5.31
1960	2445402	9113	268.35	5.47
1970	5433198	8863	613.04	4.95
1980	8364379	11339	627.06	4.52
1985	9639110	15921	605.43	4.12
1990	10612577	17532	605.34	3.76
1995	10595943	17491	605.78	3.06
2000	10373234	17132	605.5	2.91
2005	10297004	17009	605.4	2.63
2010	10575447	17473	605.25	2.44
2015	10297138	17013	605.25	2.39
2019	10010983	16541	605.24	2.25

(*: no data available)

Source: own compilation based on Seoul Metropolitan Government (2020)

Proportions of housing types in Seoul have changed significantly. In 1970, more than 80 percent of the houses in Seoul were detached houses, and apartments accounted only for 4 percent ('Seoul Research Data Service—House type', n.d.). Since the mid-1970s, the proportion of detached houses has decreased while new apartment buildings have increased due to the development of the Gangnam area[13] and some detached houses have been redeveloped into tenement houses or multiplexes ('Seoul Research Data Service—House type', n.d.). In 2010, detached houses accounted for 16.1 percent of housing types and apartments accounted for 58.8 percent, making apartments the representative housing type in Seoul ('Seoul Research Data Service—House type', n.d.). Table 4-2 presents the types of housing found in the Republic of Korea and Figure 4-3 presents the trends in housing types in Seoul from 1970 to 2011.

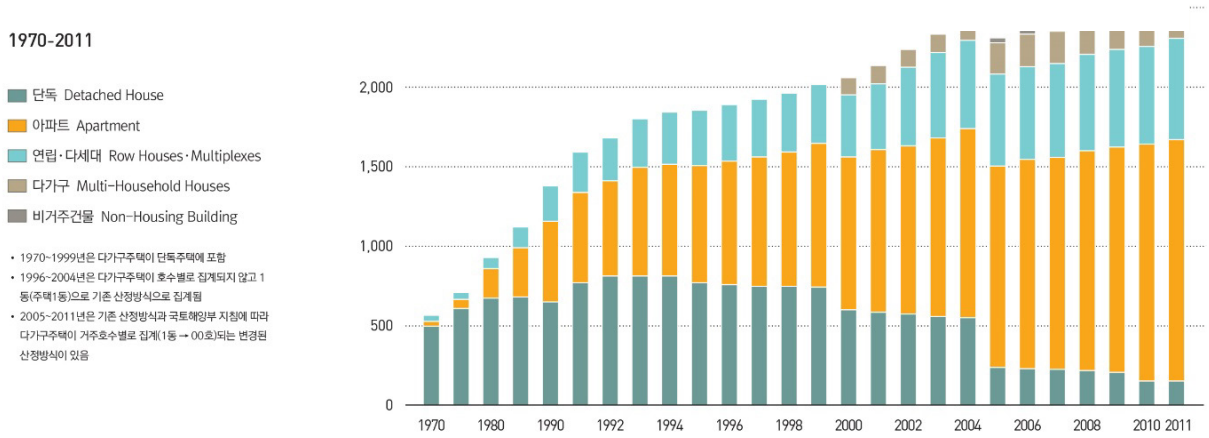
[13] Gangnam is an area in the south of Seoul that has been developed into an urban area since 1970 ('National Archives of Korea - Korea through records - Economy & Industry - Gangnam Development', n.d.).

Table 4-2 Types of housing in the Republic of Korea

Detached housing is housing structured so that one household can reside independently from other households within one building	Detached house
	Multi-user house • Structures that allow multiple people, such as students or office workers, to live in the same building • Buildings that do not have an independent dwelling (meaning that bathrooms can be installed in each room, but cooking facilities are not installed); • The total floor area is 330 m^2 or less and there are three floors or less
	Multi-household house: a house that meets all of the following requirements and does not fall under the category of a multi-family house. • The number of floors used for living (excluding the basement) is three or less; • The total floor area (excluding attached parking) used for living for one building is 660 m^2 or less; • 19 households or less live in the building
Multi-family housing means housing structured so that each household that uses all or some of the walls, hallways, stairs or other facilities of a building can reside independently from other households within one building	Apartment: Houses with five or more floors
	Tenement houses: A house with a total floor area of one building used as a house (when two or more buildings are connected with an underground car park, each building is considered as each) exceeds 660 m^2, and the number of floors is four or less
	Multiplex: A house with a total floor area of 660 m^2 or less in one building used as a house and four or fewer floors
	Dormitory: Used for students or employees of schools or factories, etc., equipped with a structure for communal cooking, etc., but not equipped with an independent dwelling type, and more than 50 percent of the households use communal cooking facilities based on each building

Source: own compilation based on Ministry of Land, Infrastructure and Transport (2003)

Figure 4-3 Trends in housing type in Seoul, 1970-2011



Source: 'Seoul Research Data Service—House type' (n.d.)

The city of Seoul has served as the capital city of Korea since the Joseon Dynasty moved its capital to Hanyang (the old name of Seoul) in 1392. The population of Seoul was 830,000 in 1944, but quickly after the liberation, in 1946, this increased to 1.26 million and reached two million in 1959 (Seoul Metropolitan Government, 2015b). Despite this rapid increase in population, the Korean War that broke out in 1950 destroyed 25 percent of Seoul's urban area and 55,000 houses (Seoul Metropolitan Government Residential Regeneration Division, 2016).

The Republic of Korea's government began significant efforts to improve national economic development starting in the mid-1960s. Beginning in the 1960s, the rapid industrialisation of Seoul caused an influx of residents from rural areas across the country, and the shortage of housing led to a rapid increase in the number of unlicensed settlements in hilly areas and along rivers (Seoul Metropolitan Government Residential Regeneration Division, 2016). In the 1960s, the government cracked down on these unauthorised settlements and demolished them, while providing new settlements for the residents (Seoul Metropolitan Government Residential Regeneration Division, 2016). As Korea experienced rapid industrialisation and urbanisation, the population of Seoul rapidly increased, and Seoul expanded its boundary towards the north-east and south (so-called Gangnam) in August and September 1963 ('Seoul Urban Planning Portal—Urban Formation and Change,' n.d.).

Urban redevelopment projects were actively carried out from the 1970s, although the policy regarding 'redevelopment districts' was introduced earlier, in 1965, through the revision of the Enforcement Decree of the Urban Planning Act (Seoul Metropolitan Government Residential Regeneration Division, 2016). The downtown redevelopment project was added to the Urban Planning Act, and the procedure for the redevelopment project was first enacted into law, providing a foothold as a means for projects in 1971 (Seoul Metropolitan Government Residential

Regeneration Division, 2016). From 1973 to 1976, 12 core downtown areas were designated as downtown redevelopment districts (Min, 2015). Downtown redevelopment projects involve the complete demolition of the majority of structures in the project district and the construction of new modern buildings (Seoul Metropolitan Government Residential Regeneration Division, 2016).

In the 1970s, a legal and institutional system was prepared, aiming to facilitate the mass construction of apartment houses (The Housing Construction Promotion Act was enacted in 1972, apartment districts were introduced in the Urban Planning Act in 1976, and regulations related to housing construction standards were introduced in 1979); as a result, the construction of apartments accelerated and housing was supplied in large quantities (Seoul Metropolitan Government Residential Regeneration Division, 2016). Since the 1970s, policies have been implemented to disperse the population concentrated in the Gangbuk area through the development of the Gangnam area, while renovating the ageing downtown area with modern buildings through the downtown redevelopment project (Seoul Metropolitan Government, 2015b). In the 1980s, the city's urban development boomed following the decision to host the 1988 Olympic Games in September 1981 and the 1986 Asian Games in November 1981 ('Seoul Urban Planning Portal - Urban Formation and Change,' n.d.). The urban development of Seoul in the 1980s focused on maintenance and construction in preparation for becoming an international city and on large-scale development of housing and land to deal with the shortage of housing ('Seoul Urban Planning Portal—Urban Formation and Change,' n.d.). To solve the serious problem of housing shortages, the Korean government announced a plan to build five million houses in 1980, and Seoul expanded its boundary further by building large-scale apartment complexes in Mok-dong and Sanggye-dong (Seoul Metropolitan Government Residential Regeneration Division, 2016).

The housing improvement and redevelopment project is a development project that aimed to restore high-level land use and urban functions through the maintenance and improvement of residential buildings (Jung, 1995). Starting with the settlement development relocation projects in 1955, housing improvement projects continued in Korea, and the housing improvement and redevelopment project was introduced in earnest with the 'Act on Temporary Measures for the Promotion of Housing Improvement' in 1973 (Jung, 1995). The following projects were subsequent to the settlement development relocation projects in 1955: the improvement and redevelopment project under the loan (1976-1982), the demolition redevelopment project under the consignment method (1979-1982), and the demolition redevelopment project through the joint redevelopment method (1983~present) (Jung, 1995). After the introduction of the joint

redevelopment method, housing redevelopment projects have rapidly increased, resulting in a sharp increase in the supply of apartments in Seoul (Jung, 2019).

After that, the reconstruction method was added in 1987 as another business method for the deteriorated residential area (Seoul Metropolitan Government Residential Regeneration Division, 2016). As multi-unit houses developed with a low floor area ratio in the 1960s were deteriorated, the 'Housing Construction Promotion Act' was revised to provide a legal basis for reconstruction in 1987 (Seoul Metropolitan Government Residential Regeneration Division, 2016) (See Table 4-3).

Table 4-3 Maintenance methods for deteriorated areas in Seoul

Main maintenance methods for deteriorated areas in Seoul	
Old downtown area	Downtown redevelopment project
Low-income old residential areas such as hilly areas	Housing redevelopment project
An ageing apartment complex in an existing city area	Reconstruction project

Source: own compilation based on Seoul Metropolitan Government Residential Regeneration Division (2016)

In 1990, the population of Seoul recorded a population peak exceeding 10 million, but as the population flowed out due to the development of new towns in the metropolitan area, the population decreased for the first time in 1995. In terms of industry in the 1990s, changes in the industrial structure such as the progress of de-industrialisation occurred. In this period, the ageing residential areas of Seoul were continuously maintained, and the reconstruction project of deteriorated apartment houses in the old towns was established as the main means of housing supply in Seoul (Seoul Metropolitan Government Residential Regeneration Division, 2016). The floor area ratio for apartment development was less than 100 percent in the 1960s but continued to increase to 400 percent in the late 1990s (Seoul Metropolitan Government Residential Regeneration Division, 2016). In contrast to the ageing Gangbuk area, citizens' desire for development in the Gangnam area continued and the proportion of apartments gradually increased due to the 'two million housing supply policy' and active redevelopment projects (Seoul Metropolitan Government, 2015b).

Problems caused by overcrowding and poor development were highlighted by the Korean society, and interest in the environment increased in the 2000s (Seoul Metropolitan Government Residential Regeneration Division, 2016). From the mid to late 1990s, as the city shifted from high growth to low growth, the central value of the city shifted from development to conservation, from economy to cultural welfare and environment symbiosis, and from government to cooperative governance (Cho, 2015). However, demolition-type redevelopment and reconstruction continued.

In addition, Seoul Metropolitan Government introduced the 'New Town Project' to renovate old and defective residential areas in the Gangbuk area in the four-year municipal administration plan (2002-2006) in 2002 (Kim, 2016). The purpose of the 'New Town Project' is to expand urban infrastructure, renovate old residential areas, and resolve the imbalance between Gangnam and Gangbuk (Kim, 2016). As the perception that the new town project is profitable spreads, excessive new town districts have been designated (Seoul Metropolitan Government Residential Regeneration Division, 2016). However, as the residential area was developed into an apartment complex even after the total demolition of the residential area, it caused many side effects such as uniform, supplier-oriented planning, community destruction, loss of local characteristics, and damage to the natural landscape (Seoul Metropolitan Government Residential Regeneration Division, 2016). From 2005 to 2012, 401 maintenance areas in Seoul were newly designated, which is 5.7 times the amount designated in the previous seven years and one-third of the designated maintenance zones in the past 40 years (Seoul Metropolitan Government, 2014b; Kim, 2016). It caused numerous problems, such as the destruction of the local community due to mutual conflicts between leaders and residents concerning the pros and cons and an excessive increase in development costs due to the stagnation of the real estate economy (Seoul Metropolitan Government, 2014b; Kim, 2016). This over-designated maintenance area caused numerous problems, such as the encouragement of real estate speculation, destruction of local communities due to mutual conflicts over pros and cons, and excessive increases of charges due to the real estate recession (Seoul Metropolitan Government, 2014b; Kim, 2016).

The 2008 global economic crisis which resulted in the deterioration of the real estate market meant that the designated new town districts suffered from difficulties in business promotion because of a deterioration of business feasibility (Seoul Metropolitan Government Residential Regeneration Division, 2016). In January 2012, the Seoul Metropolitan Government announced the 'Seoul New Town Solution Plan'—it aimed to recognise the problems caused by the new town project and resolve them. The previous mayor of Seoul, Park Won Sun, announced 'New Policies for Seoul's New Town and Maintenance Projects' (Seoul Metropolitan Government Housing Policy Office, 2012); it states that the city will develop a new method of mitigating the problems caused by the existing new town and maintenance projects. In other words, it is a policy to change the direction of development from owner-oriented development to resident-oriented development, from business-oriented development and development after total demolition to community and village development-oriented development. This was done by conducting a fact-finding survey for each maintenance area, analysing the individual estimated contributions of landowners and sharing the results with the residents. The decision of whether or not to proceed with the project was determined by the residents (Kim, 2016; Seoul Metropolitan Government Regeneration Policy Department, 2018).

The movement for urban regeneration started in 2000 in Seoul. In the residential area, a 'village development project' centred on the residents was started (Seoul Metropolitan Government Residential Regeneration Division, 2016). In 2000, a new type of urban planning in the Hanok Village located in Bukchon emerged in which residents, civic groups, and the Seoul Metropolitan Government maintained cooperative relationships and jointly resolved issues in villages (Choi, 2003). Furthermore, the Myeongdong district unit plan was established in 2004; this was an attempt to establish a district unit plan based on resident participation by forming a resident council (Seoul Metropolitan Government Residential Regeneration Division, 2016). Seoul began the pilot project termed 'Creating a Liveable Town Through a District Unit Plan' in 2008 and the 'Human Town Pilot Project' in 2011 which focused on the new town release area (Seoul Metropolitan Government Residential Regeneration Division, 2016). The project aimed to support the installation of infrastructure such as electric wires in basements; convenience facilities such as senior citizens' centres, day-care centres, and study rooms; safety provisions such as CCTV; and parking spaces while preserving the existing low-rise residential areas (Hwang, 2011). Efforts to reorganise public spaces into pedestrian spaces for citizens have been actively initiated in downtown areas (Seoul Plaza (2004), Cheonggyecheon Restoration (2005), Sungnyemun Square (2006), Gwanghwamun Square (2009)) (Seoul Metropolitan Government, 2015b).

Attempts to regenerate neighbourhoods with the participation of residents—such as the Village Development Trial in Seoul and Human Town—became the basis for the development of a resident participatory regeneration project termed the 'Urban and Residential Environment Improvement Act' in 2012. During this project, new types of maintenance projects were introduced—'Residential Environment Management Project' and 'Street Housing Maintenance Project'. This pursued the goal of preserving and managing the existing dwellings and restoring the community, rather than a method of development after total demolition (Seoul Metropolitan Government Residential Regeneration Division, 2016). Based on research on the national urban regeneration research and development project that began in 2007, 'The Special Act on Promotion of and Support for Urban Regeneration' was enacted—this laid the foundation for urban regeneration plans and projects (Seoul Metropolitan Government Residential Regeneration Division, 2016).

4.1.2 Climate change issues

In this section, climate change issues in Seoul are discussed. Although there are a variety of climate change impacts in Seoul—such as the rise of temperatures, extreme weather events, disturbed ecosystems, etc.—this section mainly focuses on the discussion of heatwaves and floods (resulting from typhoons and heavy rain) which are regarded as one of the most significant climate change impacts in Seoul.

The impacts of climate change—such as an increase in average temperature, an increase in the number of heatwave days, and an increase in precipitation—are becoming more serious. Seoul is a large city, occupying about 0.6 percent of Korea's total area, but is a very densely populated city with about 20 percent of the country's population living in the city. The fact that 58 percent of housing in Seoul is apartments explains the high population density of Seoul ('Seoul Research Data Service—House type', n.d.).

According to the Korea Meteorological Administration (2017), Seoul has a higher temperature and more heatwave days than Korea on average; the average annual temperature for the last ten years (2001-2010) in Seoul was 13.0 degrees Celsius—0.2 degrees higher than Korea's 12.8 degrees Celsius (Korea Meteorological Administration, 2017). Furthermore, the number of tropical nights and heatwave days in Seoul is 8.2 and 11.1 respectively, whereas the average in Korea is 3.7 and 10.2 respectively (Korea Meteorological Administration, 2017); this means that Seoul experiences 4.5 more tropical nights and 0.9 more heatwaves days compared to Korea on average.

One of the biggest damages caused by climate change in Seoul over the past ten years is heat illness and loss of life due to the heatwave in 2018 and the loss of life and property damage due to flooding in 2010 and 2011—this is discussed in following paragraphs. 738 people in Seoul died from a heatwave in 1994 (Park, 2005). The five most vulnerable groups to heatwaves (seniors living alone, low-income vulnerable groups, homeless people, *jjokbang* residents, [14] and construction site workers) were specially managed by the Seoul Metropolitan Government in 2018 as they suffered death from heatwaves (Seoul Metropolitan Situation Response Department, 2018). In 2018, the heatwave was particularly severe so the mayor of Seoul at the time, Park Won-soon, held an emergency response meeting on 30 July 30 2018 and announced that the heatwave would be defined as a natural hazard in the 'Seoul City Disaster and Safety Management Basic Ordinance' (Seoul Metropolitan Situation Response Department, 2018). Then, on September 18, 2018, the heatwave was added as a natural disaster to the Framework Act on the Management of Disasters and Safety. In 2018, the highest temperature recorded since meteorological observations began and the greatest number of heatwave days occurred. The highest temperature recorded in Seoul is 39.6 degrees Celsius, recorded on August 1, 2018. The number of tropical nights[15] was 26 days (Korea Meteorological Administration, Climate Prediction Division, 2018).

[14] A *jjokbang* is a room divided into several smaller rooms to accommodate one or two people. Usually, it is a small room of about 1.65 to 9.9 m^2 and is generally rented on a monthly basis without a deposit. This type of housing can be found in slum areas (Ha *et al.*, 2005).
[15] The number of tropical nights is the number of nights when the minimum temperature is 25 degrees or higher at night (18:01-9:00 the next day).

Seoul is vulnerable to heatwaves due to its high population density and permeability; 77 percent of urbanised areas (residential, commercial, and industrial areas) are impervious (Cho and Lee, 2018). As the paved asphalt and concrete road absorb and discharge a lot of heat, the heatwave and heat island phenomenon become serious. Heatwaves for people dwelling in rooftop rooms and jjokbang are more severe. Rooftop rooms are a typical residential type for the low-income class in Seoul, and they are created by illegal extensions using the space on the roof, resulting in a poor residential environment (Koh, 2014). To experience the living situations of people vulnerable to heatwaves and gain a better understanding of urban problems in the Gangbuk area,[16] in 2018, Park Won-soon lived for a month in a rooftop room; during his stay in a rooftop room, the highest temperature recorded was 41.8 degrees Celsius in Gangbuk-gu (Yim, 2018). Low-rise residential buildings in Seoul—not only rooftop rooms and jjokbang but also detached houses and multi-family houses built 20 years ago—are very vulnerable to heatwaves since most of them are old buildings that require additional insulation and waterproofing.

Another significant climate change impact in Seoul is flooding. Damages are caused by flooding in the city due to the limited number of sewer and drainage facilities, overflows of the Han River, the limited capacity of sewer pipes and rainwater pumping stations, and overflows onto low-lying ground. Table 4-4 presents the main causes of flooding damage and flooded areas by year.

Table 4-4 Main causes of flooding damage and flooded areas by year

Year	Main causes of flooding	Main flooded areas
1987	• Lack of sewage and drainage facilities • Increase of runoff coefficient, sedimentation of soil • Reduction of reservoir capacity and insufficient capacity of drainage pump, etc.	• About 70 low-lying areas including Guro, Gaebong, Mangwon, Banpo, and Sinjeong
1990	• Heavy rain in the upper Han River area • Insufficient capacity of reservoirs, drainage pumping stations, and sewerage systems	• About 70 low-lying areas including Seongnae, Pungnap, Banpo-cheon,[17] Jungnang-cheon, Ttukseom, and Yeouido
1998	• Rising river flood level and overflow • Insufficient capacity of sewage pipelines, rainwater pumping stations, etc.	• Drainage area near Jungnang-cheon • Ui-dong Valley and landslide in Jingwanae-dong, Eunpyeong-gu
2001	• Exceeding the limit of sewage pipe due to torrential downpours with a frequency of 200 years	• Jungnang-gu, Dongdaemun-gu, Nowon-gu, Seongbuk-gu, Eunpyeong-gu, Yangcheon-gu, Dongjak-gu, Gwanak-gu, etc.

[16] There are a majority of vulnerable people from heatwaves reside in Gangbuk area.
[17] Cheon is a Korean word for stream.

	• Poor drainage of road surface water	
2010	• Rainfall exceeding the design capacity of the sewer pipe • Low-lying roads	• Gangseo-gu, Yangcheon-gu, Dongjak-gu, Yangcheon-gu, Seocho-gu, Gangnam-gu, Gangdong-gu, Gwanak-gu, Guro-gu, etc.
2011	• Rainfall exceeding the design capacity of the sewer pipe • Low-lying roads	• Seocho-gu, Gangnam-gu, Dongjak-gu, Gwanak-gu, Guro-gu, etc.

Source: own compilation based on Koh and Lee (2012)

Damage from flooding in low-rise residential areas occurs frequently in Seoul, particularly affecting semi-basement houses. According to the 2018 housing survey conducted by the Ministry of Land, Infrastructure and Transport, there are 379,605 semi-basement households nationwide, most of which are located in Seoul. 222,706 households, or 5.8 percent of the total 3,839,766 households in Seoul, live in semi-basement houses. Among the houses that were damaged by flooding in 2010, 90 percent were semi-basement houses (Nam and Cho, 2020). In addition, flooding to buildings in general occurs every year. In 2010, there were five casualties in Seoul due to heavy rains (casualties are defined as people declared dead, missing, or injured), and in 2011 this figure increased to 61 people (see Table 4-5).

Table 4-5 Damages caused by wind and flood damage in Seoul (2006-2015)

	Casualties (persons)*	**Victims (persons)**	**Buildings flooded**	**Total damage** (million KRW)****
2006	-	73	721	5734
2007	-	-	15	-
2008	-	128	58	45
2009	1	541	339	24
2010	5	41529	18498	22207
2011	61	34253	14848	31317
2012	-	1002	515	1203
2013	1	176	82	896
2014	-	2	61	37
2015	-	-	-	-

*Casualties: death, disappearance, injury; ** Total monetary damage to buildings, farmland, public facilities, and private facilities; *** 1 EUR=1,345.05 KRW (as of 27 May 2022)

Source: own compilation based on Seoul Metropolitan Government and The Seoul Institute (2017)

According to the 2018 Greenhouse Gas Inventory Survey performed by Seoul Metropolitan Government, Seoul's greenhouse gas emissions amounted to 47,074,000 tons of CO2eq—an increase of 388,000 tonnes of CO2eq compared to 2017 and a decrease of 2,372 tonnes compared

to 2006. Regarding the sources of the emissions, the energy sector accounts for the overwhelming majority of emissions—91 percent—while waste accounts for 6.1 percent, and industrial processes 3.3 percent of emissions. Among the energy sector, buildings account for 68.8 percent, transport 19.2 percent, and power generation 1.4 percent of emissions; the building sector is the most significant source of GHG emissions in Seoul (Baek, 2020).

Seoul has a large population and high population density, so the impact of climate change is great, and the city also emits a large amount of greenhouse gases. In particular, it appears that low-rise residential areas in Seoul are more vulnerable to damage from heatwaves and flooding caused by heavy rain. Seoul Metropolitan Government has been implementing various policies to reduce greenhouse gas emissions and reduce the damage caused by climate change, which are addressed in Section 5.2.3.

4.1.3 Characteristics of residential areas in Seoul

Types of housing

In 2019, the total number of houses in Seoul was 2,953,964, of which 58 percent (1,720,691) were apartments (Table 4-6). Due to an increased preference for living in apartments, the proportion of apartments of the total housing volume has increased significantly, and the number of multiplexes is also increasing (Seoul Metropolitan Government, 2015a).

Table 4-6 Housing type in the Republic of Korea and Seoul (unit: house (percent))

Housing type	Republic of Korea	Seoul
House	18,126,954	2,953,964 (100)
Detached house	2,651,613	68,114 (2)
Multi-household	820,408	195,448 (7)
Detached house for business	445,662	52,004 (2)
Apartment	11,287,048	1,720,691 (58)
Tenement houses	514,337	110,968 (4)
Multiplex	2,194,943	777,205 (26)
House in non-residential buildings	212,943	29,534 (1)
Residence other than home	896,930	224,878 (8)

Source: own compilation based on Statistics Korea, Census Division (2020)

Table 4-7 shows that 36.6 percent of households in the Republic of Korea lived in apartments in 2000, and the proportion has increased continuously (51.1 percent of households in the Republic of Korea lived in apartments in 2019). On other hand, the proportions of detached houses continue to decrease (Table 4-7).

Table 4-7 House type in the Republic of Korea by year (2000-2019) (Unit: thousand households (percent))

	Total	**Detached house**	**Apartment**	**Tenement houses / multiplex**	**Housing in non-residential buildings**	**Residence other than home**
2000	14312 (100.0)	7,103 (49.6)	5238(36.6)	1294(9.0)	593(4.1)	84(0.6)
2005	15887(100.0)	7,064 (44.5)	6629(41.7)	1695(10.7)	282(1.8)	217(1.4)
2010	17339(100.0)	6860 (39.6)	8169(47.1)	1744(10.1)	212(1.2)	354(2.0)
2015	19111(100.0)	6739(35.3)	9197(48.1)	2133(11.2)	328(1.7)	714(3.7)
2016	19368(100.0)	6640(34.3)	9422(48.6)	2219(11.5)	316(1.6)	770(4.0)
2017	19674(100.0)	6549(33.3)	9671(49.2)	2269(11.5)	327(1.7)	858(4.4)
2018	19979(100.0)	6415(32.1)	10013(50.1)	2312(11.6)	319(1.6)	920(4.6)
2019	20343(100.0)	6312(31.0)	10405(51.1)	2339(11.5)	318(1.6)	969(4.8)

Source: own compilation based on Statistics Korea, Census Department (2020)

42.8 percent of the total number of households in Seoul (1,669,000 households) live in apartments. The next most common types of dwellings are detached houses and multiplexes (Table 4-8).

Table 4-8 House type of households in the Republic of Korea and Seoul (Unit: thousand households (percent))

	Republic of Korea	**Seoul**
Total	20343 (100.0)	3896 (100.0)
Detached house	6312 (31.0)	1048(26.9)
Apartment	10405(51.1)	1669(42.8)
Tenement houses	434(2.1)	104(2.7)
Multiplex	4905(9.4)	727(18.6)
House in non-residential buildings	318(1.6)	81(2.1)
Residence other than home	969(4.8)	269(6.9)

Source: own compilation based on Statistics Korea, Census Division (2020)

Multi-household houses and tenement houses/multiplexes still account for a large portion of the low-rise residential areas in Seoul. The areas subject to urban regeneration are primarily those with mostly ageing detached houses, multi-household houses, tenement houses, and multiplexes.

<u>The ageing of houses</u>

The majority of 20 to 30-year-old buildings are regarded as dilapidated and substandard structures and are targets of maintenance in Korea. According to the 'Seoul Metropolitan City Urban and Residential Environment Maintenance Ordinance', the criteria for dilapidated and substandard structures are presented in Table 4-9. Although the standards for multi-family

housing and non-multi-family housing are different, they are usually considered old or defective buildings after 20 to 30 years and may be subject to maintenance projects such as urban redevelopment and urban reconstruction in the future.

Table 4-9 Legal standards for dilapidated and substandard structures

Building type	Years
Multi-family housing	
Reinforced concrete, steel-framed concrete, steel-framed reinforced concrete, and steel structures multi-family houses	20-30 years (depending on the year of construction and the number of floors)
Other	20 years
Buildings other than multi-family housing	
Reinforced concrete, steel-framed concrete, steel-framed reinforced concrete, and steel structures	30 years
Other	20 years

Source: own compilation based on Seoul Metropolitan Government, Residential Maintenance Department (2003)

The average length of use of a house after construction is 77 years in the UK, 55 years in the US, and 27 years in Korea (Ministry of Land, Transport and Maritime Affairs, Housing Construction and Supply Division, 2013). There are several reasons for the short lifespans of houses in the Republic of Korea: (1) use of wet construction and monolithic structure construction, (2) consciousness favouring reconstruction as means of real estate investment, (3) low initial construction cost and undeveloped building technology, (4) laws and institutions that are not suitable for long-lived housing (Lee and Lim, 2013).

Some apartments have fewer floors than the contemporary apartment construction trend in Korea, meaning owners of the apartments were incentivised to increase the number of households through reconstruction and make significantly more profits. There have also been cases where buildings were intentionally neglected and damaged so that they could be redeveloped, creating profits for house owners and private developers (Han, 2020). This occurred since a permit for reconstruction was only given out by the city if there was a significant problem with the building, even if the 30-year period for reconstruction has passed (Han, 2020). To obtain the permit, it was necessary for the building to obtain a score of 55 or less out of 100 safety examination points (Han, 2020). The high demand for the reconstruction trend happened because the apartment was regarded as an investment object rather than a 'place to live' (Han, 2020). Today, the Korean government better understands the need for long-lived housing and is striving to provide durable and long-lasting housing (Kim, 2021). Multi-household houses, multiplexes,

and tenement houses also deteriorate easily. In many cases, housing contractors in charge of construction carried out projects at low prices within a short period of time, leading to poor construction. Accordingly, in February 2019, the Ministry of Land, Infrastructure and Transport implemented the Enforcement Decree of the Building Act stating that multi-family houses are subject to designation supervision by the local government. In addition, although a majority of apartments are usually maintained by maintenance professionals regularly, housing improvement works for individual houses (excluding apartments) is not usually effective because the individual landlords who maintain them are mostly the elderly and non-experts in building maintenance (Maeng, Jang and Baik, 2017).

Lack of infrastructure and poor quality of living in low-rise residential areas

Since most of the low-rise residential areas in Seoul were built in the 1970s and 1980s, the infrastructure such as roads, parks, and car parks was designed to fit the size of the houses, household density, and the state of car ownership at that time (Maeng, Jang and Baik, 2017). These low-rise residential buildings have high building densities, high floor area ratios and building coverage rates, and narrow spaces between buildings—posing serious problems regarding access to natural light, views, soundproofing, and privacy. Buildings with greater numbers of floors and densities are continuously developed, making the living environment significantly poor. Currently, the most serious problems in low-rise residential areas in Seoul are narrow roads, insufficient car parks, refuse disposal problems, insufficient traffic safety and security due to narrow and dark roads, and lack of parks and green spaces.

As the density of buildings in low-rise residential areas increased in Seoul, available parking became scarce, and resident-priority parking was created in narrow alleyways. As a result, the space for walking is reduced and pedestrian safety is threatened accordingly (Maeng, Jang and Baik, 2017). There is still a shortage of car parks, which is one of the main residents' complaints about the physical environment in low-rise residential areas and urban regeneration areas in Seoul (INT16).

Unlike apartments, in low-rise residential areas in Seoul, there is no person in charge of managing waste, creating serious waste problems. The Republic of Korea introduced the 'volume-based waste system' in 1995 to solve the problem of excessive waste caused by rapid economic development since 1980 and the increase of cheap plastic products and packaging materials ('Record of the week—National Archives of Korea', 2018). This is a policy to decrease the discharge of waste by charging the disposer the cost of disposing of the waste. It is a system in which individuals purchase food waste bags and general waste bags and dispose of the waste in

the purchased bags. Although this system has positive economic and environmental impacts,[18] it has negative impacts such as the illegal discharging of waste on the street. Waste that is not put into the standard bags or is not disposed of on the collection day accumulates on the corners of narrow alleys, which deteriorates the aesthetics of the neighbourhood. The problem persists despite the installation of CCTV in the waste collection areas in low-rise residential areas in Seoul (Myung, 2016). The waste problem is selected as one of the representative complaints of residents in the urban regeneration area of Seoul (INT16).

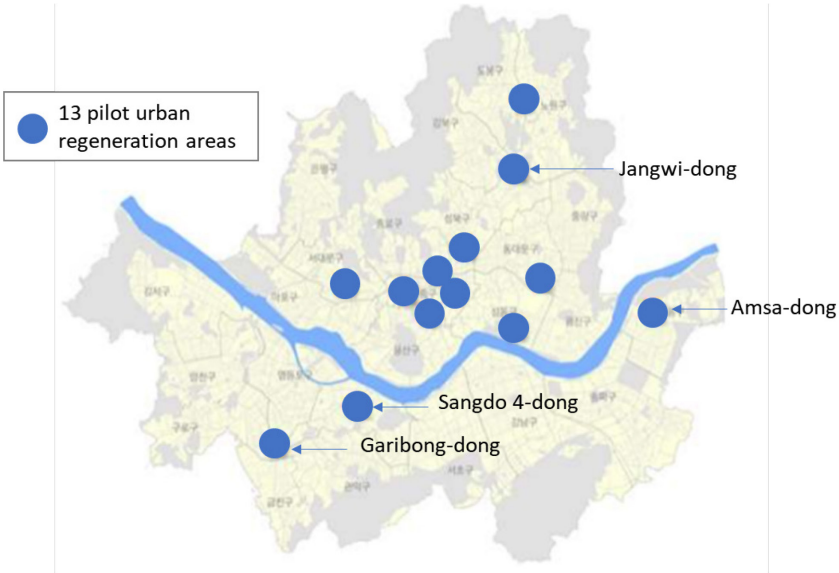
A majority of low-rise residential areas in Seoul lack green spaces and parks. The area of marginalised areas that do not have a 250 m or less boundary to small parks and children's parks is 45.8 km^2 and occupies 38 percent of the low-rise residential areas (Maeng, Jang and Baik, 2017). According to the standards for the installation and size of urban parks in 'Annex 3 of the Enforcement Rule of the Urban Parks and Green Spaces Act', the distance to children's parks should be 250 m or less, 500 m or less for neighbourhood parks in living areas, and 1 km or less for neighbourhood parks within walking distance (Ministry of Land, Infrastructure and Transport, 1990).

4.2 FEATURES OF STUDY AREAS IN SEOUL

This section explores the four Seoul communities that this dissertation focuses on. These areas are pilot areas of urban regeneration in Seoul, designated by Seoul Metropolitan City. Sangdo 4-dong and Garibong-dong are located in the south of Seoul, Amsa-dong is located in the east, and Jangwi-dong is located in the north of Seoul (see Figure 4-4 and Table 4-10). These communities are low-rise residential areas,[19] and they have common issues such as lack of infrastructure, deteriorated residential buildings, lack of community cohesion, and resident conflicts over urban development in their communities.

[18] During 1995-2012, about 103 million tonnes of waste was reduced, and economic profits of KRW 14830 billion were generated (Shin and Park, 2014).
[19] A low-rise residential area is a residential area with a concentration of low-rise houses with five stories or less (Maeng, Jang and Baik, 2017).

Figure 4-4 Urban regeneration areas in Seoul



Source: own compilation based on Seoul Metropolitan Government (2015b)

Table 4-10 Urban regeneration areas in Seoul

Type		Name of Urban Regeneration Area
Urban economy-based type		1. Seoul Station Neighborhood
Neighbourhood regeneration type	Downtown centre type	2. Changdong, Sanggye Neighborhood
		3. Seun Arcade Neighborhood
		4. Nagwon Arcade Neighborhood
		5. Janganpyeong Neighborhood
	Neighbourhood type	6. Changsin, Soongin Neighborhood
		7. Garibong Neighborhood
		8. Haebangchon Neighborhood
		9. Seongsu-dong
		10. Shinchon-dong
		11. Amsa-dong
		12. Jangwi-dong
		13. Sangdo 4-dong

Source: Seoul Metropolitan Government (2015b)

The four areas that are the focus of this dissertation belong to the general regeneration type of neighbourhood regeneration—as do all 13 pilot projects areas listed above—and were selected in 2015. The neighbourhood type deals with small-scale urban regeneration such as the expansion of living infrastructure and the provision of communal facilities for residents in low-rise residential areas. These are areas where the population continues to decrease, the population is ageing, and buildings continue to age, but that have potential for regeneration (Seoul Metropolitan

Government, 2015b). The population density of the four regions is very high—two to three times higher than the average population density in Seoul (17,013 people/km^2)—and the population is decreasing continuously. Buildings aged 20 years or more account for 66 percent to 89.4 percent of all buildings in the study areas, which is much higher than the legal standard of 50 percent or more for selection as an urban regeneration area. Table 4-11 presents the general social and physical characteristics of Jangwi-dong, Sangdo 4-dong, Amsa-dong, and Garibong-dong, such as area, characteristics of the population, households, buildings, land-use, land, and the main issues of study areas.

Table 4-11 Profiles of study areas

Community	Jangwi-dong	Sangdo 4-dong	Amsa-dong	Garibong-dong
Area	318,415 m^2	726,512 m^2	634,885 m^2	332,929 m^2
Population	11,311	30,151	37,753	18,934
Population density	35,523 persons/km^2	41,501 persons/km^2	59,464 persons/km^2	56,871 persons/km^2
Population by age	• 0-14: 11.7 percent • 15-29: 23.4 percent • 30-49: 28.7 percent • 50-64: 18.7 percent • More than 65: 17.5 percent	• 0-14: 11.2 percent • 15-29: 19.3 percent • 30-49: 34.6 percent • 50-64: 21.6 percent • More than 65: 13.2 percent	• 0-14: 11.7 percent • 15-29: 19.0 percent • 30-49: 34.3 percent • 50-64: 23.1 percent • More than 65: 12.0 percent	• 0-14: 5.0 percent • 15-29: 12.0 percent • 30-49: 35.7 percent • 50-64: 36.3 percent • More than 65: 10.9 percent
Households	4,579	12,597	15,640	6,357
Change in population	(2012-2015) -9.9 percent	(2012-2015) -1.1 percent	(2012-2015) -4.5 percent	(2012-2015) -7.5 percent

Main issues	• Cancellation of urban renewal acceleration district • Resident conflicts • Deteriorated buildings • Lack of infrastructure and poor quality of built environment	• Deteriorated buildings • Lack of infrastructure • High proportions of children and elderly residents	• Deteriorated buildings • Lack of infrastructure • Lack of community cohesion	• Cancellation of urban renewal acceleration district • Resident conflicts • Deteriorated buildings • Lack of infrastructure and poor quality of built environment • High proportions of elderly and foreign residents

Source: own compilation based on Seoul Metropolitan Government (2017b, 2017a); Seoul Metropolitan Government and Dongjak-gu (2017); Seoul Metropolitan Government and Gangdong-gu (2017); 'Seoul Statistics Service—Statistics—Seoul Open Data Plaza (2015, 4th quarter),' (2021)

4.2.1 Jangwi-dong

Jangwi-dong was developed as a large-scale residential area in 1960 when the Dongbang Life Insurance Company began the Jangwi-dong development project of 100,000 pyeong [20] (330,578.512 m^2). In the area of Dongbang Pass in Jangwi-dong, premium single-family houses were built with red bricks, but in most areas in Jangwi-dong, houses were built in narrow alleys without parks, green spaces, or welfare facilities. The Seoul Metropolitan Government decided to implement the Jangwi New Town project in December 2005, and Jangwi-dong was selected as a renewal acceleration district and pilot district by the Ministry of Construction and Transportation in 2006 (Seoul Metropolitan Government Residential Regeneration Division, 2016). However, the global financial crisis in 2008 made the real estate market slump and house prices fall. Eventually, the designation of the renewal acceleration district was cancelled in 2014 because the project did not progress after the establishment of the New Town Promotion Committee and Association (Seoul Metropolitan Government, 2015b). For about ten years, Jangwi-dong was designated a renewal acceleration district, but because there were construction restrictions, the deterioration of the building became serious and the residential environment also deteriorated, so it was instead designated as an urban regeneration area.

<u>Demographics</u>

The population of the Jangwi-dong urban regeneration area is 11,311. As for the population distribution, 11.7 percent are aged 0-14, 23.4 percent are aged 15-29, 28.7 percent are aged 30-

[20] Pyeong is a Korean word for the unit of area (1 m^2 is about 0.3 Pyeong).

49, 18.7 percent are aged 50-64, and 17.5 percent are aged 65 and over (Seoul Metropolitan Government, 2017c). The proportion of elderly residents is slightly higher than the average of 12.5 percent in Seoul, and the population decline rate from 2012 to 2015 was 9.9 percent (Seoul Metropolitan Government, 2017c).

Geographical profile

Jangwi-dong, belonging to Seongbuk-gu, is located in northeast Seoul. It faces North Seoul Dream Forest to the northwest, and Odong Park and Dongbang Children's Park are located inside the site. The difference between the highest and lowest topography is 55 m, it is a low-lying west highland type, and several retaining walls and stairs are concentrated on the south and northwest sides (Seoul Metropolitan Government, 2017c). The composition ratio of the incline of the land with five to 20 degrees is 51.8 percent, which means that more than half of the site is a fairly steep area (Seoul Metropolitan Government, 2017c). Jangwi-dong was designated as a renewal acceleration district for almost ten years but the project was not carried out, so the road has not been expanded. Within the site, there were 626 buildings (49.7 percent of the total buildings) facing a road with a width of four metres or more, and 633 buildings (50.3 percent of the total buildings) facing a road with a width of four metres or less (Seoul Metropolitan Government, 2017c). More than 90 percent of the residential area has impervious soil pavements, and Odong Park and Janggok Elementary School have low impervious soil pavement rates (Seoul Metropolitan Government, 2017c). Except for Odong Park and Janggok Elementary School, most of the areas in Janwi-dong are classified as grade five in the biotope type evaluation map (Seoul Metropolitan Government, 2017c). The land-use of the entire site is a general residential area (class I general residential area, class II general residential area, and class III general residential area), and the site includes a general aesthetic district (Appendix 5. Use area and use district).[21]

Buildings

87.4 percent (1101) of the total buildings (1259) in Jangwi-dong are for residential use and consist mainly of apartment houses (16 percent) and detached houses (71.4 percent) (Seoul Metropolitan Government, 2017c). As for the structure of the buildings, 71.3 percent are made of brick concrete, 27.2 percent of reinforced concrete, and 1.5 percent of other materials—meaning that most buildings in Jangwi-dong are detached houses in brick concrete structures, and apartments and neighbourhood lifestyle facilities mostly have reinforced concrete structures. Most of the buildings have two floors (51.9 percent), and 85 percent of the total buildings are low-rise

[21] Use area and use district are terms provided by the government official website, Korean Law Information Center (*Korean Law Information Center*, no date). Use area refers to land-use, and use district refers to zoning.

buildings with three or fewer floors (Seoul Metropolitan Government, 2017c). 89.4 percent of buildings have existed for 20 years or more, of which 586 are over 40 years old, indicating a high degree of ageing. When Jangwi-dong was designated as a new town area, there were restrictions on new construction, but since it was released from the new town area designation in 2014, old houses have been demolished, and urban living houses and multiplexes have been built. A total of 90 new buildings were permitted between 2014 and 2017 (Seoul Metropolitan Government, 2017c).

Public facilities and additional resources

There is one community centre and one elementary school—which are public institutions in Jangwi-dong—and there are a total of five welfare facilities (three senior centres, one nursing centre, and one child welfare facility). There are two car parks— Dongbang Pass car park and an off-street car park—and there are two parks and one public shelter (Seoul Metropolitan Government, 2017c).

There is a traditional market, called Janggok Market, with 21 stalls on the site (Seoul Metropolitan Government, 2017c). Additionally, there is the Kim Jung-up Architecture and Culture House—a house remodelled by Kim Jung-up, a modern architect. The owner of this building preserved and managed the house well, and Seongbuk-gu later purchased it for use as a space for residents to promote Jangwi Village, a children's bookstore, and the Kim Jung-up publicity room (J. Park, 2018).

Climate change issues

Jangwi-dong is exposed to various damages caused by climate change. Seongbuk-gu, to which Jangwi-dong belongs, shows vulnerabilities in water control and forest fires according to VESTAP [22] (Seoul Metropolitan Government and the Seoul Institute, 2017). Vulnerability evaluation indicators for flooding and forest fires are analysed according to climate exposure, sensitivity, and adaptive capacity. The statistics on damage caused by natural hazards (typhoons, strong winds, heavy rains, heavy snow, and heatwaves) that occurred during the ten years from 2010 to 2019 in Seongbuk-gu are shown in Table 4-13. There were heavy rains in 2010 and 2011, which caused severe damage to Seoul—55 and 231 households were damaged in 2010 and 2011 respectively and economic loss ranged from 33,000,000 KRW to 992,809,000 KRW (Table 4-12).

[22] VESTAP (Vulnerability assESment Tool to build climate change Adaptation Plan) is a web-based climate change vulnerability assessment tool system. It was developed by the National Climate Change Adaptation Centre from the Korea Environment Institute and the Ministry of Environment in the Republic of Korea to support community governments to assess vulnerability and create detailed implementation plans for measures to adapt to climate change.

Table 4-12 Damage from natural hazards in Seongbuk-gu from 2010 to 2019

Year	Victims	Flooded households	Estimated damage (1,000 KRW)*		
			Total	Buildings	Public facilities
2010	133	55	33,000	33,000	-
2011	544	231	992,809	138,600	854,209
2018	-	42	644,800	37,800	607,000

* 1 EUR=1,345.05 KRW (as of 27 May 2022)

Source: own compilation based on 'Statistics on the occurrence of natural disasters in Seoul—Data Set—Seoul Open Data Plaza' (2021)

The Detailed Implementation Plan for Climate Change Adaptation Plan presents research of news articles on damages from climate change impacts in Seongbuk-gu from 2006 to 2016. In this research, from the last 10 years, there were 16 news articles about torrential rains, 12 about heavy snows, eight about coldwaves, four about heatwaves, four about typhoons, three about strong winds, and one about drought. The articles about torrential rains deal with house and building flooding, collapses of walls, landslides, house collapses, sewage backflow, and road potholes. In the case of heavy snow, damage such as traffic accidents and traffic congestion occurred on icy roads due to the heavy snow. In the case of the coldwave, damages such as freezing of water meters, the occurrence of cold-related illnesses, and food waste being frozen and not being collected properly. In the case of heatwaves, articles discussed blackouts due to power overloads, heatwave patients, and fires due to overheating. In the case of typhoons, traffic lights did not work due to power outages and signs fell. In the case of strong winds, telegraph trees fell, wires were broken, and vehicles were damaged. In the case of drought, an article explained how street trees were saved from drought (Seongbuk-gu, 2017).

4.2.2 Sangdo 4-dong

Sangdo 4-dong, belonging to Dongjak-gu, is a typical low-rise residential area. Although it is not a village released from the new town area like Jangwi-dong and Garibong-dong, some areas were designated as the urban redevelopment area. After the release of Sangdo Redevelopment District 11, and frequent plan changes that resulted in deepening conflicts between the government and residents (Seoul Metropolitan Government, 2015b), the area was left almost desolate. Abandoned houses and waste dominated the area for almost 30 years, with the aesthetics and overall environment suffering as a result.

<u>Demographics</u>

Sangdo 4-dong has a population of 30,151, and the population distribution is 11.2 percent for those aged 0-14, 19.3 percent aged 15-29, 34.6 percent aged 30-49, 21.6 percent aged 50-64, and

13.2 percent aged 65 and over ('Seoul Statistics Service—Statistics—Seoul Open Data Plaza' (2015, 4th quarter), 2021). There are more elderly people living in Sangdo 4-dong than in Seoul. The number of children under the age of 14 in residential areas is 1.7 times higher than the Seoul average, and this is almost double for the number of children under the age of four. From 2012 to 2015, the population decline rate was 1.1 percent which is not high compared to other urban regeneration areas (Seoul Metropolitan Government and Dongjak-gu, 2017; 'Seoul Statistics Service—Statistics—Seoul Open Data Plaza (2015, 4th quarter)', 2021).

Geographical profile

Sangdo 4-dong is located in south-central Seoul. As it forms a hilly terrain in the direction of Guksabong in the south, there are many roads with an inclination of more than 10 degrees, with an average incline of about 8.6 degrees (Seoul Metropolitan Government and Dongjak-gu, 2017). Since the Tomb of Yangnyeong Daegun, Sangdo Neighborhood Park, and Dohwa Park are located inside the site, the ratio of green areas is rather high. There are places where it is difficult for vehicles to pass because there are narrow alleys of less than four metres. In general, Sangdo 4-dong's land is not easy to utilise because there is a lack of usable public land and most of the available lots are about 150 m^2 or less in size (Seoul Metropolitan Government and Dongjak-gu, 2017). The land-use of the site consists of class I general residential area (22 percent), class II general residential area (73 percent), and class III general residential area (5 percent) (Seoul Metropolitan Government and Dongjak-gu, 2017).

Buildings

The total number of buildings in Sangdo 4-dong is 7650, with 57 percent multiplexes, 13 percent multi-household houses, 10 percent tenement houses, 8 percent detached houses, and 9 percent apartments (Seoul Metropolitan Government and Dongjak-gu, 2017). Old buildings that were built for more than 20 years accounted for 65.9 percent, and most of them consist of old detached houses and multiplexes. Since the regeneration project started, two or three lots have been combined to build urban living houses and villas. About 30 new constructions were reported in 2015 (Seoul Metropolitan Government and Dongjak-gu, 2017).

Public facilities and resources

Public facilities located in Sangdo 4-dong include one public institution, a community centre, and two parks—Sangdo Neighbourhood Park and Dohwa Park. There are two schools—Sangdo Elementary School and Guksabong Middle School—four kindergartens, 20 daycare centres, six senior centres, and two senior welfare facilities on the site. There is one public car park in the basement of Dohwa Park (Seoul Metropolitan Government and Dongjak-gu, 2017).

The urban regeneration site is the area excluding the Seongdaegol residential environment management project maintenance area from Sangdo 4-dong. Seongdaegol was excluded from the urban regeneration project area because it was already invested in by the government for the residential environment management project in June 2015 (Seoul Metropolitan Government Residential Environment Improvement Department, 2015). Seongdaegol was also designated as an energy-independent village and is a representative village where the resident community made efforts for energy saving and energy production. This area influenced Sangdo 4-dong urban regeneration area in which the community leader of Seongdaegol was involved in the process of urban regeneration projects. The details are discussed in Chapter 5, Section 5.2.2.

Furthermore, the Tomb of Yangnyeong Daegun, Seoul's Tangible Cultural Property No. 11, and Guksabong Peak (Sangdo Neighbourhood Park) are located in the centre of the site, which can be viewed as a place with cultural and natural resources. Additionally, Seongdae Market (a traditional market) and an alley market are located at the western boundary of the site.

Climate change issues

Dongjak-gu, where Sangdo 4-dong is located, saw natural hazards including typhoons, strong winds, heavy rain, heavy snow, and heatwaves from 2010 to 2019, as shown in the Seoul Open Data Plaza (Table 4-13). In 2010 and 2011, when there was much precipitation—the number of flooded houses was 1,365 and 1393 respectively, and there was 1,050,800,000 KRW worth of damage in 2011 alone.

Table 4-13 Damage from natural hazards in Dongjak-gu from 2010 to 2019

Year	Deaths or disappearances	Victims	Flooded households	Estimated damage (1,000 KRW)*		
				Total	Buildings	Public facilities
2010	-	2752	1365	819000	819000	-
2011	2	2829	1393	1050800	850800	200000
2012	-	-	8	4800	4800	-
2019	-	-	1	21000	21000	-

* 1 EUR=1,345.05 KRW (as of 27 May 2022)

Source: own compilation based on 'Statistics on the occurrence of natural disasters in Seoul—Data Set—Seoul Open Data Plaza' (2021)

According to the Detailed Implementation Plan for Climate Change Adaptation Plan in Dongjak-gu, there were 60 news articles related to damage from climate change from 2005 to 2010 and 299 news articles from 2010 to 2014. Among all articles surveyed, hazards and hazard-related articles accounted for the most with 210 articles—there were 112 articles about torrential rains, 31 about floods, 18 about coldwaves, 18 about heavy snowfalls, 14 about victims of natural

hazards, 13 about typhoons, and four about frozen waves. There were 132 health-related articles, of which 70 were on air pollution, 30 on heatwaves, 18 on coldwaves, ten on food-related hazards, three on infectious diseases, and one on heat illness. There were 17 articles related to water management and forest ecosystems, of which six were about water pollution, three about wildfires, three about landslides, three about ecological disturbances, and two about droughts. In the case of hazards-related articles, the number of articles increased sharply in 2011—when damage was caused by torrential rain—and in the case of health-related articles, the number of articles increased sharply in 2014 due to air pollution such as ozone and fine dust (Seoul Metropolitan Government, 2015c).

4.2.3 Amsa-dong

Amsa-dong, which belongs to Gandong-gu, has a long history as a representative residential area from prehistoric times to the present. At the prehistoric site in Amsa-dong, 28 hut sites were excavated and comb-patterned earthenware was discovered (Lee and Gim, 2019). In regard to the recent urban development issue, it was designated as a residential reconstruction maintenance area in 2010 but was lifted from the planned maintenance area in 2013 due to the real estate recession (C. Park, 2018).

<u>Demographics</u>

Amsa 1-dong has a population of 37753 with 11.7 percent of those aged 0-14, 19.0 percent aged 15-29, 34.3 percent aged 30-49, 23.1 percent aged 50-64, and 12.0 percent aged 65 and over (Seoul Metropolitan Government and Gangdong-gu, 2017; 'Seoul Statistics Service—Statistics—Seoul Open Data Plaza (2015, 4th quarter)', 2021). The proportion of elderly residents is slightly higher than the Seoul average, and the population decline rate from 2012 to 2015 is 4.5 percent (Seoul Metropolitan Government and Gangdong-gu, 2017).

<u>Geographical profile</u>

Amsa-dong is located in the northernmost part of Gangdong-gu, close to the eastern boundary of Seoul and is south of the Han River. The Han River is located to the west of the site, and Amsa History and Ecological Park is located to the north. It is a generally flat topography (Seoul Metropolitan Government and Gangdong-gu, 2017). The roads within the Amsa-dong site are relatively wide compared to other study areas. However, since the main road within the site is eight to 15 m wide and the pavement and road are not separated, safety problems are occurring. The land-use of the target site consists of a general residential area, a quasi-residential area, and a green natural area. Among them, general residential areas account for 91.5 percent of the total (Seoul Metropolitan Government and Gangdong-gu, 2017). In addition, part of the target site is

designated as a historical and cultural aesthetic district, a general aesthetic district, and an Amsa district unit planning district.

Buildings

Residential buildings account for 84.2 percent of the total 2,245 buildings in the Amsa urban regeneration area (Seoul Metropolitan Government and Gangdong-gu, 2017). As for the largest number of buildings, 64.1 percent is multi-family housing, 20.1 percent are detached houses, 8 percent are class I neighbourhood living facilities, 5 percent were class II neighbourhood lifestyle facilities, and 2.8 percent were other facilities (Seoul Metropolitan Government and Gangdong-gu, 2017). As for the building structures, 55.3 percent are constructed of brick concrete, 44.2 percent of reinforced concrete, and 0.5 percent of other materials (Seoul Metropolitan Government and Gangdong-gu, 2017). 72.9 percent of buildings at Amsa-dong are more than 20 years old (Seoul Metropolitan Government and Gangdong-gu, 2017).

Public facilities and resources

Although there are three children's parks within the site (Saejangteo Children's Park, Byeotwoomool Children's Park, and Amsa Public Car Park Children's Park), the areas are very small, so the park area per person is only 0.12m^2/person (the average area of parks per person in Seoul is 16.17 m^2) (Seoul Metropolitan Government and Gangdong-gu, 2017). In addition, there are two municipal daycare centres, eight municipal welfare facilities (women, the elderly, children, and youth), two Seoul-style daycare centres and six cultural facilities such as libraries—relatively many compared to other urban regeneration areas.

The Historical Site of Amsa-dong (National Cultural Heritage Site No. 267 and in the process of being listed as a World Heritage Site) is located nearby. Another resource of Amsa-dong is related to urban agriculture—there are urban agriculture-related projects and festivals held throughout Gangdong-gu. Starting with the Gangil-dong Experience Farm in 2009, facilities specialised in urban agriculture such as agricultural education, urban agriculture academy, and urban agriculture festivals and urban vegetable gardens are located across Gandong-gu (Seoul Metropolitan Government and Gangdong-gu, 2017). There are a total of 305 farmhouses, 50 eco-friendly certified farms, and eight vegetable gardens for sale (40078 m^2) (Seoul Metropolitan Government and Gangdong-gu, 2017). There is also the Amsa General Market with a total of 120 stalls within the site.

Climate change issues

In Gangdong-gu, there was a lot of damage to houses from 1984 to 1990 due to the lack of drainage facilities in preparation for torrential rain. Typhoon 'Uto' and the rainy season front in 2001 caused localised torrential downpours of up to 99.5 mm per hour, causing 163 buildings and 11.6 ha of farmland in the Gangil-dong area to be flooded with the damages continuing to the present day.

Despite the expansion of the rainwater pumping station, the flood damage caused by the heavy rains in 1998, 2010, and 2011 was mostly concentrated in semi-basement houses (Gangdong-gu, 2016). As a measure to prevent flooding in semi-underground houses, 1,594 automatic pumping facilities were installed in 1,393 households, 11,265 in check-side areas, and 3,369 water barriers (Gangdong-gu, 2016). The community government of Gangdong-gu normally installs flood prevention facilities such as clapboards and automatic submersible pumps on semi-basement housing units for free and posts rainfall and rainwater pumping station operation status on the community government office website in real-time (Gangdong-gu, 2016).

Gangdong-gu, to which Amsa-dong belongs, showed a vulnerability in water management (water drainage, water quality, and aquatic ecology) according to VESTAP (Seoul Metropolitan Government and The Seoul Institute, 2017). Damages caused by natural hazards (typhoon, strong wind, heavy rain, heavy snow, heatwave) that occurred during the ten years from 2010 to 2019 in Gangdong-gu are summarised in Table 4-14. Notably, damages such as flooded houses and/or economic losses were steadily appearing in 2010, 2011, 2012, 2016, 2017, and 2018 (Table 4-14).

Table 4-14 Damage from natural hazards in Gangdong-gu from 2010 to 2019

Year	Deaths or disappearances	Victims	Flooded households	Estimated damage (1,000 KRW)*		
				Total	Buildings	Public facilities
2010	-	3136	1388	887135	847800	39335
2011	1	2933	1325	795000	795000	-
2012	-	76	34	20400	20400	-
2016	-	-	18	-	-	-
2017	-	-	14	8400	8400	-
2018	-	-	12	10800	10800	-
2019	-	-	-	-	-	-

* 1 EUR=1,345.05 KRW (as of 27 May 2022)

* No cases of damage were reported to the autonomous district in 2013, 2014, and 2015

Source: own compilation based on 'Statistics on the occurrence of natural disasters in Seoul—Data Set—Seoul Open Data Plaza' (2021)

In particular, two tenement houses in the Amsa-dong urban regeneration area were designated as D-grade in their safety diagnoses in 2010 due to their serious deterioration; cracks in the walls, weakly constructed insulation, and leaning walls were reported (Gangdong-gu, 2016). These issues are considered to pose serious risks in the event of a flood or typhoon (Gangdong-gu, 2016).

4.2.4 Garibong-dong

As the industrial structure changed after the 1990s, the manufacturers and industries in Guro Industrial Complex moved out, and accordingly, the workers who used to live in Garibong-dong, which is located right next to the industrial complex, also moved out. After this, Garibong-dong became popular amongst Chinese compatriots due to its low rental costs and flexibility of housing contracts.

Garibong-dong was also designated as a renewal acceleration district, but this was lifted in 2014 due to the opposition of the residents. Further, there is a serious conflict among residents over urban development in general (Seoul Metropolitan Government, 2015b).

<u>Demographics</u>

Garibong-dong has a total population of 18,934. As for the population distribution, 0-14 years old residents account for 5.0 percent of the population, 15-29 years old 12.0 percent, 30-49 years old 35.7 percent, 50-64 years old 36.3 percent, and 65 years old or older 10.9 percent (Seoul Metropolitan Government, 2017a; 'Seoul Statistics Service—Statistics—Seoul Open Data Plaza (2015, 4th quarter)', 2021). Although the population has continued to decline since 2010, the proportion of foreigners is continuously increasing due to the influx of Chinese compatriots looking for affordable housing. As of 2016, Chinese compatriots accounted for 39.8 percent of the population (Seoul Metropolitan Government, 2017b). However, when considering Chinese compatriots who relocate without completing move-in registration, and are therefore not revealed in the statistics, the ratio is thought to be around 70-80 percent (Seoul Metropolitan Government, 2017b). The reason why Chinese compatriots gather in the area is due to relatively cheap house prices in Seoul, ease of job hunting due to a large number of human resources offices, and the concentration of Chinese stores. In Garibong-dong, single-person or double-person households account for 78.2 percent of the total, as individual households, not families, often migrate in search of work.

<u>Geographical profile</u>

Garibong-dong is a village located on the far right of Guro-gu and is located in southwest Seoul. Guro Digital Complex is located on the north side and Gasan Digital Complex on the south side. 50 percent of the entire site has a relatively high slope and the difference between the highest

topography and the lowest topography is 35 m (Seoul Metropolitan Government, 2017b). In Garibong-dong, the road is very narrow and there are many buildings not adjoined to a road. The number of buildings that are in contact with a road less than four metres or not in contact with a road at all is 823, accounting for 72.9 percent of the total. As for the land-use of the site, 25.7 percent of the site is class II general residential area, 53.4 percent is class II general residential area and 20.9 percent is semi-industrial area. There is also a Garibong Market within the site.

Buildings

1039 buildings—84 percent of the total buildings on the site—are residential buildings and 178 buildings—14.4 percent of the total buildings—are religious, educational, and lodging facilities (Seoul Metropolitan Government, 2017b). Buildings that were constructed over 20 years ago accounted for 84.6 percent of the total, and among them, those that were over 40 years old accounted for 31.4 percent, with most of the buildings seriously ageing (Seoul Metropolitan Government, 2017b). In particular, in Garibong, 465 jjokbang (also called beehive) buildings among residential buildings and 66.9 percent of jjokbangs over 30 years old are in a serious state of deterioration (Seoul Metropolitan Government, 2017b). Low-income families and Chinese compatriots are living in jjokbangs because of the low deposit and monthly rent. It used to be a residential space for Guro Industrial Complex workers in the 1970s and 1980s, but after the 1990s, the workers left and Chinese compatriots began to move in. It is a type of dwelling in which the kitchen and bathroom are shared.

Public facilities

There is no park green space on the site, so the living environment of residents is poor. There is one public car park on the site. There are two public institutions (a public office building and a community centre) and a cultural facility (Seoul Metropolitan Government, 2017b). There is also one national and public daycare centre and one social welfare facility (Seoul Metropolitan Government, 2017b). Compared to other regions, Garibong-dong lacks public facilities and convenience facilities.

Additional issues

There have been many cases of crimes such as rape, robbery, murder, theft, and violence in Garibong-dong, so there is a negative perception about security in the area. Furthermore, Garibong has a serious problem of illegal waste dumping. Many people dump refuse without using the volume-based bags, which are not picked up by waste-collection workers, resulting in unpleasant aesthetics of the alley. In addition, there are many places where vacant and abandoned

houses are left unattended for a long time in the site, where various crimes and homeless people are concentrated, so residents do not feel safe.

Climate change issues

Table 4-15 shows the statistics on damage caused by natural hazards (typhoons, strong winds, heavy rain, heavy snow, and heatwaves) that occurred in Guro-gu from 2010 to 2019. In 2010, 2011, 2012, 2017, and 2019, flood damage caused many victims and economic damages (Table 4-15).

Table 4-15 Damage from natural hazards in Guro-gu from 2010 to 2019

Year	Deaths or disappearances	Victims	Flooded households	Estimated damage (1,000 KRW)*	
				Total	Buildings
2010	-	4008	1768	1060800	1060800
2011	-	685	338	202800	202800
2012	-	200	94	56400	56400
2017	1	-	3	1800	1800
2019	-	-	1	21000	21000

* 1 EUR=1,345.05 KRW (as of 27 May 2022)

Source: own compilation based on 'Statistics on the occurrence of natural disasters in Seoul—Data Set—Seoul Open Data Plaza' (2021)

The precipitation in Guro-gu is higher than the average for Seoul and for Korea as a whole, so it is expected that the impact of precipitation will increase in the future (Korea Meteorological Administration, 2016). Northeast Garibong-dong has a steep slope, and when torrential rain comes, it can cause great flood damage. In fact, in 2010, 69 households in Garibong-dong experienced flood damage. Furthermore, there is a very high risk of collapse of the ageing walls in the slope area (Seoul Metropolitan Government, 2017b).

5 URBAN REGENERATION AND CLIMATE CHANGE POLICIES IN KOREA

In Chapter 4, the features of Seoul and four neighbourhoods in Seoul are introduced. Chapter 5 outlines two sectors of policy, urban regeneration and climate change policies and the process of the integration of climate measures into urban regeneration. Section 5.1 introduces urban regeneration policy and plan at national and city levels as well as the urban regeneration revitalisation plans in four neighbourhoods. It then describes the process and typical stakeholders of urban regeneration. Section 5.2 identifies the main climate change policies at national, city, and community levels. The identification of climate change policy at different levels of government allows understanding of the existing climate measures and policy structure that could be integrated into urban regeneration policy and plans. Section 5.3 describes the integration of climate measures in the process of urban regeneration and evaluates the level of integration of climate measures in urban regeneration policies and plans. The chapter is concluded with a summary in Section 5.4.

5.1 URBAN REGENERATION POLICY AND PLAN AT NATIONAL, CITY, AND COMMUNITY LEVELS

5.1.1 Urban regeneration policy in Korea

The concept of urban regeneration was introduced to Korea by Seoul's urban regeneration projects such as the Bukchon village project in 2001 (Kim, 2008; Seoul Metropolitan Government, 2015b). Bukchon Hanok[23] Village is a representative hanok-dense area that retains the unique residential culture of the Korean people. The village has been revitalised by preserving the village that had been damaged by large-scale urban development—this has been achieved through the participation of residents and experts ('Seoul Metropolitan Government—Housing—Village Creation Practices—Bukchon Hanok Village', 2014). It was the time when existing ways of urban development such as urban redevelopment and reconstruction had negative issues such as gentrification and deterioration of areas when urban development projects cannot be promoted due to lack of business potential (Y. S. Kim, 2019). Furthermore, rather than urban development through the total demolition method, small-scale remodelling while maintaining the characteristics of the existing community, building a liveable village that maintains or restores the community, and a comprehensive regeneration approach was emphasised (Lee *et al.*, 2017).

The Ministry of Land, Transport and Maritime Affairs (former name of The Ministry of Land, Infrastructure and Transport) selected urban regeneration Research and Development (R&D) as

[23] Hanok is a traditional Korean house style.

one of the future new growth engines of the Republic of Korea in 2006, formulated the urban regeneration project team, and invested 943.9 billion KRW for the R&D project (Urban Regeneration Project Team, 2014). With the urban regeneration project team as the centre, the movement to pursue socio-economic regeneration beyond physical reorganisation continued based on Japan's policies such as village development projects, urban regeneration and central city revitalisation, and urban regeneration cases in England and France (Lee *et al.*, 2017). As a new town exit strategy, the Seoul Metropolitan Government actively promoted the village development project after Mayor Park Won-soon took office, and it influenced the movement to enact the Special Act on Promotion of and Support for Urban Regeneration which was enacted in 2013, resulting in the formulation of the legal basis for urban regeneration projects nationwide (Cho, 2015; Lee *et al.*, 2017; Y. S. Kim, 2019).

After the inauguration of the Moon Jae-in government in 2017, Urban Regeneration New Deal was selected as one of 100 national tasks with a plan that 10 trillion KRW would be used for the Urban Regeneration New Deal (Y. S. Kim, 2019). Urban Regeneration New Deal is a national urban innovation project that enhances urban competitiveness and creates jobs by revitalising old residential areas and decaying old towns through regional initiatives (Ministry of Land, Infrastructure and Transport, 2018b).

<u>Concept of urban regeneration and its types</u>

According to the Special Act on Promotion of and Support for Urban Regeneration, urban regeneration means:

> Economic, social, physical, and environmental revitalisation of a city which is declining due to depopulation, change of industrial structure, urban sprawl, deterioration of the dwelling condition, etc. by strengthening local capacity, introducing and creating new functions, and utilising local resources (Special Act on Promotion of and Support for Urban Regeneration (Act No. 16562, Aug. 27, 2019, Article 2(1)).

For the purpose of urban regeneration, urban regeneration revitalisation areas are designated based on specific standards which are determined by a strategic plan for urban regeneration (Special Act on Promotion of and Support for Urban Regeneration). The strategic plan for urban regeneration includes designation standards of urban regeneration revitalisation areas complying with the Special Act on Promotion of and Support for Urban Regeneration Article 13(4) which states that:

> Where a developer of a strategic plan intends to designate an urban regeneration revitalisation area based on a strategic plan for urban regeneration, at least two of the following requirements shall be met: 1. An area experiencing a sharp population decline; 2. An area where the industrial decay,

> such as a decrease in the total number of enterprises, is occurring; 3. An area where the dwelling condition is worsening, such as by an increase in deteriorated housing (Special Act on Promotion of and Support for Urban Regeneration (Act No. 16562, Aug. 27, 2019, Article 13(4)).

The detailed standards for designating urban regeneration revitalisation areas are stated as:

> Enforcement Decree of the Special Act on Promotion of and Support for Urban Regeneration—Article 17 (Detailed Standards for Designating Urban Regeneration Revitalisation Areas)
>
> The detailed standards for designating urban regeneration revitalisation areas under Article 13 (5) of the Act shall be as follows:
>
> 1. An area where the population is drastically decreasing: an area falling under any of the following: (a) An area where the population has decreased by not less than 20 percent compared to the time when the population was the largest during the last 30 years; (b) An area where the population has decreased for three consecutive years for the last five years;
>
> 2. An area where the industry departure, such as a decrease of the total number of enterprises, is occurring: an area falling under any of the following: (a) An area where the total number of enterprises according to the result of the Census on Establishments approved by the Statistics Korea under Article 18 of the Statistics Act for the last ten years (hereafter referred to as "total number of enterprises" in this subparagraph) decreased by not less than five percent compared to the time when the total number of enterprises was the largest; (b) An area where the total number of enterprises has decreased for not less than three consecutive years for the last five years;
>
> 3. An area where the dwelling condition is deteriorating, such as by an increase of decrepit housing: an area where the ratio of buildings the construction of which was completed not less than 20 years ago, is not less than 50 percent (Special Act on Promotion of and Support for Urban Regeneration (Act No. 16562, Aug. 27, 2019, Article 13(5)).

There are five types of urban regeneration for national urban regeneration: Saving our neighbourhood type, residential support type, general neighbourhood type, central city type, and economy-based type (Table 5-1). An urban regeneration revitalisation area is designated as one of these types based on the size and the characterisation of the area.

Table 5-1 Types of urban regeneration revitalisation areas in the Republic of Korea

Type	Residential regeneration type		general neighbourhood type	Central city type	Economy-based type
	Saving our neighbourhood type	Residential support type			
Legal type	-	Neighbourhood regeneration type			Economy-based type
Legal basis	Special Act on Balanced National Development	Special Act on Promotion of and Support for Urban Regeneration			
Project area	Small residential area (less than 50,000 ㎡)	Residential area (50,000-100,000 ㎡)	A quasi-residential area, alley market area (100,000-150,000 ㎡)	commerce, local commercial area (less than 200,000 ㎡)	Industrial area, local economic area (less than 500,000 ㎡)
Target area	Small low-rise residential area	low-rise residential area	Alley market and residential areas	Commerce, business, history, tourism, culture and art, etc.	Station area, industrial complex, port, etc.
Subsidy limit with duration	5 billion KRW* in 3 years	10 billion KRW in 4 years	10 billion KRW in 4 years	15 billion KRW in 5 years	25 billion KRW in 6 years
Infrastructure, public facility	Living convenience facilities such as car parks and shared facilities	Convenience facilities such as alley maintenance, car park, and shared facilities	Small public, welfare, convenience facilities	Medium-sized public, welfare, convenience facilities	Medium-sized or larger public, welfare, and convenience facilities

*1 EUR=1,345.05 KRW (as of 27 May 2022)

Source: own compilation based on Ministry of Land, Infrastructure and Transport (2019a); 'Urban Regeneration Comprehensive Information System—Urban Regeneration New Deal Project' (n.d.)

Main research on urban regeneration

The urban regeneration R&D project was carried out from 2006 to 2014 with the participation of 67 research institutes and 262 companies (Urban Regeneration Project Team, 2014). The objective of the R&D project was to improve the policies, institutions, environment, energy, and construction technology related to urban regeneration. This was to be achieved by approaching the problems of declining urban areas, such as the old downtown areas in Korea, from a comprehensive perspective that accounts for the economy, society, culture, and environment. Ultimately, it was about improving the quality of life and securing the competitiveness of urban areas (Urban Regeneration Project Team, 2014). The project consisted of three stages: the development stage of four urban regeneration core technologies, the urban regeneration model verification stage, and the urban regeneration model completion stage. The four urban regeneration core technologies are (1) regeneration techniques and support systems for declining cities, (2) social integration residential community regeneration technology, (3) old downtown mixed-use space regeneration technology, and (4) urban system green regeneration technology. These technologies were applied to testbeds such as Changwon, Jeonju, Cheonan, Busan, Cheongju, Daejeon, and Jeju. The R&D project played a significant role in establishing urban regeneration policy and preparing for the management system of urban regeneration projects.

'Research for the Establishment of Basic Policy for National Urban Regeneration' was performed in April 2014 by the Korea Research Institute for Human Settlements (Korea Research Institute for Human Settlements and Ministry of Land, Infrastructure and Transport, 2014). It was submitted to the Ministry of Land, Infrastructure and Transport to formulate the Basic Policy for National Urban Regeneration—this is a national policy to provide a general vision, objectives and principles of urban regeneration, roles of urban regeneration stakeholders, and main urban regeneration policies that the country should focus on. The scope of the study not only provides the content of the national basic policy but also justifies the inclusion of policy statements, including details and foreign cities' cases that support the policy content. The Korea Research Institute for Human Settlements was the main research institute. A variety of universities and public and private research institutes participated as external researchers and advisors.

Designation of urban regeneration revitalisation areas

Urban regeneration revitalisation areas have been designated actively since 2014 in the Republic of Korea. 13 areas were designated as leading urban regeneration revitalisation areas in 2014 and 33 areas were designated more in 2016. After the beginning of the urban regeneration new deal policy, in 2017, 68 pilot areas were confirmed for regeneration. The number of designated urban regeneration revitalisation areas increased in 2018 when 99 areas were designated. Among these

areas, 69 were designated by the city and province governments and only 30 areas were designated by the national government—this was done in a bid to enhance the authority and responsibility of city and province governments. In 2019 and 2020, 98 and 117 urban regeneration revitalisation areas were designated respectively ('[Policy Wiki] Policies at a glance—Urban Regeneration New Deal,' 2020; 'Urban Regeneration Information System—Urban Regeneration New Deal Project,' n.d.).

Urban regeneration policy at national level

At national level, urban regeneration policy includes the Special Act on Promotion of and Support for Urban Regeneration, Basic Policy for National Urban Regeneration, Guidelines for the Formulation of Strategic Plans for Urban Regeneration and Guidelines for Formulation of Neighbourhood Regeneration Revitalisation Plan. These laws and policies have been formulated by the Ministry of Land, Infrastructure, and Transport, the Republic of Korea, supported by Korea Research Institute for Human Settlement, Architecture & Urban Research Institute, and Korea Land & Housing Corporation.

The act was released in 2013 and revised seven times until 2019 (as of 2021). The purpose of this act is as follows:

> To contribute to the enhancement of the quality of life of the people as evidenced by the expansion of a foundation for sustainable growth of cities, improvement of competitiveness of cities, and recovery of the local community, by strengthening the support and public role in the economic, social, and cultural revitalisation of cities (Special Act on Promotion of and Support for Urban Regeneration (Act No. 16562, Aug. 27, 2019, Article 1).

This act states definitions of the terms related to urban regeneration, including but not limited to, urban regeneration, basic policy for national urban regeneration, strategic plan for urban regeneration, developer of strategic plans, urban regeneration revitalisation area, urban regeneration project, community company. It also discusses the promotion system of urban regeneration, such as the establishment of a dedicated organisation for urban regeneration, urban regeneration support organisation, and urban regeneration support centres. The act defines the role of a developer of strategic plans of urban regeneration and the contents of the plan. According to the act, the developer who establishes the plan shall perform basic investigations and hold a public hearing in advance to gather the opinions of residents and relevant experts and consider them when creating the plan. The act also states general rules of implementation of urban regeneration projects, such as the designation of implementers and general urban regeneration project managers. Measures to support urban regeneration revitalisation, such as coexistence agreements, special accounts, and a comprehensive information system for urban regeneration

are also stated in the act. Lastly, the designation and characteristics of special urban regeneration areas—such as urban regeneration leading areas, special regeneration areas, and innovation districts—are determined in the act.

Basic Policy for National Urban Regeneration was established in 2013 and released to the public in 2014 based on the Special Act. The basic policy was prepared relatively late considering that the special act was already released in 2013. It is established by the Minister of Land, Infrastructure and Transport every ten years, and it may be re-examined and renewed every five years. According to the act, Basic Policy for National Urban Regeneration means:

> A national urban regeneration strategy that is established in order to push forward urban regeneration in a comprehensive, planned, and efficient manner (Special Act on Promotion of and Support for Urban Regeneration (Act No. 16562, Aug. 27, 2019, Article 2(1)).

Although this basic policy provides a general vision, objectives, and rules that an urban regeneration plan shall pursue, it does not state specific and detailed guidelines. It does include the following contents: the significance and purpose of urban regeneration; the vision, objective, and principles of urban regeneration; the main policies to be actioned by the state; the basic direction and principle regarding preparation for a strategic plan for urban regeneration and an urban regeneration revitalisation plan; the standards for designating an urban regeneration leading area; the standards for gauging the decline of cities and standards for diagnosis thereof; the scope and national minimum standard of basic living infrastructure; and other matters necessary for urban regeneration revitalisation prescribed by presidential decree.

The 'Guidelines for the Formulation of Strategic Plans for Urban Regeneration' was first established in 2014 by the Ministry of Land, Infrastructure and Transport and Korea Land & Housing Corporation. It states detailed criteria, processes, and directions to create a strategic plan for urban regeneration with detailed examples. It is suggested that city governments follow the guidelines and fulfil the criteria to formulate their strategic plans, but the guidelines also state that the context and circumstances of each city may mean there are variations from one plan to another. A strategic plan for urban regeneration is a plan to establish an urban regeneration promotion strategy by investigating plans, projects, and programmes related to urban regeneration and by designating urban regeneration revitalisation areas in the city (*Special Act on Promotion of and Support for Urban Regeneration*, 2013).

The guidelines define the characteristics and roles of a strategic plan of urban regeneration. It then specifies the purpose, contents, and methods for basic investigation for formulating the strategic plan. It also provides guidelines for specific planning such as the designation of urban

regeneration revitalisation area, diagnosis of shrinkage, establishment of dedicated organisations, financing measures, and so on.

'The Guidelines for the Formulation of Urban Regeneration Revitalisation Plans' was established in 2014 by the Ministry of Land, Infrastructure and Transport, Korea Land & Housing Corporation. An urban regeneration revitalisation plan is an implementation plan that is established by the state, local governments, public institutions, residents, etc. in urban regeneration revitalisation areas (*Special Act on Promotion of and Support for Urban Regeneration*, 2013). The guidelines discuss the main considerations for formulating urban regeneration revitalisation plans, contents and methods of preliminary surveys, considerations when creating detailed plans, and measures for operating and revitalising organisations related to urban regeneration. When the study areas formulated the urban regeneration revitalisation plans, these guidelines were available. The guidelines apply to any urban regeneration revitalisation area at national level. Seoul Metropolitan Government and Seoul Urban Regeneration Support Centre published 'Guidelines for Implementation of Seoul-type Urban Regeneration Revitalisation Plan—Neighbourhood Regeneration General Type' in July 2019; it's important to note the publication was after the completion of the formulation of urban regeneration revitalisation plans in the study areas, meaning the areas were not afforded guidance by this document.

5.1.2 Urban regeneration policy and plan in Seoul

Although urban regeneration is being promoted nationwide, urban regeneration in Seoul is the most numerous and diverse in terms of project types and the most leading and innovative in terms of planning techniques (Cho, 2015). Table 5-2 states the types of urban regeneration in Seoul. Seoul Metropolitan Government has different classifications of urban regeneration as shown in the table. The scope of the concept of Seoul-type urban regeneration is wider than the concept of urban regeneration at national level. In other words, Seoul-type urban regeneration includes not only urban regeneration projects based on the Special Act on Promotion of and Support for Urban Regeneration but also other projects based on the Act on the Improvement of Urban Areas and Residential Environments and the Special act on Balanced National Development.

Table 5-2 Types of urban regeneration of Seoul

Seoul type		Types on law		Related law	No. of projects
Job creation centre fostering type	Aiming to create drivers of jobs and growth by cooperation between public and private sectors (large scale shrinking areas)	Economy-based type		Special Act on Promotion of and Support for Urban Regeneration	4
Living downtown specialised type	Aiming to make the areas centres for the neighbouring region (shrinking commercial and industrial areas with historic values and resources)	Neighbourhood regeneration type	Central city type		9
Residential area regeneration type	Aiming to improve residential environments and community revitalisation (areas with poor quality residential buildings)		General neighbourhood type		11
			Residential areas support type		3
			Saving our neighbourhood type		2
		Residential environment improvement project		Act on the Improvement of Urban Areas and Residential Environments	76
		Urban vitality enhancement project		Special Act on Balanced National Development	11
		Saeddeul maeul project			2
Expansion of centre base type	Aiming to revitalise the areas and expand the growth impact to the neighbouring areas (large scale and abandoned public land)	Seoul type urban regeneration project		Not applicable	12
		Alley regeneration project			2

Source: own compilation based on Seoul Metropolitan Government (2018a)

Seoul Metropolitan Government formulated its strategic plan for urban regeneration in compliance with the Special Act on Promotion of and Support for Urban Regeneration, Basic Policy for National Urban Regeneration, and Guidelines for the Formulation of Strategic Plans for Urban Regeneration. It also created guidelines for the implementation of the urban regeneration revitalisation project.

The process of urban regeneration at city level consists of agenda-setting, policy process, and policy output. Aside from the Seoul Metropolitan Government, other stakeholders are involved in the process of urban regeneration at city level, including The Seoul Institute, the public, Seoul City Council, relevant administrative agencies, and the Seoul Urban Planning Committee.

According to the Special Act on Promotion of and Support for Urban Regeneration, a strategic plan for urban regeneration refers to:

> A plan for a developer of a strategic plan to establish an urban regeneration promotion strategy by investigating and exploring various plans, projects, programmes, tangible and intangible regional assets, etc. related to urban regeneration, and by designating an urban regeneration revitalisation area for the whole city or areas of a city, or, if necessary, not less than two cities in consideration of the basic policy for national urban regeneration (Special Act on Promotion of and Support for Urban Regeneration (Act No. 16562, Aug. 27, 2019, Article 2(1)).

Being compliant with the Special Act on Promotion of and Support for Urban Regeneration and guidelines established by the national government, the Seoul Strategic Plan for Urban Regeneration was formulated in 2015 and renewed in 2018. It is formulated every ten years and, if necessary, it can be rearranged every five years according to the special act. The primary contents of this plan include the analysis of the shrinking status of the city; the basic vision of urban regeneration in Seoul; the selection criteria of urban regeneration revitalisation areas and ways to manage them; and the structure of implementation, support, and evaluation.

The main three visions of urban regeneration in Seoul were stated in the strategic plan. First, to alleviate low growth and enhance Seoul's sustainable competitiveness, the urban regeneration plan aims to expand new growth engines, revitalise the local (social) economy, and achieve balanced regional development. Second, in areas where it is difficult to carry out existing methods of urban development, the urban regeneration plan aims to improve the built environment and the quality of life for citizens by restoring local communities, strengthening local identity, and expanding people-centred infrastructure. Third, to create an environment where the private sector (residents, landowners, business owners, etc.) can improve local issues, the urban regeneration plan aims to build a sustainable urban regeneration foundation (Seoul Metropolitan Government, 2015b).

The city government designates urban regeneration revitalisation areas among community governments that submit proposals to the city and national government. The standards for designating urban regeneration revitalisation areas are stated in the Seoul Strategic Plan for Urban Regeneration of 2015 and were revised in 2018, although the four study areas were designated as urban regeneration revitalisation areas in 2014 with different designation criteria (B. J. Park, 2014; Seoul Metropolitan Government, 2015b).

15 projects were submitted by 14 community governments. The Seoul Metropolitan Government conducted an in-depth evaluation with an evaluation committee composed of experts in each field, such as architecture, urban planning, transportation, history and culture, and city councillors ('[Law/Guideline] First five selected 'Seoul-type Urban Regeneration Pilot Project' by living area unit—Policy data—Seoul Urban Regeneration', 2016). The committee reviewed the proposals in three steps: (1) written evaluation, (2) on-site evaluation, and (3) comprehensive evaluation. The main standards for the review were the appropriateness of the pilot project, the capacity of community governments, residents' interest and participation, the ripple effect of the project, and the level of the decline of the area(Table 5-3) ('First 5 selected 'Seoul-type Urban Regeneration Pilot Project' by living area unit—Policy data—Seoul Urban Regeneration,' 2014).

Table 5-3 Evaluation criteria for Seoul-type urban regeneration pilot project

Evaluation criteria	**Contents**
Appropriateness as a Seoul-type urban regeneration pilot project	The reality of early project implementation of project contents
	Adequacy of functional and content linkage between detailed projects
	Whether to adopt a step-by-step, gradual project promotion method
	Local specialisation efforts such as discovery and utilisation of local resources
	Initiative for preservation and utilisation of existing communities
Capacity of community governments	Appropriateness of establishing a cooperative system between dedicated organisations and departments and excellence in operational performance
	Establishment of a system for collecting opinions of stakeholders
	A plan for capacity building of residents
	Possession of similar projects in the relevant autonomous district and the degree of successful implementation
	Possibility of self-financing of community governments
Capacity and participation of residents	Activities of the currently formed resident organisation
	Contents and realisation of existing private proposal projects
	Measures to discover village workers and strengthen their capabilities
	Measures to induce resident participation
	How to form a partnership with the public
	The revitalisation of the local economy by creating new high-quality jobs

Ripple effect of projects	Appropriateness of the scale of the urban regeneration pilot project
	Effect of enhancing comfort and convenience for a healthy life of residents
Level of decline	The degree of decline in major indicators such as population, number of businesses, and old buildings

Source: own compilation based on Seoul Metropolitan Government (2014b)

Designation standards are stated in the Seoul Strategic Plan for Urban Regeneration in 2015. The first criterion for the designation of an urban regeneration revitalisation area is to meet the legal decline criterion; it must be an area that satisfies at least two of these three criteria, such as an area where population declines, industrial evacuation, and ageing of buildings (see Section 5.1.1). The second criterion is a quantitative evaluation of the Seoul Complex Decline Index introduced by the Seoul Metropolitan Government, and a qualitative evaluation of residents' capacity. The Seoul Complex Decline Index was developed because 76 percent of neighbourhoods in Seoul meet the legal decline criterion (Seoul Metropolitan Government, 2018b). The Seoul Complex Decline Index for the neighbourhood regeneration type is presented in Table 5-4. The qualitative evaluation criteria of the neighbourhood regeneration (general neighbourhood type) are the potential based on the capabilities of residents and local characteristics (Seoul Metropolitan Government, 2015b).

Table 5-4 Seoul Complex Decline Index for the neighbourhood regeneration type

Category (weighted value)	**Index**
Population and society (59)	Elderly population ratio (over 65 years old)
	Net migration rate
	Number of recipients of assistance based on the National Basic Living Security Act
	Tenant household ratio
	Number of social welfare facilities (per thousand people)
Industry and economy (13)	Change in the number of businesses (ten years)
	Change in the number of employees (ten years)
	Number of wholesalers and retailers
	Official land value
	Local tax collection amount
Physical environment (28)	Ratio of old buildings (over 30 years)
	Inaccessible land by car
	Car park rate
	Number of building permits (last five years)
	Urban park area ratio

Source: own compilation based on Seoul Metropolitan Government (2015a)

According to the strategic plan for urban regeneration, the characteristics of the general neighbourhood type, to which the four study areas belong, include (1) areas that have declined due to population decline and ageing but need to maintain local characteristics and (2) areas have been released from the designation as an urban renewal acceleration district and have complex problems such as lack of community cohesion and physical deterioration. The strategic plan also defines the characteristics of projects of this type. The projects for this type have a ripple effect at neighbourhood level, such as improving the residential environment based on the residents' needs in their neighbourhood, revitalising the neighbourhood economy, and improving the living-friendly infrastructure by strengthening the capacity of the resident community (Seoul Metropolitan Government, 2015b).

The main regeneration direction and strategies for old residential areas, which are presented in the strategic plan, are an important guide for communities that plan to design urban regeneration projects. The main regeneration directions stated in the strategic plan are (1) to improve the residential environment tailored to the village unit while considering the characteristics of the area and the residents; (2) small-scale gradual community-based improvement; and (3) to regenerate eco-friendly residential areas by improving the energy efficiency of old houses and to expand living infrastructure that considers the handicapped pedestrians. In order to achieve this regeneration, the strategies presented in the strategic plan include not only improving the physical environment of old low-rise residential buildings, but also creating a residential regeneration model that integrates society, economy, and environment. Furthermore, it aims to induce self-renewal by strengthening the capacity of residents and expanding public support while more carefully expanding the large-scale maintenance project area (Seoul Metropolitan Government, 2015b).

The Seoul Strategic Plan for Urban Regeneration was revised in 2018. The plan had updated urban regeneration revitalisation areas that had been designated after the release of the first strategic plan which was released in 2015. The new version of the plan discusses not only the performances and challenges of urban regeneration projects in Seoul in the past but also major changes in the strategic plan for urban regeneration. The major changes include expansion of the range and type of urban regeneration, designation of additional urban regeneration revitalisation areas, standards of designation of urban regeneration revitalisation areas, assignment of actors' roles, and improvement of implementation and support systems. Also, unlike the previous strategic plan, the new version presents basic concepts of urban regeneration for each of the five regions in Seoul (downtown, northeast region, northwest region, southeast region, and southwest region); these are included so as to achieve the development direction of the 2020 Seoul Urban

Master Plan, as this also includes general directions for the five regions (Seoul Metropolitan Government, 2015b).

The 'Guidelines for Implementation of Seoul-type Urban Regeneration Revitalisation Plan—Neighbourhood Regeneration General Type' was released in 2019 by Seoul Metropolitan Government. It aims to provide detailed information for the establishment and implementation of urban regeneration revitalisation projects. Community governments within urban regeneration revitalisation areas that plan to create an urban regeneration revitalisation plan are required to follow the guidelines. The guidelines advise on the establishment of organisational structures, the process of creating an urban regeneration revitalisation plan and its implementation, execution of budgets, monitoring, and supporting organisational systems for urban regeneration projects.

Urban regeneration revitalisation areas that this dissertation examines established their plans in 2017 and were implementing their projects in 2019. Therefore, these guidelines were not available for the study areas at that time. However, investigating the guidelines is still valuable as the principles capture the directions pursued by Seoul Metropolitan Government. These principles are in line with the regeneration direction and promotion strategy for old residential areas presented in the Seoul Strategic Plan for Urban Regeneration (2015).

The guidelines state three principles of Seoul-type urban regeneration:

> (1) Voluntary participation and cooperation: The revitalisation project should be conducted through voluntary participation and cooperation of relevant entities such as residents based on public support. To this end, it must be ensured that opportunities are presented for residents and stakeholders of various classes to actively present their opinions and participate in the planning and project execution process.
>
> (2) Social, economic, and physical regeneration: In the process of planning and executing the revitalisation project, the improvement of the physical living environment and social and economic regeneration must occur together.
>
> (3) Establishment of a sustainable system: Through the process of planning and executing the revitalisation project, a structure should be prepared so that sustainable urban regeneration can proceed even after public support is terminated (Seoul Metropolitan Government and Seoul Urban Regeneration Support Centre, 2019, pp. 2-3).

5.1.3 Neighbourhood urban regeneration plans

Seoul Metropolitan Government announced the selection plan for the Seoul-type urban regeneration pilot project in September 2014 and held a briefing session in October. At the end of November, community governments in Seoul prepared a project proposal together with urban

planning companies and submitted it to the Seoul Metropolitan Government. Each community government is in charge of the urban regeneration of the neighbourhood. In December 2014, five pilot projects were selected and announced after evaluation processes by the Seoul Metropolitan Government with the evaluation committee. The five Seoul-style urban regeneration pilot projects include one in the northwest region (Sinchon), two in the northeast region (Jangwi-dong, Seongsu-dong), one in the southeast region (Amsa-dong), and one in the southwest region (Sangdo 4-dong). In principle, it was decided to designate urban regeneration pilot projects evenly for each region. The three study areas of this study, Jangwi-dong, Sangdo 4-dong, and Amsa-dong, were selected for this Seoul-type urban regeneration pilot project (B. J. Park, 2014). The community government (Guro-gu) that includes Garibong-dong submitted its proposal to the Ministry of Land, Infrastructure and Transport's urban regeneration project competition in April 2015 and was selected as an urban regeneration revitalisation area by the Ministry of Land, Infrastructure and Transport in December 2015 (Seoul Metropolitan Government, 2017b).

Areas selected for urban regeneration establish an urban regeneration revitalisation plan about for two years. At this time, an additional 500 million won is provided to hire a company in charge of establishing an urban regeneration revitalisation plan. A total of ten billion won (nine billion won from the city government and one billion won from the community government) is provided for the areas selected as the Seoul-type urban regeneration pilot project (Seoul Metropolitan Government, 2017c; Seoul Metropolitan Government and Dongjak-gu, 2017; Seoul Metropolitan Government and Gangdong-gu, 2017). Garibong-dong received about 11.3 billion won from the city and about 2.5 billion won from the community government (Seoul Metropolitan Government, 2017b). This amount of support is the amount invested in the pump-priming project of the urban regeneration revitalisation plan. There are extra projects, called cooperative projects, which are also included in the urban regeneration revitalisation plan. This cooperative project means a project that can be included in the relevant urban regeneration revitalisation area as a project that is being promoted under the responsibility of other departments in the city and community governments.

In the areas selected as urban regeneration revitalisation areas, revitalisation plan establishment service companies and master planners are hired to work to establish urban regeneration revitalisation plans. The companies are usually those that perform architectural and urban planning, and the master planner is usually a professor at a university. In addition, an urban regeneration on-site support centre was established in each urban regeneration revitalisation area, and the Seoul Urban Regeneration Support Centre was established in Seoul.

Revitalisation plans consist of five sections: an overview of the plan, analysis of the current situation, revitalisation plans and projects, management of related organisations, and plans for financing and budget execution. It analyses the population and social status, spatial and environmental status of the area, analyses the degree of decline, presents the process and results of collecting residents' opinions, and includes goal-setting of the revitalisation plan and the plan of the regeneration project according to the results. In addition, it contains detailed information on the progress from the time when it was selected as an urban regeneration activation area and the establishment of the revitalisation plan, the future implementation plan, the budget execution plan, the progress of governance establishment, and its operation plan.

A community that is designated as an urban regeneration revitalisation area formulates an urban regeneration revitalisation plan complying with the Special Act on Promotion of and Support for Urban Regeneration, Basic Policy for National Urban Regeneration, Guidelines for Formulation of Neighborhood Regeneration Revitalisation Plan, Strategic Plan for Urban Regeneration, and Guidelines for Implementation of Urban Regeneration Revitalisation Projects. Urban regeneration revitalisation plan means:

> An implementation plan established comprehensively by linking various urban regeneration projects which are pushed forward by the state, local governments, public institutions, residents, etc. in an urban regeneration revitalisation area for local development and urban regeneration to comply with a strategic plan for urban regeneration, and falls into one of the following types according to its main purpose and characteristics:
>
> (a) Urban economy-based revitalisation plan:…
>
> (b) Neighbourhood regeneration revitalisation plan: Urban regeneration revitalisation plan for the improvement of the living environment of a residential zone unit, expansion of basic living infrastructure, revitalisation of the community, revival of the local economy, etc. (Special Act on Promotion of and Support for Urban Regeneration (Act No. 16562, Aug. 27, 2019, Article 2(1)).

Guidelines for Formulation of Neighbourhood Regeneration Revitalisation Plan states the procedure for the formulation of urban regeneration revitalisation plans as follows.

(1) As soon as the local urban regeneration supporting centre,[24] the team for the revitalisation plan formulation, and the residents' and merchants' council are established, the project coordinator conducts a diagnosis of the current status of the community's decline, causes, potential, and resources with residents. (2) The project coordinator and the dedicated organisation derive the basic plan for the goal of the revitalisation plan and the core contents for

[24] The dissertation uses the term 'urban regeneration on-site support centre' instead of 'local urban regeneration supporting centre'.

achieving the goal based on the results of the diagnosis of the current status and determine it through discussions with the administrative council and the project promotion council. (3) When the core content is determined, the project coordinator and the dedicated organisation establish an implementation plan for the unit project accordingly. At this time, the administrative council and the project promotion council are gathered continuously to establish an implementation plan by converging and combining projects in various fields and departments. (4) When a unit project is drawn up, a plan for financing and budget execution for the implementation of the unit project is established, centring on a dedicated organisation, and an evaluation and inspection plan such as monitoring performance indicators is established.

Every urban regeneration revitalisation plan includes the establishment and operation of the anchor facility [25] complying with the Special Act on Promotion of and Support for Urban Regeneration. Most of the budget for the pump-priming project is assigned for the construction and operation of the anchor facility in a majority of cases of urban regeneration areas (urban regeneration revitalisation plans of Jangwi-dong, Sangdo 4-dong, Amsa-dong, and Garibong-dong). This is a concept that includes a shared-use facility, which is a necessary facility for environmental improvement in the village, and a base space—a shared space where residents can gather for community cohesion and capacity building (Seoul Urban Regeneration Support Centre, 2019a). It will also become a space for the Community Regeneration Corporation (CRC), the operator of the anchor facility after the completion of urban regeneration projects. The CRC is a cooperative that pursues sustainable urban regeneration by combining and utilising various local agendas. It is a business model developed by Seoul Metropolitan Government, which pursues the sustainment of urban regeneration through empowering residents to be better capable of dealing with local agendas, as part of urban regeneration projects. All urban regeneration revitalisation areas in Seoul are required to establish CRCs to continuously lead the urban regeneration while nurturing the village community and residents ('Seoul Urban Regeneration Support Centre—Seoul Urban Regeneration Corporation (CRC) Support Project,' n.d.).

The revitalisation plans were prepared by three main actors—city and community governments, a professor who was appointed by the community government to serve as master planner, and a private urban planning consulting company that is hired by the community government. Once the plans' agendas were set, residents' opinions and needs on urban regeneration projects were collected through many meetings supported by the Urban Regeneration On-site Support Centre—the intermediary organisation between the community government and residents—and by the Resident Consultative Group, a group of residents who are actively involved in the whole process

[25] An anchor facility is a building created through urban regeneration projects. It can be used for public office buildings, cultural facilities, and can be deemed necessary for public use.

of urban regeneration planning. The process and stakeholders of urban regeneration revitalisation plans are discussed in the next section, 5.1.4.

The communities that this dissertation has examined all released separate urban regeneration revitalisation plans. Garibong-dong released its plan in May 2017, Amsa-dong in June 2017, Jangwi-dong in August 2017, and Sangdo-dong also released its plan in August 2017. These four communities are among those that were designated as the first generation of Seoul-type urban regeneration communities.

5.1.3.1 Jangwi-dong

The regeneration direction of the Jangwi Urban Regeneration Revitalisation Area is to create a sustainable, nature-friendly residential environment where residents can live together. To this end, it has the planning task of 'creating a nature-friendly village that takes the lead in energy regeneration, creating a pleasant and safe living environment, and strengthening the community's capacity to enhance sustainability' (Seoul Metropolitan Government, 2017c).

Specifically, three goals were set, and the pump-priming project and cooperative project corresponding to these goals were included. The first goal is to create a 'livable residential environment'. This is to create a safe and pleasant living environment and a residential base where daily life is convenient. This includes pump-priming projects such as improvement of alley pedestrian environment, rainwater management project, urban agriculture support project, public car park development, youth cultural space creation, and expansion of convenience facilities for residents. Cooperative projects include mini vegetable garden creation, rainwater village construction, public car park construction, formulation of construction review guidelines, remodelling revitalisation plan establishment, and maintenance of alleyways of residential houses. This first goal—to create a livable residential environment—demonstrates that Jangwi-dong has a desire to include activities that work towards an eco-friendly residential environment (Seoul Metropolitan Government, 2017c).

The second goal is a 'resident culture that communicates.' This is to create an education system in which villages thrive and a community that grows together with their neighbours. There are pump-priming projects to create a base for welfare and culture, such as the establishment of a welfare culture centre and the creation of a house of Kim Jung-up architectural culture, as well as community discovery and public participation projects. Cooperative projects include the establishment of the complex welfare culture centre as a base facility in the target site, the establishment of a national and public daycare centre in Jangwi-dong, support for the holding of local cultural projects such as open concerts, celebratory performances, and food markets,

reconstruction of a creative children's playground, and creation of a space for residents to talk (Seoul Metropolitan Government, 2017c).

The third goal is a vibrant village economy. This is to restore the village's economy and build a shared village with local resources. As for the pump-priming project, there is a market alley environment improvement project to revitalise the Janggok market located at the site of Jangwi-dong, education and capacity building to promote market vitality. It also includes start-up support projects and the operation of an urban regeneration on-site support centre. Cooperative projects included home improvement and repair counselling, home repair classes, and social service demand surveys (Seoul Metropolitan Government, 2017c).

5.1.3.2 Sangdo 4-dong

Sangdo 4-dong largely set social goals, environmental goals, and economic goals, planning pump-priming and cooperative projects corresponding to them. The social goal is to improve and utilise the alley space of the village and create a safe village where the elderly and children live well together. To achieve this goal, the pump-priming project is a project to create an alley park near daycare centres so that the alley is safe from traffic accidents, crime, and fire (CCTV installation, mini fire station installation, retaining wall reinforcement, etc.), and expansion of public facilities for residents using the village space (resident shelters, small bookstores, etc.). Cooperative projects under this goal are related to the beautification and safety improvement of alleys and children's parks: alley planning project, children's alley park development through public art, improvement and maintenance of facilities in children protection zones,[26] traffic safety guidance project for children, maintenance and reinforcement of car park in Dohwa Park, extensions of the Sinsangdo underpass, new and relocated installation of CCTV for crime prevention, LED lighting and maintenance of alleyway security lights, and installation of a mini fire station (Seoul Metropolitan Government and Dongjak-gu, 2017).

The environmental goal is to create a new park green space from an environmental point of view, open the now-closed cemetery of Yangnyeong Daegun, connect these public spaces with existing green spaces such as Dohwa Park and Guksabong Peak, and install eco-friendly house repairs and urban vegetable gardens, etc. It is about sharing natural, historical, and cultural resources through the creation of an energy-saving village. The pump-priming projects for this goal are: the opening of the Yangnyeong Daegun Cemetery and the construction of a historical-themed trail, the urban vegetable garden creation project (public rooftop and leftover vegetable gardens and distribution of box vegetable gardens), energy-saving house repair support, operation of guidelines for

[26] A children protection zone is an area designated to protect children (referring to the persons younger than 13 years; hereinafter the same shall apply) from the risk of traffic accidents.

building permits, support for solar power generators, installation of solar street lights, and support for eco-friendly residents' meetings. Cooperative projects corresponding to this environmental goal include the installation of additional toilets and crime prevention facilities for the opening of Yangnyeong Daegun Cemetery, maintenance of Sangdo's neighbourhood park and its trails, construction of a magpie ecological playground, maintenance of slopes to prevent landslides, creation of a unique cultural heritage road around Jidoksa Temple, forest creation and greening of idle space at Guksabong Middle School, a rooftop vegetable garden project, a Seoul-style house repair project (improving the residential environment for the underprivileged), and a Seoul-style caring house project (subsidising the house repair project of old houses in low-rise residential areas) (Seoul Metropolitan Government and Dongjak-gu, 2017).

The economic goal is to restore the vitality of the declining Goblin Alley Market in terms of the alley economy, to support community activities such as the installation of anchor facilities and resident competition projects, and to strengthen the capacity of residents such as the urban regeneration university to bring the village economy and the community together. Pump-priming projects to achieve the economic goal include (1) alley market vitality recovery projects such as sign maintenance, sign installation, resident start-up support and market revitalisation programmes, (2) anchor facility construction and operation support projects, (3) construction of space for the education and community space of the youth and residents, and (4) operation of a government-funded competition programme for residents and management of an urban regeneration on-site support centre. Cooperative projects related to this goal include the installation of sculptures in the market, pavement of roads, and improvement of signboards. It also includes the maintenance of aerial lines in the alley market and the establishment of the Sangdo 4-dong Community Centre (Seoul Metropolitan Government and Dongjak-gu, 2017).

5.1.3.2 Amsa-dong

Amsa-dong has set goals in four aspects: (1) residential regeneration, (2) local capacity strengthening, (3) residential economic regeneration, and (4) historical and cultural regeneration, planning priming, and cooperative projects. The goal of the residential regeneration is to improve the convenience of housing through the bettering of the living environment; the goal of the local capacity strengthening is to enhance community capacity by providing support for education, spaces, and activities; the goal of residential economic regeneration is to revitalise the local economy by strengthening the competitiveness of regional specialised industries and providing jobs; and the goal of historical and cultural regeneration is to create public spaces by using historical and cultural resources (Seoul Metropolitan Government and Gangdong-gu, 2017).

In the field of residential regeneration, the pump-priming projects are: CPTED (crime prevention through environmental design) village creation, CCTV installation, LED security light replacement, village safety delivery box installation and operation, resident participation type sharing parking, and pedestrian priority road construction in Amsa-gil. In addition, the Amsa home repair education and subsidising house repairs for the underprivileged are included (Seoul Metropolitan Government and Gangdong-gu, 2017).

In the field of local capacity strengthening, the pump-priming projects include the operation of an urban regeneration on-site support centre, the establishment of a community activity base, and the creation of a green love room at Amsa Library. In addition, supports for the urban regeneration village school, self-education for residents, resident council, community activities, a government-funded competition programme for residents, kitchen sharing, and village newspaper publication are included in the community capacity building. Lastly, the construction of an anchor facility in Amsa-dong is included in the local capacity strengthening section (Seoul Metropolitan Government and Gangdong-gu, 2017).

In the field of residential economic regeneration, the pump-priming projects include urban agriculture revitalisation projects that were already active in Gangdong-gu (urban vegetable garden creation project, flea market programme operation, etc.), job-related projects (job training, food truck rental business for youth, leather industry consultation, etc.), and plans to revitalise the Amsa market (making the market a popular spot, strengthening merchants' capabilities, operating the youth night market, etc.) (Seoul Metropolitan Government and Gangdong-gu, 2017).

In the field of historical and cultural resource linkage, as part of the prehistoric story road creation project, it was planned to create a prehistoric-themed street environment, operate a theme street activation programme, and create a storytelling street space for a historical experience and cultural enjoyment (Seoul Metropolitan Government and Gangdong-gu, 2017).

The number of cooperative projects in Amsa-dong is slightly smaller than that of other communities. CPTED applied to a neglected landscape improvement project, sewer pipe maintenance work for pipes that were over 30 years old, the Saejangteo Park underground car park construction project, a street creation project with attractive signage, putting messy overhead electrical and telecommunications cables underground at Olympic Road, and a project for the maintenance of disordered and defective cables (Seoul Metropolitan Government and Gangdong-gu, 2017).

5.1.3.3 Garibong-dong

Garibong-dong includes priming and cooperative projects in three aspects: community revitalisation, living environment improvement, and cultural economy regeneration.

First, in the field of community revitalisation, the pump-priming projects include (1) education for residents in urban regeneration through school and community activities (resident organisations, business operation, cooperatives, and village enterprises related to the promotion of regeneration projects) to strengthen the capacity of residents; (2) operation of a government-funded competition programme for residents, which lays the foundation for the promotion of the regeneration project; (3) public relations for urban regeneration projects (Seoul Metropolitan Government, 2017b).

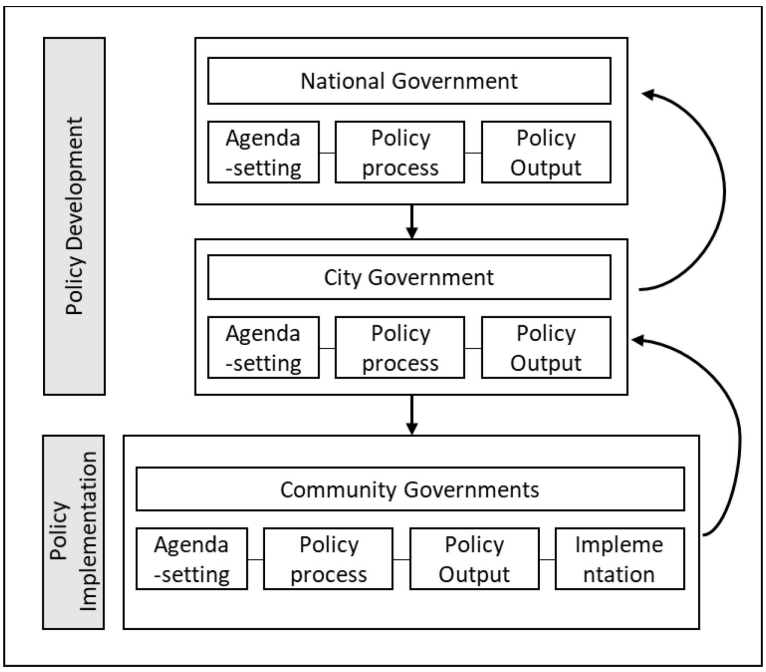
Second, in the field of living environment improvement, five major pump-priming projects were included to improve the village space: (1) improvement of village spaces such as deteriorated roads (repair of deteriorated roads and sidewalks, non-slip pavement, maintenance of stairs, and the sewer pipeline maintenance project; (2) creation of a crime-free village (installation of additional CCTV and LED security lights and activities and operation of crime prevention patrols); (3) creating a clean village (through the installation of waste treatment facilities, environmental education, and campaigns); (4) disaster prevention response system creation project (emergency fire extinguishing facility installation, disaster prevention education, and training); (5) creation of village yard and car park (construction of car park and village yard; formation and operation of car park operation cooperative). Cooperative projects include modernisation of traditional market facilities, sewage pipeline maintenance project, maintenance of overhead electrical and telecommunications cables, creation of a crime prevention environment tailored to the community, replacement of low-efficiency lighting for the underprivileged with LEDs, renovation of the Garibong central road, installation of customised waste collection bins, creation of a communication plaza, and support of various activity programmes (Seoul Metropolitan Government, 2017b).

Lastly, as a pump-priming project in the field of cultural economy regeneration, (1) revitalisation of Uma-gil cultural street (maintenance of road pavement, entrance sculpture installation, Uma-gil promotion committee organisation, hosting a special programme and event), (2) anchor facility creation, (3) the Garibong tour course foundation formation (pavement improvement, sidewalk maintenance, installation of information boards, operation of the tour programme) was planned. Cooperative projects in this field included the establishment of a family integration support centre, temporary use of purchased anchor facilities, and support for the anchor facility operation (Garibong Laboratory) (Seoul Metropolitan Government, 2017b).

5.1.4 Process and stakeholders of urban regeneration at national, city, and community levels

The policy process of urban regeneration consists of policy development and policy implementation. In the policy development stage, national and city governments are involved in urban regeneration policy and plans. Each level of policy has three policy cycles—agenda-setting, policy process, and policy output. In the policy implementation stage, the community government is involved in the process of the urban regeneration revitalisation plan, which consists of four policy cycles—agenda-setting, policy process, policy output, and implementation. In the dissertation, the policy development stage refers to the whole process of urban regeneration policy at national and city levels, including the Special Act on Promotion of and Support for Urban Regeneration, the Basic Policy for National Urban Regeneration, Guidelines for the Formulation of Strategic Plans for Urban Regeneration, Guidelines for the Formulation of Urban Regeneration Revitalisation Plans, and the Strategic Plan for Urban Regeneration. The policy implementation stage is related to the whole process of the urban regeneration revitalisation plan. Figure 5-1 presents a simplified process of urban regeneration, and this section describes it in detail.

Figure 5-1 Simplified policy process of urban regeneration in Korea



Source: own compilation

<u>Process of national urban regeneration policy</u>

The process of national urban regeneration policy such as the Special Act on Promotion of and Support for Urban Regeneration and the Basic Policy for National Urban Regeneration includes agenda-setting, policy process, and policy output. Agenda setting of these two policies includes

research and R&D projects performed by a variety of government subordinate research institutes and universities.

A study on the enactment of the Special Act on Urban Regeneration was conducted in response to the necessity of urban regeneration legislation. As a representative study, 'Development of the Urban Regeneration Law System and Support Means (2010)', conducted by the Ministry of Land, Transport and Maritime Affairs and the Urban Regeneration Project Group, was carried out as one of the R&D tasks of this group. Here, the nature of the Special Act on Promotion of and Support for Urban Regeneration, its main contents, and main actors were suggested (Urban Regeneration Project Team, 2014). A 'Study on Urban Regeneration Legislative Reform and Revitalisation Plans (2011)' was also carried out. Additionally, 'New Urban Regeneration: A Study on Legislation for Korean Urban Regeneration (Hanul) (2012)' conducted by the Urban Regeneration Project Group was also carried out before the enactment of the Special Act on Promotion of and Support for Urban Regeneration. These studies provided the main content of the special act concerning agenda-setting through suggestions for the necessity and direction of its enactment.

There was also a process to obtain opinions from experts in universities, government subordinate research institutes, and research associations. A public hearing was held by the Ministry of Land, Transport and Maritime Affairs concerning the 'Study on Urban Regeneration Legislative Reform and Revitalisation Plan (2011)' in April 2010. According to the material presented by Professor Ho-Chul Kim here, the main contents of the Special Act on Promotion of and Support for Urban Regeneration are (1) establishment of the purpose and basic ideology of urban regeneration, (2) presentation of common application standards (as different laws have different standards and incentives), (3) expansion of the range of integration of wide-area planning (4) introduction of an urban regeneration cooperative project system, (5) diversification of regeneration strategies considering local characteristics, (6) establishment of governance for linkage and coordination of regeneration policies, (7) change of financial support system of urban regeneration, and (8) establishment of the institutional basis for low-carbon green regeneration. However, in the end, the special act did not include the eighth point.

National urban regeneration policies such as the Basic Policy for National Urban Regeneration, Guidelines for the Formulation of Strategic Plans for Urban Regeneration, and Guidelines for Formulation of Neighbourhood Regeneration Revitalisation Plan were formulated based on research entrusted to the Ministry of Land, Infrastructure and Transport. 'Research for the Establishment of Basic Policy for National Urban Regeneration (2014)' was performed by the Korea Research Institute for Human Settlements, the University of Seoul, Konkuk University, Doori Space Research Institute, and Seoul National University. This served to provide scientific

evidence and justification for the main content of the Basic Policy for National Urban Regeneration. In addition, before guidelines related to the establishment of plans—such as Guidelines for the Formulation of Strategic Plans for Urban Regeneration and Guidelines for Formulation of Neighbourhood Regeneration Revitalisation Plan—were published, the national R&D research of the Urban Regeneration Project Team suggested the main content and direction of the guidelines.

In sum, all urban regeneration policies at national level went through the process of policy establishment carried out by the Ministry of Land, Infrastructure and Transport based on the R&D tasks of the Urban Regeneration Project Team and various studies in which government subordinate research institutes and universities participated. The completed national policies presented the legal/administrative basis for the establishment of Seoul's strategic plan and designation of the urban regeneration revitalisation area.

The process of formulating Strategic Plans for Urban Regeneration

Although Seoul Metropolitan Government designated the Seoul Institute as a support organisation for urban regeneration, it did not depend as greatly on the institute for research into good practices and the main content of urban regeneration as the national government did (INT19). This is because the city government already had the expertise to promote urban regeneration through accumulated experience in village community projects before the Special Act on Promotion of and Support for Urban Regeneration was established (INT19). However, the Seoul Institute still played important roles (1) in establishing the new town exit strategy while Seoul Metropolitan Government tried to solve the problem of the new town development and (2) in participating in the establishment of the Strategic Plan for Urban Regeneration (INT19). Since the Seoul Institute is not involved in the selection of urban regeneration revitalisation areas and the establishment of the revitalisation plans, the support organisation at city level can be considered to have a high degree of involvement only in the beginning stage of Seoul's urban regeneration policy (INT19). Furthermore, expert consulting and panel discussions took place before the strategic plan was formulated in 2015. After the agenda-setting process, the plan was reviewed by different stakeholders. A public hearing took place in August 2015. Then the city council of Seoul reviewed it and provided comments in the same month. Relevant administrative agencies such as other departments in Seoul Metropolitan Government and community governments reviewed the plan and gave opinions in September 2015. The final policy process of the strategic plan is to obtain approval from the Seoul urban planning committee, which took place in

November 2015.[27] Reviews and suggestions from the policy process were applied to the strategic plan and the plan was finalised. The finalised plan was distributed to the community government and was available to the public in 2015 (Seoul Metropolitan Government, 2015b).

The process of urban regeneration revitalisation plans

The implementation stage of urban regeneration policies at national and city levels is the process of urban regeneration revitalisation plans i.e. the formulation and process of the urban regeneration revitalisation plan and the output of the plan. This is because an urban regeneration revitalisation plan can be immediately implemented on-site as an action plan.

There are many processes to go through when establishing an urban regeneration revitalisation plan. Since Jangwi-dong, Sangdo 4-dong, and Amsa-dong are Seoul-type urban regeneration revitalisation areas and Garibong-dong is an urban regeneration revitalisation area designated by the Ministry of Land, Infrastructure, and Transport, there are slightly different processes for Garibong-dong, which includes additional deliberation processes by the Ministry of Land, Infrastructure, and Transport. After the study areas are selected as urban regeneration revitalisation areas, they undergo a process whereby opinions and verdicts from consultations and deliberations are collected from various stakeholders. This process is ongoing until an urban regeneration revitalisation plan is announced (see Table 5-5).

Table 5-5 Process of urban regeneration revitalisation plans

Seoul-type urban regeneration revitalisation areas	**Urban regeneration revitalisation area designated by the national government**
Selection as an urban regeneration revitalisation area	
Opening of urban regeneration on-site support centre	
Collection of residents' opinions, meetings of residents' councils, public hearings	
• Communication meeting between the city and community governments' (6-10 times) • Meeting with master planners for urban regeneration pilot projects • Listening to the opinions of the community government's council • Community government's planning committee	• Review by the Ministry of Land, Infrastructure and Transport • Deliberation by the urban regeneration special committee • Listening to the opinions of the Seoul Metropolitan Government

[27] Although the urban regeneration committee, formed by the Seoul Metropolitan Government in July 2017 is supposed to be involved with review and approval of the strategic plan for urban regeneration, the first version of the plan released in 2015 did not involve the process of the urban regeneration committee (Seoul Metropolitan Government, 2018a).

• Meetings between city and community governments • Submission of urban regeneration revitalisation plan (draft) to Seoul Metropolitan Government • Listening to and discussing opinions of relevant departments in Seoul Metropolitan Government	
Deliberation by the Urban Regeneration Committee of Seoul	Deliberation by the Urban Planning Committee of Seoul
Announcement of urban regeneration revitalisation plan	

Source: own compilation based on Seoul Metropolitan Government (2017a, 2017b); Seoul Metropolitan Government and Dongjak-gu (2017); Seoul Metropolitan Government and Gangdong-gu (2017)

Implementation of urban regeneration revitalisation plans

The implementation process of urban regeneration revitalisation plans as well as their outcomes and performances are monitored by Seoul Metropolitan Government with detailed indicator sets. The purpose of this monitoring is to inspect the progress of urban regeneration projects that were planned and to revise the relevant plans or further urban regeneration policies of Seoul (Seoul Metropolitan Government, 2018a). When the strategic plan for urban regeneration was re-established in 2018, the urban regeneration revitalisation plans for these study areas were already created. Thus, the achievements and limitations of the regeneration project were included in the new strategic plan in 2018.

During the implementation stage of urban regeneration revitalisation plans, the urban regeneration on-site support centre and the community government are in charge of operating planned urban regeneration projects. During this time, they not only manage to implement urban regeneration projects but also adopt additional cooperative projects and/or government-funded competition programmes for residents. Ultimately, the urban regeneration on-site support centre, the community government, and the residents pursue the establishment of CRCs in the area to continue urban regeneration even after the termination of the pump-priming projects. In this stage, the role of the Seoul Urban Regeneration Support Centre is also important. The support centre is an intermediatory agent between Seoul Metropolitan Government and the community governments founded in 2017.[28] It serves to distribute the Seoul Metropolitan Government and national government's cooperative projects and programmes to residents within urban regeneration revitalisation areas.

[28] The communities that this dissertation examines had already or almost established the revitalisation plan when the centre was open.

Feedback loop of the urban regeneration policy cycle

Seoul Metropolitan Government receives feedback from the community in a variety of ways on its urban regeneration policy at city level. For example, the Seoul Strategic Plan for Urban Regeneration was revised in 2018 after the completion of the urban regeneration revitalisation plans of the pilot areas in Seoul. The revised version of the strategic plan emphasised the outcomes and limitations of the pilot areas of urban regeneration in Seoul. It stated that the newly designated urban regeneration revitalisation areas' strategies for urban regeneration will reflect the performances and limitations of the pilot areas. It determined that the previous urban regeneration areas had limitations such as a lack of expanding ripple effects of urban regeneration projects towards surrounding areas near the pilot areas, a negative public perception due to the prolonged planning period, a lack of acknowledgement of the unique characteristics of the community, and limitations of continuous implementation and support from private sectors. The new version of the strategic plan aims to provide better-developed strategies by dealing with these limitations.

The strategic plan also provides general directions for urban regeneration by applying good practices from the community; for example, an energy-independent village, a cooperative project included in several urban regeneration revitalisation plans, was regarded as a good practice and became one of five main regeneration strategies for residential areas as stated in the new strategic plan.

Seoul Urban Regeneration Support Centre, an intermediary organisation funded by Seoul Metropolitan Government, work with the city and community governments as well as urban regeneration on-site support centres. While supporting the urban regeneration on-site support centre in the community in terms of education and consulting, the Seoul centre formulates all guidelines related to the implementation of urban regeneration with Seoul Metropolitan Government. This governance structure allows the city government to reflect and revise the strategy of urban regeneration in Seoul by communicating with community governments.

In addition, there is a feedback loop from the city government to the national government. The city government provides feedback to the national government to improve national urban regeneration policy and urban regeneration revitalisation areas designated by the national government. In this feedback process, the role of Seoul Urban Regeneration Support Centre is significant in providing good practices and information on urban regeneration nationwide. As the secretariat of the Nationwide Council of Urban Regeneration Support Centre, it helps to share successful cases of Seoul's urban regeneration to centres all over the country and to provide recommendations for urban regeneration policy and ideas about the implementation structure of

urban regeneration projects (INT17). Also, the Nationwide Council of Urban Regeneration Support Centre hosts a variety of seminars with stakeholders of national urban regeneration policy, such as the Ministry of Land, Infrastructure and Transport, Land & Housing Corporation (LH), and Korea Research Institute for Human Settlements (KRIHS). This forms a structure in which urban regeneration in Seoul provides feedback to national urban regeneration in the feedback loop and develops policies.

Although urban regeneration in Korea aims to employ a bottom-up approach, in that it collects opinions of residents to finalise the urban regeneration revitalisation plans, the government structure and the way it implements urban regeneration policy is top-down.

President of the Republic of Korea

Whereas efforts such as urban regeneration research and development and the enactment of a special urban regeneration law had been ongoing nationally prior to President Moon Jae-in taking office in 2017, urban regeneration became a major policy after Moon's administration; the New Deal for urban regeneration was a major pledge, and the budget and effort invested in urban regeneration projects across the country increased significantly. In addition, the Moon Jae-in administration is more active in environmental policies and climate change mitigation and adaptation than the previous administration (see political factor discussed in Section 6.1.1). Such will of a serving president can be a great driving force in the establishment and implementation of national urban regeneration and climate change policies.

Ministry of Land, Infrastructure and Transport

The person in charge of the Ministry of Land, Infrastructure and Transport plays a major role in the overall national urban regeneration policy such as the Special Act on Promotion of and Support for Urban Regeneration, Basic Policy for National Urban Regeneration, Guidelines for the Formulation of Strategic Plans for Urban Regeneration, and Guidelines for the Formulation of Neighbourhood Regeneration Revitalisation Plans, and selection and management of urban regeneration revitalisation areas. When formulating a policy document by the Ministry of Land, Infrastructure and Transport, government subordinate research institutes conduct policy research and prepare the policy document. At this time, the interests and values of the person in charge of the Ministry of Land, Infrastructure and Transport play an important role in determining the final policy statements (INT7).

Urban Regeneration Support Organisation

The Urban Regeneration Support Organisation serves as an intermediate support organisation that acts as a bridge between the central and local governments and plays a role in promoting and supporting urban regeneration by supporting current policy issues and strengthening the regeneration capacity of residents and local governments. In 2014, the Korea Land & Housing Corporation (LH), the Korea Research Institute for Human Settlements (KRIHS), and the Architecture and Urban Research Institute (AURI) were designated as urban regeneration support organisations. The roles of the LH are to manage the new deal project (public competition support and evaluation, follow-up management), research general policies and revitalisation policies, and carry out education; the roles of the KRIHS and AURI are to investigate laws and institutions of urban regeneration and activation policy and to support networking of urban regeneration on-site support centres ('Urban Regeneration Information System—Urban Regeneration Support Structure,' n.d.).

Special Committee on Urban Regeneration

The Special Committee on Urban Regeneration is led by the Prime Minister, consisting of ministers of central administrative agencies and private members commissioned by the Prime Minister and ministers, to deliberate on plans and projects related to urban regeneration. The committee deals with agendas related to the Basic Policy for National Urban Regeneration, urban regeneration revitalisation plans that include national support matters, designation of urban regeneration leading areas, and their urban regeneration revitalisation plan (Article 7 of the Special Act on Urban Regeneration). Among the four study areas of the dissertation, Garibong-dong was deliberated on by the Special Committee on Urban Regeneration as it was designated by the national government as an urban regeneration revitalisation area.

Mayor of Seoul

Former Mayor Park Won Sun is an important actor in the introduction of urban regeneration policies in Korea. Park was elected in a total of three elections from 2011 to 2020 and served as the mayor of Seoul for roughly nine years. When he was elected as the mayor of Seoul, he started working to solve the problems of the new town project in Seoul, and he announced that he would implement an urban regeneration policy as an exit strategy for the new town in 2012. In addition, the mayor of Seoul showed a strong interest in climate change policies and implemented various policies (see Political factors discussed in Section 7.1.1)

Urban Regeneration Headquarters in the Seoul Metropolitan Government

The Urban Regeneration Headquarters is an organisation in charge of overseeing and coordinating Seoul-type urban regeneration policies and projects. Additionally, it is in charge of organising cooperation with other stakeholders such as other departments in Seoul Metropolitan Government, national and community governments, and the Seoul Urban Regeneration Support Centre. Cooperation with other stakeholders is important due to the nature of urban regeneration, which means that the role of the Urban Regeneration Headquarters is also significant for the successful implementation of urban regeneration policy. The primary roles of the Urban Regeneration Headquarters are to support the establishment of urban regeneration revitalisation plans, to manage the project implementation process, to manage the national treasury related to urban regeneration, to perform evaluation and monitoring of urban regeneration revitalisation plans and urban regeneration projects, and to support and manage budgets (Seoul Metropolitan Government, 2015b). The Urban Regeneration Headquarters has intervened greatly in terms of setting the regeneration direction for these four study areas that were the first pilot areas for Seoul-type urban regeneration (INT20; INT38; INT43; INT44; INT47).

Seoul Urban Regeneration Support Centre

The main roles of the Seoul Urban Regeneration Support Centre are to support urban regeneration in Seoul and to serve as the secretariat of the Nationwide Council of Urban Regeneration Support Centres. To support urban regeneration in Seoul, it has a role to share and spread the values and philosophy of Seoul's urban regeneration with the urban regeneration areas' stakeholders by operating education and training programmes such as the Urban Regeneration University for actors such as coordinators, activists, and resident leaders in the field. Also, it operates and supports the Hope Site Project [29] to build a foundation for urban regeneration before the community applies for the designation as an urban regeneration revitalisation area. Moreover, most guidelines are formulated and distributed by this centre while designating and managing the urban regeneration areas jointly with Seoul Metropolitan Government. They work closely with the urban regeneration on-site support centres to monitor and make policy proposals to Seoul Metropolitan Government based on the experiences gathered from communities.

Additionally, as the secretariat of the National Association of Urban Regeneration Support Centres, Seoul Urban Regeneration Support Centre shares Seoul's urban regeneration cases and

[29] Hope Site Project is a subsidy for community gatherings that share the necessity of urban regeneration among residents. Residents in the gatherings discuss the local resources and agendas before applying for the designation of urban regeneration revitalisation area. It is operated by a community that is designated by Seoul Metropolitan Government to prepare urban regeneration in advance (Urban Regeneration Support Centre, no date).

promotion system with centres across the country. It also operates the Seoul Type House Repair Centre which provides information about government subsidies and loans for house repairs for low-rise residential buildings and consults residents with house repair/remodelling.

The Seoul Urban Regeneration Support Centre opened in July 2017. Since the revitalisation plans of study areas were already established in March (Jangwi-dong), May (Garibong-dong), June (Amsa-dong), and July (Sangdo 4-dong) 2017, the Seoul Urban Regeneration Support Centre was not involved in the designation of urban regeneration areas or establishment of their plans. However, the centre strengthened residents' capacity during the implementation phase of the neighbourhood regeneration revitalisation plan, provided plans and guidelines for anchor facility planning and operation, published an urban regeneration practical manual for urban regeneration practitioners, and guided and implemented urban regeneration projects. It can be seen that it influenced the implementation stage in various ways, such as providing guidelines for Seoul-type urban regeneration projects and capacity building for residents to lead the CRCs (Seoul Urban Regeneration Support Centre, 2021).

Urban Regeneration Committee/Seoul Urban Planning Committee

The Urban Regeneration Committee, composed of experts and activists related to urban regeneration, deliberates and advises on major topics such as key urban regeneration-related policies, strategic plans of urban regeneration, and urban regeneration revitalisation plans. When this study area was selected, the Seoul Urban Planning Committee was in charge of its function, and the Seoul Urban Regeneration Committee was established in 2017 (Seoul Metropolitan Government, 2015b, 2018a).

The Seoul Institute

The Seoul Institute is a research institute established by the Seoul Metropolitan Government. It publishes a variety of research that helps Seoul Metropolitan Government in its policy-making. The Seoul Institute established a new town exit strategy, and based on this, Seoul Metropolitan Government announced that the future direction of urban development in Seoul would be urban regeneration (INT19). The role of the Seoul Institute as defined in the Strategic Plan for Urban Regeneration (2015) is to support successful Seoul-type urban regeneration promotion by discovering urban regeneration issues and performing leading policy tasks and efficient urban regeneration through the establishment of a monitoring and evaluation system closely related to the field (Seoul Metropolitan Government, 2015b). In 2014, the Urban Regeneration Research Centre was established at the Seoul Institute so that the department could respond to the formation of the Urban Regeneration Headquarters in Seoul Metropolitan Government (INT19).

Head of community government

The mayor's will and interest in urban regeneration pilot projects are key. In addition, the existing projects that the head of community government is interested in and the direction of operation of the community government have a great influence on the establishment of an urban regeneration revitalisation plan. The head also plays a significant role in the collaboration between departments within the community government and among stakeholders in urban regeneration. Jangwi-dong exemplifies good practices in that the head of the community government had a positive impact on the integration of climate measures in urban regeneration projects (INT47).

Civil servants in the urban regeneration department in community government

The civil servants in charge of the urban regeneration in the community government serve to direct and supervise the entire urban regeneration revitalisation plan from the establishment stage to the implementation stage. In the stage of establishing the urban regeneration revitalisation plan, they direct the company that formulates urban regeneration revitalisation plans and review residents' opinions and decide whether these can be reflected in the urban regeneration projects; they review possible projects organised by other departments in the city and community governments and decide whether to adopt them as cooperative projects in the urban regeneration revitalisation plan; and they develop a plan the promotion of the pump-priming projects and establish and operate an urban regeneration on-site support centre (Seoul Metropolitan Government and Seoul Urban Regeneration Support Centre, 2019). Various councils for urban regeneration governance are organised and operated by the civil servants in the community government (Seoul Metropolitan Government and Seoul Urban Regeneration Support Centre, 2019). In the implementation stage of the urban regeneration revitalisation plan, they establish a community regeneration corporation[30] and operate a government-funded competition programme for residents; they establish the management and operation plan of urban regeneration; and the overall budget is organised and executed for the urban regeneration revitalisation project by the civil servants in the community government (Seoul Metropolitan Government and Seoul Urban Regeneration Support Centre, 2019).

Master planner

The master planner—a professor who is an urban regeneration expert in a department related to urban planning or architecture and hired by the community government of an urban regeneration revitalisation area—played the role of establishing an urban regeneration revitalisation plan. In

[30] A community regeneration corporation is an operator of the anchor facility after the completion of urban regeneration projects.

the study area, the master planner also served as the head of the Urban Regeneration On-Site Support Centre and oversaw the overall activities to establish the revitalisation plan. Then, after the establishment of the revitalisation plan was completed, a new director was appointed. The master planner is an actor that requires expertise and leadership to work with both Seoul and community governments, as well as an urban regeneration on-site support centre and residents.

The company that formulates the urban regeneration revitalisation plan

A company—hired by community governments to formulate urban regeneration revitalisation plans—conducts research and investigation to establish urban regeneration revitalisation plans. The hired company works at an urban regeneration on-site support centre to collect data and information about the area, participate in meetings with stakeholders of urban regeneration revitalisation plans, and collect residents' opinions and needs about urban regeneration.

Urban Regeneration On-Site Support Centre

The Urban Regeneration On-Site Support Centre serves as a communication channel between the community government, residents, and stakeholders, as well as supporting the implementation of urban regeneration projects. In order to gather various opinions during the process of creating an urban regeneration revitalisation plan and implementing the project, it should encourage the participation of residents, disclose the progress of the project, and expand participation (Seoul Metropolitan Government, 2015b). The head of the centre director, the coordinator hired via contract, and civil servants of the community government work at the Urban Regeneration On-Site Support Centre during the whole process of urban regeneration. The head of the centre oversees the overall work of the centre—establishing and coordinating urban regeneration revitalisation plans, reviewing budget plans, writing project execution plans, discovering and discussing cooperative projects with the central government and local governments, adjusting and reflecting stakeholder opinions, discovering urban regeneration projects, establishing a cooperative system in the community, and discovering the main actors of anchor facilities (Seoul Metropolitan Government and Seoul Urban Regeneration Support Centre, 2019).

Civil servants from the community government working in the urban regeneration on-site support centre provide administrative support for tasks such as the operation of on-site support centres, operation of resident councils, public competition for residents, operation of anchor facilities, and budget executions. Coordinators in the urban regeneration on-site centre can work in the field of community revitalisation or/and in the field of establishing the urban regeneration revitalisation plan. The coordinator in the community revitalisation field supports the gathering of residents' opinions and basic surveys necessary for establishing a revitalisation plan and

discovers and supports cooperative projects from the governments, and they are in charge of preparing the revitalisation plan for the community sector and social economy sector (e.g. CRCs discovery and training). The coordinator in charge of establishing an urban regeneration revitalisation plan serves to discover projects, conduct a survey on deteriorated houses and investigate public support projects, and conduct the pre-consultation necessary for physical planning and implementation (Seoul Metropolitan Government and Seoul Urban Regeneration Support Centre, 2019).

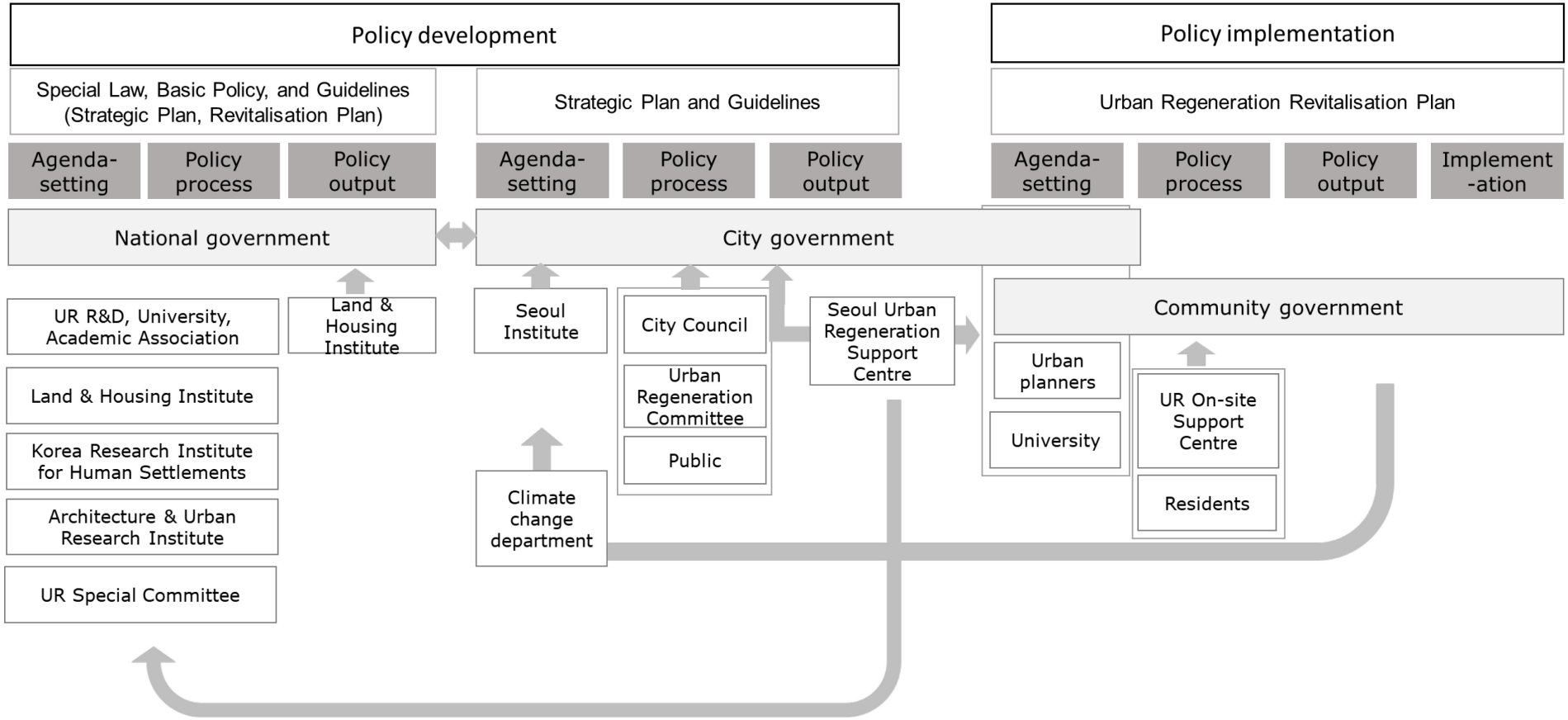
Residents and resident councils

Residents' participation in urban regeneration projects is required for successful urban regeneration. The role of residents—as defined in the Basic Policy for National Urban Regeneration—is to discover new local resources in the process of carrying out urban regeneration, propose innovative ideas, and actively participate in the project implementation and subsequent operation and maintenance stages. In particular, in the Seoul-type urban regeneration project, the role of residents is important even from the time before formulating the urban regeneration revitalisation plan, in that in order to be selected as an urban regeneration revitalisation area, the capacity of residents and their interest and will for urban regeneration are regarded as important criteria for the designation.

The existence of active resident leaders in communities is the key to sustaining urban regeneration projects because they can serve to motivate other residents to participate in them. These resident leaders are the heads of resident councils, the leaders of community gatherings, and the leaders of future CRCs. Each urban regeneration revitalisation area formulates a resident council. This is a means to encourage residents to participate autonomously and form a consensus in solving local problems. The resident council collects the opinions of the residents and serves as a communication channel for the residents (Seoul Metropolitan Government, 2015b). It also implements and participates in various community activities. In terms of governance, the resident council has a head and also leaders of sub-groups—their leadership plays an important role in resolving conflicts between residents and fostering cooperation between residents and the administration.

Figure 5-2 lays out the whole process of urban regeneration policy development and key stakeholders in each process. It is a simplified diagram to show the process of urban regeneration policy at national, city, and community levels. Some of the initiatives—e.g. the energy-independent village project—started from local level and city and national governments implemented urban regeneration linked energy-independent village projects.

Figure 5-2 The process of establishing urban regeneration policy and relevant key stakeholders



Source: own compilation

5.2 CLIMATE CHANGE POLICY AT DIFFERENT LEVELS IN KOREA

In this section, climate change policy and plans at different government levels in Korea are introduced. There are three levels of climate change policy and plan—national, city, and community levels. Climate change policy in Korea consists of mitigation and adaptation policies which are stated in various policies organised by different levels and sectors of government. The section discusses the main climate change policies and plans in each level of government that can be implemented at community level through urban regeneration projects.

5.2.1 Climate change policy at national level

The Korean government began to establish climate change policy in response to the international discussions on climate change at the Conference of Parties of Framework Convention on Climate Change. The national government of Korea coordinated the 'Pan-government Countermeasure Organisation for Framework Convention on Climate Change' in 1998—an initial instrument to respond to the Framework Convention on Climate Change efficiently. The organisation established the 'Greenhouse Gas Emission Mitigation Plan' to prepare for the possible future international pressure to mitigate greenhouse gas emissions ('Government to Form a Pan-Governmental Measures Organisation for the Climate Change Convention—The Chosun Ilbo', 1998). The name and work scale of the organisation has changed over time; the organisation was reorganised into 'Committee of Countermeasure for Framework Convention on Climate Change' in 2001 and then 'Committee of Countermeasures for Climate Change' was launched in 2007 (Ministry of Land, Transport and Maritime Affairs, 2009). The committee has established 'Comprehensive Measures for Climate Change' four times since 1999, and the 'Comprehensive Master Plan for Response to Climate Change' in September 2008 (Ministry of Land, Transport and Maritime Affairs, 2009). Until this time, the climate change policy had mainly focused on establishing a foundation to respond to the burden of duty for greenhouse gas emission reduction from the international society. It was in 2008 when the national government shed light on adaption, and consequently, the Ministry of Environment took the lead to establish the 'Comprehensive Plan for National Climate Change Adaptation' in 2008, created jointly by all ministries (Ministry of Land, Transport and Maritime Affairs, 2009).

Currently, there are three main climate change policies at national level that were established and renewed regularly, which are discussed in this section. They are: Basic Plan for Coping with Climate Change; Measures for Adaptation to Climate Change, and National Strategy for Low Carbon; and Green Growth and Five-Year Plan for Green Growth.

Basic Plan for Coping with Climate Change

Framework Act on Low Carbon, Green Growth, which was enacted by the Office for Government Policy Coordination in 2010 states that the Korean government shall formulate a 'Basic Plan for Coping with Climate Change'. Consequently, the first basic plan was established in 2016 with the principles of actively participating in global efforts to respond to climate change, achieving a reduction of greenhouse gas emissions through the use of regulations, markets, and technologies, and minimising the impact of climate change (the Republic of Korea, Joint Corporation of Relevant Ministries, 2016). The plan was targeted for the next 20 years (2017 to 2036) and it was planned to be amended every five years. However, the Second Basic Plan for Coping with Climate Change was revised in 2019 to apply the greenhouse gas emission reduction targets and implementation measures from the '2030 Basic Roadmap for National Greenhouse Gas Emission Reduction' established in 2018 into the Basic Plan (the Republic of Korea, Joint Corporation of Relevant Ministries, 2019). According to the Framework Act, the Basic Plan for Coping with Climate Change shall include:

> (1) Tendency and forecast of domestic and overseas climate changes and changes in concentration of greenhouse gases in the atmosphere; (2) current status and outlook of greenhouse gas emissions and absorption thereof; (3) establishment of medium and long-term targets for the reduction of greenhouse gas emission and countermeasures for each area by phase; (4) matters concerning international cooperation in coping with climate change; (5) matters concerning cooperation between the state and local governments in coping with climate change; (6) matters concerning research and development for coping with climate change; (7) matters concerning training of human resources for coping with climate change; (8) matters concerning measures for adaptation, such as monitoring, forecasts, and impacts of climate change and evaluation of weakness therefor, and prevention of disasters; (9) matters concerning education and public relations activities for coping with climate change; and (10) other matters necessary for promoting measures for coping with climate change (Framework Act On Low Carbon, Green Growth (Act No. 16133, Dec. 31, 2018, Article 40(3)).

Both the first and second basic plans for coping with climate change provide both mitigation and adaptation plans, aiming at the realisation of a low-carbon society as the vision of the Republic of Korea. The First Basic Plan for Coping with Climate Change has seven main tasks for mitigation and adaption of climate change: (1) transition to low-carbon energy policy, (2) cost-effective reduction through carbon market utilisation, (3) fostering new industries to respond to climate change and expanding research investment for new technologies, (4) realisation of a safe society in abnormal climates, (5) improvement of carbon absorption and resource circulation, (6) strengthening international cooperation to respond to the new climate regime, and (7) laying the foundation for practice and participation from the public.

This plan includes a variety of parts that can be applied in urban regeneration areas and plans: enhancing energy efficiency in the building, transportation and industrial sectors, fostering eco-friendly energy project development, protecting and supporting the vulnerable groups in climate change, strengthening the prevention and management of health damage from climate change, maintenance to minimise damage to areas and facilities vulnerable to climate change, enhancement of disaster management systems, technology development for low impact development (LID) technology application, technology development for zero rainwater runoff, technology development for urban water management, and operation of climate change education programmes (the Republic of Korea, Joint Corporation of Relevant Ministries, 2016).

The Second Basic Plan for Coping with Climate Change has ten main tasks: (1) implementation of measures in eight sectors to achieve the national greenhouse gas reduction goal, (2) allocating the total amount of emission allowances in accordance with national goals and strengthening corporate responsibility, (3) establishment of a prompt and transparent cross-ministerial performance check and evaluation system, (4) improving adaptability to climate change in five major sectors (land, water, ecosystem, agriculture, fisheries, and health), (5) advancement of climate change monitoring and forecasting and strengthening of adaptation evaluation, (6) realisation of mainstreaming of climate change adaptation by all sectors and actors, (7) creating future markets by fostering new technologies and new markets to respond to climate change, (8) responding to international negotiations for a new climate system that matches national status and strengthening international cooperation, (9) raising awareness of climate change among all citizens and spreading a low-carbon living culture, and (10) establishment of infrastructure to respond to climate change such as system, organisation, and governance. In the second basic plan, the section on adaptation was further developed and it provided more detailed targets for every sectoral plan compared to the first basic plan.

Specific parts that can be implemented in urban regeneration areas include: promotion of energy performance improvement of existing buildings; improvement of energy performance such as strengthening of new building permit standards; establishment of building energy information infrastructure; green remodelling; improvement of city-level energy independence; improvement of energy efficiency of public buildings; reinforcement of early warning and management of flood risk; water cycle recovery and water cycle target management system (LID application); a management system for river ecosystem restoration and disaster risk reduction; social infrastructure analysis for abnormal climate impact; disaster information citizen participation platform establishment; establishment of a land/building/facility management system considering climate change impact; a foundation for protection of vulnerable groups; discovery of urban climate change vulnerability reduction projects (cool roof, cool pavement, etc.); review of

climate insurance and expansion of disaster insurance; and promotion of support for the vulnerable groups for climate change.

Measures for Adaptation to Climate Change

Although both the Basic Plan for Coping with Climate Chang formulated in 2016 and 2019 include climate change adaptation, Measures for Adaptation to Climate Change was released in 2010, 2015, and 2020. Being in line with the 'Framework Act on Low Carbon, Green Growth', it is a plan that aims to prepare for climate change to work towards reducing its impacts in advance. It has been established every five years since 2010 and the current plan is the third Measures for Adaptation to Climate Change, established in 2020. It is a general plan that provides visions and sectoral plans. Based on this general plan, central administrative agencies and city and community governments create a plan termed 'Detailed Implementation Plan for Measures for Adaptation to Climate Change' (Office for Government Policy Coordination, 2010a).

The second Measures for Adaptation to Climate Change plan especially highlighted the importance of adaptation mainstreaming, stating the policy task of preparing a policy basis for mainstreaming climate change adaptation in order to strengthen the effectiveness of the adaptation policy. To be specific, while central agencies—such as the Ministry of Environment, Ministry of Oceans and Fisheries, Ministry of Land, Infrastructure and Transport, and the Ministry of Industry—establish mid-long term plans related to infrastructures, they shall take into account climate change components and the Ministry of Land, Infrastructure and Transport shall provide measures to enhance climate change adaptation while establishing urban planning. The measures also contain specified measures to expand green architecture considering adaptation and mitigation, such as zero-energy buildings (the Republic of Korea, Joint Corporation of Relevant Ministries, 2015) (See Table 5-6).

Table 5-6 Overview of measures for adaptation to climate change

	Measures for Adaptation to Climate Change			
	Comprehensive Plan	**The First**	**The Second**	**The Third**
Duration	2009-2030	2011-2015	2016-2020	2021-2025
Vision	Establishing a safe society and supporting green growth through climate change adaptation	Establishing a safe society and supporting green growth through climate change adaptation	Establishing a society where people are happy and safe through climate change adaptation	Realisation of a climate-safe nation with the people
Structure	1. Establishment of a system for climate change risk assessment 2. Promotion of climate change adaptation programme for six sectors (ecosystem, water management, health, disaster, adaptation industry/energy, SOC) 3. Securing the foundation of domestic and international cooperation and institutional foundation	<Seven major sectors> 1. Health 2. Hazard 3. Agriculture 4. Forest 5. Marine/fisheries 6. Water management 7. Ecosystem <Adaptation-based measures> 1. Climate change monitoring and prediction 2. Adaptation Industry/Energy 3. Education, public relations and international cooperation	<Four major policies> 1. Scientific risk management 2. Building a safe society 3. Securing industrial competitiveness 4. Sustainable nature resource management <Implementation basis> 5. Preparation of domestic and international implementation basis	< Three major policies> 1. Improving adaptability to climate risks 2. Strengthen monitoring, forecasting and evaluation 3. Realise adaptive mainstreaming

Source: own compilation based on the Ministry of Environment (2020)

National Strategy for Low Carbon, Green Growth and Five-Year Plan for Green Growth

National Strategy for Low Carbon, Green Growth is the top-level national plan related to climate change policy complying with the Framework Act on Low Carbon, Green Growth. Being established in 2009, it provides a long-term strategy from 2009 to 2050. It states a vision, three strategies, ten policy directions, and 50 projects for the national green growth policy. The primary contents of the policy are (1) matters concerning the realisation of the green economic system; (2) matters concerning green technology and green industries; (3) matters concerning policies for coping with climate change, policies on energy, and policies on sustainable development; (4) matters concerning the green life, the green homeland under Article 51 and the low-carbon traffic system under Article 53; (5) matters concerning international negotiations and cooperation in relation to low carbon and green growth including climate change; (6) Other matters considered necessary for low carbon and green growth, including procurement of financial resources, taxation, financing, training of human resources, education, and public relations activities.

To implement the national strategy, the Five-Year Plan for Green Growth is established every five years as a means of providing mid-term strategies. The recent version of the plan is the Third 5-Year Plan for Green Growth (Office for Government Policy Coordination, 2010b; the Republic of Korea, Joint Corporation of Relevant Ministries and Green Growth Korea, 2019).

5.2.2 Climate change policy at city level

Seoul Metropolitan Government has been making efforts to respond to climate change from an early age by enacting the Seoul Metropolitan Government Ordinance in Response to Climate Change in 2008. Then, in April 2012, a comprehensive plan—One Less Nuclear Power Plant—was established to comprehensively promote energy production, efficiency, and saving projects. From July 2014, the second phase of the One Less Nuclear Power Plant project, 'Energy Living City, Seoul,'[31] has been implemented and has been promoting policies based on the values of energy independence, energy sharing, and energy participation (Seoul Metropolitan Government Climate Environment Headquarters, 2020).

The Detailed Implementation Plan for Measures for Adaptation to Climate Change in Seoul Special City, 2012-2016 was established in 2011 (Seoul Metropolitan Government and The Seoul Institute, 2011). This plan is based on 'Framework Act on Low Carbon, Green Growth', 'Enforcement Decree of the Framework Act on Low Carbon, Green Growth'. The Enforcement Decree states:

[31] The term of 'Energy Living City' is a direct translation of the slogan in Korean.

> The head of each relevant central administrative agency, each Mayor/Do Governor and the head of each Si/Gun/Gu (referring to the head of each autonomous Gu;[32] hereinafter the same shall apply) shall formulate and execute a detailed implementation plan for measures for adaptation to climate change for matters under his/her jurisdiction in accordance with the measures for adaptation to climate change (Enforcement Decree of the Framework Act on Low Carbon, Green Growth (Presidential Decree No. 29617, Mar. 12, 2019, Article 38(2)).

This detailed implementation plan confirms the current projects of Seoul to implement the adaptation measures established at national level and creates and promotes new projects for the missing parts. The city government shall assess the impacts and vulnerability of climate change in the city. The assessment results, as well as the sectoral detailed implementation plan, should be included in the Detailed Implementation Plan for Measures for Adaptation to Climate Change (Seoul Metropolitan Government and The Seoul Institute, 2011). The plan states its vision as 'Seoul, the climate environment capital, with advanced climate change adaptation', with four sectoral objectives in the sector of hazard, health, water management, and forest/ecosystem. The objective in the hazard sector is to build a safe city from natural hazards resulting from unusual weather events. In the health sector, the plan pursues to protect the lives of citizens from heatwaves and air pollution and to improve their health. The plan also aims to build a city with a healthy water environment where humans, water, and nature live in symbiosis. The objective of the forest/ecosystem sector is to improve the condition of urban ecosystem health through increasing climate change adaptation capacity.

<u>Comprehensive Plan for Seoul Climate Change Response</u>

After the completion of the Detailed Implementation Plan for Measures for Adaptation to Climate Change in Seoul Special City, 2012-2016, the Comprehensive Plan for Seoul Climate Change Response was established in 2017. The plan states the performance and limitations of the detailed implementation plan. To provide supporting evidence and a basis to formulate the plan, Research for Establishment of Comprehensive Plan for Seoul Climate Change Response, 2017-2021 (Seoul Metropolitan Government and The Seoul Institute, 2017), was performed by The Seoul Institute in 2017. with the research as a basis, the plan tackles greenhouse gas reduction and climate change adaptation. Greenhouse gas reduction is planned to be realised through energy saving, energy efficiency, renewable energy production, and resource recycling. Climate change adaptation is planned in the fields of health, hazard, water management, and forest/ecosystem. The legal basis of this plan is based on the Framework Act on Low Carbon, Green Growth and

[32] See Appendix 1. Administrative Structure of the Republic of Korea.

Seoul Municipal Ordinance of Climate Change Response which was established in 2015 (Seoul Metropolitan Government and The Seoul Institute, 2017).

The promise of Seoul: Taking Actions against Climate Change, 2015

Seoul Metropolitan Government has been highly interested in climate change issues. It hosted the ICLEI (International Council for Local Environmental Initiatives) World Congress where ICLEI members and partners gather and showcase their actions, launch new commitments, and discuss strategies for the following years (ICLEI—Local Governments and for Sustainability, 2015). At this World Congress, Seoul Metropolitan Government released a report, 'Promise of Seoul: Taking Actions against Climate Change, 2015'. In the report, it declared the eleven pledges that embrace the intent of citizens, businesses, and the city government to take action against climate change in the fields of energy, air quality, transport, waste to resource, water, ecology, urban agriculture, health, safety, and urban planning. The pledges are as follows:

1. Seoul will reduce its CO2 emissions by 25 percent by 2020 and by 40 percent by 2030 from the 2005 level, thereby creating a low-carbon, high energy-efficient city.

2. Seoul will ensure energy welfare by sharing energy with underprivileged communities that are vulnerable to climate change.

3. Seoul will set an example in countering climate change by adopting an integrated and comprehensive management system for greenhouse gas and air pollutants.

4. Seoul will create a city resilient to climate change.

5. Seoul will reduce greenhouse gas emissions by raising reuse and recycling levels while reducing food waste.

6. Seoul will reduce greenhouse gas emissions by saving water and utilising collected rainwater.

7. Seoul will strengthen its adaptive capacity to climate change by creating an eco-city with rich and harmonious biodiversity.

8. Seoul will cut energy consumption by expanding urban agriculture to be practised widely in citizens' daily lives.

9. Seoul will ensure the health of the city by employing preventive measures against infectious diseases and heat waves while improving its capacity to respond to climate change.

10. Seoul will ensure safety by building the capacity to respond to and prevent climate disasters.

> 11. Seoul will stay at the forefront in pursuing cooperation at home and abroad as well as establish an implementation system to effectively tackle climate change (Mayor of Seoul Metropolitan Government, 2015, p. 9).

In the urban planning section, the government targeted a 3,000,000 tonne CO2 reduction by 2030. Detailed plans for the target in the field of urban planning include:

> (1) Conduct evaluation on climate threats against Seoul in the middle and long term and improve capacities of adapting climate change for climate-vulnerable baskets and regions; (2) reflect urban climate in adopting urban management plan; (3) set up a management plan for an energy-conserving city; (4) guarantee participation of women in local communities as a means to improve convenience and wellness of citizen's daily life; (5) increase various benefits for setting up eco-friendly urban management plans; (6) forecast energy consumptions in line with the development project and suggest ways to save energy; and (7) opt for green architecture and strengthen energy consumption cap of buildings (Mayor of Seoul Metropolitan Government, 2015, p. 141).

Seoul Metropolitan Government Ordinance on Response to Climate Change

The Seoul Metropolitan Government Ordinance on Response to Climate Change was enacted in 2008 and includes the greenhouse gas reduction target and responsibilities of city and community governments, business operators, and citizens. It also includes a comprehensive plan for responding to climate change, the obligation to write a climate change white paper, a greenhouse gas reduction plan, and measures to adapt to climate change. According to this ordinance, Seoul aims to reduce total greenhouse gas emissions by 25 percent by 2020 compared to 1990 levels (Seoul Metropolitan Government, Environmental Policy Department, 2008).

Climate measures from Seoul Metropolitan Government

A variety of projects of Seoul Metropolitan Government such as the Energy-independent Village Project, the solar power project, the Caring Housing Project, and the Rainwater Village are already being operated as cooperative projects for urban regeneration to increase climate mitigation and adaptation. As different departments in the city government operate these projects, it is required for the urban regeneration department to cooperate with other departments to adopt the project. Although cooperation projects that can be integrated into urban regeneration are currently limited, if various climate change-related projects carried out by Seoul are combined with urban regeneration areas, greenhouse gas reduction and climate change adaptation policies can be implemented more efficiently.

Energy-independent Village Project—one of the climate measures from Seoul Metropolitan Government—is a part of the comprehensive plan to respond to climate change, termed 'One Less

Nuclear Power Plant' which pursues a reduction in energy demand and the production of renewable energy with involvement from six fields, 21 policy tasks and 78 projects (Seoul Metropolitan Government, 2012). An energy-independent village project aims at minimising energy supply from outside the village and being independent in terms of the energy supply through energy saving, energy efficiency improvement, and energy production. When selected for the energy-independent village project, residents gather and engage in these energy-related activities on their own, while the city government provides the residents' activity expenses and administrative support (Seoul Metropolitan Government, Green Energy Department, 2013). The contents of the project include energy efficiency work such as solar panel installation, insulation or LED replacement, promotional activities for energy independence, and related education, consulting, and partial support for installation costs from the Seoul Metropolitan Government for up to three years (Kim and Hwang, 2017). Starting with seven villages in 2012, the number of energy-independent villages has increased—to 11 villages in 2013, 15 villages in 2013, 35 villages in 2015, 55 villages in 2016, and 80 villages in 2017 (Kim and Hwang, 2017).

Seongdaegol Energy-independent Village, an area located in Sangdo 4-dong but excluded from the urban regeneration revitalisation area, was an important factor in making the energy sector one of the main goals in the Sangdo 4-dong urban regeneration revitalisation plan. The village was designated as the Energy-independent Village for the first time in 2012 and received financial support from the Seoul Metropolitan Government for three years. The activist in Seongdaegol was the leader of the environmental sub-group of the resident council in the Sangdo 4-dong urban regeneration revitalisation project, participating in energy-related advice and community activities while formulating and implementing the urban regeneration revitalisation plan (INT40; INT37; INT41). Residents in the area had already made an effort voluntarily to reduce electricity consumption while receiving energy education at a library in 2009, and in 2012, the Seoul Energy-Independent Project carried out the insulation improvement project of the village school used jointly in the village to create an energy-independent space (J. Lee, 2016). Furthermore, projects such as energy instructors for residents, energy consulting, solar power plants, and the establishment of a village company[33] were performed through the Energy-Independent Village Project in 2013. Projects such as the installation of house solar power plants, veranda-type mini solar power plants, and the creation of an alley to attract people for an energy field-trip were performed in 2014 (Kim and Hwang, 2017). It then continued energy production and energy-saving activities, conducting the Seongdaegol Energy Transition Living Lab including the

[33] The village company, called 'energy supermarket', was established by residents in the neighbourhood. It sells energy-saving products such as solar chargers and insulation products. It also promotes energy-related campaigns to residents.

development of mini solar panels and a financial product (a type of loan) to install mini solar panels in 2015 (INT36).

The Energy-Independent Village Project operated by the Seoul Climate Environment Headquarters has been actively linked to the urban regeneration areas since 2017 when the headquarters began selecting the energy-independent villages for the urban regeneration areas. The project supported a resident group consisting of three or more residents or social cooperatives in urban regeneration areas to establish an energy vision for the village and provide education for residents to sustain participation in energy-related activities (Seoul Metropolitan Government, Climate Environment Headquarters, Energy Citizen Cooperation Department, 2017). Janwi-dong and Amsa-dong urban regeneration areas were selected this year (2017) (Seoul Metropolitan Government, Climate Environment Headquarters, Energy Citizen Cooperation Department, 2019). Garibong-dong was selected as an energy-independent solar power supply project for urban regeneration revitalisation areas in a contest by the urban regeneration department of Seoul Metropolitan Government in 2019. The energy-independent solar power supply project included a private solar installation subsidy support project (if residents of individual houses apply, 50 percent of the solar panel installation cost is provided, and a maximum of four million won is provided for roof greening and roof waterproofing) and a solar power installation project for public facilities (full cost support) (Seoul Metropolitan Government, Residential Regeneration Department, 2019).

One of the projects in high demand in the urban regeneration area of Seoul, which consists of low-rise old residential areas, is the house repair project. As a representative example, the house repair support project that was carried out for the urban regeneration revitalisation area is the Seoul Caring Housing project. In 2016, the Seoul Urban Regeneration Headquarters started this project which subsidises house repair costs and dispatches experts to the 40 deteriorated detached and multi-family housings in the urban regeneration revitalisation area (Kang, 2018).

For individual houses, subsidies are paid for design costs and house repairs such as major repairs, general repairs, building performance improvement works, and maintenance of alleyways such as road pavement, power pole relocation, and installation of CCTV/security lights (Kang, 2018).

Sangdo 4-dong and Jangwi-dong were selected among the urban regeneration revitalisation areas in 2016; Sangdo 4-dong and Jangwi-dong were selected again in 2017; and Sangdo 4-dong, Jangwi-dong, Amsa-dong, and Garibong-dong were selected in 2018 (Kang, 2018).

Whereas the Seoul Caring Housing is operated by Urban Regeneration Headquarters in Seoul Metropolitan Government, there is another support project for housing repair in urban

regeneration areas, being organised by Housing and Architecture Bureau in Seoul Metropolitan Government, called 'Long-term safe housing for remodelling support'. This project aims to support remodelling costs for individually owned old houses that are more than 15 years old, targeting eight urban regeneration areas (including all study areas of this dissertation); a budget for remodelling of up to ten million won per household has been supported since 2017 (Seoul Metropolitan Government, Housing and Construction Bureau Rental Housing Department, 2017). The scope of remodelling includes (1) construction to enhance energy efficiency and performance of deteriorated buildings (fixing leaking sections of roofs, walls or basements; interior and exterior insulation for energy efficiency enhancement; and replacement of windows, boilers, and old water and sewage pipes); (2) improvement of living convenience in living spaces (simple painting; replacement of flooring; furniture work such as sink, shoe cabinet, and washstands repairs and replacements; and toilet replacement) (Seoul Metropolitan Government, Housing and Construction Bureau Rental Housing Department, 2017).

Moreover, a variety of house repair projects are organised by various ministries and departments individually (six ministries and nine departments and 11 housing-related support projects) in the form of cost subsidy, loan, and interest rate support (Kang, 2018). Among them, various house repair projects as of 2018 that can be specifically applied to urban regeneration areas are presented in Table 5-7. Various departments are in charge of these projects that can be linked to urban regeneration areas as cooperative projects. Specifically, projects related to building energy efficiency (insulation, wall greening, solar panel, etc.) are included as part of the house repair projects.

Table 5-7 List of home repair support projects and departments in charge

Type	Project	Department in charge
House repair	Loan interest support for house repair and new construction expenses	Home Improvement Counselling Room in Seoul Metropolitan Government
	Loan support for house repair and new construction costs	Housing Maintenance Department in the Ministry of Land, Infrastructure and Transport
	Home repair project	Housing Policy Department in Seoul Metropolitan Government
	Loan support for house repair and new construction in the urban regeneration area	Home Improvement Counselling Room in Seoul Metropolitan Government
	Building energy efficiency improvement project (insulation material, windows,	Green Energy Department in Seoul Metropolitan Government

Energy efficiency improvement	heating and cooling construction, LED, wall greening, etc.)	
	Solar mini power plant subsidy support	
	Green remodelling interest support	Green Remodelling Creation Centre
	Renewable energy supply	Renewable Energy Centre
	Support for the installation of eco-friendly boilers at home	Air Management Department in Seoul Metropolitan Government
Others	Rainwater utilisation facility installation support	Water Circulation Policy Department in Seoul Metropolitan Government
	Green parking support	Parking Planning Department in Seoul Metropolitan Government
	Replacement of old water pipes	Seoul Water Supply Division in Seoul Metropolitan Government
	Vacant house restoration project	Housing Policy Department in Seoul Metropolitan Government

* Organisational structure of the Seoul Metropolitan Government changes over time. The departments' names were identified in May 2018.

Source: own compilation based on Seoul Metropolitan Government Regeneration Policy Department (2018)

A representative project of Seoul, which was carried out for urban regeneration revitalisation areas, is Seoul Caring House. In 2016, the Seoul Urban Regeneration Headquarters targeted Sangdo 4-dong and Jangwi-dong.

In 2016, the Seoul Urban Regeneration Headquarters started the 'Seoul Dream Housing Project,' which subsidises house repair costs and dispatches experts to the 40-year-old single and multi-family houses in the urban regeneration activation area (Kang, 2018).

In Korea, there is a problem of insufficient building management due to the short lifespan of buildings and expectations for development. The purpose of the Seoul Caring Housing Project is to form a consensus on house repair by creating and promoting model homes for house repair through systematic public support for old houses in low-rise residential areas and to revitalise the culture of repairing and caring for houses on their own. Although the projects related to house repairs are included as measures to improve energy efficiency and respond to climate change by raising the performance of buildings, it is difficult to view all the projects included in the house repair projects as climate measures. A more active green remodelling concept of house repairs that can be applied to urban regeneration areas is still missing in Seoul.

As various urban problems occur due to the increase in the impermeable layer due to urban development, there are projects to integrate rainwater management in urban regeneration areas.

The Rainwater Village Creation Project was first started in 2016 by the Water Circulation Policy Department in Seoul Metropolitan Government. It pursues the creation of exemplary rainwater villages by encouraging citizens' voluntary participation in village-level rainwater management and use in daily life. The Rainwater Village Creation Project aims not only to provide opportunities for citizens to participate in rainwater management but also to create safe villages that adapt to climate change. The project involves maximising the use of rainwater through the installation of facilities such as rainwater tanks and rainwater collectors and by constructing permeable pavement and rain gardens to absorb rainwater into the soil (Seoul Metropolitan Government, Water Circulation Policy Department, 2017).

The Water Circulation Policy Department used criteria to select the villages for the Rainwater Village Creation Project in 2016. The selected areas were those where rainwater was able to easily penetrate the ground and where sufficient sewer systems for those catchment areas were lacking; where resident communities were formed and active in the creation of rainwater villages; where residents were willing to participate in voluntary activities for the rainwater village development process and future rainwater management us; where the project can be realised effectively; areas that require rainwater management such as flooded areas; or areas that require community revitalisation because of the release from the new town area designation (Kang, 2016). In 2017, the main project contents were the same as the previous year, but the selection criteria began to include the phrase 'an urban regeneration area where the designation of redevelopment/reconstruction has been lifted' (Park, 2017).

The Seoul Metropolitan Government has selected a total of 13 areas as of 2020, and most of them—including Jangwi-dong, Suyu-dong, Bulgwang 2-dong, Jegi-dong, Sinwol 1-dong, Eunpyeong-gu Hyangrim Village, and Chang 3-dong—are urban regeneration areas. It is being carried out in collaboration between the Urban Regeneration Headquarters and the Water Circulation Policy Department. Jangwi-dong is the first designated village and is considered a successful case of the pilot Rainwater Village Creation Project ('News—Environment—Seoul Metropolitan Government 'Seoul, using rainwater as an eco-friendly resource... Expands 'rainwater villages' to 13 places', 2019; Seoul Metropolitan Government, 2018c; Seoul Metropolitan Government, Water Circulation Policy Department, 2017).

5.2.3 Climate change plan at community level

On March 23, 2013, Article 48 of the Framework Act on Low Carbon, Green Growth and Article 38, Paragraph 2 of the Enforcement Decree of the Act were amended, and the establishment of a 'Detailed Implementation Plan for Measures for Adaptation to Climate Change' became mandatory from January 1, 2015; the city and community governments are required to renew the plan every

five years (Office for Government Policy Coordination, 2010b). In this section, the detailed implementation plans from the community governments of the four study areas are reviewed and the characteristics of each community government's climate change-related plans are discussed.

Four study areas established a Detailed Implementation Plan for Measures for Adaptation to Climate Change—Seongbuk-gu in 2017 (2017-2021), Dongjak-gu in 2015 (2016-2020), Gangdong-gu in 2015 (2016-2020), and Guro-gu in 2016 (2016-2020). In this period, the study areas had already established urban regeneration revitalisation plans, so projects related to adaptation to climate change that are linked to urban regeneration can be identified by reviewing the plans. A detailed implementation plan includes the general status and characteristics of the community government, climate change impact, vulnerability assessment, promotion strategies, detailed plans for each sector (in the fields of health, disaster and disaster, water management, forest ecosystem), and implementation and future management (implementation evaluation and monitoring) planning. The remaining parts of this section introduce each community government's Detailed Implementation Plan for Measures for Adaptation to Climate Change as well as the main mitigation measures.

5.2.3.1 Jangwi-dong

The Detailed Implementation Plan for Measures for Adaptation to Climate Change for Seongbuk-gu contains vulnerability assessments and projects based on research about the climate change adaptation of Seongbuk-gu. It includes discussion on the Vulnerability Assessment Tool to Build Climate Change Adaptation Plan (VESTAP) developed by the National Climate Change Adaptation Centre of the Korea Environmental Institute and the Climate Change Adaptation Toolkit based on Geographic Information System (CCGIS) (for city, county, and district unit analysis) and the Local Climate Change Adaptation Toolkit based on GIS (LCCGIS) (*dong* unit analysis tool) distributed by the National Institute of Environmental Research. These assessments derive the results of climate exposure, sensitivity, and adaptive capacity for 26 evaluation items in a total of five sectors: health, disaster, forestry, ecosystem, and water management. The criteria for vulnerability assessments were analysed using data from 2010, and climate change scenarios of the 2000s, the 2020s and 2040s were derived. Based on the vulnerability assessment and current status, 37 projects from 12 departments in Seongbuk-gu were selected. Of these, 24 projects were already performed by Seongbuk-gu, six projects were designed to supplement existing projects, and seven new projects were planned for the climate change adaptation of Seongbuk-gu. Table 5-8 presents the list of climate change adaptation projects stated in the detailed implementation plan.

Table 5-8 List of projects for climate change adaptation in Seongbuk-gu

Sectors	Projects	Phase
Health	Activation of the operation of shelters from extreme heat and coldwaves	CEP
	Health care for vulnerable groups in preparation for heat and coldwaves	EP
	Discovering and supporting welfare blind spots in preparation for extreme weather	EP
	Guaranteeing the right to accessibility, such as convenient facilities for the disabled	EP
	Infectious disease prevention and management	EP
	Safe call service support project for the vulnerable in preparation for extreme weather (coldwaves and heatwaves)	CEP
Hazards	Improvement of management and operation of autonomous prevention foundation for hazards	EP
	Safety management of vulnerable facilities in the housing and construction fields in preparation for winter	EP
	Hope Ondol Warm Winter Project	EP
	Operation of a professional house repair service group	EP
	Safety inspection and maintenance for hazard-vulnerable households	EP
	Snow-clearing campaign promotion project in front of my house and my store	EP
	Eco-friendly snow removal	NP
	Flood prevention facility installation for underground houses	EP
	Safety inspection of small multi-family housing to protect from hazards	EP
	Hazard preparedness safety training	CEP
	Development of public and private hazard response programmes	NP
Water management	Creating a rainwater community	EP
	Sewer pipeline maintenance	EP
	Management of wastewater discharge plants in preparation for water pollution accidents	EP
Forestry	Landslide prevention	EP
	Establishment of forest fire prevention and fire extinguishing system	EP
	Cultivation of urban farmers and expansion of vegetable gardens	EP
	Forest pest prevention and hazards prevention	EP
Ecosystem	Creating a walkable river ecology environment	EP
	Ecosystem disruptive species management	EP
	Eco-friendly learning space creation through eco-school project	EP
	Maintenance of ecological trails	NP
	Operation of Seongbuk Power Savings Station	EP

Foundation for adaptation	Cultivation of leaders and support for practical activities to respond to climate change	EP
	Greening of urban structure wall and rooftop	NP
	Insulating public buildings to reduce energy use	NP
	Mini solar power generation facility installation support	CEP
	Employee/resident training to respond to climate change	NP
	Cooling fog system	NP
	Energy welfare project for the underprivileged	EP
	Promotion of fine dust reduction business	CEP

CEP: complementing existing projects; EP: existing projects; NP: new projects

Source: own compilation based on Seongbuk-gu (2017)

Seongbuk Power Savings Station is a representative climate change response project in Seongbuk-gu. Seongbuk-gu Office has been promoting the Seongbuk Power Savings Station Project since 2012 with the Green Coalition, an environmental group ('Looking back on five years of Seongbuk power-saving station activities—Green Union,' 2016). Seongbuk Power Savings Centre is an energy-saving community working together to save energy at the village community level. Starting with the participation of 2154 households in three locations in 2012, it has been expanded to 38,925 households in 75 locations as of 2018 (Seoul Metropolitan Government Climate Environment Headquarters, 2019). The amount of electric energy saved from 2012 to 2015 was 7,718,779 kWh, which equated to 3,632 tonnes of greenhouse gas, and the amount of electricity saved via Seongbuk Power Savings Station was 18 percent of the total savings in Seongbuk-gu ('Looking back on five years of Seongbuk power-saving station activities—Green Union,' 2016).

The Seongbuk Sharing Power Plant Project is a project to raise a climate change fund through a solar power generation project to promote the supply of renewable energy and support the people who experience energy poverty. With the Seongbuk-gu Climate Change Fund of 167 million won (cumulative), 40 million won of solar power mini power plant installation costs were supported in 2018 and five million won was provided to the energy poor (Seoul Metropolitan Government Climate Environment Headquarters, 2019).

A total of 900 households were supported for the installation cost of the solar power mini power plant by adding the city budget and the community government budget. Additionally, several programmes such as giving awards to residents who save the most energy in the neighbourhood and the promotion of an eco-mileage system are being promoted (Seoul Metropolitan Government Climate Environment Headquarters, 2019). In particular, Seoul Metropolitan Government ran the environmental and climate change education programme to train residents to be green leaders;

green leaders visit daycare centres, kindergartens, and schools to run environmental classrooms (Seoul Metropolitan Government Climate Environment Headquarters, 2019).

5.2.3.2 Sangdo 4-dong

Dongjak-gu conducted a vulnerability assessment for 20 items in four fields using the VESTAP. Dongjak-gu also analysed the climate change scenarios of the 2000s, 2020s, and 2040s by dong (neighbourhood). A total of 28 climate change adaptation-related projects were derived by synthesising the analysed vulnerability assessment and the current status of Dongjak-gu. Of these, four projects are complementing existing projects, and 24 projects were already performed by Dongjak-gu (see Table 5-9).

Table 5-9 List of projects for climate change adaptation in Dongjak-gu

Sector	Project	Phase
Health	Installation of shade for the summer heat	EP
	Air pollution warning system operation	EP
	Operation of a shelter from the heat for the elderly	CEP
	Operating a coldwave shelter for the elderly	CEP
	Strengthening food poisoning prevention and management	EP
	Strengthening the prevention and management of atopic dermatitis and asthma	EP
	Establishment of infectious disease monitoring and response system	CEP
	Implementation of national support for vaccinations	EP
	Visiting healthcare for the underprivileged	EP
Hazard	Establishment and operation of river crisis management system	EP
	Safety inspection and maintenance of disaster-vulnerable households	EP
	Support for wind and flood insurance	EP
	Operation of the Self-Defence Foundation	EP
	Reinforcement of disaster response training	CEP
	Strengthening safety management of facilities subject to specific management	EP
	Promotion of snow removal measures	EP
	Comprehensive maintenance of sewage pipes in Sadang and Imok drainage basins	EP
	Prevention of flooding in low-lying underground houses	EP
	Sewer and rain gutter dredging	EP
Water management	River water quality management in preparation for water pollution accidents	EP
	Operation of groundwater auxiliary observation network	EP

Forestry, ecosystem	Creating safe and comfortable forest areas	EP
	Comprehensive measures to prevent forest fires	EP
	Plant pest control	EP
	Expansion of street green space to reduce greenhouse gas emissions	EP
	Creating a pleasant forest path	EP
	Forest Ecology Restoration	EP
	Improvement of pine growth environment	EP

CEP: complementing existing projects; EP: existing projects

Source: own compilation based on Dongjak-gu, Seoul Metropolitan Government (2015)

The main mitigation measures in Dongjak-gu include the residential solar power supply project, LED lighting installation in welfare facilities, LED lighting supply project for low-income families, eco-mileage, diesel vehicle emission control, and eco-friendly boiler project (Seoul Metropolitan Government Climate Environment Headquarters, 2019). Energy-related activities are being actively promoted in Sangdo 4-dong, Dongjak-gu, mainly in Seongdaegol area. This had a positive impact on designing a plan for the Sangdo 4-dong urban regeneration revitalisation area (Seoul Metropolitan Government Climate Environment Headquarters, 2019).

5.2.3.3 Amsa-dong

Gangdong-gu conducted a vulnerability assessment for 22 items in four fields using the VESTAP. The detailed implementation plan analysed the scenarios of the 2000s, 2020s, and 2040s by dong. In Gangdong-gu, a total of 28 projects were organised in four fields, and among these projects, only one project—securing biodiversity (Cheonho-daero Ecological Pathway Creation Project)—was newly planned. The remaining projects had already been carried out by Gandong-gu (see Table 5-10)

Table 5-10 List of projects for climate change adaptation in Gangdong-gu

Sector	Project	Phase
Health	Establishment of a response system for meteorological hazards such as heat and coldwaves	EP
	Operation of a shelter from heatwaves	EP
	Operation of a shelter for heatwave and the Block Captains Programme[34]	EP
	Creating a healthy Gangdong with zero food poisoning	EP
	Strengthening and prevention of infectious disease surveillance systems	EP
	Energy welfare (voucher) support for the underprivileged	EP
	Creating a safe environment for atopy and asthma in children	EP

[34] The Block Captains Programme is a programme that select volunteers who can immediately help the elderly living alone in the event of a heatwave.

	Establishment and operation of air pollutant reduction and forecast warning system	EP
	Climate change adaptation health education and promotion	EP
Hazard	Establishment of adaptation measures for heavy snowfall	EP
	Establishment of a prevention system for vulnerable groups in flood damage	EP
	Periodic inspection of storm and flood warning system	EP
	Establishment of hazard relief goods management system	EP
	Strengthening building safety management to reduce flood damage	EP
Water management	Conservation of water resources through systematisation of groundwater management	EP
	Expansion of rainwater use facilities	EP
	Promotion of river maintenance	EP
	Promotion of preventive measures for water pollution accidents	EP
	River ecology restoration and greening	EP
Forestry, ecosystem	Oullim purrim creation project for carbon offset	EP
	Roadside green space expansion	EP
	Landslide and erosion prevention	EP
	Small-scale living habitat creation	EP
	Cheonho-daero ecological pathway creation	NP
	Maintenance and management of Dunchon-dong Ecological Landscape Conservation Area	EP
	Promotion of eco-friendly urban vegetable gardens in response to climate change	EP
	Supply of vegetable garden boxes and rooftop gardens for green space expansion	EP
	Promotion of resource-circulating eco-friendly urban agriculture	EP

EP: existing projects; NP: new projects

Source: own compilation based on Gangdong-gu (2016)

Main mitigation measures in Gangdong-gu include the Gangdong-gu government building remodelling project (solar power installation, replacement of air conditioners and heat recovery ventilation systems for energy efficiency), mandatory introduction of solar and geothermal energy facilities in reconstructed apartment complexes, supplying eco-friendly vehicles, and operating eight energy-independent villages as of 2018 (Seoul Metropolitan Government Climate Environment Headquarters, 2019).

The community government also operated a programme—Cool City Gangdong—which involved 90 organisations to raise awareness of good practices for the environment; it used Godeok-dong

Energy Maru for climate change education, promotion, and as a physical centre for gathering an environmental community and space for green leader training. It also promoted mitigation policy for the non-industrial sector with greenhouse gas diagnoses and consulting and the public sector with a greenhouse gas and energy target management system (Seoul Metropolitan Government Climate Environment Headquarters, 2019).

5.2.3.4 Garibong-dong

Guro-gu conducted a vulnerability assessment for 22 items in four fields using the VESTAP. Vulnerability was found for 25 items in four areas: health, disaster, water management, and forestry ecosystem. The vulnerability assessment and current status of Guro-gu were comprehensively analysed, and 29 projects were planned to respond to them. Of these, 23 had already been carried out by Guro-gu and six were new projects (see Table 5-11).

Table 5-11 List of projects for climate change adaptation in Guro-gu

Sector	Project	Phase
Health	Promotion of comprehensive measures against heatwaves	EP
	Measures to protect vulnerable elderly from heatwaves	EP
	Protection measures for the vulnerable in winter	EP
	Prevention and management of cardiovascular disease	EP
	Establishment of a comprehensive monitoring system for vector-borne infectious diseases, waterborne infectious diseases, and insects and rodents	EP
	Food poisoning prevention and management reinforcement	EP
	Prevention activities to prevent infectious diseases	EP
	Atopy and asthma relief school and programme operation	EP
	Reduction of vehicle emissions and restriction of idling	EP
	Implementation of air pollution example and warning system	EP
	Road cleaning plan	EP
	Establishment of Guro Resource Circulation Centre	NP
	Promotion of public lighting LED supply project	NP
Hazard	Safety education for children	EP
	Promotion of safety culture movement	EP
	Measures for safe energy supply and safety management of facilities	EP
	Implementation of public officials' care service in flood-prone areas	EP
	Flood and flood insurance project	EP
	Promotion of snow removal measures	EP
	Improvement project for Oryu Stream sewage facility	NP
	Maintenance and replacement of old rainwater pumping stations	NP

	Improvements to rain gutter cleaning	EP
Water management	River water quality improvement purification activities	EP
	Groundwater conservation management	EP
Forestry, ecosystem	Urban agriculture revitalisation plan	EP
	Promotion of small park development	NP
	Street tree maintenance	EP
	Maintenance of park facilities	NP
	Creation and maintenance of riverside flower complexes	EP

EP: existing projects; NP: new projects

Source: own compilation based on Guro-gu (2016)

Main mitigation measures in Guro-gu include solar power installation in 15 public facilities as of 2018, and gas safety devices were installed in about 400 households of the energy vulnerable in 2018 through some of the profits from the climate change fund accumulated there (Seoul Metropolitan Government Climate Environment Headquarters, 2019). In addition, a total of 3,119 households have installed solar power mini power plants as of 2018 (Seoul Metropolitan Government Climate Environment Headquarters, 2019). 238 high energy consumption buildings and 238 small and medium-sized buildings participated in the Building Retrofit Programme (2018 Climate Change White Paper). Gocheok Library in Guro-gu is operating the Guro Hope Sunshine Power Plant Programme, which installs solar power generation facilities and sells the energy produced to make a profit ('Guro Hope Sunshine Power Plant—Korea Energy Agency Blog,' 2016). With the proceeds from this, the climate change fund plans to install solar power generation facilities annually (Seoul Metropolitan Government Climate Environment Headquarters, 2019).

Combining the climate change adaptation-related projects of each autonomous district, the health sector includes projects for prevention and countermeasures for climate change impacts such as heatwaves and coldwaves and visiting and management projects for the underprivileged. The hazard sector includes maintenance of infrastructure that is vulnerable to flood damage and heavy snow and management of underground houses that are at risk of flooding. The sector of water management includes underground water management, river maintenance, and water quality management. In Seongbuk-gu, a project to create a rainwater community was included and in Gangdong-gu there was a project to expand rainwater use facilities. In the forestry and ecosystem sector, projects such as forest fire management, green space creation, and landslide prevention are included. In particular, through community governments (except for Dongjak-gu), urban agriculture such as the expansion of vegetable gardens and the establishment of urban agriculture revitalisation plans are included. In the 'Detailed Implementation Plan for Measures For Adaptation To Climate Change', there are several projects requiring community activities that

could be integrated into urban regeneration projects (e.g. urban vegetable gardens, rainwater community creation, and climate change adaptation education).

In regard to mitigation measures in each community government, one of the common projects is solar panel installation. In the cases of Gangdong-gu and Dongjak-gu, energy-saving campaigns were led by private organisations and residents, and in the case of Seongbuk-gu, the community government and an environmental NGO played a role to encourage residents to participate in the energy-related activities. In the case of Guro-gu, it was found that the performance of solar power installation led by the community government was the highest. Such activities of community governments, civic groups, and residents related to greenhouse gas reduction provide an opportunity to be linked with urban regeneration projects in the future.

5.3 INTEGRATION OF CLIMATE MEASURES IN THE PROCESS OF URBAN REGENERATION

This section discusses the contents related to climate change mitigation and adaptation integrated into the urban regeneration policies and plans, and the process of including the contents will be discussed. Each section discusses the extent to which climate measures are included at national, city, and community levels, and policy processes that include climate factors are discussed. Each section investigates the climate factors involved in the agenda-setting and policy process and the policy output process and defines the level of integration in each policy process. 5.3.1 Investigates national-level urban regeneration; 5.3.2 explores city-level urban regeneration policy and plans, and 5.3.3 discusses community-level urban regeneration plans.

5.3.1 Level of the integration of climate measures in urban regeneration policy at national level

<u>Agenda-setting and policy process of urban regeneration policy at national level</u>

Climate measures that are integrated with the process of agenda-setting and policy process of national urban regeneration policy can be found in the research and development (R&D) tasks of the Urban Regeneration Project Team, Research for Establishment of Basic Policy for National Urban Regeneration, and the public hearing for 'Revitalisation of Urban Regeneration and Legislative Reorganisation'.

As a part of the R&D tasks by the Urban Regeneration Project Team, research on eco-friendly green technology for urban regeneration was carried out in 2014. One of the four core technologies is green regeneration technology which consists of the development of building performance reuse technology, green regeneration technology development of urban environment systems, and complex energy application and management technology development

in urban regeneration areas. Although climate change-related content was included in the research for agenda-setting of national urban regeneration policy, it was not reflected in the policy.

'Research for Establishment of Basic Policy for National Urban Regeneration' (2014) suggests eight detailed goals in the 'Sectoral Urban Regeneration Detailed Goals' section. Two of the goals are climate change related—creating a foundation for an eco-friendly city and building a foundation for a safe city. The goal 'creating a foundation for an eco-friendly city' includes (1) establishment of an environment-friendly city management foundation, (2) reduction of environmental load at community level, (3) establishment of a resource circulation system for recycling water, waste, and energy, and (4) promotion of energy-saving buildings. The goal 'Creating a foundation for a safe city' includes (1) dispersal of urban hazard risks with a total hazard prevention system and (2) protection of the vulnerable from crime and accidents. These two targets were not fully reflected in the Basic Policy for National Urban Regeneration—here, only a general statement related to an eco-friendly and safe city remained.

In the public hearing 'Revitalisation of Urban Regeneration and Legislative Reorganisation', a presentation—'Legal Reform Direction for Urban Regeneration Revitalisation'—suggested eight main topics for the legal reform vision. The last item among the eight main topics included the establishment of an institutional foundation for low-carbon green regeneration (Kim, 2010; Ministry of Land, Transport and Maritime Affairs, Urban Regeneration Department and Housing Maintenance Department, 2010). However, this part was not reflected in the Special Act on Promotion of and Support for Urban Regeneration.

<u>Policy output of urban regeneration policy at national level</u>

Although most of the suggested agendas (such as green technology, an eco-friendly city, and a safe city) in the studies and presentations mentioned during the process of agenda-setting and policy-making were omitted in the policy output as a result, some parts that remained in the national urban regeneration policy are as follows.

The Special Act on Promotion of and Support for Urban Regeneration includes statements that allow the designation of special regeneration areas which are vulnerable to natural disasters. The act states:

> The term "special regeneration area" means an area where it is necessary for the State and a local government to urgently and effectively implement urban regeneration for the improvement of housing, infrastructure, etc. in a damaged area, disaster prevention and response, psychological stability of residents, and the revitalisation of the community in the damaged area among the areas proclaimed as special disaster areas under the Framework Act on the Management of Disasters and

Safety[35] (Special Act on Promotion of and Support for Urban Regeneration (Act No. 16562, Aug. 27, 2019, Article 2(1)).

The term "disaster" means any of the following which actually causes or is likely to cause any harm to the lives, bodies, and property of citizens and the State:

Natural disasters: Disasters caused by a typhoon, flood, downpour, strong wind, wind and waves, tidal wave, heavy snowfall, lightning, coldwave, lightning, drought, heat wave, earthquake, sandy dust, hypertrophy of algae, ebb and flow, volcanic activity, crash or collision of a natural space object, such as an asteroid and meteoroid, and other natural phenomena equivalent thereto[36] (Framework Act On The Management Of Disasters And Safety Act (No. 17698, Dec. 22, 2020, Article 3(1)).

After the Pohang Earthquake,[37] the Special Act on Promotion of and Support for Urban Regeneration was amended on 17 April 2018 to establish a 'special regeneration area' system for areas damaged by hazards (Bae, 2020). It was originally formulated to recover the damaged areas caused by Pohang Earthquake in 2017. The special act serves as an additional supporting system to regenerate these areas that have experienced natural hazards and are vulnerable to further hazards. Therefore, it mainly deals with large-scale hazards, not including gradual change of climate and its impacts, such as heatwaves or coldwaves.

The above text describing 'special regeneration area' in the Special Act was included to prepare an additional support basis for the damaged areas because the damage caused by hazards is enormous (INT5). In addition, it is difficult to say that this phrase was included in the urban regeneration policy in response to climate change because significant climate change impacts such as heatwaves and coldwaves were not included. Currently, urban regeneration policymakers plan to amend the law using the above phrase to designate areas vulnerable to climate change as urban regeneration revitalisation areas (INT5).

In addition, the part describing establishing the institutional basis for low-carbon green regeneration that was discussed before the special act was enacted was not included. Policymakers argue that it is difficult to include strongly regulatory content, such as climate change-related content, because the nature of the special act is that it provides a basis for supporting urban regeneration projects (INT16; INT6).

[35] The quote comes from the official translation website, 'Korean Law Information Center' (*Korean Law Information Center*, no date).
[36] The quote comes from the official translation website, 'Korean Law Translation Center' (*Korean Law Information Center*, no date).
[37] The Pohang Earthquake, one of the biggest earthquakes recorded in Korea with a magnitude of 5.4, struck the city of Pohang on 15 November 2017.

The Basic Policy for National Urban Regeneration also mentions a climate-related objective, stating 'It strives for an environmentally friendly and healthy city and a safe built environment from crime and hazards'. This objective is among five objectives that the basic policy pursues. Maximising the built environment and attractiveness of existing urban areas is one of the main urban regeneration policies to be pursued in the basic policy. In this category, the third specific policy is the expansion of pleasant eco-type urban areas; abandoned properties, such as long-delayed urban planning facilities, vacant houses, and deserted houses shall be used as parks, and ecological restoration of streams in urban areas, such as wetlands around streams shall be promoted. When promoting urban regeneration projects, systems that apply eco-friendly technologies such as rainwater management and resource circulation should be introduced to enhance urban sustainability.

Although the basic policy includes climate-related objectives, it contains only one objective phrase and does not include details on the creation of an eco-friendly urban area and the establishment of a safe urban area, which were included in the study for establishing the Basic Policy for National Urban Regeneration

The 'Guidelines for the Formulation of Strategic Plans for Urban Regeneration' provides examples of how to include 'special areas for improvement with environment-friendly or energy-saving strategies' when formulating the criteria document to designate urban regeneration revitalisation areas. These guidelines also suggest including 'areas that can achieve integration of urban regeneration and safety measures, such as frequently flooded areas and areas vulnerable to landslide', when the city/state government analyse the circumstances of shrinking areas in its strategic plan for urban regeneration. Although the guidelines include more specific statements related to climate measures, the statements are presented as examples without a legal duty for the city government.

The 'Guidelines for the Formulation of Neighbourhood Regeneration Revitalisation Plans' was established by the national government in 2016 (as a revised version of 'Guidelines for the Formulation of Urban Regeneration Revitalisation Plans' in 2014). The guidelines describe the plans of a variety of fields that should be considered when formulating a neighbourhood regeneration revitalisation plan; these are land use planning, architectural plans, urban planning, environmental planning, and disaster planning. The incorporation of these plans is particularly important when planning changes in density or the creation of new green/blue spaces.

Level of integration of climate measures in urban regeneration policy at national level

All national urban regeneration policies show a lower degree of integration in policy output than agenda-setting and policy processes.

Urban regeneration policies at national level are analysed based on the framework of Roeck, Orbie and Delputte (2018). The level of integration varies throughout the policy process of urban regeneration. Urban regeneration policies at national level, such as the Special Act on Promotion of and Support for Urban Regeneration, the Basic Policy for National Urban Regeneration, and Guidelines for the Formulation of Strategic Plans for Urban Regeneration, are assessed for 'coordination' during the agenda-setting, policy process, and policy output. During the agenda-setting and policy process of national urban regeneration policies, the integration of climate measures was framed as an add-on component in aid activities. In the policy output of national urban regeneration, climate measures were integrated with the outlining of sectoral activities limited to incidental mentioning, but they were not interlinked with sectoral policy priorities.

5.3.2 Level of the integration of climate measures in urban regeneration policy at city level

Agenda-setting and policy process of urban regeneration policy at city level

The Seoul-type urban regeneration pilot project competition guidelines announced by the Seoul Metropolitan Government in October 2014 state the directions for neighbourhood regeneration for five regions in Seoul. Although different regions have different directions based on the characteristics of the region, all regions share a common direction—'inducing measures for a virtuous cycle of energy such as the introduction of low-carbon and eco-friendly elements'. At this time, a strategic plan had not yet been released. Thus, community governments mainly referred to these competition guidelines to design proposals for urban regeneration. By presenting such climate-related directions, it can be said that Park Won-soon, former Mayor of Seoul, reflects his high interest in climate change and the direction of existing policies (INT7; INT13; INT14; INT16).

While formulating the 'Seoul Strategic Plan for Urban Regeneration', there was no process to integrate climate measures into urban regeneration; processes, such as a review of the plan by the city council or urban regeneration committee and public hearings, did not include any statements on the inclusion of climate measures (Seoul Metropolitan Government, 2015b).

However, Seoul Metropolitan Government did make an effort to integrate green remodelling into urban regeneration after the completion of the plan. Climate Environment Headquarters in Seoul Metropolitan Government hosted an energy forum—'City-wide energy efficiency, green remodelling, and urban regeneration—in 2016 (Seoul Metropolitan Government, Environmental Policy Department, 2016). The forum provided an opportunity for policymakers, experts, and

citizens to gather and discuss the current status of urban regeneration and further direction for the integration between green remodelling and urban regeneration. As the head of the Urban Regeneration Headquarters in Seoul Metropolitan Government had a presentation about the current status of urban regeneration and good practices in terms of incorporating energy measures in the forum, it can be determined that both headquarters (Climate Environment Headquarters and Urban Regeneration Headquarters) made efforts for the integration of energy measures into urban regeneration areas.

Policy output of urban regeneration policy at city level

The 'Seoul Strategic Plan for Urban Regeneration' was formulated in 2015 and revised in 2018. The recent version incorporates more climate measures and objectives compared to the previous version. However, this dissertation analyses only the previous version because it was the basis of the formulation of the urban regeneration revitalisation plans for Seoul at community level starting from 2015. Climate objectives are included in the Seoul Strategic Plan for Urban Regeneration; the following are relevant climate-related objectives or/and measures.

First, it states that environmental policies such as the 'Sustainable Development Basic Plan' were reviewed to formulate the Strategic Plan for Urban Regeneration. Second, as a way to respond to urban shrinkage in Seoul, the Strategic Plan for Urban Regeneration declares that urban regeneration projects should be driven with an approach that considers not only physical built-environmental improvements but also social, economic, cultural, and environmental aspects. Third, the strategic plan mentions that the possibility of natural hazard events increases in southeast Seoul, and the plan suggests finding preparation measures for natural hazards like flooding. Fourth, more specific climate objectives are stated in the planning for deteriorated residential areas. One of three policy directions for these residential areas is to expand living infrastructure for socially vulnerable classes. To be specific, it pursues environment-friendly residential area regeneration by improving the energy efficiency of deteriorated buildings and the expansion of living infrastructure considering the weak in walking, such as senior citizens and the disabled. Fifth, the strategic plan suggests establishing planning objectives with a core value of sustainability in the urban regeneration revitalisation plan by applying environment-friendly and energy reduction measures. Lastly, the strategic plan states the directions of Jangwi-dong and Sangdo 4-dong urban regeneration revitalisation plans with measures for eco-friendliness and energy efficiency. At the time the strategic plan was published (2015), Jangwi-dong and Sangdo 4-dong were in the process of establishing an urban regeneration revitalisation plan, and it can be seen that the main agendas of its urban regeneration projects are related to eco-friendliness and energy. According to the strategic plan, the regeneration direction of Jangwi-dong is 'Creating a

carbon-reducing village that takes the lead in energy regeneration, through measures such as creating an eco-friendly leading base space, establishing an eco-friendly environment at the village level, and establishing a virtuous cycle of energy saving'. Sangdo 4-dong's regeneration direction is 'Creating a comfortable and safe living environment—to create an eco-friendly residential space by supporting energy-saving house repairs, operating green public transportation, installing green car parks, and creating a safe living environment that reduces crime through the improvement of the alley environment' (Seoul Metropolitan Government, 2015b).

Level of the integration of climate measures in urban regeneration policy at city level

The level of integration of climate measures in the strategic plan in agenda-setting and policy output processes is determined to be 'coordination'; climate measures are 'framed in the policy documents as add-on components in aid activities' in agenda-setting processes and climate measures are 'in outlining of sectoral activities are limited to incidental mentioning, not being interlinked with sectoral policy priorities" in the policy output (Roeck, Orbie and Delputte, 2018). During the policy process, there were no specific procedures for the integration of climate measures into the process of formulating the strategic plan, which can be defined as 'no-integration'.

5.3.3 Level of the integration of climate measures in urban regeneration plan at community level

5.3.3.1 Agenda-setting and policy process

Jangwi-dong and Sangdo 4-dong incorporated climate measures during the process of agenda-setting of the urban regeneration revitalisation plan. There were several influences on this integration. As discussed in the previous section, the Strategic Plan for Urban Regeneration in 2015 already had regeneration directions which included an eco-friendly and energy-saving urban environment. Furthermore, when these two neighbourhoods were designated as Seoul-type urban regeneration pilot projects in December 2014 by Seoul Metropolitan Government, their proposals for the designation included climate-related measures or/and objectives ('First five selected for 'Seoul-type Urban Regeneration Pilot Project' by living area unit—Policy data—Seoul Urban Regeneration', 2014). The Jangwi-dong project proposal includes the operation of rainwater communities in residential areas among the ten specialised projects planned. In other words, it was a plan to utilise the ongoing rainwater community project in Seongbuk-gu that formed part of the urban regeneration project. The proposal of Sangdo 4-dong includes 'Regeneration of a pleasant living environment with nature—with the creation of pleasant and

safe alleyways and a realisation of neighbourhood regeneration centred on alleys, communities, and people' among the five goals.

In the agenda-setting stage, the existing policies and activities promoted by Jangwi-dong and Sangdo 4-dong had an impact on the inclusion of these described climate-related elements related to greenhouse gas reduction and adaptation to climate change, and Seoul's interest and will for climate change also played an important role as seen in the Seoul-type urban regeneration pilot project competition guidelines.

All four communities went through a process of collecting opinions from stakeholders related to urban regeneration through numerous procedures such as public hearings, meetings, and administrative consultations with related organisations when establishing an urban regeneration revitalisation plan. In particular, the Seoul Metropolitan Government and each department of each community government went through the process of reviewing and discussing the urban regeneration revitalisation project. These processes allow the stakeholders who establish urban regeneration revitalisation plans to get administrative support accompanying the project implementation and the discovery of cooperative projects from other departments in community and city governments. All four communities went through a process of consultation with relevant departments of the city and community governments, and in this process, departments related to climate change response also participated. Departments that served as administrative support and consultation through meetings include the Parks and Greenery Department and Environment Department in Seongbuk-gu; the Clean Environment Department and Parks and Greenery Department in Dongjak-gu; the Urban Agriculture Department and the Green City Department in Gangdong-gu; and the Environment Department, the Parks and Greenery Department, and the Urban Safety Department in Guro-gu.

In the case of Jangwi-dong, the rainwater creation project was already proposed in the agenda-setting process. After agenda-setting, additional measures for a more active climate change response were proposed by the master planner, but not all of them were accepted. For example, the installation of water-saving valves for energy saving in each household, the establishment of a carbon-reducing virtuous cycle structure that provides crops harvested from gardening to local elementary schools, adding eco-friendly content to the building review guidelines, and the creation of alleys without cars/parking were proposed by the master planner. The main reasons all of these measures were not included in the final plan were legal restrictions and a lack of consent from the residents (INT44).

In the case of Sangdo 4-dong, both Seoul Metropolitan Government and related departments in Dongjak-gu gave opinions on the creation of an energy-saving village. The Urban Planning

Department in Seoul Metropolitan Government voiced that the Sangdo 4-dong urban regeneration revitalisation plan could be organically linked with the Seongdaegol area adjacent to Sangdo 4-dong. The Clean Environment Department of Dongjak-gu further expressed opinions on the energy-saving village development project that had already been planned, suggesting that the project being carried out by the Clean Environment Department should be included as a cooperative project. Both of these opinions were reflected in the urban regeneration revitalisation plans. In addition, in the case of Sangdo 4-dong, Kim So-young—who led the energy-independent village in Seongdaegol area—played a significant role in the process of the urban regeneration revitalisation plan in that she acted as the representative of the Green Group in the residents' council for urban regeneration in Sangdo 4-dong. Moreover, it was reported that the professor's opinion in the expert seminar had a major influence on integrating the content on establishing an energy diagnosis service for energy saving of buildings into the revitalisation plan (INT38).

5.3.3.2 Policy output

Jangwi-dong

The finalised urban regeneration revitalisation plans of the study areas are the policy document outputs. The climate measures incorporated into urban regeneration in Jangwi-dong include eco-friendly village development consisting of rainwater management and urban agriculture support. The rainwater management projects involve the installation of three rainwater-saving boxes in a new public building and the creation of four village communal gardens to utilise the water resources of the boxes, and urban agricultural support involves the distribution of 600 vegetable garden boxes over two years. Although these projects are the only projects that are used as a pump-priming project budget for the urban regeneration revitalisation project, Jangwi-dong established a plan to include many other cooperative projects in the urban regeneration revitalisation plan and utilise them in the urban regeneration area (Seoul Metropolitan Government, 2017c).

There are five cooperative projects. The first cooperative project is a project to promote the installation of rainwater management facilities and rainwater utilisation facilities as a project for the creation of Jangwi Rainwater Village. This is a support project that facilitates the installation and management of rainwater utilisation facilities such as rainwater infiltration facilities, and the provision of rainwater collectors and vegetable garden boxes. A total of 400 million won was provided in 2016 as a cooperative project with Seoul Metropolitan Government (Seoul Metropolitan Government, 2017c).

The second cooperative project is to improve the infrastructure. It involves improving the old sewage pipelines in Jangwi-dong to prevent flooding and accidents as the infrastructure of Jangwi-

dong is deteriorated, causing flood damage due to insufficient water flow during rainfall. This is a project that was supported by three billion won from the Water Regeneration Planning Department in Seoul Metropolitan Government in 2017 (Seoul Metropolitan Government, 2017c).

The third cooperative project is a project that was awarded 100 million won in 2017 by Seoul Metropolitan Government for the establishment of housing improvement standards and the designation of remodelling activation zones. This project is being carried out because the deterioration of the low-rise residential area is worsening in general, and the improvement and support for individual housing are insufficient as the management and regeneration measures of the old low-rise residential area are mainly focused on external space improvement. The contents of the project include (1) basic investigation and diagnosis of community conditions, (2) establishment of basic directions for remodelling revitalisation, (3) establishment of remodelling activation plan and architectural design plan, (4) alley environment improvement plan for pilot base alleys, (5) presentation of public support measures and remodelling guidelines, and (6) designation of Jangwi remodelling revitalisation area (Seoul Metropolitan Government, 2017c).

The fourth cooperative project is to create a rooftop and box vegetable garden. The Parks and Greenery Department in Seongbuk-gu creates rooftop and box vegetable gardens for eco-friendly village development, linking with resident community activation of the urban regeneration project (Seoul Metropolitan Government, 2017c).

The fifth cooperative project is a project to operate guidelines for the construction review in the 13th district of Jangwi, Seongbuk-gu. This was a project conducted with Seongbuk-gu in 2015, and restrictions on new construction were lifted as the urban renewal acceleration district designation was lifted. The project was carried out to prevent unplanned development in this area and create a pleasant residential environment. When a building is built within the Urban Renewal Acceleration District, it is subject to deliberation by the Building Committee as per the guidelines. A comprehensive review is applied in consideration of changes in conditions for each guide item and facility support. When applying to the Building Committee, the designer (architect) is required to submit the application after checking whether the guidelines have been applied. There are seven induction items as follows; (1) arrangement: building arrangement, spatial arrangement, and inducing common space development, (2) scale/landscape: harmony with surroundings, mass segmentation, skyline, avoiding pressure, various elevations, design specialisation, integrated design, material, colour, (3) external space: continuity, environment, pedestrian-friendly environment, (4) transportation and car park: safety, convenience, eco-friendliness, (5) eco-friendly architecture: rainwater community, solar energy, eco-friendly energy saving, public space lighting, street lighting, energy efficiency, greening, (6) safety: crime

prevention design, fire safety, and (7) reduction of the number of floors: land-use, building standards, relationship with roads, public contribution (Seoul Metropolitan Government, 2017c).

In regard to the level of integration of climate measures in urban regeneration, Jangwi-dong is categorised as 'harmonisation' based on the criteria of the level of climate policy integration in Roeck, Orbie and Delputte (2018), as it includes climate-related objectives as one of three primary objectives/vision of its urban regeneration revitalisation plan. One of the three main objectives of this plan is the 'Establishment of an environmentally friendly community that leads to energy recovery'. A specific description of this objective states that the community aims to create an eco-friendly leading base space, to establish eco-friendly conditions for each village, and to establish a carbon reduction village that leads to energy recovery. Urban regeneration projects relevant to this objective include rainwater management and urban agriculture supporting projects. The other urban regeneration initiatives that are driven by cooperation with other departments in the community government include mini vegetation gardens, rainwater village creation, improvement of deteriorated sewage lines, formulation of a remodelling promotion plan, and maintenance of infrastructure in residential building renovation areas.

Sangdo 4-dong

Climate measures that are incorporated in urban regeneration in Sangdo 4-dong include the urban vegetable garden creation project and the energy-saving village development project. These two projects were carried out with the budget of the urban regeneration revitalisation project as a pump-priming project.

The urban vegetable garden creation project was initiated because many residents revealed they wanted to grow a vegetable garden when their opinions were collected, and some residents had existing experience in gardening activities. Through the project, rooftop gardens on public facilities were created and eco-friendly vegetable garden boxes were distributed to residents with the individual paying 30 percent of the cost (Seoul Metropolitan Government and Dongjak-gu, 2017).

The energy-saving village project is a project that can be applied by expanding the experience and assets of the adjacent Seongdaegol energy-independent village, as the problems of energy efficiency degradation and electricity consumption were mostly centred on low-income homes with weak insulation performance. The goal is to allow many residents to participate in the energy-saving village development project to facilitate a consensus on the necessity and effect of energy reduction. The project includes the following activities: (1) an energy regeneration preliminary diagnosis and the establishment of an application plan, (2) energy-saving house

repair support, and (3) energy consulting implementation for the establishment of energy-saving lifestyle practices. Based on an investigation and analysis of monthly electricity and gas energy consumption from 2012 to 2016 by household and housing type, detailed implementation plans for the energy-saving village development project were established (Seoul Metropolitan Government and Dongjak-gu, 2017).

The research and living lab project conducted to analyse the efficiency of building energy use in Sangdo 4-dong was an important project in that it provided information on the effectiveness and performance of the energy-saving home repair project. The study 'Selection of houses and promotion of pilot projects for energy use efficiency in ageing houses' was conducted in 2016 by Seoul Metropolitan Government's Energy Community Team and Seoul National University (Seoul Metropolitan Government and Dongjak-gu, 2017). The project team measured the insulation performances of two houses in Sangdo 4-dong. Through the project, they found locations that should be insulated to increase energy efficiency and applied the insulation technologies they developed. For the 2016 Seoul Living Lab 'Eco-friendly house repair idea', a research team from Seoul National University's Seoul Living Lab selected a target house in Sangdo 4-dong. The team then installed green walls, an ecological rainwater gutter, and a flower bed (Seoul Metropolitan Government and Dongjak-gu, 2017).

Among the cooperative projects included in the Sangdo 4-dong urban regeneration revitalisation plan, the projects that correspond to climate measures are (1) to create a forest at Guksabong Middle School as part of the 2017 eco-school project and to green the idle space, (2) to create a vegetable garden using the roof of a public institution or apartment building and to support the installation of waterproofing, irrigation, and resting facilities to revitalise urban agriculture (Yaksu youth reading room, senior citizen's house, and private housing), (3) to repair houses of the low-income class as part of the 2017 Seoul-type house repair project, and (4) to support subsidy for home repair projects in low-rise residential areas as part of the 2016 Seoul Caring Housing Project.

Sangdo 4-dong is another community determined to hold 'harmonisation' status in terms of the level of integration of climate measures into urban regeneration based on the criteria of the level of climate policy integration in Roeck, Orbie and Delputte (2018). The community also includes environmental objectives as one of three main objectives. The objectives are described as follows: 'Environmental: the creation of new green space and opening the boundaries of the grave of Prince Yang-nyeong so that these new open spaces are connected to the existing green spaces such as Do-hwa park and Guksabong Peak, and the creation of energy reduction villages through environment-friendly housing renovation and urban agriculture creation'. Urban regeneration

projects relevant to climate resilience include energy reduction village creation projects and urban agriculture creation projects. The other urban regeneration projects that are driven by cooperation with other departments in the community government include the maintenance of Sang-do Neighbourhood Park, the creation of Magpie Ecological Playground, the creation of a safe forest environment (landslide prevention), the designation of a middle school as an eco-school in 2017, the creation of a rooftop garden, and a Seoul-type housing renovation project for the underprivileged and deteriorated buildings.

Amsa-dong

The Amsa-dong urban regeneration revitalisation plan includes an urban agriculture revitalisation project. This is not a project for mitigation or adaptation to climate change by expanding urban green spaces but by combining the urban vegetable garden project promoted in Gangdong-gu as the theme of the urban regeneration project (INT29; INT31; INT33). The project, called the urban vegetable garden creation project, is to install vegetable gardens on the rooftop of public facilities and support box-type rooftop gardens for individuals (Seoul Metropolitan Government and Gangdong-gu, 2017).

Among the Amsa-dong cooperative projects, old sewage pipe maintenance is related to climate measures. Due to the ageing and damage of sewage pipes that are more than 30 years old, there is a leakage problem and there is a risk of flooding and damage from water damage (Seoul Metropolitan Government and Gangdong-gu, 2017).

In regard to the level of integration of climate measures in urban regeneration, Amsa-dong is defined as 'no integration' based on the criteria of the level of climate policy integration in Roeck, Orbie and Delputte (2018), as there was no intention to put climate change objective as one of the urban regeneration objectives.

Garibong-dong

In Garibong-dong, there is no urban regeneration pump-priming project related to climate measures, but the sewage pipeline maintenance project and LED lighting supply project for the vulnerable are included in the urban regeneration revitalisation plan as cooperative projects. The sewage pipe maintenance project is a project to repair and replace the sewage pipe network for four years in an area in urgent need of maintenance because flooding occurs frequently and there is a risk of damage to the sewage pipe. The LED lighting supply project for the underprivileged is a project that provides free replacement of LED lighting and insulation products to the recipients of basic living and Chinese compatriots to reduce energy costs (Seoul Metropolitan Government, 2017b).

Although the urban regeneration revitalisation plan of Garibong-dong includes a project for sewage line maintenance as a cooperative project organised by other departments in the community government, there is no urban regeneration project or objective related to climate measures in the urban regeneration revitalisation plan. Based on the criteria of the level of climate policy integration provided by Roeck, Orbie and Delputte (2018), the dissertation determines that the level of integration of climate policy integration in Garibong-dong's urban regeneration is evaluated as 'no-integration' based on the criteria of the level of climate policy integration in Roeck, Orbie and Delputte (2018).

5.3.3.3 Implementation

Since the urban regeneration revitalisation plan in each community is a project unit plan, most of the plans are implemented once the plan is established except for the main operator of the anchor facility. The main operator can be decided after the formulation of the urban regeneration revitalisation plan.

The urban regeneration support organisation (e.g. Land & Housing Corporation) and the Seoul Urban Regeneration Support Centre continue to provide cooperative projects that can be incorporated into the activities of community governments and urban regeneration on-site support centres of urban regeneration areas. Although the revitalisation plan is being implemented, additional cooperative projects are being promoted in urban regeneration revitalisation areas. In all four study areas, the establishment of an urban regeneration revitalisation plan was announced in 2017, but after that, in 2017 and 2018, the Urban Regeneration Linked Energy-independent Village and the Seoul Caring Housing Project were all implemented in these study areas (Seoul Metropolitan Government, Housing and Construction Bureau Rental Housing Department, 2017).

Furthermore, the Climate Environment Headquarters and Urban Regeneration Headquarters cooperated to introduce the energy-independent village linked with urban regeneration for the first time in 2017 (Kim and Hwang, 2017). In this year, Amsa-dong and Jangwi-dong started the Energy-Independent Village Project, and in 2018, Garibong-dong initiated the same project (Lee, 2018; Seoul Metropolitan Government, Residential Regeneration Department, 2019).

The Seoul Caring Housing Project, organised by the Urban Regeneration Headquarters, started in 2016 and has continued to operate in urban regeneration areas; Sangdo 4-dong and Jangwi-dong were designated as urban regeneration areas in 2016 and 2017 and all four areas were designated in 2018 (Kang, 2018). Although Amsa-dong and Garibong-dong urban regeneration revitalisation plans did not include the same content as the Seoul Caring Housing Project, they incorporated the project during the implementation stage.

The reason why cooperative projects related to climate factors have been actively included in urban regeneration areas is that the Seoul Urban Regeneration Support Centre opened in 2017 and actively promoted and played an intermediate role in Seoul's cooperative projects. Also, the head and coordinators of the Urban Regeneration On-Site Centre serve to discover and promote cooperative projects.

The implemented measures and views of the four neighbourhoods are presented in Figures 5-3, 5-4, 5-5, and 5-6).

Figure 5-3 Rainwater collector, rooftop garden, and solar panel in Jangwi-dong

(Photos taken by the author in August 2020)

Figure 5-4 Rooftop garden in Sangdo 4-dong

(Photos taken by the author in August 2020)

Figure 5-5 View of Garibong-dong

(Photos taken by the author in August 2020)

Figure 5-6 View of Amsa-dong

(Photos taken by the author in August 2020)

5.3.3.4 Level of the integration

Typically, as most of the pump-priming project budget for urban regeneration is used for the construction of the anchor facility, there is a limited budget left to install facilities designed to respond to climate change. The rainwater management project in Jangwi-dong and the energy-saving village project in Sangdo 4-dong were included in the pump-priming project. In Jangwi-dong, Sangdo 4-dong, and Amsa-dong, the urban vegetable garden project was included in the pump-priming project as a commonality. The urban agriculture project distributes vegetable garden boxes and installs rooftop vegetable gardens on public buildings and/or private households. It can be said that the urban agriculture project is different from projects that have a direct goal to respond to climate change, such as rainwater management projects or energy-saving village projects. This is because this project was carried out on reflection of the opinions of residents who wanted to harvest vegetables through urban regeneration, rather than aiming to respond to climate change issues. In Jangwi-dong and Sangdo 4-dong, cooperative projects similar to the pump-priming project were included in the urban regeneration revitalisation plan, and Jangwii-dong made an effort to directly include climate measures for new buildings by applying the architectural review guidelines in urban regeneration areas.

This dissertation investigates each Urban Regeneration Revitalisation Plan in four communities in Seoul. It is determined that the level of climate measures integration in urban regeneration plans varies in different communities; two communities, Jangwi-dong and Sangdo 4-dong, are

defined as 'harmonisation' and two communities, Amsa-dong and Garibong-dong, are defined as 'no integration' throughout their urban regeneration revitalisation plans.

After the agenda-setting of the urban regeneration revitalisation plan in each study area, the process and efforts to integrate climate measures did not significantly change the urban regeneration goals of the areas (INT40). The goals stated in the proposals for Jangwi-dong and Sangdo 4-dong to be selected as urban regeneration revitalisation areas are almost the same as the goals of their urban regeneration revitalisation plans. It can be argued that it is still difficult to actively reflect the opinions of many stakeholders and residents when establishing an urban regeneration revitalisation plan, despite the aim of urban regeneration being a bottom-up urban planning process.

During the process of consultation with related administrative agencies, the dedicated organisation—the Urban Regeneration Department—already have an agenda set. Since the projects in charge of each department are different and there is an issue of authority in the government, innovative mainstreaming is difficult to achieve (INT16). In addition, although residents' opinions are collected at meetings such as resident councils, public hearings, and briefing sessions, the basic goal or concept of urban regeneration has already been established by the Seoul Metropolitan Government and community governments. Thus, during the process of collecting residents' opinions, residents are likely to discuss only minor elements of urban regeneration projects. There are also structural problems in this process—most residents do not have experience in discussing these community problems together, the participation rate is low, and the projects need to be completed in a short time, meaning they go ahead without resolution to the conflicting opinions of the residents on urban development.

However, as seen in the cases of Jangwi-dong and Sangdo 4-dong, if an actor is active in responding to climate change and participates in the agenda-setting process, this can be a positive driver in integrating climate measures into the policy output of urban regeneration revitalisation plans.

5.3.3.5 Feedback loop

There are two feedback loops in the process of urban regeneration policy—one from community governments to Seoul Metropolitan Government and one from Seoul Metropolitan Government to the national government.

After the implementation of urban regeneration projects at community level, performances and challenges of urban regeneration projects were monitored by Seoul Metropolitan Government. In particular, in the context of climate measures, good practices such as the Rainwater Village Creation Project and the Energy-independent Village Project were initiated by community

governments such as Jangwi-dong and Sangdo 4-dong. These projects become active cooperative projects for urban regeneration areas in Seoul; Seoul Metropolitan Government started to create a type of climate-related cooperative project that targets only urban regeneration areas (e.g. Urban Regeneration Linked Energy-independent Village). This means that good practices for the integration of climate measures in urban regeneration projects were adopted by the city government and promoted to the other community governments.

Limitations of urban regeneration projects at community level are also monitored by Seoul Metropolitan Government. The main limitation was the lack of information for the community government to integrate cooperative projects from the city government, resulting in the limited number of cooperative projects in urban regeneration revitalisation plans. In this regard, the city government published a variety of manuals for the community to use. One of these manuals is the 'Urban Regeneration Cooperation Project Utilisation Manual' released in 2019. The Urban Regeneration Headquarters found out that community governments tend to miss projects that are implemented in their urban regeneration area due to a lack of information and cooperation with other departments (Seoul Metropolitan Government, Regeneration Policy Department, 2019). On this matter, Seoul Metropolitan Government published the manual with 100 projects (among them, nine projects are related to climate measures[38]) that are operated in Seoul, which can be used as cooperative projects in urban regeneration areas. It is expected that the manual serves to increase the efficiency of the administration and performance of each project. During the feedback process, Seoul Urban Regeneration Support Centre plays a significant role in monitoring the Urban Regeneration On-Site Centre and community governments and providing guidelines and manuals for urban regeneration stakeholders based on the monitoring.

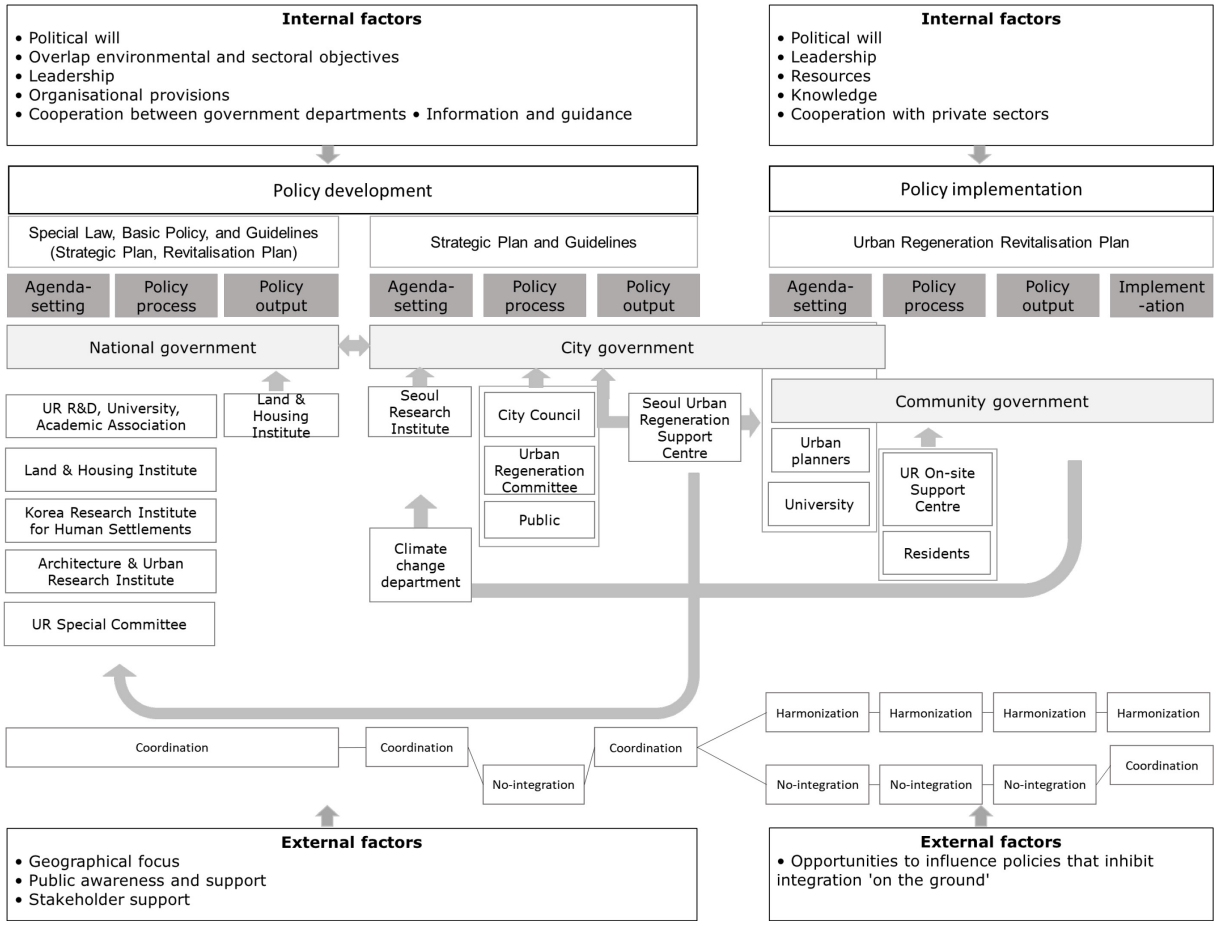
The national government also receive feedback from the city government. In the process of feedback, the role of Seoul Urban Regeneration Support Centre serves to promote cases of Seoul on a national level. Policymakers of national urban regeneration policy and the Nationwide Council of Urban Regeneration Support Centres, in which Seoul Urban Regeneration Support Centre serves as the secretariat, have hosted several seminars related to the integration between energy-related measures and urban regeneration. In these seminars, the head of staff of Seoul Urban Regeneration Support Centre held presentations to publicise good practices of Seoul and suggest further directions for the integration. The main seminars include 'Urban regeneration and sustainable energy independence foundation creation' which was organised by the Nationwide

[38] Creation of urban greening shelters and street gardens; green parking; supply of new and renewable energy for private houses; LED lighting supply project for the underprivileged; expansion of rainwater management facilities and creation of rainwater villages; support for improvement of sewer pipeline; maintenance and expansion of water-friendly spaces in the city centre; Hope House Repair Project; and Energy-saving LED signage replacement.

Council of Urban Regeneration Support Centres, National Balanced Development Committee, Ministry of Land, Infrastructure and Transport, LH, Korea Research Institute for Human Settlements, and others in 2019. In one of the three presentations in the seminar, an employee at the Seoul Urban Regeneration Support Centre held a presentation to introduce good practices for the integration of energy measures in urban regeneration areas in Seoul. Another main seminar in this regard is 'Green New Deal Urban Regeneration Tasks and the Role of Urban Regeneration Support Centres' in 2020, organised by the Nationwide Council of Urban Regeneration Support Centres, LH, and the Ministry of Land, Infrastructure and Transport. One of three presentations in the seminar was also presented by the formal head of Seoul Urban Regeneration Support Centre—'Green New Deal Initiatives and Prospects for a Sustainable City'—and facilitated the sharing of experiences and knowledge of Seoul's urban regeneration. In addition, the former head of the Seoul Urban Regeneration Centre proposed that the Ministry of Environment start national level research to integrate Sustainable Development Goals (SDGs) with urban regeneration, resulting in the publication of 'SDGs Linked Urban Regeneration Guidelines Study' in 2018 by the Ministry of Environment.

Figure 5-7 presents the level of integration of climate measures in urban regeneration policy and plan.

Figure 5-7 The level of integration of climate measures in urban regeneration



Source: own compilation

5.4 SUMMARY

This chapter investigates two policy domains, urban regeneration and climate change, at different levels of government—national, city, and community levels—and the integration of climate measures into the process of urban regeneration policy. This section summarises the chapter before explaining the internal and external factors for the integration of climate measures into urban regeneration in policy development and implementation (Chapters 6 and 7).

Urban regeneration—one of the main urban policies in the Republic of Korea—has been implemented in many neighbourhoods in Seoul. Although urban regeneration aims to adopt an integrative approach for the economic, social, physical, and environmental revitalisation of urban areas, it rarely considers climate policy integration at national, city, and community levels of urban regeneration.

In the Republic of Korea, different levels of government—national, city, and community levels—establish climate change policy and plans. The national government establishes climate mitigation and adaptation policies. It is noteworthy that the 'Measures for Adaptation to Climate Change',

being in line with the legal basis of the Framework Act on Low Carbon, Green Growth, states visions and sectoral plans for climate adaptation of the country as well as imposes the establishment of the 'Detailed Implementation Plan for Measures for Adaptation to Climate Change' on the city and community governments. The main climate measures at different levels of government are introduced in Section 5.2. The climate measures that are established by Seoul Metropolitan Government are implemented in communities and their neighbourhoods. Several climate measures that were integrated into urban regeneration projects in neighbourhoods were organised and funded by Seoul Metropolitan Government, including the Energy-Independent Village Project, Seoul Caring House and house repair projects, and the Rainwater Village Creation Project.

In the Korean government's administrative structure, city and community governments have an autonomy that allows the government to highlight climate objectives in urban regeneration plans and projects. The national government influences how city and community governments formulate overall visions of urban regeneration policy and plan. Seoul Metropolitan Government demonstrated higher involvement in community governments for the formulation of urban regeneration revitalisation plans of neighbourhoods. This is because the urban regeneration budgets for the study areas (except for Garibong-dong) come from Seoul Metropolitan Government and these four areas were the initial pilot areas of Seoul-type urban regeneration. In this government structure, investigating policies of urban regeneration and climate change and assessing the level of integration of climate measures in each process of urban regeneration policy help to understand the urban regeneration policy process of Seoul and the way it incorporates climate measures.

In the process of agenda-setting and policy process of national urban regeneration policies (Special Act on Promotion of and Support for Urban Regeneration, Basic Policy for National Urban Regeneration, Guidelines for the Formulation of Strategic Plans for Urban Regeneration, and Guidelines for the Formulation of Neighbourhood Regeneration Revitalisation Plans), government sub-ordinate research institutes and universities played vital roles in that they performed R&D projects and research to provide main directions, content, and evidence to establish the policy. However, it was the civil servants in the national government who decided whether or not to integrate climate measures, and to what extent, in the final policy output. It was determined that during the agenda-setting and policy process, the level of integration of climate measures in national urban regeneration policy is 'coordination'—a lower level of weak integration—based on the criteria of the level of climate policy integration in Roeck, Orbie and Delputte (2018). However, it is noticeable that outputs of urban regeneration policy have a lower level of integration of climate measures than the agenda-setting and policy process of urban regeneration.

In sum, the final policy outputs did not reflect all climate measures proposed during the agenda-setting and policy process.

The Urban Regeneration Headquarters in Seoul Metropolitan Government formulated the Seoul Strategic Plan for Urban Regeneration in compliance with the urban regeneration policies that were established by the national government. The nature of the strategic plan is to declare visions and general directions of urban regeneration in Seoul, especially in urban regeneration revitalisation areas. The first version of the plan (2015) did not significantly highlight climate objectives, which directly influenced the formulation of urban regeneration revitalisation plans in study areas. However, as demonstrated in the second version of the plan (2018)—which incorporated climate objectives more than the previous version—attempts at climate policy integration in urban regeneration have increased. During the agenda-setting of the strategic plan, The Seoul Institute provided research and strategy advice on urban regeneration. There were clear policy processes in establishing the strategic plan, such as the involvement of the City Council, the Urban Regeneration Committee, and public hearings. Nevertheless, there were no significant efforts from these involvements to help to increase the level of climate policy integration in the strategic plan. The general policy direction of Seoul Metropolitan Government, as well as the previous Mayor's high interest in climate change issues, influenced the level of integration of climate objectives in the strategic plan. Therefore, the level of integration of climate measures in the strategic plan in Seoul during the agenda-setting and policy output is regarded as 'coordination', whereas the policy process is evaluated as 'no integration' based on the criteria of the level of climate policy integration in Roeck, Orbie and Delputte (2018).

The four study area neighbourhoods—Jangwi-dong, Sangdo 4-dong, Amsa-dong, and Garibong-dong—completed urban regeneration projects. They were all governed by both Seoul Metropolitan Government and their community government. Among these four areas, Garibong-dong was governed by three different levels of government— national, city, and community governments—as it was designated and funded by the national government (Ministry of Land, Infrastructure and Transport). They are all residential areas with similar geographical conditions (low-rise residential areas with limited green space and infrastructures), being managed by Seoul Metropolitan Government as they are four among eight Seoul-type urban regeneration pilot areas. Although Seoul Metropolitan Government was involved in the whole process of urban regeneration revitalisation plans of these four areas, two of them—Jangwi-dong and Sangdo 4-dong—show a higher level of integration of climate measures in their plans compared to Amsa-dong and Garibong-dong. The influences of this phenomenon vary, but existing policy projects and residents' activities related to climate change before the agenda-setting process of urban regeneration revitalisation plans can be determined to have had an impact on the integration of

these policy projects and activities into the plans. Although there were similar policy processes to collect the opinions of residents, experts, and other administrative agencies (including the government department in charge of climate measures) in four neighbourhoods, it is seen that the integration of climate measures in neighbourhoods is challenging without important actors who possess a high level of leadership in the neighbourhood.

The following two chapters, Chapters 6 and 7, explore the main internal and external factors that affect the integration of climate measures into urban regeneration during policy development and policy implementation stages.

6 POLICY DEVELOPMENT: INTERNAL AND EXTERNAL FACTORS TO INTEGRATE CLIMATE MEASURES INTO URBAN REGENERATION POLICY

The dissertation investigates internal and external factors to integrate climate measures into urban regeneration policy along the policy cycle—policy development and policy implementation. In this dissertation, policy development refers to a policy stage when urban regeneration policies from national and city governments are prepared and released as policy outputs. Policy implementation refers to a stage when these urban regeneration policies are implemented with urban regeneration revitalisation plans prepared and released by community governments. The whole process of urban regeneration is complex, thus it is reasonable to examine the climate policy integration in each process of urban regeneration policy. This dissertation divides the policy development and implementation process and intends to discuss it in two chapters, Chapter 6 and Chapter 7. The structure of these two chapters is arranged based on the conceptual framework presented in Section 2.6 in Chapter 2. Chapter 6 focuses on policy development and Chapter 7 focuses on policy implementation.

As introduced in Chapter 2, the term 'internal factors' refers to 'those that can be actively addressed and changed by the agents responsible for integration, such as a government' (Persson and Runhaar, 2018). In this dissertation, internal factors include political factors, organisational factors, resources, cognitive factors, and characterisation of the problem at hand. External factors—defined as 'those that are beyond the direct control of the policy integration process'—according to the definition of Persson and Runhaar (2018), include public awareness and support, and private sector support.

Chapter 6 discusses these internal and external factors of climate policy integration in the policy development of urban regeneration at both national and city levels.

6.1 INTERNAL FACTORS

The section introduces an overview of highlighted factors by stakeholders and policymakers of urban regeneration (see Table 6-1). These factors are organised by category, and the numbers in the corresponding columns refer to the number of interviewees who highlighted each factor. The following subsections explain each factor.

Table 6-1 Highlighted internal factors (drivers and barriers) by stakeholders and policymakers of urban regeneration during policy development

(Total number of interviewees: 50)

Factors that affect the integration of climate measures into urban regeneration	No. of interviewees	Driver	Barrier
Policy Development Stage			
Internal factors			
Political factors			
(Absence of) political support of major political leaders	11	11	0
Organisational factors			
(Lack of) cooperation with the Ministry of Environment/climate change departments	14	2	12
(Lack of) leadership/expertise of urban regeneration civil servants	10	5	5
(Absence of) supportive regulatory framework	3	0	3
Different/similar levels of hierarchy between climate change policies and urban regeneration policies	3	0	3
High/low turnover of civil servants leading to a lack of continuity	3	0	3
Resources			
(Lack of) information and guidance from climate change policies, lack of relevant research	8	2	6
(Lack of) budgets and resources	5	0	5
(Lack of) expertise of urban regeneration support centre	2	2	0
Cognitive factors			
Diverging/similar priorities	5	0	5
(Un)certainty of effectiveness/performance of climate measures	5	0	5
Characterisation of the problem at hand			
Different/similar objectives for climate change and urban regeneration policies	4	0	4
Timescales	2	0	2

Source: own compilation

6.1.1 Political factors

Political support of major political leaders

Political support of major political leaders is one of the top relevant internal factors in the policy development stage of urban regeneration. Interviewees in the central government, subordinate research institutes, the city government, the Seoul Urban Regeneration Support Centre, and the

community master planner, all highlighted the significance of political support of major political leaders.

In the policy development stage, the factor of political support of major political leaders is defined as the support of the President and the mayor of Seoul Metropolitan Government. Their willingness to mitigate and adapt to climate change impact plays a significant role in the integration of climate measures in urban regeneration policies.

Park Geun-hye, who served as President of the Republic of Korea from 2013 to 2017, did not focus much on climate change policy (Hwang, 2017). In a survey by the Citizens' Institute for Environmental Studies, one hundred informants who are in the field of academia and/or civil society in the environment and energy sector evaluated the performance of environmental policy during her presidency as 1.48 out of 5 (Hwang, 2017).

Moon Jae-in who has served as the president of the Republic of Korea since 2017 proposed his political commitment to climate change and renewable energy with specific goals as he started his presidency in 2017. One of the 100 policy tasks he set was to establish a solid implementation system for the new climate regime. He proposed detailed climate change mitigation and adaptation goals in his 100 policy tasks with a five-year roadmap ('Table, Moon Jae-in government's 100 national tasks—the Republic of Korea Policy Briefing,' 2017). In July 2020, the Korean government released the 'Comprehensive Plan for Korean New Deal: Great transition to Korea, which is leaping forward as a leading country'. This New Deal is twofold; consisting of the Digital New Deal and Green New Deal, with 160 trillion won invested with the goal of creating 1,901,000 jobs by 2025 (the Republic of Korea, Joint Corporation of Relevant Ministries, 2020a). Among the measures in the Green New Deal Policy, there are policies such as 'green remodelling' which applies to urban regeneration areas. Currently, the goal of green remodelling is to construct and remodel eco-friendly, energy-efficient buildings using new and renewable energy facilities and high-performance insulation materials in public buildings (the Republic of Korea, Joint Corporation of Relevant Ministries, 2020a).

Since the initiation of the Special Act on Promotion of and Support for Urban Regeneration 2013, and the establishment of basic policies and guidelines which followed this Act until 2016, there was no significant political drive from President Park to integrate climate measures into the national policies of different sectors. However, the significance of the political support of major political leaders for climate policy integration was highlighted by stakeholders of the national urban regeneration policy. 'The truth is, putting climate change into urban regeneration depends a lot on the will of the superiors.' (INT5) 'In Korea, the direction of national policy seems to have a big impact.' (INT6)

Meanwhile, at the city level, the mayor of the Seoul Metropolitan Government, Park Won-soon, has put significant efforts into formulating effective climate change policies. From commencing his term as mayor of Seoul in 2011 up until he finished his term in 2020, a variety of climate change policies had been implemented, including 'one less nuclear power plant', 'energy-independent village', 'resource circulation city', 'Seoul urban agriculture', and 'rainwater savings bank'. Mr Mayor Park Won-soon promoted these climate policies by investing the required labour and budget in them, which is very rare for a city government in Korea (J. Lee, 2016). To be specific, he set up 'One Less Nuclear Power Plant Management Team', 'Green Energy Division', and 'Energy Citizen Cooperation Team' in the Climate and Environment Headquarters in Seoul Metropolitan Government. To support these initiatives his office formulated a governance structure by establishing 'One Less Nuclear Power Plant Citizens' Committee' and 'One Less Nuclear Power Plant Executive Committee' (J. Lee, 2016).

Hosting the ICLEI (International Council for Local Environmental Initiatives) World Congress in Seoul in 2015 demonstrates a good example by showing that he was committed to taking action against climate change. ICLEI holds its World Congress to show how its member cities put their efforts into advancing sustainable urban development. In this World Congress, he proclaimed the Seoul Declaration, which includes the promise to create and develop sustainable cities. The Seoul Declaration included 11 promises of Seoul such as revealing an exact target number for greenhouse gas emissions, expanding urban agriculture, and employing preventive measures against infectious diseases and heatwaves, while improving its capacity to respond to climate change, among others (Mayor of Seoul Metropolitan Government, 2015).

The high level of commitment of Mr Park to climate policy played a significant role in affecting the integration of climate measures in urban regeneration (INT11; INT12; INT13; INT14).

The two issues of energy strategy and being eco-friendly have been the main indicators of Seoul's policies for a long time. Now the focus is on the process of dealing with these issues in urban regeneration projects. The city has a lot of policy interest in the environment, and the mayor's will was reflected in the regeneration projects.

Due to Mayor Park's high prioritisation of climate change issues, the city government put a high level of priority on climate change policy, even higher than the central government (INT7; INT11; INT17; INT19). Park announced the Seoul version of the Green New Deal in July 2020 and declared Seoul would become a zero-emission city by 2050 by investing 2.6 trillion KRW by 2022 to promote a large-scale Green New Deal (Seoul Metropolitan Government Environment Policy Department, 2020). In this declaration, he outlined plans to start green remodelling to develop 241 existing public buildings to become zero-energy buildings, the introduction of the GHG

emission limit system for public buildings, and the mandatory zero-energy construction guidelines for private new buildings. He announced this plan would start in the year 2023, two years earlier than the Green New Deal roadmap from the national government. Furthermore, it was announced that the 'Seoul Caring House' project, a small-scale urban regeneration project that can repair old houses and improve alleyways with subsidies and low-interest loans, would be upgraded with a focus on greenhouses (Seoul Metropolitan Government Environment Policy Department, 2020).

Mr Park had requested all departments in the Seoul Metropolitan Government and government-affiliated organisations to report on how to reduce greenhouse gas emissions in their plans and projects weekly (INT14). The vice mayor also held meetings with all departments in the city government and requested them to report on all possible projects that can be incorporated into urban regeneration plans (INT18). To encourage the departments to fully investigate the relevant projects, the city government provided incentives to the departments that cooperated with urban regeneration projects in 2016 and 2017 (INT18).

6.1.2 Organisational factors

Organisational factors are the most important factors in the development of urban regeneration policy at national and city levels. Despite urban regeneration in Korea pursuing a strategy which aimed to reflect a variety of opinions from residents involved in urban regeneration policy and plans (known as a bottom-up planning approach), it was still commonplace to use a top-down approach for decision-making in meetings for urban regeneration at that time (Shin and Kang, 2019). In this regard, organisational factors, as well as political factors, are regarded as significant factors in influencing the level of integration of climate measures into urban regeneration. There are many organisational factors in the policy development stage; cooperation with the Ministry of Environment/climate change departments, leadership/expertise/interest of the civil servant of urban regeneration, supportive regulatory framework, different levels of hierarchy between climate change and urban regeneration policies, high turnover of civil servants leading to a lack of continuity, and failure to reflect opinions gained from the policy research process.

The most frequently highlighted factor among internal factors in the policy development stage is the 'cooperation with the Ministry of Environment/climate change departments'. For the climate policy integration in urban regeneration policy at national and city levels, the Ministry of Land, Infrastructure and Transport in the national government and the Urban Regeneration Headquarters in Seoul Metropolitan Government are expected to cooperate with both the Ministry of Environment (national level) and the Climate Environment Headquarters (city level).

The lack of cooperation at these different levels of government stems from several reasons; fear of losing authority, ambiguity in evaluating performance based on cooperation, divergent priorities, the different cultures of the two fields of urban regeneration and climate change, staff evaluation points, multi-sectoral management, and finally lack of clear process for cooperation. These points are discussed in this section later.

Cooperation with the Ministry of Environment/climate change departments

In the policy development stage, cooperation between two different sectors, the sector of urban regeneration and the sector of climate change, is a significant factor in the integration of climate mitigation and adaptation measures in urban regeneration. At national level, urban regeneration policy is formulated and managed by the Urban Regeneration Planning Group of the Ministry of Land, Infrastructure and Transport. Cooperation between the Ministry of Land, Infrastructure and Transport and the Ministry of Environment is required for the integration of climate measures in the national urban regeneration policy. At city level, urban regeneration policy was formulated and managed by the Urban Regeneration Headquarters of the Seoul Metropolitan Government. Its cooperation with the Climate and Environment Headquarters of the Seoul Metropolitan Government is required for the integration of climate measures in urban regeneration.

National urban regeneration policies such as the Special Act on Promotion of and Support for Urban Regeneration and the Basic Policy for National Urban Regeneration state that the urban regeneration policy and plan should be established by investigating and exploring various other sectors' plans, projects, and programs related to urban regeneration (*Special Act on Promotion of and Support for Urban Regeneration*, 2013; Lee *et al.*, 2017). As these plans, projects, and programmes are organised by different ministries, cooperation between different sectors is crucial to establishing urban regeneration policy and plans while achieving a variety of objectives of these policies and plans. Urban regeneration policy and planning cannot be established by only one ministry (Jang, Hwang and Lee, 2018). The cooperation of ministries involved in the urban regeneration projects also has the effect of preventing the cost of inefficiency caused by different ministries implementing different projects separately in the urban regeneration area (Cho, Ryu and Choi, 2017). Urban regeneration policymakers and stakeholders who were involved in the process of policymaking insist that one of the most significant barriers that affect the lack of integration of climate measures in urban regeneration policy is the lack of cooperation.

The level of cooperation among ministries or departments for urban regeneration policy is at the level of sharing information, such as policies or projects being promoted between ministries or departments. Some of them might be aware of some parts or contents of policies or projects in other ministries/departments, but most of them rarely know about policies or projects in other

ministries/departments in detail. It is still not enough for ministries to cooperate through discussion (Lee *et al.*, 2017).

The Ministry of Land, Infrastructure and Transport launched the Urban Regeneration Project Planning Team in 2017. This team is in charge of formulating and implementing national urban regeneration policy. The Climate Change and Carbon Neutral Policy Office in the Ministry of Environment is in charge of climate change mitigation and adaptation policies generally. This office consists of three bureaus: the Climate Change and International Cooperation Bureau, the Green Transition Policy Bureau, and the Air Quality Policy Bureau. Another division that can be related to urban regeneration policy is the Environmental Assessment Policy Division which belongs to the Nature Conservation Bureau in the Ministry of Environment; a policy established by them is the promotion of integrated management between land planning and environmental planning, achieved by matching the temporal range of these plans and investigating possible policy components that can be linked to each other.

During the process of agenda-setting for urban regeneration, the level of cooperation between the Ministry of Land, Infrastructure and Transport and the Ministry of Environment is low. The lack of consultation between the Ministry of Environment and the Ministry of Land, Infrastructure and Transport directly results in the lack of inclusion of climate measures with specific and actionable contents in national-level urban regeneration. An interviewee who is one of urban regeneration stakeholders at national level states:

> In fact, since there was hardly any discussion with the Ministry of Environment, the statements (climate objectives in national urban regeneration policies) are vague with a principled level (INT10).

The central government pursued a high level of integration among relevant ministries. The Special Committee on Urban Regeneration launched in 2016 under the prime minister was supposed to provide a forum for cooperation between ministers of the national government, although it did not function as planned (INT5). In 2018, the Ministry of Land, Infrastructure and Transport entrusted the Urban Regeneration Working Committee with practical tasks of the Urban Regeneration Special Committee. Since it was challenging to gather senior government officials and the prime minister together, the practical tasks were instead reviewed by the Urban Regeneration Working Committee. One of the main tasks of this committee was to investigate cooperative projects with other ministers. Although this committee was also expected to suggest climate policy integration in urban regeneration policy, no significant action resulted from its work ('[Press Release] The working committee of the Urban Regeneration Special Committee is

scheduled to be launched in early July. Encouraging active participation of each ministry', 2018) (INT3). An interviewee who is involved in the working committee states:

> The working committee itself is very multi-ministerial. Therefore, it seems like one of the roles is to discover multi-ministerial projects or something like that… Right now, the Ministry of Land, Infrastructure and Transport is not very interested in this issue (climate policy), because they are busy dealing with their tasks (INT3).

Both the climate change and urban regeneration sectors claim that climate policy integration is challenging because the other sector is not active in this integration. An interviewee who is an expert in the field of climate policy argues:

> There are projects promoted by the Ministry of Environment and projects promoted by the Ministry of Land, Infrastructure and Transport. Although experts suggest that these projects should be integrated, ministries do not set out to do this because of their own tasks. The Ministry of Environment has a will to do that but the Ministry of Land, Infrastructure and Transport has little interest in (the integration) (INT3).

On the other hand, a decision-maker who was in charge of formulating national urban regeneration policy in the Ministry of Land, Infrastructure and Transport argues:

> I don't think various climate measures that are organised by the Ministry of Environment were included (in the Basic Policy for National Urban Regeneration). That's what the Ministry of Environment should have recommended to us. Maybe they have not done so much. I don't know. It might be helpful if they (the Ministry of Environment) ask for such cooperation in the future (INT7).

Within Seoul Metropolitan Government, there is a lack of cooperation between departments for the integration of climate measures into urban regeneration policy. A reason that leads to a lack of discovering cooperative projects is that the dedicated organisation, the Urban Regeneration Headquarters, was launched only with functions from the Urban Planning Bureau and Housing Policy Division, which focuses only on the implementation of physical and spatial policies (Jang *et al.*, 2017). As there is a routine and practice of a silo effect in the government, it is difficult to cooperate with other departments (Jang *et al.*, 2017).

In the Seoul Metropolitan Government, the Urban Regeneration Headquarters was launched in 2014 (S.-D. Park, 2014). [39] Although the cooperation between the Urban Regeneration Headquarters and the Climate Change Headquarters was as challenging as the cooperation

[39] Since the current mayor, Oh Se Hoon, started his term in Seoul Metropolitan Government in April 2021, the new organisational structure no longer includes an urban regeneration related department/headquarters.

between ministries in the national government, the Seoul Metropolitan Government implemented several processes for the cooperation between headquarters in the city. One of these is the Energy-Independent Village Project becoming an urban regeneration-related project. The Energy-Independent Village Project began in 2012 ('CE&E Case / Korea—Energy Independent Villages Project in Seoul,' 2018) and later there was a movement to incorporate the project into urban regeneration projects (see Section 5.2.2 for descriptions of the Energy-Independent Village Project). Civil servants who used to work in both the Urban Regeneration Headquarters and Climate and Environment Headquarters in the Seoul Metropolitan Government emphasised the difficulty in cooperation between departments in governments. For example, when the two departments were involved in the Urban Regeneration Linked Energy-independent Village Project, the departments had to conclude an official agreement to work on the project together. An interviewee who was in charge of organising the Urban Regeneration Linked Energy-independent Village Project in the Seoul Metropolitan Government argues:

> When doing the Urban Regeneration Linked Energy-independent Village, strangely, two Headquarters had an agreement in the same government. They are under the Seoul Metropolitan Government. While watching that they shook their hands and took pictures for the agreement, I was wondering if it had to be like this to move (to work on the cooperative project) (INT23).

There are various contributing factors resulting in the lack of cooperation between the ministries within the central government and within the headquarters of Seoul Metropolitan Government. These factors include divergent priorities, absence of staff evaluation points, independent budget systems, lack of clear process for cooperation, different nature/culture in the two different sectors of urban development and climate change, and finally a lack of cooperation between the central government and the city government.

It has been criticised for a long time that the Government of Korea presents a high degree of the organisational silo effect within ministries, as well as amongst the departments in the city/state government (Cho, Ryu and Choi, 2017). The Korean term 'kanmagi haengjeong' can be translated as 'partitioned administration' in English, and it refers to when different ministries in departments are separated by 'partitions' that block communication with each other. The term is commonly used to criticise the lack of cooperation and communication within the ministries in the national government as well as among departments in the city/state government. Urban regeneration stakeholders at national level argue:

> Cooperation between ministries should be conducted, but cooperation is not possible, because it is a problem in terms of who is in charge of the project. There are silo mentalities in the governments (INT9).

> In regard to the integration of climate measures in urban regeneration, each ministry is afraid of losing authority. Even within the Ministry of Land, Infrastructure and Transport, collaboration between departments is lacking due to their strong ownership of their projects, which becomes a hindrance (INT4).

The Ministry of Environment leads projects that can be applied in urban regeneration areas organised by one of their departments. Due to the silo effect between ministries, civil servants prefer to cooperate with a department within their ministry rather than try to cooperate with other ministries. An interviewee who was in charge of urban regeneration states:

> When the Ministry of Land, Infrastructure and Transport is conducting an urban regeneration project, they have to collect all relevant projects related to urban regeneration from other ministries and then put them into a 'funnel', but a civil servant in the Ministry of Environment says, 'why do we go in that funnel? We have a small funnel too.' There is such a thing as a turf war among ministries (INT7).

When performing collaborative tasks, the responsibilities and roles of the participating ministries will likely be unclear. Therefore, it is challenging to evaluate performance for cooperative projects. Urban regeneration, a type of cooperative project, is also challenging due to the ambiguity to evaluate performance for cooperation. Urban regeneration stakeholders at national level argue:

> Who manages the project, who is responsible for it, who controls it—they are hesitant to collaborate with each other. And although they are much better than before, they still don't try to initiate to be involved in challenging projects (INT8).

> Cooperation between departments doesn't really work. Because having a budget and using it in other departments does not make sense. It has to be his or her job; they don't want to do someone else's job. So, it is possible to have the exact role and to give extra points when cooperating with each other. There has to be that type of policy (INT10).

Although there were efforts made to cooperate between the Urban Regeneration Headquarters and the Climate and Environment Headquarters in Seoul Metropolitan Government, they faced challenges in evaluating performances for the cooperation. In 2018, the budget of the Energy-Independent Village Project came from the Climate and Environment Headquarters and the project was managed by the Urban Regeneration Headquarters (INT13). Then, the Energy-Independent Village Project, as an urban regeneration-related project, was created by the Urban Regeneration Headquarters with the budget from the Climate and Environment Headquarters (INT13). Eventually, the Urban Regeneration Headquarters planned budgets for the project and they took the project due to the ambiguity of evaluating the performance of the headquarters (INT13). When evaluating the performance of the headquarters and the civil servants in the Seoul

Metropolitan Government, one of these two headquarters was required to report the project in the final report, which was challenging to be evaluated (INT13). An interviewee who was working in the Urban Regeneration Headquarters argues:

> The thing is who will take the performance in the final report? If the money comes from the Climate and Environment Headquarters, and both headquarters take it as their performance, the city councillors would ask, 'Whose business is this? Climate and Environment Headquarters or the Urban Regeneration Headquarters?' When these two headquarters answered, 'We collaborated', the city councillors don't appreciate that because the budget has to be clearly reported, and the performance cannot be processed (INT13).

It is commonplace that civil servants care less about meetings hosted by other headquarters. When the civil servants are invited to other headquarters' meetings, they frequently think the tasks are not relevant to them. A stakeholder of urban regeneration at city level reported this issue, saying:

> When the other headquarters/departments/teams organise any meetings, civil servants don't listen to others. They think, 'this is not my job'. Although the administrative council of urban regeneration exists, civil servants from the Urban Regeneration Headquarters might say 'Isn't it just a meeting convened by the head of the Urban Regeneration Headquarters? We must all work together and help him to achieve that person's achievements?' This is a common thought (INT16).

The absence of common budgets that can be used by various relevant sectors is directly related to the ambiguity in evaluating performance for cooperation. It is vague to evaluate performance when two different ministries/ headquarters are in charge of the same project; one that has the budget, and another one that performs the main tasks of the project. Stakeholders of urban regeneration argue that one of the reasons that lead to the lack of integration of climate measures in urban regeneration is the absence of integrated budgets that can be used for the cooperative projects, saying:

> Another important problem is the lack of integrated financial resources that we can use here and there. For example, any ministries like the Ministry of Land, Infrastructure, and Transport should be able to use the money from the Ministry of Environment, or vice versa. It should be like this, but if it's not my budget, it's not my business. It's a very common story. So, an integrated project management system is important, but an integrated project budget is also important. It seems that there is a fundamental need for common resources that can be used by any ministry in an integrated way (INT17).

> If the departments in Seoul are different, it is difficult to smoothly implement the budget and project execution methods. The Seoul Metropolitan Government had experience in collaboration with departments for a Seoul-type energy-independent village as an urban regeneration-related project.

> However, after all, Urban Regeneration Headquarters directly carried out the project due to difficulties in the evaluation of performances and different budgets (INT13).

Stakeholders and policymakers at national and city levels emphasised that urban regeneration projects should be planned and operated by multiple departments, not just the Ministry of Land, Infrastructure and Transport, saying:

> One of the reasons why urban regeneration is difficult is because the budget is sent down to the Ministry of Land, Infrastructure and Transport. There is economic regeneration, cultural regeneration, and environmental regeneration all needed to regenerate a city, but since the Ministry centred on the construction project and manages the budget, it has to recognise the multiple needs of the project. So I don't think it's good to just send the budget to a specific ministry. This is not something the Ministry of Land, Infrastructure and Transport alone can do (INT16).

The Ministry of Land, Infrastructure and Transport deals with various complex issues for urban regeneration areas (INT7). They insist that the urban regeneration budget is limited to dealing only with main urban regeneration issues such as installing CCTV, paving roads, cleaning street waste, and enlarging public car parks. Thus, incorporating climate measures in urban regeneration projects requires extra budgets and support from the department of environment (INT13; INT7; INT16; INT19).

One of the reasons for the lack of cooperation is that the nature, and therefore the culture of the fields of urban regeneration and climate change, are very different. Researchers who would like to cooperate from these two different sectors struggle to find common ways to cooperate. A researcher who is working in the field of urban regeneration and who has expertise in climate policy argues:

> The frame of thought between the experts in the fields of urban regeneration and climate change has to adapt a lot for cooperation to happen. However, if we talk about the important goal and vision that we should aim for together, there is now a point of intersection (INT8).

It is difficult to cooperate with other ministries unless there is an extra effort in suggestions for cooperation from other ministries, administrative processes, or incentives for cooperation (INT7). It is criticised that the two ministries—the Ministry of Environment and the Ministry of Land, Infrastructure and Transport—rarely have discussions, which means the statements about climate objectives in the national urban regeneration policy can only be general (INT10). The stakeholders in the sector of urban regeneration argued that there should have been initial suggestions and guidance from the Ministry of Environment about the cooperation (INT10; INT7).

Although the cooperation among different sectors in the city government is also difficult, Seoul Metropolitan Government did have a policy process for cooperation; there were meetings convened by the vice mayor with high-level civil servants (mostly first- or second-class civil servants), aiming to look for possible relevant projects that could be incorporated into urban regeneration projects (INT18).

Another process for the cooperation was to evaluate its effectiveness. In 2016 and 2017, when a department of the Seoul Metropolitan Government was involved in urban regeneration projects, the department could be measured against this performance (INT18). This process was one of the drivers of the development of cooperation between different sectors.

However, it is argued that the process for cooperation in Seoul Metropolitan Government was not effective for the integration of climate measures into urban regeneration policy. Although the opinion consultation with related organisations in the Seoul Metropolitan Government took place whilst renewing the Strategic Plan for Urban Regeneration, the period when it took place was already too late to incorporate climate policy (Seoul Metropolitan Government, 2015b). This is because the consultation took place at the very end of the policy process when the draft of the plan had already been reviewed and discussed by various stakeholders in meetings throughout the process. The result of this is that the civil servants in each department didn't seem to intervene and request to revise it unless there were significant issues which conflicted with the policies they manage (INT19).

Leadership/expertise of the civil servants of urban regeneration

The civil servants who are in charge of urban regeneration are the Director-General of the Urban Regeneration Project Planning Department which sits within the Ministry of Land, Infrastructure and Transport of the Republic of Korea, and the Deputy Minister of the Office of Urban Regeneration in Seoul Metropolitan Government. During the policy process of urban regeneration in the policy development stage, consultations from the government subordinate research institute or researchers directly affect the expertise and interest of civil servants in urban regeneration. This is because policy is usually formulated through the consultation of reports and seminars from subordinate research institutes. The main institutes involved in the process of agenda-setting of urban regeneration policies were the Korea Research Institute for Human Settlements, Land & Housing Institute, the Architecture & Urban Research Institute at national level, and The Seoul Institute at city level. Consulting reports and/or drafts of urban regeneration policies with a higher degree of emphasis on the integration of the climate measures can contribute to the level of the integration of climate measures in urban regeneration policy documents (INT19). However, it is ultimately the individual civil servants who decide whether to

consider climate change issues in urban regeneration policy (INT7). The policymaker of national urban regeneration policy in the Ministry of Land, Infrastructure and Transport states:

> When a research institute makes a proposal (for a policy), we sometimes revise the general vision or goal during the process (of finalising the policy). The detailed items don't change so much, but at the top level, the first one or two pages change significantly… and sometimes even the title changes. It's a very common story (INT7).

A majority of policymakers and stakeholders who were involved in urban regeneration at national and city levels pointed out that one of the most important factors as both a driver and a barrier is the leadership/expertise/interest of the civil servant of urban regeneration in relation to climate change policy. The role of the Direct General of Urban Regeneration Project Planning Department in the Ministry of Land, Infrastructure and Transport is one of the most influential in influencing the integration of climate measures in national urban regeneration. Their interest and expertise in climate change issues can directly affect the whole concept of agenda-setting and can also convince other relevant organisations to engage in further cooperation (INT5; INT6). An urban regeneration stakeholder at national level states:

> In reality, the will of the Direct General of Urban Regeneration Project Planning Department is very important, and a driving force. It is absolute. Because they all decide. They don't do it if they are not interested. If they don't understand, they can't convince others (INT5).

At city level, the Deputy Minister of the Office of Urban Regeneration in the Seoul Metropolitan Government plays a significant role in the integration of climate measures in urban regeneration policy. The role of the civil servant in the city could even be seen as a more important person than the mayor, from a practical point of view, as it is the civil servant who decides whether the urban regeneration policy could include climate measures or not (INT15).

One of the important actors who introduced the Energy-independent Village Project to the Urban Regeneration Headquarters in Seoul Metropolitan Government is Yoon Jun-woo. Previously, he worked with the Climate Environment Headquarters in the city government before moving to the Urban Regeneration Headquarters (INT13). His expertise and leadership positively affected the integration of climate measures in urban regeneration policy in Seoul.

The factor 'leadership/expertise of the civil servants of urban regeneration' is highly related to the factor of relevant law, ordinance, and guidelines. Civil servants' interest and expertise in specific issues directly influence the initiation of formulating and/or revising relevant laws, ordinances, and guidelines, as they are the ones who are in charge of establishing these policies (INT6).

However, up until now, policymakers and experts in the fields of climate change or urban regeneration argue that the civil servants being in charge of urban regeneration in the Ministry of Land, Infrastructure and Transport and Seoul Metropolitan Government still lack the interest in incorporating climate measures in the urban regeneration policy (INT3; INT9; INT11).

One of the main reasons given by the policymakers and stakeholders to explain the lack of expertise of the person in charge of urban regeneration in the government is that they lack information and knowledge about what kinds of climate measures can be integrated into urban regeneration. All stakeholders and policymakers of urban regeneration at national and city levels who were interviewed, point out that the person in charge is required to be informed about possible items of climate measures that can be adopted by urban regeneration projects by the Ministry of Environment or relevant research institutes. Although they would like to adopt climate measures, they do not know what kinds of measures they can choose (Information and guidance on climate change policy and the lack of relevant research will be discussed in Section 6.1.3).

Supportive regulatory framework

This factor is one of the most relevant factors for the integration of climate measures in urban regeneration policy. Legal basis and regulation are driving forces for civil servants to take action within the administrative procedures in the Korean government (INT6). An urban regeneration stakeholder at national level states:

> From the point of view of the administration, it is important to have the relevant statute precisely, because I think that doing work that does not have any statute can be problematic (INT6).

To be effective in implementing climate policy integration, there should be the existence of a legal basis in other implementing sectors. Currently, attempts for mainstreaming were performed by the Ministry of Environment by establishing mainstreaming strategies and programmes in the Measures for Adaptation to Climate Change. However, one stakeholder who is in charge of formulating the Measures for Adaptation to Climate Change argues that the other sectors outside the climate change sector should have a legal framework that includes climate change mitigation and adaptation, saying:

> Obviously, it should be the implementing sector that includes climate measures in their legal framework. What is the use of stating the Environmental Impact Assessment Act in the Measures for Adaptation to Climate Change, if the implementing sector does not include adaptation policy in their statute? (INT2)

National strategies and long-term plans of climate policy are established at the national level based on the 'Low Carbon, Green Growth Framework Act' (see Section 5.2.1). Although they

include contents and items of climate measures applicable to be integrated into urban regeneration policies and projects, they contain basic statements and suggestions without stating any implementation strategies in detail (Wang, 2013).

While the Seoul Metropolitan Government established the Seoul Green New Deal in July 2020, some climate measures required a higher level of supportive regulatory framework from the central government, such as the provision of regulations made into laws for private buildings to reduce greenhouse gas emissions (Seoul Metropolitan Government Environment Policy Department, 2020). Currently, there are no regulations that command the decrease in greenhouse gas emissions from privately owned buildings. As a result, Seoul Metropolitan Government proposed a revision to the regulations whereby privately owned buildings to the central government (Seoul Metropolitan Government Environment Policy Department, 2020)(INT11). As the city government is not able to formulate any relevant act, it attempted to encourage the private sector to decrease greenhouse gas emissions by suggesting the inclusion of incentives or penalties in relation to the decrease in greenhouse gas emissions (INT11). A civil servant in the Seoul Metropolitan Government states:

> In Seoul, the major amount of CO2 comes from private buildings and there is no regulation to force them to decrease CO2 (INT11).

<u>Different levels of hierarchy between climate change and urban regeneration policies</u>

A factor that hinders the integration of climate policy in urban regeneration policy at national and city levels is how there is no climate change policy/plan that is applicable for integration into urban regeneration policy at a similar level of hierarchy (Wang, 2013) (INT3). In other words, it can be observed that there is an institutional limitation in applying the climate measures effectively because the hierarchy between the related areas to develop urban regeneration is not clear (Wang, 2013).

In addition, the Special Act on Promotion of and Support for Urban Regeneration and the Framework Act on Low Carbon, Green Growth possess different legal characteristics, which makes the integration between an applicable law/plan insufficient (Wang, 2013). Climate change-related laws have a policy-strategic characteristic, and related laws mainly contain content for establishing long-term plans or planning from a macroscopic perspective by sector. On the other hand, the Special Act on Urban Regeneration has the characteristic of supporting individual projects in local governments. The Special Act is meant to support urban regeneration areas, not regulate them, which makes the inclusion of climate measures in the Act difficult (INT6).

High turnover of civil servants leading to a lack of continuity

Another issue related to the leadership/expertise of the person in charge of urban regeneration in the government is a high level of job rotation frequency. Although the research on climate policy integration has been highlighted by government subordinate research institutes, the government employees in urban regeneration are replaced by employees from other departments who are not familiar with urban regeneration, every two or three years. This issue has been raised by two policymakers at the national level, as one of the main reasons for the lack of knowledge of both urban regeneration and the necessity of climate change mainstreaming into urban regeneration projects. As civil servant roles are constantly being turned over, civil servants lack expertise, and it is difficult to progress climate policy integration in a long term strategic way. An interviewee who is in the field of urban regeneration at national level states:

> So, we revisit the story of Low-Carbon Green Growth[40] [policy] which we talked about ten years ago as if we are telling a new story. Climate change also promises to achieve its target, sets another high target, eventually fails to achieve it and thus, it does not last for a long time. When a Director in the Ministry of Land, Infrastructure and Transport changes, the policy direction changes as well. So, it is meaningless (INT9).

The Seoul Metropolitan Government recognised the discontinuance of policy resulting from the rotation of civil servants. Therefore, it established a system that ensured professional researchers continued to work in one department for five years (urban regeneration) until the project is completed (INT13). In addition, Seoul Metropolitan Government operates a 'dedicated responsible system', where a dedicated civil servant is appointed and assigned responsibility. In this system, a person in charge of important projects is first appointed, and then this person is given additional 'points' for promotion, training opportunities, and performance incentives (Ministry of Land, Infrastructure and Transport, Land & Housing Corporation and Architecture & Urban Research Institute, 2016a).

The Ministry of Land, Infrastructure and Transport have adopted this system since 2016. The Guidelines for Implementation of Neighbourhood Regeneration Type Urban Regeneration (2016) suggested that city and community governments should make efforts to provide incentives, such as giving additional points for training opportunities or promotions and discouraging working-level managers within the administrative organisation from rotating roles during the urban

[40] Low-Carbon Green Growth is a policy and national vision established by the former president, Lee Myeong Bak in 2008. It highlighted the synergy between two sectors of environment and economic growth (Seong and Sim, 2009).

regeneration project period (Ministry of Land, Infrastructure and Transport, Land & Housing Corporation and Architecture & Urban Research Institute, 2016a).

6.1.3 Resources

The factors related to resources are relevant factors for the integration of climate measures in urban regeneration policy at both national and city levels. The concept of 'resources' includes not only financial resources, but also non-financial resources, such as knowledge and information, and having an intermediary agent for urban regeneration established by the government. Factors of resources are closely related to political factors and organisational factors, which have been discussed in the previous sections, in that actors in national and city governments need the resources that help to decide the adoption of climate measures in the process of policymaking.

<u>Information and guidance on climate change policy, and lack of relevant research</u>

As climate measures do not demonstrate their effects clearly, visibly, or immediately, the need for information and research is significant for stakeholders to be convinced to take action. The government subordinate research institute that prepared the research for urban regeneration policy also plays a significant role in integrating climate measures into urban regeneration. A person who was in charge of preparing the Basic Policy for National Urban Regeneration pointed out that consultations from subordinate research institutes resulted in him considering incorporating the statements related to climate change, such as rainwater management and safety from hazards, in the policy (INT7).

This factor is related to a cognitive factor, which is the uncertainty of the overall effectiveness/performance of climate change policy. Lack of information and guidance on climate change policy and lack of relevant research results in policymakers and the general public not visibly seeing the clear effectiveness or performance of climate change policy.

The critical issues are the lack of relevant research about (1) the effectiveness of possible climate measures in urban regeneration, (2) the types of climate measures that can be incorporated into urban regeneration, and (3) the vulnerability of climate change impacts in urban regeneration areas. During the policy development process of urban regeneration projects, it is challenging to engage policymakers without supportive research and scientific evidence. Policymakers and stakeholders at national and city levels claim that there is a lack of information and research in these areas (INT1; INT4; INT5; INT8; INT17; INT19; INT21).

There is little research about the effectiveness of possible climate measures that can be incorporated into urban regeneration plans. Knowing the actual feasibility of climate measures in terms of performance and benefits is essential to convince policymakers to adopt climate

mitigation and adaptation measures as urban regeneration projects. Interviewees in this study argue:

> We have to see whether each of these climate measures are actually effective or not, but this has not been studied yet. There are a lot of arguments that we need to make space for wind circulation,[41] but some people say, 'What will be better if you make space for wind circulation? And does that help actual business value?' These things have not been studied yet (INT21).

> I think a framework for measuring and evaluating the effect of climate measures should be provided. Currently, carbon can be converted and evaluated, but carbon reduction does not work as an index when actually evaluating urban planning. I think we need to evaluate things that are invisible (INT1).

> We are discussing what kind of urban regeneration measurement calculates emissions, since doing that for a new city is quite easy. There must be a lot of new towns, but now, regeneration rather than new towns. Anyway, the urbanisation rate is 92 percent, so most of them are cities, so despite the overall city within the city, the evidence is lacking, so I'm thinking about them now (INT5).

As urban regeneration areas mostly consist of existing deteriorated buildings with a high level of density, incorporating climate mitigation and adaptation measures into the existing building environment is challenging (Refer to Section 6.1.5). Researchers who agree with the integration of climate measures in urban regeneration areas in the field of urban regeneration, do not have much knowledge or information on different types of climate measurements and summarise that physical interventions for climate mitigation and adaptation in urban regeneration areas are challenging (INT19; INT5). One stakeholder who formulates guidelines for urban regeneration at national level has researched the improvement of the development of urban regeneration areas, titled 'Technology Development to Strengthen the Regeneration Capacity of Declining Areas'. He argues, 'So far, the thing is what kinds of measures we should adopt in urban regeneration areas. We need to make a list of items' (INT5).

The research, 'Technology Development to Strengthen the Regeneration Capacity of Declining Areas', is a government-funded research project related to the improvement of urban resilience in urban regeneration. This is a four-year project which started in 2019, funded by the Ministry of Land, Infrastructure and Transport. This study is designed to build an integrated system for risk analysis technology, urban resilience improvement technology, and infrastructure for reinforcing resilience in order to strengthen the regeneration capacity through the improvement of urban resilience in declining areas. One researcher in the research project points out that the research

[41] Making space for wind circulation is an urban planning strategy in Seoul. By considering wind path between buildings in urban areas, urban heat island effects can be minimised (Song, 2021).

on vulnerability to climate change impacts of urban regeneration is absent in Korea (INT5). They tried to find relevant research that presents urban regeneration areas which are also highly vulnerable to climate change impacts, such as heatwaves or flooding. However, there is no research found as yet (INT5). As it is required to have criteria to designate vulnerable areas to climate change impacts as part of urban regeneration projects, the vulnerability study can give scientific evidence to set the criteria for the urban regeneration policy (INT5). The existing studies focus more on the vulnerability of areas of climate change impacts on a national and city level, rather than on a small scale. What makes the specific building environment in these areas more vulnerable should be studied. Also, the social aspect of urban resilience in urban regeneration is important, however, there is not currently any study in this area (INT5).

These three knowledge areas that are required for the climate policy integration in urban regeneration allow policymakers and stakeholders to have convincing reasons to initiate the actions for the climate policy integration efforts.

Researchers who are involved in urban regeneration and climate change sectors are important stakeholders. They play significant roles in the integration of climate measures in urban regeneration policy. One of the significant barriers is a lack of experts and researchers who could perform interdisciplinary research with wider perspectives on both urban regeneration and climate change sectors (INT17).

Researchers and stakeholders of urban regeneration also argue that publicising this information, and exchanging communication between different sectors with this information, is also important. It is argued that although there are studies of climate measures, they have not been publicised to the policy sector and the general public enough (INT8). One of the main factors affecting the lack of attention from the policy sector and the general public is that researchers in the field of climate change cannot promote their research contributions to society and communicate with policy sectors effectively. An interviewee argues:

> The most important thing is that the research on climate measures is not popularised. So it's a study for themselves. They don't research for policy reasons, they just research and develop technology, and then they don't keep making this effort until it continues to become a social movement or policy project, and they just accumulate it as research. A lot of research has been done, but there is still no consensus on this. Researchers are responsible if other people don’t understand their research (INT8).

Budgets and resources

The factor of budgets and resources is another barrier to the integration of climate measures in urban regeneration. As urban regeneration projects are funded by the government, the view of the Ministry of Economy and Finance on urban regeneration and climate change policy plays a significant role in getting budgetary support. The Ministry of Economy and Finance assigns the resource allocation and conducts a performance evaluation of the allocated budget. Currently, the Ministry of Economy and Finance have a lack of interest in climate change issues (INT7). An interviewee who was in charge of the national urban regeneration policy states:

> The Ministry of Economy and Finance doesn't regard urban regeneration and climate change as essential things. They think that the budget goes into them and just disappears. The awareness of this ministry on climate change and budgetary support from the ministry is crucial. That is actually a necessary condition, not a sufficient condition (INT7).

Another budget aspect that hinders the integration of climate mitigation and adaptation measures is the high cost of the measures. New construction and remodelling with the addition of climate measures are much more expensive than those without them. Green remodelling with climate-friendly building materials costs 20 to 30 percent more than basic remodelling. The higher cost of climate-friendly remodelling also negatively affects the motivation to integrate these measures into urban regeneration policy (INT11).

The fact that the urban regeneration budget is managed by only the Ministry of Land, Infrastructure and Transport also serves as a similar barrier. Since the budget is under the management of the Ministry of Land, Infrastructure and Transport, the general vision and objectives are oriented to achieve the vision of this ministry. This is highly related to the previously discussed factor of cooperation challenges between and within ministries and departments. As discussed in Section 6.1.2, the absence of a common budget that can be used by multiple ministries negatively affects the cooperation between different ministries, resulting in the lack of the integration of climate measures into urban regeneration policy (INT16).

Expertise of Urban Regeneration Support Centre

The Seoul Urban Regeneration Centre has played a vital role in adopting climate measures as cooperative projects in urban regeneration plans. During regular meetings with the Climate and Environment Headquarters of the Seoul Metropolitan Government, the centre suggested that urban regeneration projects need to incorporate the climate-related projects that are managed by the Climate and Environment Headquarters (INT18). These meetings resulted in the cooperation between the Climate and Environmental Headquarters and the Urban Regeneration Headquarters

(INT18). They finally made several urban regeneration-related projects, including the energy-independent village as an urban regeneration-related project (INT18).

The Seoul Urban Regeneration Centre attempts to establish climate resilience and sustainability as a critically important value for urban regeneration (INT17). Their attempts include requesting the minister of the Ministry of Environment to perform a research project that provides guidelines for the SDGs (Sustainable Development Goals) which are linked to urban regeneration. This resulted in the publication of the 'SDG-Linked Urban Regeneration Guidelines Study' in 2018 by the Ministry of Environment (INT17). The centre also hosted a workshop that educated the minister of the Ministry of Environment and urban regeneration companies on how to incorporate environmental policy in urban regeneration (INT17). Furthermore, the Director of Seoul Urban Regeneration Centre suggested cooperation between Seoul Urban Regeneration Centre and Korea Environmental Industry & Technology Institute, which is a sub-ordinate institute of the Ministry of Environment. Currently, although they put their efforts into integrating climate change policy in urban regeneration projects, they are not satisfied with the outcome. The director evaluates that they are still on the journey to achieving their goals:

> Urban regeneration is a big yard. People with environmental values come here. The environment is the fundamental philosophy of urban regeneration. We have to bring in the environment and continue to integrate it, but shouldn't it be the most open organisation to create such a yard? In fact, the characteristic of the centre should be very open and can be a platform. So the centre has to play a role here… Although urban regeneration is a public-led project, the centre is playing a role in facilitating convergence between organisations, whether it is climate or urban regeneration, by using the established urban regeneration governance framework (INT17).

The head of the centre highlights that the main vision/value of urban regeneration should consider climate change issues. As a presenter at the 2020 Korea Urban Regeneration Symposium, he emphasised that the integration between the national Green New Deal policy and urban regeneration policy generates a significant amount of synergy that will lead to a paradigm shift in Korea ('Seoul Urban Regeneration Support Centre—Head of Centre Kim Jong-Ik, Urban Regeneration and the Green New Deal,' 2020).

Their priority value and vision are crucial elements because they interlink with different sectors horizontally, and different levels of governments vertically, which means that the centre is communicating with many different stakeholders and has more opportunities to engage them with the centre's prioritised vision. An interviewee who works in the Seoul Urban Regeneration Support Centre states:

> The role of the Seoul Urban Regeneration Centre seems to be mediation and facilitation. Sometimes it acts as an intermediary, sometimes as a medium, sometimes facilitating the establishment of certain values, and on the other hand, it also plays the role of a developer of urban regeneration projects. Sometimes it develops content. So I think the centre should play a central role in connecting the relationship between Seoul and community governments, between community governments and the urban regeneration support centre, and among community governments, the urban regeneration support centre, and residents. Because it's so fragile now (INT17).

6.1.4 Cognitive factors

Cognitive factors of policymakers/actors in the governments, including both divergent priorities, and uncertainty of effectiveness/performance of climate measures negatively impact the level of integration of climate measures in the urban regeneration policy. These factors are reported as barriers in the analysis of this study.

<u>Divergent priority</u>

Although urban regeneration policy deals with a variety of agenda items including increasing community cohesion, releasing community conflicts, improving built environments, building anchor facilities, etc., climate measures are not regarded as a priority agenda (INT8). During the development process of formulating national urban regeneration policy, the consulting report prepared by the Korea Research Institute for Human Settlements included climate mitigation and adaptation measures such as the adoption of low impact development, and building a low carbon village with smart technology in urban regeneration areas (INT8). However, during the policy output stage, these measures were not included in the final policy document due to the other important issues being regarded as more important issues, rather than those with climate-related issues (INT8).

Urban regeneration policy was adopted as one of the alternatives to new town development, which would have meant the demolition of existing buildings, and new ones being constructed, and also would have caused gentrification issues. Urban regeneration areas are regarded as undeveloped areas with urban problems, which made residents feel a sense of relative deprivation, especially compared with other areas which are already developed with sufficient infrastructures. In this complex situation, the climate change issue is not an urgent one (INT17).

Limited financial resources result in divergent priorities. One policymaker in urban regeneration points out that a limited amount of government budget made the policymaker focus on the prioritised urban issues (INT11). In spite of increasing demands for zero energy buildings to be developed from existing buildings in urban regeneration areas, higher costs of construction materials needed for green remodelling prevent building owners from adopting the measures

(Kim, 2020). Furthermore, the main stakeholders of urban regeneration, who are usually in the field of urban engineering, do not take environmental values seriously. An interviewee in the study argues:

> Currently, the people who are leading our urban regeneration are mainly technicians and city engineers. As a result, there are many aspects to approach from an urban engineering perspective. Therefore, it is very rare to think of the environment and the city as a convergence, to look at this from the perspective of sustainability, or to set the goal of urban regeneration with SDGs in mind (INT17).

Uncertainty of effectiveness/performance of climate measures

It is argued that the performance of climate change policy is hard to estimate, which made the integration of climate measures in urban regeneration more challenging. As urban regeneration policy is usually monitored when the policy is implemented, estimating its performance is crucial to prove its efficacy. Climate change issues are not focused on by policymakers unless there are extreme weather events taking place. This is because policymakers have to report the performance of their policy every year. Climate mitigation and adaptation measures are measures that are meant to prepare for any climate change impacts in advance. This nature of climate change makes policymakers more interested in other policies, rather than climate change policies (INT10; INT11). An interviewee argues:

> Let's imagine a retaining wall was improved because it was vulnerable to flooding. Then there is a flood and there is no problem with the wall. Here, the performance of the project is difficult to measure. No one can measure this effect unless there is a problem. However, the cost of civil engineering is very high... The retaining wall must be broken once. If it collapses, it is now dangerous, and the justification for doing it now arises… On the other hand, if a community centre worth eight billion dollars is built, people from various classes can use it within 20 minutes or 500 meters of the surrounding environment. It is easy to measure its performance (INT10).

Furthermore, even though climate risks occur, it is difficult to prove that the events resulted from climate change. An interviewee states:

> For example, let's say a patient got a high fever during a prolonged tropical night and then they died. We don't know whether they died due to old age, or the lack of a system for climate resilience in this area. In fact, it is difficult to pinpoint the cause clearly. As a result, when it comes to urban regeneration projects, I think that policies related to climate measures are being pushed back (INT10).

The factor of uncertainty of the effectiveness/performance of climate change policy is also linked to the factor of information and guidance of climate change policy and the lack of relevant research.

The lack of information about the performance of climate change policy leads to uncertainty about this matter (INT21).

6.1.5 Characterisation of the problem at hand

Different objectives for climate change and urban regeneration policies

The factor 'different objectives for climate change and urban regeneration policies' affects divergent priorities that result in a lack of cooperation between ministries/departments discussed in the previous sections of cognitive factors and organisational factors (Sections 6.1.2 and 6.1.4). It is observed that the objectives of climate change policy and urban regeneration policy do not overlap, which means that it is hard to find aligned objectives between these two policy areas (INT8; INT15; INT17; INT19). This resulted from a lack of a clear process that enables discussions about the common vision and a lack of expertise of civil servants in the other fields (INT8; INT17; INT19).

Difficulty to measure climate change policy/project

Policymakers argue that the difficulty to measure climate change policies or projects brings about a decrease in the level of the integration of climate measures in urban regeneration policy. Measuring climate change policies or projects affects cognitive factors, organisational factors, and resources. This is a relevant cause that leads to a lack of awareness of the necessity of climate measures, a decrease in interest in climate measures from the civil servants in the urban regeneration sector, and a lack of information and research on climate change policies (INT5; INT6; INT10).

This characteristic was discussed in the factors under resources and cognitive factors. The difficulty to measure the results of climate change policies and projects makes governments uncertain about the effectiveness and performance of climate measures (see Section 6.1.4 Cognitive factors). This challenge also affects a lack of information on the effectiveness of possible climate measures in urban regeneration (see Section 6.1.3 Resources).

Timescale

One of the factors that affect the integration of climate measures in urban regeneration policy is the characteristic of different timescale between urban regeneration policy and climate change policy. On the one hand, urban regeneration policy was established to solve the problems that communities face at the moment—mostly urgent issues such as the need to expand car parks, build an anchor facility, and so on. On the other hand, policymakers of urban regeneration regard climate change policy as a policy that is solved in the long run. Considering the short period of an

urban regeneration project (usually a five-year term), policymakers assume that incorporating climate measures in urban regeneration projects is not an effective and optimal way to implement climate change policy (INT1) (INT17). An interviewee working in the Seoul Urban Regeneration Support Centre states:

> From the point of view of climate change, we are talking about net zero in 2050. So let's talk about 30 years. But the city is not like that. Of course, urban regeneration sometimes needs a long breath. But we immediately need to renovate houses and alleyways and designate some urban regeneration areas for urban regeneration. Urban regeneration requires immediate achievements with a focus on performance. However, climate change policy must be taken from a very macroscopic and global perspective. They have different speeds to implement the policies (INT17).

6.2 EXTERNAL FACTORS

There are not many external factors in the policy development stage. As discussed in the study of Persson and Runhaar (2018), examples of external factors in the stage include geographical focus, public awareness and support, and stakeholder support. In this dissertation, the factor 'geographical focus' was not determined as a relevant factor for the integration of climate measures in urban regeneration policy (see Table 6-2).

Table 6-2 Highlighted external factors (drivers and barriers) by stakeholders and policymakers of urban regeneration during policy development

(Total number of interviewees: 50)

Factors that affect the climate measures into urban regeneration	No. of interviewees	Driver	Barrier
Policy development stage			
External factors			
Public awareness and support	9	3	6
Private sector support	4	1	3

Source: own compilation

6.2.1 Public awareness and support

One of the main objectives of urban regeneration policy in Korea is to focus on collecting residents' demands for their communities. Although the factor 'public awareness and support' is categorised as an external factor in this dissertation, it is regarded to have a significant impact on internal factors of the integration of climate measures in the policy development stage of urban regeneration. People's lack of interest in and awareness of climate change leads to policymakers in urban regeneration prioritising other issues over climate change issues because they intend to formulate the urban regeneration policy at national and city levels based on the demand for urban

regeneration at community levels. The policymakers at national and city levels also take feedback from urban regeneration areas at community levels and apply the residents' demands on urban regeneration policy during the policy process such as through public hearings and workshops.

The public awareness and support factor is reported both as a driver and barrier to the integration of climate measures in urban regeneration policy. It is argued that climate change objectives were incorporated in urban regeneration policies at national and city levels such as the Basic Policy for National Urban Regeneration and the Seoul Strategic Plan for Urban Regeneration which was published in 2018 due to the increase in public awareness of climate change issues (INT2; INT7; INT12; INT14; INT14). According to 'Public Attitudes towards the Environment—2020 Survey', the public thinks of climate change as one of the three biggest issues facing Korea—69.6 percent think garbage disposal is the biggest problem, 61.7 percent think it is air pollution/fine dust, and 55.1 percent think it is global warming and climate change (Kim, Jeon and Lee, 2020). This increase in the general public's awareness of climate change is naturally reflected in urban regeneration policies.

On the other hand, it is claimed that there is still a lack of public interest in climate change in the context of urban regeneration. It is difficult to attract the public's attention due to the uncertainty and unpredictability of climate change. Stakeholders of urban regeneration policy at national and city levels emphasised that one of the factors that did not motivate enough policymakers to integrate climate change objectives in urban regeneration policy is the lack of public awareness and support (INT1; INT5; INT9; INT17). Some interviewees in the study argue:

> Climate measures are directly visible benefits and effects that cannot be felt. The level of interest in them is very low and the necessity of them is also low (INT1).

> People are not interested in climate change or hazards unless an event happens… I think that's the most difficult issue. Everyone knows climate change, but in reality, if you ask what to do to improve resilience to climate change, it cannot be measured right now (INT5).

Strategic plans of urban regeneration at city level include some processes that allow citizens to provide their opinions on them such as public hearings. However, there were no viewpoints heard concerning a desire to integrate climate objectives into planning from citizens during the public hearings. Although today there is a trend of considering climate change impacts, the significance of integrating climate measures into urban development is still overlooked.

6.2.2 Lack of private sector support

A missing part in the current governance structure for urban regeneration policy development is the market. The urban regeneration policy was driven by the public investment to develop and

support urban regeneration companies, called Community Regeneration Corporations after the completion of the public investment. In the current urban regeneration process, there is a limited driving force for successful urban regeneration resulting from the lack of private sector support. An interviewee argues:

> If you look at it as an obstacle, I think it is an important factor that the urban regeneration sector is still not market-friendly at the moment. So, market-friendly means that there are weaknesses that can impede the public interest, but the driving force is secured. Because the market has to work, from the point of view of the entity doing the market business, it has to be maintained. So, there is an advantage of continuously generating power. However, the current urban regeneration is not yet market-friendly. It should go that way in the future. If that's the case, the private sector has to actively come in and work for it to be grafted, but it's still not working well (INT17).

The involvement of the private sector related to climate change response during the development of urban regeneration policy would increase the level of integration of climate measures in urban regeneration policy. Community corporations in the field of energy-saving worked with Seoul Metropolitan Government by leading the Energy-Independent Village Project funded by the government, which became one of the driving forces of the development of the 'Urban Regeneration Linked Energy-independent Village Project' (INT11). Considering this project is one of the main projects related to climate measures among urban regeneration cooperative projects, private sector support plays a significant role in driving an increase in the level of integration of climate measures in urban regeneration not only during the policy implementation stage but also during the policy development stage.

6.3 RELEVANT FACTORS AND GAPS REGARDING FACTORS IN THE CONCEPTUAL FRAMEWORK

Internal and external factors that are discussed in the previous sections in this chapter are relevant factors that inhibit and/or enable the integration of climate measures in urban regeneration policy at national and city levels. This section discusses the most important factors among them. The results were drawn from content analysis of semi-structured interviews and supplemented by process tracing. The most frequently mentioned factors by stakeholders of urban regeneration and climate change policies are organisational, political, and resource factors. The most frequently mentioned drivers are organisational and political factors. The most frequently mentioned barriers are the organisational, resource, and public awareness and support factors.

In this dissertation, the most frequently mentioned factors are (1) cooperation with the Ministry of Environment/climate change departments, (2) political support of major political leaders, (3) leadership/expertise of the civil servant of urban regeneration, and (4) information and guidance

of climate change policy and a lack of relevant research. These are the most frequently reported factors by the urban regeneration policymakers at national and city levels.

The most frequently mentioned drivers are (1) political support of major political leaders and (2) leadership/expertise of the civil servants of urban regeneration. These drivers are also under organisational factors and political factors.

The most frequently mentioned barriers drawn from content analysis at national and city level, are related to not only organisational factors but also resources and external factors, which are (1) cooperation with the Ministry of Environment/climate change departments, (2) information and guide of climate change policy and lack of relevant research, and (3) lack of public awareness and support.

The level of integration of climate measures into urban regeneration at national level and city level is evaluated as coordination (weak integration) based on the criteria of the level of climate policy integration in Roeck, Orbie and Delputte (2018). The evidence from process tracing finds that different factors are important for the different levels of government. The following paragraphs summarise the most relevant drivers and barriers to climate policy integration in national and city urban regeneration policy.

Drivers for climate policy integration in the national urban regeneration policy

Throughout the cycle of national urban regeneration policy, the President of the Republic of Korea and the national policy's vision related to climate change play significant roles in the integration of climate measures into urban regeneration policy. This political support of major political leaders positively affects the research of urban regeneration to include statements related to climate objectives in the research. Research prepared before formulating national urban regeneration policy, such as the Special Act on Promotion of and Support for Urban Regeneration, Basic Policy for National Urban Regeneration, and Guidelines for the Formulation of Strategic Plans for Urban Regeneration, proposed to include climate objectives in urban regeneration policy. It can be said that this research with information and guidance on climate measures positively affected the integration of climate objectives in national urban regeneration. However, the research and studies did not present critical issues for consideration for the climate policy integration in urban regeneration, such as the effectiveness of possible climate measures in urban regeneration, the type of climate measures that can be incorporated in urban regeneration, and the vulnerability to climate change impacts in urban regeneration areas.

By combining all results from different analyses, the most important factors as drivers at the national level are (1) political support of major political leaders, (2) leadership/expertise of the

civil servants of urban regeneration, and (3) information and guide of climate change policy and a lack of relevant research.

Barriers to climate policy integration in the national urban regeneration policy

Examination of the process of national urban regeneration policy shows that the policy output of national urban regeneration did not reflect all suggestions of climate policy integration in research prepared for the establishment of the policy. Also, although there is an Urban Regeneration Special Committee that can facilitate the integration of different sectors' policies into urban regeneration policy, it did not show significant performance in terms of the climate policy integration in urban regeneration policy. In sum, the level of integration during the policy output is lower than the level of integration during the agenda-setting and policy process. As the final decision is made by the Ministry of Land, Infrastructure and Transport, organisational factors and the lack of cooperation with the Ministry of Environment are relevant inhibiting factors. These organisational factors are directly influenced by other factors such as a lack of information and guidance on climate change policy and research and divergent priorities of urban regeneration policymakers. In addition, a lack of public awareness and support for climate measures hinders the highlighting of climate change issues in urban regeneration policy.

As a result, the most relevant barriers to climate policy integration in the national urban regeneration policy are (1) leadership/expertise of the civil servants of urban regeneration, (2) cooperation with the Ministry of Environment, (3) information and guidance on climate change policy and lack of relevant research, (4) divergent priorities, and (5) lack of public awareness and support.

Drivers for climate policy integration in the city urban regeneration policy

In the process of urban regeneration policy at city level, one of the main drivers that came into play regarding the integration of climate measures in urban regeneration policy in Seoul is the political support of the mayor who has a strong interest in climate issues. His policy direction and vision influenced the establishment of many relevant climate policies that are incorporated into urban regeneration policy. Although the Seoul Strategic Plan for Urban Regeneration of 2015 only incorporates elements of climate objectives, the Urban Regeneration Headquarters in Seoul Metropolitan Government has developed a variety of climate measures such as the Energy-independent Village Project, Seoul Caring Housing and house repair projects, and the Rainwater Village Creation Project that are applied to urban regeneration areas in Seoul. With the support of Mayor Park, the implementation of climate measures in various government departments took place, making cooperation between departments easier. This cooperation was highly related to

the leadership/expertise of the civil servants of urban regeneration. In the case of Seoul, the cooperation was initiated by a civil servant who worked in both the Climate Environment Headquarters and the Urban Regeneration Headquarters in the city government by introducing the Energy-independent Village Project to the Urban Regeneration Headquarters.

In brief, the most important drivers for climate policy integration in the urban regeneration policy of Seoul are (1) political support of major political leaders, (2) cooperation between departments, and (3) leadership/expertise of the civil servants of urban regeneration.

Barriers to climate policy integration in the city urban regeneration policy

As the level of the integration of climate measures in urban regeneration policy in Seoul is evaluated as 'coordination' (weak integration), many relevant barriers were investigated in the dissertation. The most relevant barriers are mostly characterised as organisational factors affected by resources and cognitive factors. Analysis of process tracing shows that the policy process of urban regeneration such as review from the city council and Urban Planning Committee and public hearings did not result in efforts towards climate policy integration. Thus, similar to the policy development stage, organisational factors directly affected the integration of climate measures in urban regeneration policy. Although the city government presents efforts of cooperation between departments and the leadership/expertise of the civil servants to support the cooperation, the level of the integration of climate measures in urban regeneration is still weak. There is still a lack of cooperation with the climate change department and the leadership/expertise of the civil servants is lacking because of their divergent priorities in urban regeneration policy and lack of information, guidance, and research on climate change policy. Lack of public awareness and support also affects cognitive factors of civil servants with divergent priorities in urban regeneration policy. In summary, the most relevant barriers to climate policy integration in urban regeneration policy are (1) leadership/expertise of the civil servants of urban regeneration, (2) cooperation with the Ministry of Environment, (3) information and guidance on climate change policy and lack of relevant research, (4) divergent priorities, and (5) lack of public awareness and support.

Gaps regarding factors in the conceptual framework

Runhaar *et al*. (2018) reveals the frequency of drivers and barriers reported in studies of climate policy integration. Three factors—political commitment, cooperation with private actors, and cooperation between departments—are highlighted the most in their study and are relevant factors both in policy development and implementation stages.

The dissertation found a variety of factors not highlighted in existing studies—this can be explained by how factors have different weights of significance in different contexts. Runhaar *et al*. (2018) finds factors affecting climate policy integration in a variety of fields; these include environmental and natural resources management (including agriculture), urban and regional planning and land use, water and flood risk management, crisis management and risk disaster reduction, healthcare, water supply and sanitation, forestry, transportation and telecommunication, housing and infrastructure, development, tourism, business, and food security. This dissertation explores factors of climate policy integration only in urban regeneration policy. As the fields that Runhaar *et al*. (2018) and this dissertation focus on are different, the highlighted factors are also slightly different.

The purpose of identifying gaps regarding factors in the conceptual framework is to provide a relevant framework that can be used in areas where urban regeneration actively takes place, specifically where a bottom-up approach to urban regeneration is pursued in a top-down governance structure.

Organisational and political factors are significant drivers and barriers to the integration of climate measures in urban regeneration policy in the policy development stage. Whereas existing studies discussed in Runhaar *et al*. (2018) rarely highlight the factors of information and guidance on climate change policy and lack of relevant research, the case of Seoul has a different result to existing related studies. Policymakers and stakeholders of urban regeneration policy in Korea still lack the information and knowledge of climate change policy.

Another gap regarding the factors discussed in Runhaar *et al*. (2018) is a high turnover of civil servants leading to a lack of continuity. In Korea, the need to implement environmental policy in different sectors has been highlighted since 2008 when the Low-Carbon Green Growth policy was established. However, this high turnover of civil servants, especially of higher-level civil servants, negatively affects the continuity and development of policy. Although this factor is not the most important, it does have an impact and could have been included in the conceptual framework.

6.4 DISCUSSION

This chapter investigates internal and external factors for the integration of climate measures in policy development for urban regeneration. The examination of internal and external factors in different policy cycles includes an understanding of the detailed factors that inhibit and enable the integration of climate measures in urban regeneration policy at different levels of government.

Internal factors are categorised into five categories: political factors, organisational factors, resources, cognitive factors, and characterisation of the problem at hand. A factor under political

factors is the political support of major political leaders. Organisational factors include five detailed factors: cooperation with the Ministry of Environment/climate change departments, leadership/expertise of the civil servants of urban regeneration, supportive regulatory framework, different levels of hierarchy for climate change and urban regeneration policies, and a high turnover of civil servants leading to a lack of continuity. 'Resources' include information and guidance on climate change policy, lack of relevant research, budgets and resources, and expertise of urban regeneration support centres. Under cognitive factors, there are divergent priorities and uncertainty about the effectiveness/performance of climate measures. Characterisation of the problem at hand includes different objectives for climate change and urban regeneration policies and timescale.

External factors are categorised into two detailed factors—public awareness and support and lack of private sector support. With detailed descriptions of each factor under each category, Chapter 6 discussed the most important factors and gaps regarding factors in the conceptual framework of this dissertation. As the policy process of national and city urban regeneration policies rarely involves activities of the public and private sectors, the number of external factors in policy development is limited.

Section 6.3 discussed the most important factors and gaps regarding factors in the conceptual framework of this dissertation. Results from content analysis and process tracing show that the most relevant drivers for climate policy integration in the national and city urban regeneration policy are (1) political support of major political leaders, (2) leadership/expertise of the civil servants of urban regeneration, (3) information and guide of climate change policy and lack of relevant research, and (4) cooperation between departments. The most relevant barriers to climate policy integration in the national urban regeneration policy are (1) leadership/expertise of the civil servant of urban regeneration, (2) cooperation with the Ministry of Environment, (3) information and guidance on climate change policy and lack of relevant research, (4) divergent priorities, and (5) lack of public awareness and support.

It is clearly demonstrated that the political support of major political leaders is the most important driving force for climate policy integration in urban regeneration policy during policy development. Other organisational factors and resources such as leadership/expertise of civil servants of urban regeneration, information and guidance on climate change policy, a lack of relevant research, and cooperation between departments are significant factors both as drivers and barriers. Divergent priorities and a lack of public awareness and support are relevant barriers to climate policy integration into urban regeneration at national and city levels.

These factors confirm important factors from the existing relevant studies. However, a factor of geographical focus, highlighted in the framework of Persson and Runhaar (2018), is not relevant in the context of Seoul. In addition, the factor of a high turnover of civil servants leading to a lack of continuity is not included in Runhaar *et al*. (2018). However, this is a factor that was investigated in the case of Seoul as a barrier that affects the integration of climate measures into urban regeneration during the policy development stage.

7 POLICY IMPLEMENTATION: INTERNAL AND EXTERNAL FACTORS TO INTEGRATE CLIMATE MEASURES INTO URBAN REGENERATION PROJECTS

Chapter 6 discussed internal and external factors for the integration of climate measures in policy development stages. It also identified the most important factors and gaps regarding the conceptual framework of this dissertation. Chapter 7 focuses on the disclosure of internal and external factors that affect the integration of climate measures into urban regeneration in the policy implementation stage. The policy implementation stage refers to a stage that involves the development and implementation of urban regeneration revitalisation plans at a community level.

7.1 INTERNAL FACTORS

This section introduces an overview of highlighted internal and external factors for the integration of climate measures in urban regeneration during policy implementation (see Table 7-1). These factors are organised by category, and quantities refer to the number of interviewees highlighting the factor. The following subsections explain each factor.

Table 7-1 Highlighted internal factors (drivers and barriers) by stakeholders and policymakers of urban regeneration during policy implementation

(Total number of interviewees: 50)

Factors that affect the climate measures into urban regeneration	No. of interviewees	Driver	Barrier
Policy Implementation Stage			
Internal factors			
Political factors			
(Absence of) political support of the mayor of Seoul and the general policy direction of the city government	13	10	3
(Lack of) political support of the head of community governments (policy direction)	6	5	1
Organisational factors			
(Absence of) supportive regulatory framework	15	1	14
(Lack of) expertise (interest in climate issues) of the civil servant of urban regeneration in the community government	14	4	10
(Lack of) cooperation among stakeholders	14	9	5
(Lack of) cooperation with climate change departments	13	5	8
Short-termism, short term performance-oriented system	7	0	7
Resources			
(Lack/absence of) information about climate measures	15	1	14

(Lack of) expertise (interest in climate issues) of urban regeneration support centre (community level) and master planner	14	8	6
(Lack of) budgets and resources	11	3	8
(Lack of) expertise of urban planning company hired by the government	8	4	4
(Lack of) expertise (interest in climate issues) of urban regeneration support centre (city level)	4	3	1
Cognitive factor			
Divergent priority (at the community government and urban regeneration support centre)	4	0	4
Characterisation of problem/opportunity at hand			
Existence of local features that can be integrated with urban planning theme	10	10	0
(Difficulty of) measuring performance/effectiveness of climate measures	5	1	4
Overlapped objectives for climate change and urban regeneration projects	4	4	0
Existence of local features that can be integrated with urban planning theme	4	3	1
Difficulty in adopting additional projects on the already planned urban regeneration projects	3	0	3
Inability to regulate private property (e.g. buildings)	3	0	3

Source: own compilation

7.1.1 Political factors

This section discusses political factors consisting of the political support of the mayor of Seoul, the general policy direction of the city government, and the political support of the head of community government. Political support has been highlighted as one of the most significant factors in current studies of climate policy integration (Runhaar *et al.*, 2018). In this dissertation, the significance of political factors has also been frequently reported by policymakers and stakeholders in urban regeneration projects. The political support of the mayor of Seoul Metropolitan Government and the head of community governments are categorised as political factors.

Political support of the Mayor of Seoul and general policy direction of the city government

One of the driving forces behind the high level of the integration of climate measures in urban regeneration policy in Seoul is the mayor's support of climate change policy. The mayor's high interest in climate mitigation and adaptation policy is acknowledged by a variety of policymakers (INT7; INT35). His strong interest in climate change policy affected the integration of climate measures in urban regeneration policy, not only in the policy development stage but also in the policy implementation stage. Policymakers of urban regeneration in the national and city

governments confirm that the will of the previous mayor, Mayor Park, was a significant driver in the integration of climate measures in urban regeneration projects at community levels. General policy for the integration of climate measures into urban regeneration is in the hands of the mayor of Seoul Metropolitan Government. Stakeholders who took part in the process of urban regeneration projects stated a high level of involvement of the city government during the formulation of the agenda of urban regeneration projects and even after the completion of projects (INT20; INT31; INT33; INT38; INT43; INT44).

The city government involved urban regeneration stakeholders in Jangwi-dong and Sangdo 4-dong in the process of designing an urban regeneration agenda in their community and considering climate measures (INT38; INT43; INT44). Stakeholders of urban regeneration in Sangdo 4-Dong explained that the city government convinced the stakeholders in the community to include projects that are related to energy when they had meetings to design the urban regeneration agenda. One of the stakeholders of urban regeneration in Sangdo 4-dong argues:

> While formulating the urban regeneration revitalisation plan, the urban planning company and Seoul Metropolitan Government stated that one pillar of the plan should be energy. A significant focus was placed on administration and a higher level of organisation. Yes, I don't know if it is proper to say, but they recommended the inclusion of energy-related measures by saying "This [energy-related measures] should be included at least" (INT38).

The city government was also actively involved in the process of designing Jangwi-dong's Urban Regeneration Revitalisation Plan (INT43; INT44; INT47).

Seoul Metropolitan Government directly implements policies related to climate policy in urban regeneration areas, such as the Energy-independent Village Project, Seoul Caring Housing, and Rainwater Village Creation Project (see Section 5.2.2). It sent a request for cooperation to the community governments to link these projects to the urban regeneration projects. To link them, the Seoul Metropolitan Government first created such cooperative projects to be implemented in urban regeneration areas (INT33). These climate measures are implemented in all four communities owing to the general policy direction of the city government. Although Amsa-dong and Garibong-dong did not include climate measures in the urban regeneration revitalisation plans, they incorporated them during the implementation stage of the plans.

<u>Political support of the head of community governments (policy direction)</u>

The political support of the head of community governments is an important driver in the policy implementation stage. The former head of Seongbuk-gu (where Jangwi-dong is located), Kim Youngbae, had critically influenced cooperation between departments which positively affected

the integration of climate measures in urban regeneration projects. Urban regeneration stakeholders who participated in formulating urban regeneration projects from both the public and private sectors highlight Kim's strong interest in cooperative projects as well as urban regeneration. It can be considered the most influential enabling factor for the incorporation of diverse projects from other departments in Jangwi-dong's urban regeneration projects. His involvement in the Urban Regeneration Governance Forum as a co-representative demonstrates clearly that he had a strong desire for urban regeneration and its governance; he was the co-president of the forum which functions as a space for collaboration between governments, research institutes, intermediary agents, and NGOs ('Successful promotion of the Urban Regeneration New Deal—launch of the 'Urban Regeneration Governance Forum,' 2018).

A stakeholder who participated in the process of implementing urban regeneration projects in Jangwi-dong pointed out that urban regeneration was initiated and driven by Kim. The stakeholder asserts that he had considerable power during the period when the urban regeneration projects were designed because he had just been re-elected at that time (INT47). Kim underscored the significance of urban regeneration governance. For example, he hosted meetings with a wider range of stakeholders when making important decisions for urban regeneration projects (INT47) and demanded to incorporate other projects into urban regeneration (INT45). Kim made a new evaluation system of civil servants to assign extra points to those who cooperated with other departments in Seongbuk-gu, which was adopted by Seoul Metropolitan Government later (INT13). He was directly involved in urban regeneration projects, such as giving direct instructions about urban regeneration to the urban planning team and meeting frequently with residents (INT45).

In addition, he was resolved to implement a rainwater management system in Seongbuk-gu with the established Rainwater Management Team in Seongbuk-gu government being directed by Mr Kim in July 2015 (Park, 2015). It was the first community government to include a team that dealt with rainwater management as one of its main tasks. In 2014, Seongbuk-gu started a project named 'Creating A Rainwater Community' in Samdeock Maul (Green Education Center, 2015). The purpose of the project was to create practical examples of citizens who can solve global water problems at the local level through the installation of rainwater facilities, the development and monitoring of rainwater education materials, and educational activities (Green Education Center, 2015). Seongbuk-gu and Seoul National University hosted a 'Rainwater Citizen Forum' in 2015 and Mr Kim showed his willingness to implement 'Creating A Rainwater Community' in Jangwi-dong through urban regeneration projects. The initial vision of Jangwi-dong urban regeneration in March 2015 was a 'Sustainable Water Cycle City' (Hong, 2015). In 2016, Jangwi-dong was designated as the site of the Rainwater Village Creation Project by Seoul Metropolitan

Government. Urban regeneration stakeholders from the public and private sectors in Jangwi-dong agree that Kim is the main impetus behind integrating rainwater collectors in urban regeneration projects (INT44; INT44; INT47; INT49; INT50). One of these stakeholders argues:

> As well as the will of the head, Seongbuk-gu itself was more interested in the Rainwater Collector Project than other districts [community governments] … Because the head had a strong will in the eco-friendly field, he pushed for a rainwater collector… As far as I know, Seongbuk-gu is the first city to carry out the Rainwater Collector Project. And it was a time when the head of Seongbuk-gu promoted the Rainwater Collector Project, strengthened it, and set it as one of the policy directions of the Seongbuk-gu. Even before we started it in Jangwi Dong, there were a lot of rainwater collector projects in Seongbuk-gu, and he [Kim] wanted to continue attracting such things even in general housing complexes, even if it wasn't for the urban regeneration revitalisation project (INT45).

7.1.2 Organisational factors

<u>Supportive regulatory framework</u>

The supportive regulatory framework is the most frequently reported internal factor to integrate climate measures into urban regeneration projects in the policy implementation stage by policymakers and stakeholders at national, city, and community levels. Although this factor is not highly focused upon in existing studies as presented in Runhaar *et al*. (2018), it is regarded important as both a driver and barrier in this dissertation.

The regulatory framework has developed over time since urban regeneration policies started. The current regulatory framework that affects the integration of climate measures in urban regeneration includes (1) financial support for renovating housing from the Caring Housing Project of Seoul Metropolitan Government, installing solar panels, and installing rainwater collectors; (2) a guideline that suggests installing solar panels on the roof of anchor facilities when it is newly constructed (Seoul Urban Regeneration Support Centre, 2019a); (3) and architectural guidelines for newly constructed buildings in Jangwi-dong.

As it is not compulsory for stakeholders of urban regeneration areas to adopt these guidelines and incentives to incorporate climate measures in their urban regeneration projects, except for Jangwi-dong's case,[42] incorporating climate measures still requires stakeholders' additional motivations. It is difficult for stakeholders of urban regeneration projects to adopt climate measures in urban regeneration areas unless the criteria for it to be designated as such includes

[42] As discussed in the Jangwi-dong's case, a community government can establish and implement its own architectural guidelines to make the built environment integrate climate measures in an obligatory manner.

the necessity of integrating climate measures in the urban regeneration revitalisation plans (INT3; INT5; INT15). An interviewee states:

> They don't integrate climate measures because these guidelines don't have anything like that. After all, a community government assigned the duty of designing an urban regeneration revitalisation plan to an urban planning company. The company establishes the plan. But the people who are doing it just follow the guidelines. If there is no such thing in the guideline, they don't worry about it at all. So, the most important thing about institutional things is that if you don't say anything to the institution, they don't do anything (INT5).

It is argued that the legal system of the Republic of Korea is meticulous, and guidelines are provided in detail, but people follow only what is given and do not have the capacity to do more other than follow the written guidance. For example, the Guidelines for the Formulation of Urban Regeneration Revitalisation Plans is too detailed. Urban planning companies who formulate urban regeneration revitalisation plans comply only with statements written on the guidelines, which makes urban regeneration areas similar to each other with no incorporation of climate measures (INT5; INT8; INT16).

The current regulatory framework does not contain climate measures in the Guidelines for the Formulation of Urban Regeneration Revitalisation Plans and Strategic Plans for Urban Regeneration. This acts as an important inhibiting factor in the case of urban regeneration stakeholders in Korea only following the current guidelines (INT3; INT5; INT15). An interviewee argues:

> A limit of our society is its laws, systems, and organisations for the achievement of goals that were created in the era of development. It's a legal system to get things done quickly, not to improve the lives of citizens. In the era of population decline, it [focusing on getting things done quickly] is considered outdated. The system must change because society has changed. This is a system failure. It is a structure that moves only when there are guidelines, rather than following a higher-level policy. It's our society's problem (INT15).

Seoul Metropolitan Government announced that the 'Zero Energy Building Policy'[43] would be implemented for public buildings from 2020 and plan to expand it to private buildings from 2023. It would also introduce a 'Greenhouse Gas Emission Management System'[44] for buildings owned

[43] Zero-energy architecture refers to a building that reduces (passive) energy consumption of a building through strengthening insulation and airtight performance and minimises energy consumption by producing (actively) energy with new and renewable energy facilities such as solar power.

[44] It is a system that sets and manages the total amount of emissions per building to reduce greenhouse gas (GHG) emissions from buildings. It is a policy that sets the total amount of allowed GHG emission for each building every year, comprehensively considering the energy-use status, the trend of total floor area increase, the reduction target, etc.

by the city of Seoul in 2021 and private buildings in 2022. It was announced in July 2020 (Seoul Metropolitan Government Environment Policy Department, 2020). As most buildings in urban regeneration areas are privately owned, it is difficult to make them install climate measures and renovate existing buildings in an energy-efficient way with the current regulatory framework. The Seoul Climate and Environment Headquarters do not have any legal basis in the regulation of private buildings to introduce climate factors into urban regeneration areas. The current strategy to induce owners of private buildings is to grant incentives such as an increase in floor area ratios or a reduction of acquisition tax and property tax. They proposed a revision of the current act—the Green Building Construction Support Act—to the central government in July 2020 (INT11).

Expertise (interest in climate issues) of the civil servant of urban regeneration in the community government

Civil servants in charge of urban regeneration in community governments have various tasks in the implementation stage of urban regeneration. When it comes to the integration of climate measures in urban regeneration, their roles come into play more significantly. After collecting residents' opinions, they decide whether to reflect them in urban regeneration revitalisation plans. They also review and adopt projects that can be possibly linked to urban regeneration projects from other ministries/departments and relevant organisations. Although a variety of stakeholders are involved in formulating urban regeneration revitalisation plans, one of the most important actors to decide the objectives and the components of projects in these plans are the employees in the department of urban regeneration in the community government. In this sense, they are one of the significant decision-makers in this stage (INT33; INT37; INT38; INT42). An interviewee who is one of urban regeneration stakeholders at community level states:

> Residents or experts can persuade the person in charge of urban regeneration in the community government to alter the urban regeneration revitalisation plan, but it is very hard (INT39).

In Sangdo 4-dong and Jangwi-dong, good examples can be observed in that civil servants played significant roles in integrating climate measures into urban regeneration revitalisation plans. Stakeholders who participated in urban regeneration projects articulated that civil servants' expertise and active efforts to integrate climate measures were significant enabling factors in their integration into urban regeneration revitalisation plans (INT37; INT38; INT43; INT44).

Moreover, it was the civil servants who actively supported the addition of environmentally friendly measures in the architectural guidelines as suggested by the master planner (INT44). The civil servant in charge of urban regeneration projects in Jangwi-dong highlighted civil servants should take the lead and actively bring relevant projects that include climate measures from the

city government and the central government (Urban Regeneration New Deal projects) (INT43). He states:

> Since ten billion won is not enough for an urban regeneration project, you have to bring a lot of cooperative projects. To do that, civil servants or related departments must find government projects [that can be adopted by their communities], such as Ministry of Land, Infrastructure and Transport projects, New Deal projects, and other projects of Seoul Metropolitan Government. In the case of Seongbuk-gu, our financial independence is less than 50 percent. It's the lowest in Seoul. You have no choice but to depend on Seoul or something like that. So, in the end, the relevant civil servants have to take the lead…There are energy activation services and diagnostic services, right? It's cumbersome to bring something like that. We make it (a proposal), go and present it, but most civil servants aren't bothered. It doesn't help them at all... After that, I look up what the central government budget is, and think 'oh, I might be able to get something like this.' In this way, about 26.8 billion won was spent here on the urban regeneration of Jangwi-dong. The efforts of civil servants in community governments that can bring such cooperative projects are necessary (INT43).

On the other hand, decision-makers and stakeholders of urban regeneration at national and city levels believe that civil servants at community levels generally have a low level of expertise and interest in climate change issues and their relevant measures (INT4; INT5; INT7; INT8; INT13; INT15; INT16). Furthermore, it is argued that stakeholders of urban regeneration in Garibon-dong and Amsa-dong viewed their civil servants in the community governments as being without interest and expertise in climate measures and their integration into urban regeneration revitalisation plans (INT24; INT28; INT33).

In most cases, the person in charge of urban regeneration in a community government has no expertise or interest in climate change or the environment, as their majors are administration or urban planning. It seems to be rare that civil servants in charge of urban regeneration have personal knowledge or interest in climate change issues (INT33). In addition, education and publicity on information about climate change should be conducted for civil servants, yet such instances are insufficient (INT4). This factor is closely related to resources, in particular, 'lack/absence of information about climate measures'.

The necessity of education on climate change to improve the level of integration of climate measures in urban regeneration projects is highlighted by stakeholders. This is closely linked to the awareness of climate change. Although there are educational opportunities and programmes for government employees working in the department of urban regeneration, they are not obligatory, and so not enough to increase the interest of the employees in climate change issues. It is stated by national and city urban regeneration policymakers that climate change-related

education should be obligatory for the person in charge of urban regeneration in the community government. The absence of guidelines about climate measures that can be adopted into urban regeneration plays a significant role in limiting expertise in the field. This issue will be discussed in the next section (Section 7.1.3).

Interest in the environment, in general, is not very high in community departments. Several interviewees who directly participated in the process of formulating and implementing urban regeneration projects insist that the employees tend to focus more on following administrative routines such as spending the budget of urban regeneration projects as planned rather than adapting them to innovative or cooperative plans.

Governance and cooperation among stakeholders

Each of the four urban regeneration areas that this dissertation examines has a governance system that oversees the gathering of opinions from all stakeholders, cooperation among them, and the resolving of conflicts related to urban regeneration projects. However, only two communities—Jangwi-dong and Sandgo 4-dong—demonstrate good cooperation among actors in urban regeneration projects (INT14; INT36; INT37; INT39; INT41; INT42; INT43; INT45; INT46; INT47; INT50). Alternatively, urban regeneration stakeholders in Amsa-dong and Garibong-dong argued that they lacked cooperation and active participation among actors (INT20; INT24; INT25; INT26; INT27; INT28; INT29; INT33; INT34).

Jangwi-dong shows the highest level of cooperation between stakeholders of urban regeneration projects among the four study areas. Representatives from Seongbuk-gu (where Jangwi-dong is located), the urban regeneration on-site support centre, the urban planning companies and residents highlighted that cooperation amongst different actors played a significant role in integrating climate measures in Jangwi-dong (INT43; INT45; INT46; INT47; INT49; INT50).

While having meetings to make important decisions for urban regeneration projects, the head of Seongbuk-gu invited a variety of stakeholders to collect various opinions from them, e.g. staff from a company performing community revitalisation of urban regeneration areas (INT47). This is rare in normal urban regeneration projects (INT47). Also, residents were actively involved in the process of urban regeneration implementation, for example, attending meetings that were not obligatory for residents (INT49). Climate measures that were initiated by Seongbuk-gu and the urban regeneration on-site support centre had been welcomed by residents (INT45; INT49; INT50). A resident of Jangwi-dong who actively participated in the process of urban regeneration stated that the cooperation between stakeholders was better than in other neighbourhoods in that all representatives of stakeholders attended a meeting where stakeholders of different urban

regeneration areas and the city government were invited. Stakeholders of urban regeneration in Jangwi-dong state:

> At that time, when we went to the office of Seoul Metropolitan Government, the residents, the coordinator, the head of urban regeneration on-site support centre, and the civil servant from the community all went there together. But for one neighbourhood, the head of the urban regeneration on-site support centre alone came. For another neighbourhood, only the coordinator of the urban regeneration on-site support centre came, and there were no residents in the meeting except for Jangwi-dong… Yes, so from that time on, I was like, 'Oh, will there be development in our neighbourhood [Jangwi-dong]?' (INT49).

> In terms of eco-friendliness, a lot of progress has been made in the forward direction. There are a lot of projects that residents didn't want to do. Environmentally friendly projects were driven by the head of Seongbuk-gu, and civil servants in Seogbuk-gu followed the direction of the head. If residents didn't want to do these projects, they would not follow, but for residents, the word sounded nice and positive. They said "Eco? Oh, I wish we could do it in an eco-friendly way too." No part strongly opposed or thought negatively about eco-friendliness, energy, or anything like that (INT45).

A resident community, called 'Descendants of the Sun', was established during the implementation period of urban regeneration. Residents learn climate change issues and ways to decrease energy consumption and then educate children in the community (INT49). The community has continued its activities even after the completion of urban regeneration (INT49).

Representatives from Dongjak-gu government, the urban planning company, the urban regeneration on-site support centre, and residents highlighted that urban regeneration projects in Sangdo 4-dong were successful because of good cooperation with each other (INT36; INT37; INT39; INT41). Some of the interviewees from Sangdo 4-dong state:

> Actually, the teamwork between the community government, urban planning company, and residents [in Sangdo 4-dong] was really good... We felt this way and worked very hard (INT37).

> I think it will be difficult to carry out urban regeneration projects unless the central body precisely sets the goal. In Sangdo 4-dong, the leaders in the resident council put a lot of effort into it (INT39).

It is reported by stakeholders in Amsa-dong and Garibong-dong that these two communities showed a lack of cooperation among urban regeneration actors (INT20; INT24; INT25; INT26; INT27; INT28; INT29; INT33; INT34). Garibong-dong had severe conflicts between residents related to urban developments after the cancellation of the new town policy—sometimes there were physical fights between residents due to disagreements on some urban regeneration agendas (INT25).

Cooperation with climate change departments

The cooperation with other departments in charge of climate change is a driving force behind the integration of climate measures in urban regeneration projects in the light of sharing possible climate measures to be integrated and discussing the administration processes for the integration.

The departments in charge of urban regeneration and climate change in the community governments are shown in Table 7-2. Jangwi-dong and Sangdo 4-dong established a new department of urban regeneration separated from urban planning. Amsa-dong and Garibong-dong did not establish new urban regeneration departments when urban regeneration policy was initiated. Regarding departments in charge of climate change, none of the departments had names associated with climate change, although Jangwi-dong established a new team, the Rainwater Management Team, in 2015.

Table 7-2 Departments of urban regeneration and climate change in community governments of four study areas

Urban regeneration areas	Community government	Departments in charge of urban regeneration	Departments associated with climate change
Jangwi-dong	Seongbuk-gu	• Urban Regeneration Department • Urban Planning Department	• Parks and Forests Department • Environment Department • Rainwater Management Team
Sangdo 4-dong	Dongjak-gu	• Urban Regeneration Department • Urban Planning Department	• Clean Environment Department
Amsa-dong	Gangdong-gu	• Urban Planning Department	• Green Energy Department • Clean Environment Department • Urban Agriculture Department
Garibong-dong	Guro-gu	• Urban Planning Department	• Green Urban Department • Environment Department

* Organisational structure of the community governments changes over time. The departments' names were identified in December 2021.

Source: own compilation based on 'Gangdong-gu government website', n.d.; 'Guro-gu government website', n.d.; 'Seongbuk-gu government website', n.d.; 'Dongjak-gu government website'

For effective cooperation between the departments of community governments in urban regeneration areas, the head or deputy head of each community government is supposed to

establish an administrative council and hold meetings with relevant departments and the department in charge of urban regeneration. The Guidelines for the Formulation of Neighbourhood Regeneration Revitalisation Plans states:

> The person who has the authority to establish a revitalisation plan shall operate an administrative council under the authority of the head or deputy head of the relevant community government. This is for consultation between relevant departments in charge of urban regeneration and related projects and coordination between projects during the establishment of the revitalisation plan. The council is composed of an organisation in charge of urban regeneration projects, public officials in charge of related departments, and a project coordinator. The project coordinator has the authority to participate in the decision-making of the administrative council. The administrative council has a secretary, who is in charge of a public official belonging to an organisation dedicated to community governments' (Ministry of Land, Infrastructure and Transport, Land & Housing Corporation and Architecture & Urban Research Institute, 2016b, p. 4).

Despite the existence of a governance system for the cooperation between departments in community governments, the level of cooperation is still considered as low (INT5; INT6; INT7; INT13; INT16; INT24; INT29; INT36; INT40; INT43; INT45; INT47). An interviewee states:

> The reason why the cooperative project is not progressing well is probably that the project was conducted in a state where the role of this administrative council was not clearly established in the beginning. Initially, the role of the administrative council in the eight areas[45] is not the governance we currently have, for example, each department in a certain community government, 'We have some projects, how much can we spend on your budget? Can you do it here, for our department?'… the focus of the administrative council was that every department thought about benefits they could get by cooperating (INT16).

The lack of cooperation between departments results in inefficient administration such as budget waste. One example of the lack of cooperation was reported by an interviewee at Seoul Urban Regeneration Support Centre, saying:

> In an urban regeneration area in Seoul, an urban regeneration project to lay road pavement took place. A week later, a sewer pipe replacement and improvement project took place as part of the linked project of urban regeneration, which made the road pavement project useless (INT16).

Several reasons hinder the lack of cooperation between departments in community governments.

First, there is an organisational culture whereby each department considers its work to be its own domain, and there is a tendency to think that cooperation can lead to a loss of initiative. In other

[45] The first pilot areas in Seoul were Jangwi-dong, Sangdo 4-dong, Amsa-dong, Garibong-dong, Changsin Sungin, Haebangchon, Seongsu-dong, and Shinchon.

words, they are hesitant to collaborate because they fear appearing inefficient in performance evaluations (INT5).

Second, the environmental departments and departments for urban planning naturally conflict in that the environmental department usually regulates urban development activities that are initiated by the urban planning department. Due to the traditional nature of these departments, it is challenging to cooperate (INT6).

Third, the vagueness of responsibilities for cooperative projects after the completion of project periods negatively affects the cooperation between departments in community governments. Regarding the management of facilities related to climate measures in cooperative urban regeneration projects, it is hard to determine which department is in charge of these facilities after the completion of the projects (INT29).

Fourth, despite processes that help cooperation between departments, the differences between project periods from different departments hinder urban regeneration projects from integrating other projects from other departments. In some cases, projects that could have been integrated into the urban regeneration project are discovered after the urban regeneration revitalisation plan is formulated. It is difficult to integrate such projects later because different projects have different administrative processes (INT6).

Seongbuk-gu developed and operated a staff evaluation system that gives extra points for personal performance points to civil servants who are involved in cooperation with other departments. Civil servants regarded the points as an incentive as they are directly linked to their promotions. This was regarded as good practice for the integration of other projects into urban regeneration, resulting in it being adopted by Seoul Metropolitan Government's staff evaluation system later (INT13).

<u>Short-termism, short-term performance-oriented system</u>

A short-term performance-oriented system is one of the barriers to the integration of climate measures in urban regeneration projects. In the government system, civil servants are supposed to report the performance of urban regeneration projects. Instead of examining the quality of outcomes resulting from urban regeneration, the government structure only evaluates temporary outputs. This short-term performance-oriented system makes urban regeneration stakeholders focus on choosing projects that can demonstrate effectiveness quickly (INT15; INT19). Interviewees who are involved in the urban regeneration policy at city level argue:

> An important point is that the current government's management of urban regeneration is focused on executing budgets or achieving results. They are only interested in short-term outputs, not interested in the outcome (INT15).

> For such a project, there is five year limit to the public support period, and as a result, tangible results must be achieved within five years... Otherwise, they are asked 'You put so much money into it, but you didn't do anything?' … As a result, although there are many good projects to choose from, the urban regeneration budget is used to construct anchor facilities and additional projects to show off. I don't like the expression, but it's a one-off, show-style event (INT19).

Public-led urban regeneration, rather than urban regeneration based on village community formation and a long residents consensus process, is likely to develop in the form of highlighting the administrative efficiency of the government. For this reason, urban regeneration is being initiated with an emphasis on showing results in a short period of time rather than taking considerable time contemplating `the overall value of projects the neighbourhood should pursue. Although Korea's urban regeneration pursues resident-led urban regeneration, urban regeneration policies are pursued without an extensive consensus process before public resources are first put into operation. It is difficult to improve the degree of climate policy integration due to the limitations placed on policies in their need to display substantial short-term performance results. In Sangdo 4-dong and Jangwi-dong, while the urban regeneration budget was used for the neighbourhood, the actors' activities to integrate climate measures were limited due to this government system (INT40; INT44). A resident who participated in the process of Sangdo 4-dong urban regeneration project states:

> We have a lot of children in the neighbourhood, so we aim to reduce the number of vehicles or make a green zone in the neighbourhood. Even though they couldn't agree on such things, a discussion about these issues together made the residents think about them… But I just noticed that they didn't want to see any conflicts between residents (laughs) and just wanted to fill out the date quickly and roughly finish it. Well, what can we expect from the urban planning company hired by the government?… They just have to report what they did this week to the community government. The report and paper must come out and everything has to be said on paper. So, the minutes of the meeting have to be published, and the residents should be in pictures (INT40).

7.1.3 Resources

<u>Lack/absence of information about climate measures</u>

Lack/absence of information about climate measures is one of the most relevant inhibiting factors to integrating climate measures into urban regeneration projects in the policy implementation stage. Stakeholders and policymakers who are aware of the existence of information contend that

the available information about climate measures is either not publicised or not researched enough. Similar to the policy development stage, there is limited information about climate measures that could be adopted by urban regeneration actors for urban regeneration projects at a community level (INT3; INT4; INT5; INT7; INT13).

During this stage, there were climate measures that were incorporated by Jangwi-dong and Sangdo 4-dong such as rainwater collectors, roof-top garden, solar panels, and energy-efficient remodelling of housing. On the other hand, a civil servant in charge of Amsa-dong's urban regeneration project and the head of the urban regeneration on-site support centre in Garibong-dong insisted that a lack of climate measures in their urban regeneration projects resulted from a lack of information about them (INT23; INT30). The significance of research that affected the origin of urban regeneration policy in Seoul was highlighted by a stakeholder in Amsa-dong, saying:

> I would like to go to the source where these policies came from and talk about their awareness of climate change once again. So, an organisation like the Seoul Institute proposes this policy. The organisation needs to raise awareness about climate change and the environment. Starting from there, those with high-ranking administrative positions in Seoul, the district council, and the city council review the urban regeneration policy and its budget is compiled. So, if this is to be directly reflected in urban regeneration, we must find the source which this policy comes from. Many of those sources can be found at the Seoul Institute. There are most of the policy proponents in the Seoul Institute, University of Seoul, etc. (INT33).

Both the national and city governments recently put effort into providing information/knowledge of climate measures to urban regeneration actors in urban regeneration areas. The Ministry of Land, Infrastructure and Transport have developed documents that help urban regeneration actors to review possible climate measures for urban regeneration projects at a community level since 2018. For example, 'Explanation Materials of Related Projects in Relevant Ministries for 2018 Urban Regeneration New Deal' introduces 75 projects that could be integrated into urban regeneration projects. Ten of the projects are from the Ministry of Environment, including ecological resting space creation, ecological river restoration projects, water circulation leading city development projects, etc. (Ministry of Land, Infrastructure and Transport, 2018a). Moreover, in 2020 Seoul Urban Regeneration Support Centre opened the 'Urban Regeneration Contents School' that educates residents in urban regeneration areas with five concerns, which are gardening, childcare, waste recycling, energy and climate change, and festivals. Residents in urban regeneration areas can learn information about climate measures that could be incorporated into urban regeneration projects (Seoul Urban Regeneration Support Centre, 2019b).

The information that is required to be available for urban regeneration stakeholders while designing urban regeneration projects is (1) the effectiveness of possible climate measures in urban regeneration projects, such as performance indicator information and (2) design guidelines for adopting climate measures in existing buildings.

Performance indicator information provides a calculable performance measurement of the environmental aspects of projects. This is so community governments are able to set environmental targets and residents can realise the economic and environmental benefits of their environmental behaviour within urban regeneration projects. Since urban regeneration aims to meet residents' demands for their communities, community governments need the performance indicator information to persuade the residents to choose environmental measures and objectives for their urban regeneration projects. The person in charge of urban regeneration in the community governments with good practice states:

> An important factor when incorporating climate change content in the urban regeneration revitalisation plan is to set performance indicators. Because climate change is an abstract concept, it is difficult for residents to directly experience it, so it is necessary to show tangible and numerical results by setting performance indicators. In addition, climate change cost settings must be provided to the residents. Quantifying the climate problem in terms of money allows the residents to participate in environmental projects easily and actively (INT36).

The community government of Sangdo 4-dong provided information about the analysis of energy usage for households and factors of extra energy consumption for residents. They then set performance indicators to make it easier for residents to understand, such as targeting household temperature standards through energy-saving building renovation (INT36). Also, this community provided performance indicators for an energy-saving house renovation project; the reduction in gas bills totalled 40,000 won per month, the indoor temperature during the winter increased more than five degrees, and energy consulting reduced electricity bills by ten percent (INT36).

When formulating urban regeneration revitalisation plans, a policy process such as hosting expert seminars to get consultations about the plans is included. This is a vital chance to increase the level of integration of climate measures in urban regeneration projects at a community level. While finalising the urban regeneration revitalisation plan in Sangdo 4-dong, several expert seminars were held by stakeholders in the urban regeneration project. An expert who consulted in a seminar that aimed at revising energy-related projects in urban regeneration revitalisation plans proposed to make energy reduction plans for 1,000 households (INT38). The proposal was finally implemented by way of an energy consulting project for 100 households in 2019. The consulting project included a diagnosis of energy consumption, an analysis of life patterns (analysis of electricity meters, bills, etc.), research on energy waste factors, and suggestions for

energy reduction measures. Dongjak-gu government plans to use the data accumulated through consulting for this energy use pattern of consumption in Sangdo 4-dong to formulate energy regeneration projects in the future (INT36).

In the case of the energy-saving house repair project in Sangdo 4-dong and the rainwater collector installation project in Jangwi-dong, it is reported that the community governments and urban regeneration on-site support centre put efforts into publicising relevant information about projects and promotions to raise awareness of saving energy (Sangdo 4-dong) and rainwater management (Jangwi-dong). In Sangdo 4-dong, they quantified changes in electricity costs and temperature when residents saved energy and publicised the results to residents so that they could recognise the effectiveness of the project. Through consulting, electricity bills were reduced by 10 percent (INT36). Also, in Jangwi-dong, education about rainwater collectors was conducted for the promotion of the rainwater collector installation project (INT45).

Important information that has not been provided to urban regeneration stakeholders is a design guideline that can be applied to housing repairs and remodelling with climate measures (INT4; INT13; INT47). Existing urban regeneration areas consist of old houses that do not have blueprints and have complex plumbing systems, which makes climate-friendly repairs difficult without guidelines (INT13). Regarding rainwater collector installation in homes,[46] the absence of guidelines means the actors of urban regeneration are hesitant to adopt the measures (INT13). An interviewee argues:

> We need guidelines for implementing that project. The project is how to repair the house to efficiently use the rainwater collector. Something like real construction guidelines (INT13).

In addition, guidelines on the use of materials for housing repairs should be provided to the neighbourhood (INT34). As urban regeneration involves a lot of construction, many environmental problems can occur without guidelines. In order to integrate climate measures, detailed guidelines for house repair and construction should be provided (INT4; INT13; INT47).

<u>Expertise (interest in climate issues) of urban regeneration support centres (community level) and master planner</u>

An urban regeneration on-site support centre, an intermediary organisation that links the public and private sectors in urban regeneration projects, plays an important role in determining the success or failure of urban regeneration projects as a key player in the cooperative governance of urban regeneration (Kim *et al.*, 2016; Kim and Kim, 2019). The main roles of the centre are to

[46] Currently, water collected from rainwater collector is used only for purpose of watering plants outside and cleaning streets in front of houses.

establish urban regeneration revitalisation plans, to perform surveys of local resources, to support resident groups, and to perform networking with other intermediary organisations (Kim and Kim, 2019).

The qualifications of the director and coordinator of the centre are important. This is because their expertise can influence the persuasion of stakeholders including residents and community governments to consider incorporating climate measures into urban regeneration projects. An urban regeneration stakeholder at national level states:

> Most of the people in the support centre are experts in the field of urban planning or governance. Of course, there are some people who have experience of environmental movements among those who have expertise in governance, but the centre is now an extension of the civic movement, and there are no engineers with expertise in environmental policy or business (INT6).

The issue of a lack of independence in urban regeneration on-site support centres also becomes a problem (Kim, 2017). According to a survey result in 2018 from all urban regeneration on-site support centres in the Republic of Korea, they lack management independence, authority to establish a budget, and autonomy to plan projects and project performances (Lee *et al.*, 2018; J. Kim, 2019; Kim and Kim, 2019). In particular, Garibong-dong and Amsa-dong, reported that the centre had no authority for making decisions for urban regeneration projects (INT31; INT33; INT23; INT24).

In the urban regeneration projects of Seoul, the administration has the authority to establish plans and promote the project, and the authority of the on-site centre is insufficient. In this situation, it is difficult to quickly respond to residents' requests or complaints, and it can act as a factor in causing conflicts between the administration and on-site centres, and on-site centres and residents (Maeng *et al.*, 2019). An interviewee in the dissertation argues:

> 'In a way, the support centre should play the role of a think tank, but rather than the role of a think tank, it is almost acting like an agent of administration. In a way, the centre is under pressure from the administration and residents. It is sad.' (INT5)

In the four on-site support centres, the initial head of the centre is a master planner. Heads of the urban regeneration on-site support centre in Jangwi-dong had a high level of interest in adopting climate measures and environmentally friendly buildings (INT46). The master planner of Jangwi-dong tried to introduce more eco-friendly elements when the urban regeneration revitalisation plan was established. For example, proposals included the installation of water-saving valves on water-saving faucets and toilets, the circulation of resources by supplying local food through vegetable gardening, and changes to architectural guidelines for new buildings to be constructed in a more environmentally friendly way. The second head of the centre, previously a house repair

expert, worked as a community cultivator and activist in the Jangsu Village home repair support project that led to the creation of the Caring Housing Project in the Seoul Metropolitan Government. After taking office as the head of the centre, he made use of his previous career to establish the Caring Housing Project and made many proposals to introduce more eco-friendly elements in the construction of anchor facilities. A coordinator in the centre also had experience in the environmental field, including working as an energy assessor in Seoul Metropolitan Government who gave lectures on the environment to elementary school students. The coordinator suggested to the community government that there should be more education and activities related to energy saving and urban agriculture in urban regeneration areas (INT46).

The head of the urban regeneration on-site support centre in Sangdo 4-dong also had great interest and expertise in eco-friendly buildings and energy efficiency. As part of the urban regeneration projects 'Actual Survey on Energy Use Efficiency of Old Houses' and 'Realisation of the 2016 Seoul Living Lab Eco-Friendly Home Repair Ideas', the head of the centre and a research team at Seoul National University jointly measured the energy use efficiency in Sangdo 4-dong and held seminars related to the projects (INT37; INT38).

It was after the change of the centre's head in 2019 that Garibong-dong integrated projects related to climate factors. The next head had a strong determination to integrate climate measures into urban regeneration areas—the Caring Housing and Energy-Independent Village projects started actively in 2019 as part of urban regeneration cooperative projects. He is also the person who proposed the Energy-Independent Village Project to Seoul Metropolitan Government. However, since the time the urban regeneration revitalisation plan was established in 2017, there was no attempt to integrate climate measures in urban regeneration projects until 2019. Since 2019, as part of the Caring Housing Project, 60 houses were repaired and 100 houses were targeted to be repaired; projects such as cool roofs, eco-friendly boilers, and alley gardens were implemented. The residents are not interested in climate change, so the head of the centre tries to convince the residents by introducing the benefits the projects can provide for them (INT23).

In Amsa-dong, it was not reported in any interviews or sources that either the staff or the head in the centre showed any attempts to incorporate climate measures in the process of urban regeneration. A staff member in the urban regeneration on-site support centre stated that the centre did not have any clear guidance on climate change or energy issues for the residents, which resulted in low participation in energy-saving initiatives (INT32).

Budget and resources

The four study areas have different budgets for urban regeneration projects (Table 7-3). The Pump-Priming Project budget is to be first used in urban regeneration areas. The Cooperative Project budget is to be invested separately from the Pump-Priming Project budget by other departments in city or community governments. As the four neighbourhoods have a limited budget for the Pump-Priming Project, they attempt to incorporate other cooperative projects from different departments that are relevant to urban regeneration.

Table 7-3 Budget of urban regeneration in the four study areas (unit: KRW)

	Jangwi-dong	Sangdo 4-dong	Amsa-dong	Garibong-dong
Pump-Priming Project budget	10,000,000,000.00	10,000,000,000.00	10,000,000,000.00	13,890,000,000.00
Cooperative Project budget	20,808,000,000.00	21,914,000,000.00	15,414,000,000.00	25,249,000,000.00
Total	30,808,000,000.00	31,914,000,000.00	25,414,000,000.00	39,139,000,000.00

* 1 EUR=1,345.05 KRW (as of 27 May 2022)

Source: own compilation based on Seoul Metropolitan Government (2017b, 2017a); Seoul Metropolitan Government and Dongjak-gu (2017); Seoul Metropolitan Government and Gangdong-gu (2017)

This factor of budget limitations is reported as an important factor for the integration of climate measures in urban regeneration projects in the implementation stage. Most urban regeneration budgets are spent on the construction cost and management of anchor facilities. As shown in Table 7-4, the cost of anchor facilities ranges from 21 percent to 55.2 percent of the Pump-Priming Project budget.

Table 7-4 Cost of anchor facilities in study areas

	Jangwi-dong	Sangdo 4-dong	Amsa-dong	Garibong-dong
Pump-Priming Project budget	10,000,000,000.00	10,000,000,000.00	10,000,000,000.00	13,890,000,000.00
Anchor facilities	2,781,000,000	5,522,000,000	5,170,000,000	2,918,000,000
Percent	27.8 percent	55.2 percent	52 percent	21 percent

Source: own compilation based on Seoul Metropolitan Government (2017b, 2017a); Seoul Metropolitan Government and Dongjak-gu (2017); Seoul Metropolitan Government and Gangdong-gu (2017)

Since most of the urban regeneration budget is used for establishing anchor facilities, the amount remaining is not enough to cover all issues raised by residents. As climate change issues are not a priority in urban regeneration areas, it is difficult to focus on the climate measures of projects in urban regeneration. Different actors in the four study areas as well as stakeholders of national and city urban regeneration policies confessed that they lack a pump-priming project budget. This results in more focus on projects that are requested by residents (INT5; INT13; INT16; INT23; INT20; INT29; INT43; INT40). An interviewee points out:

> The reason is that the project cost is now usually around 10 to 20 billion, but in the Seoul area, it takes about five billion to build just one anchor facility. It is mostly because of high land prices in Seoul… Now, once you have covered all of the operating costs, labour costs for operating personnel, and software programme costs related to the anchor facility, you have no choice but to focus on items that are highly prioritised by residents… such as a car park… If you have a really good budget and a lot of money, or if you say that you have enough social overhead capital in the area, you can then turn your eyes to other things (INT16).

However, despite the similar situation of budgets in the four communities, Jangwi-dong and Sangdo 4-dong included climate measures both in pump-priming projects and cooperative projects. Actors from Jangwi-dong's urban regeneration projects highlighted that the limited budget allowed them to find more cooperative projects from other departments in the community government (INT43; INT46). Amsa-dong and Garibong-dong assigned their pump-priming budgets to the most urgent projects requested by residents. The residents' prioritised projects in these two communities were not related to climate measures. It was hard to persuade residents to adopt the concept of the passive house into the anchor facility because the cost of the passive house is more expensive than a normal building. Residents did not agree to these measures due to the higher costs in relation to the limited budget (INT23).

<u>Expertise of urban planning company hired by the government</u>

Every community government that prepares an urban regeneration revitalisation plan places an order for services to an urban planning company. The role of the urban planning company includes 'research on the features of local resources, the establishment of an urban regeneration revitalisation plan, setting goals for the plan, planning and preparing for ripple effects of urban regeneration projects, installation of urban regeneration infrastructure, plans for maintenance, public and private financing plans, budget execution plans, evaluation and inspection plans for urban regeneration projects, and securing areas subject to activity restrictions and urban management means' (Seoul Metropolitan Government, 2017a).

It is reported that urban planning companies that were hired by the community governments to participate in formulating urban regeneration revitalisation plans played roles in integrating climate measures in Jangwi-dong and Sangdo 4-dong. In Jangwi-dong, during the discussions to design the overall concepts and visions of the urban regeneration revitalisation plan, the urban planning company and civil servants in the Seoul Metropolitan Government suggested a focus on environmental aspects, being motivated by the proximity to the Dream Forest in North Seoul[47] (INT43). In Sangdo 4-dong, while considering the selection of possible urban regeneration projects, the urban planning company and civil servants in Seoul Metropolitan Government suggested including energy-related projects (INT38). The employee from the urban planning company stated that they suggested the inclusion of solar panels and roof-top gardens because they are suitable to the physical characteristics of Sangdo 4-dong (INT37).

However, it is argued that the urban planning companies hired to formulate urban regeneration revitalisations are reported to be passive in providing opinions during the process of the formulation of the plans (Shin and Kang, 2019). An interviewee who works in an urban regeneration on-site support centre argues:

> Decisions are mainly made by the civil servants, not by the urban planning company. Because the civil servants place an order for urban planning services and they become the administration, the administration does what it wants, and the subcontractors are not able to do what they want (INT33).

It is argued that the urban planning company follows the Guidelines for the Formulation of Urban Regeneration Revitalisation Plans without any expertise in regenerating the communities (INT24; INT5). An interviewee argues:

> The company does not include climate measures, because there is no such thing in the guidelines. After all, those who make plans, the community government, place an order to urban planning companies. But the people who do the service in the companies just follow guidelines. There is no such thing in the guidelines, so they don't worry about it at all (INT5).

The urban planning companies, that have expertise in the field of urban planning, not the environment, are hired by the community government during the period of formulating urban regeneration revitalisation plans. The urban regeneration revitalisation plans that they prepare are affected by the interests and opinions of the city and community governments. It does not appear that the hired company's opinions influence the integration of climate change and other planning elements into urban regeneration. Urban planners from the hired urban planning

[47] Dream Forest in North Seoul is a green park built on an area of 660,000 square meters and is the third largest park in Seoul (*Introduction of the park—Parks in Seoul*, no date).

company that was in charge of formulating urban regeneration revitalisation plans in Jangwi-dong stated that the major reason for including climate measures in the area was the Head of Seongbuk-gu who had a high interest in rainwater management and the head of the urban regeneration on-site support centre who was active in the Caring Housing project (INT45). The person in charge of the urban planning company that was hired by Dongjak-gu government for formulating the urban regeneration revitalisation plan in Sangdo 4-dong pointed out that the main factor for adopting climate measures was the community leader who led the Seongdaegol Energy-independent Village Project (INT37). Alternately, the urban regeneration revitalisation plans of Gar ibong-dong and Amsa-dong did not include climate components. Urban regeneration actors in these areas required the urban planning company to suggest possible urban regeneration projects, and important decisions on initiatives were made mainly by the civil servants of the community governments (INT33), the master planner and residents (INT22).

Expertise (interest in climate issues) of the urban regeneration support centre (city level)

Seoul Urban Regeneration Support Centre was established in July 2017. As the four communities had already completed the formulation of the urban regeneration revitalisation plans before the opening of the centre, the centre did not have a direct impact on the integration of climate measures in them. However, the centre influenced the urban regeneration areas in several ways.

First, it hosts education programmes for coordinators at urban regeneration on-site support centres, community activists, and residents for capacity buildings of urban regeneration. Education programmes organised by Seoul Urban Regeneration Support Centre, such as 'Urban Regeneration Citizen Academy', 'Urban Regeneration Activists Training Course', and 'Urban Regeneration Coordinator Training' allowed stakeholders of urban regeneration to understand the meaning of urban regeneration and to increase the capacity to be community activists or coordinators at urban regeneration on-site support centres. The education programme is oriented around community cohesion, residents' participation, community revitalisation, and the development of local human resources. It was after the opening of Seoul Urban Regeneration Contents School that climate change issues have been included in the education programmes organised by the Seoul Urban Regeneration Support Centre. One of the five themes in the education programme of the school is 'Energy', which aims to train citizen energy activists to actively take on the initiatives of (1) energy-independent village projects, (2) integration of climate measures in urban regeneration revitalisation plans such as installation of solar panels, improvement of housing energy performances, improvement of alley environment, and (3) energy-independent activities of anchor facilities (Seoul Urban Regeneration Support Centre, 2019b) (INT17).

Second, the Urban Regeneration Support Centre serves to introduce projects that can be linked to urban regeneration areas among the projects in the Ministry of Land, Infrastructure and Transport and Seoul Metropolitan Government to the urban regeneration on-site support centre. For example, the project to install rainwater collectors in Seoul required applications for all areas in Seoul, but the Seoul Urban Regeneration Support Centre requested Seoul Metropolitan Government to allocate it to the urban regeneration project by priority and the request was reflected in the revision of the project descriptions (INT18).

7.1.4 Cognitive factors

<u>Divergent priority (at the community government and urban regeneration support centre)</u>

Civil servants and urban regeneration on-site support centres do not view climate change issues as a priority of urban regeneration. The divergent priorities of community government and urban regeneration on-site support centres are considered a barrier to the integration of climate measures into urban regeneration projects. In community governments, the goal of urban regeneration is to create jobs and build prosperous, vibrant communities. No matter how much the central government tries to incorporate climate change, it cannot be implemented unless one of the priorities of community government is a climate change issue (INT5; INT7; INT8).

The cognitive factors affecting the integration of climate measures into urban regeneration projects were not highlighted frequently by stakeholders of urban regeneration at city and community levels. They were reported by policymakers of urban regeneration policy at a national level. Their statements about the factor of divergent priorities did not criticise specific communities but urban regeneration areas in general. These statements include:

> Community governments would say 'why climate change?' Ultimately, these projects are community government projects… The community governments don't know why they must do this [integrate climate measures into urban regeneration projects]. The residents especially don't know. So, there is still public opinion against this being done (INT8).

> There is not much awareness or interest in climate change by the project implementers. I don't think they will consider rainwater. Although the Basic Policy for National Urban Regeneration has some statements on rainwater, I haven't seen any community governments that proposed plans which included rainwater measures. The main focus of urban regeneration projects for them is to revitalise the main street. So, while the central government wants to include something like that (climate measures), the community governments and residents, who are the main actors of the project, wouldn't have much interest in it… Staff and the heads of urban regeneration on-site centres also didn't have much interest in this. The main priority of urban regeneration was to make a prosperous, lively town. So, climate change was not the main thing (INT7).

7.1.5 Characterisation of the problems/opportunities at hand

The characterisation of problems/opportunities for the integration of climate measures in urban regeneration between policy development and implementation stages are similar. These include the difficulty of measuring the performance/effectiveness of climate measures and overlapping objectives between climate change and urban regeneration. These are common internal issues throughout the entirety of urban regeneration policy discourse. However, there are other factors reported during the policy implementation stage only, such as the existence of local features that can be integrated with urban planning themes, and the inability to regulate private property (e.g. buildings).

<u>Existence of local features that can be integrated with an urban planning theme</u>

Sangdo 4-dong, Jangwi-dong, and Amsa-dong already had some projects that were related to climate initiatives before urban regeneration projects were planned, such as the Energy-Independent Village Project in Sangdo 4-dong, rainwater management in Jangwi-dong, and urban agriculture in Amsa-dong. These existing projects allowed urban regeneration stakeholders to integrate climate measures more easily.

Sangdo 4-dong includes the Seongdaegol area which was the first energy-independent village promoted by Seoul Metropolitan Government in 2013. The area has demonstrated performance through the development of mini solar panels and the My Home Solar Loan Financial Product[48] while implementing Seongdaegol Energy Transition Living Lab since 2015. Currently, the residents actively lead the area aims of the energy-independent village by managing a Seongdaegol Environment Improvement Project steering committee and running an energy-related business, named 'Village Dot Salim Cooperative' (INT36). Thanks to the residents' active and continuous energy transition efforts, it is now recognised as an exemplary case of an energy-independent village. While designing the urban regeneration revitalisation plan in Sangdo 4-dong, the concept and vision of the plan were influenced by the experiences of the Energy-Independent Village Project which also helped residents to increase their level of interest and expertise in climate change and energy transition issues (INT14; INT36; INT37).

Seongbuk-gu, which includes the Jangwi-dong area, established a 'Rainwater Management Comprehensive Plan' in 2015 (Seoul Metropolitan Government—Climate Environment Headquarters, 2019). The community government prioritised the rainwater management project, supported by the strong intentions of the former head of Seongbuk-gu. In 2016, Seongbuk-gu was selected as the Rainwater Village Creation Project by the Seoul Metropolitan Government and, in

[48] A financial product (a type of loan) to install mini solar panels.

2018, a total of 30 rainwater facilities were installed. Projects for the restoration of water circulation were also continuously promoted, such as operating the Visiting Rainwater Experience School (Seoul Metropolitan Government—Climate Environment Headquarters, 2019). Similar to the case of Sangdo-dong, rainwater management projects were already dominant in Jangwi-dong at the time when urban regeneration projects were planned, which permitted stakeholders to include the project of installing rainwater collectors in urban regeneration projects (INT13; INT44; INT45). An interviewee who was one of urban regeneration stakeholders in Jangwi-dong states:

> As far as I know, Seongbuk-gu is the first city to carry out a rainwater collector project… It was a time when the head of Seongbuk-gu publicised and strengthened the rainwater-related project, setting it as one of the policy directions of the Seongbuk-gu administration. Before we started urban regeneration, there were already many rainwater collector projects in Seongbuk-gu. Seongbuk-gu wanted to install rainwater management facilities in a housing complex even if it wasn't an urban regeneration revitalisation project. So, this empowered us to include rainwater collector projects (INT45).

Amsa-dong also included an urban agriculture project that was already ongoing in Gangdong-gu. As there are large portions of the green-belt area that can be used for farming, Gangdong-gu government have implemented a variety of urban agriculture projects since 2009 (INT29). Gangdong-gu enacted 'The Ordinance for Urban Agriculture Revitalisation and Support' in 2011 for the first time. It has managed a diverse urban agriculture education programme and urban garden to be used by residents in Gangdong-gu ('Gangdong-gu Office Urban Agriculture Portal—Gangdong-gu Urban Agriculture Footprint,' n.d.). When urban regeneration in Amsa-dong was initiated in 2014, the theme of urban agriculture was adopted based on the specialised objectives of this area (INT29; INT31; INT33). An interviewee in Amsa-dong states:

> Urban agriculture in Amsa-dong was reflected in urban regeneration because of the characteristics of Amsa-dong itself. Amsa-dong is to the east of Seoul, and this is where the green belt area is tied together. So, it is a place with a much higher rate of gardening than Songpa or Gangnam. and there were urban agriculture companies that were doing well. It's probably ruined now. Anyway, if there is something that goes well, the local government absorbs it. They want to specialise in this and make it their own. Then, when the hegemony originally held by local governments in this district is grafted into the climate change and environment measures, this will be reflected in urban regeneration (INT33).

<u>Difficulty of measuring performance/effectiveness of climate measures</u>

In the policy implementation stage, the difficulty of measuring the performance/effectiveness of climate measures is considered a relevant barrier affecting the integration of climate measures in urban regeneration projects. This problem discourages stakeholders at a community level from

considering the adoption of climate measures in their urban regeneration projects. This is because the performance/effectiveness of climate measures is critical information needed to convince civil servants of urban regeneration in community governments to include them in plans.

Diagnostic data on energy reduction per community is not available, which prevents stakeholders from having clear visions and objectives of climate measures (INT13). This problem becomes a major issue, especially when integrating climate measures into deteriorated low-rise residential buildings in urban regeneration areas. It is easier to measure the energy reduction after adopting climate mitigation measures in high-rise apartment residential buildings because the data is available through the buildings' records of energy use. Since the urban regeneration areas consist of mostly low-rise residential buildings without facilities to measure output, the availability of data collection on energy use is limited.

This factor is specifically related to resources and organisational factors. This problem results in a lack of information about climate measures to educate civil servants on urban regeneration in community governments. Availability of the performance and effectiveness of possible climate measures could convince civil servants and stakeholders who are involved in formulating urban regeneration revitalisation plans to adopt climate measures in urban regeneration areas.

<u>Overlapping objectives between climate change and urban regeneration projects</u>

This factor was reported as a driver of the integration of climate measures in urban regeneration projects by stakeholders of urban regeneration in Sangdo 4-dong and Jangwi-dong. Unlike the policy development stage in which policymakers viewed this issue as a barrier to the integration of climate objectives in urban regeneration policy, urban regeneration stakeholders viewed it as a great opportunity since both project domains shared overlapping objectives.

In one example of this opportunity, residents living in deteriorated residential buildings in urban regeneration areas shared a common understanding of the need to save on bills for wasted electricity. The urban regeneration area mostly consists of houses with poor insulation and low energy efficiency (INT37). The application of climate mitigation measures such as installing solar panels and roof-top gardens and energy-saving repairs of houses were suitable not only as a climate change measure but also for answering the demand of residents (INT39).

Another aspect viewed as an opportunity is community cohesion through adopting climate measures such as urban agriculture which provides an opportunity for people to work together. A large proportion of the population in urban regeneration areas are senior citizens, who also make up the largest demographic participating in urban regeneration projects. It is reported that the senior citizens have a strong desire for cultivating the land and farming which increases the

level of community cohesion. As one of the main objectives of urban regeneration is community cohesion, urban agriculture is a suitable measure to be adopted in urban regeneration projects (INT46). A resident who participated in the process of urban regeneration in Jangwi-dong states:

> The truth is, if the households in this urban regeneration neighbourhood hold a population of 12,000, for example, there are not many of those people who really participate in urban regeneration consistently. When I think of them, they are the elderly, so the coordinators plan things like that (urban agriculture). Now, for the sake of our residents, we also planted potatoes… There was land in front of the urban regeneration on-site support centre a while ago. We planted potatoes there, also planted Chinese cabbage... I think these activities connected the residents a lot (INT50).

<u>Existence of local features that can be integrated with an urban planning theme</u>

This factor was highlighted as driving the integration of climate measures in urban regeneration projects during the policy implementation stage. Local characteristics can be an important influencing factor when determining the overall theme of urban regeneration and selecting urban regeneration projects.

Urban planners and stakeholders who formulated urban regeneration revitalisation plans in Sangdo 4-dong and Jangwi-dong noted that the physical environment of the area inspired them to integrate climate measures in urban regeneration.

Among the urban regeneration areas of Seoul, residential areas may not be suitable for the installation of solar panels on the buildings if the distance between buildings is narrow and the land is flat. However, when the Sangdo 4-dong urban regeneration revitalisation plan was formulated, it was analysed that the area was a hilly one, so the terrain was suitable for installing solar panels. It was one of the reasons to pursue the adoption of the project of solar panel installation in the area as an urban regeneration project (INT37). A civil servant in Seongbuk-gu who formulated the urban regeneration revitalisation plan in Jangwi-dong pointed out that one of the specific characteristics of Jangwi-dong is its proximity to the Dream Forest in North Seoul. It is reported that the proximity to the forest was a starting point for influencing community identity and setting a theme of urban regeneration revitalisation plan embracing the environment (INT43).

<u>Inability to regulate private property (e.g. buildings)</u>

As urban regeneration projects are publicly funded, discussion as to what extent these funds can enhance the physical environment of regeneration areas is significant. Publicly owned buildings are targeted for climate measures. There is no legal recourse to regulate private property responses to climate change. It is impossible to force owners of private buildings to install climate

mitigation measures such as renewable energy generating systems (INT11). This factor is closely related to the aspect of a supportive regulatory framework. Seoul Metropolitan Government has prepared a plan (incentives and penalties) to apply the scope of greenhouse gas emission regulations to private buildings as well as public buildings and is requesting that the central government revise the law (INT11) (Also, see Section 7.1.2 Organisational factors—Supportive regulatory framework).

The question of whether public financial support can go directly to private property is also one of the issues raised by those involved in urban regeneration. An example of this is the support funds of the Caring Housing policy from Seoul Metropolitan Government. As most houses in urban regeneration areas are deteriorating buildings with low energy efficiency due to poor insulation structures, they are eligible to receive financial support to repair them. Fifty percent of construction costs for the repair are directly given to residents who are eligible for the project. This repair is related to climate adaptation measures as it increases the insulation capacity. However, some criticise that it is unfair to provide public funds to individuals. The criticisms are made by the media and residents who are not eligible to receive the funds because their property value is higher than the criteria limit that allows for their use (INT26; INT21; NT19).

7.2 EXTERNAL FACTORS

The lack of studies related to investigating external factors in policy implementation is pointed out by many scholars. However, as this dissertation focuses on urban regeneration that involves interactions with a variety of stakeholders outside the government administration, various external factors are examined (see Table 7-5).

Table 7-5 Highlighted external factors (drivers and barriers) by stakeholders and policymakers of urban regeneration during policy implementation

(Total number of interviewees: 50)

Factors that affect the integration of climate measures into urban regeneration	No. of interviewees	Driver	Barrier
Policy implementation stage			
External factors			
Residents' support			
Public awareness and support	31	12	19
Pecuniary matters of residents	26	4	22
Characterisation of problems at hand			
Lack of facilities and spaces to adopt climate change projects	12	0	12
Fear of the absence of government financial support for climate facilities after the project	5	1	4

Private sector support			
Lack of private sector support	2	1	1
Cognitive factor			
Divergent priorities	11	0	11

Source: own compilation

7.2.1 Residents' support

Public awareness and support

The most frequently highlighted critical factor that affects the integration of climate measures in urban regeneration projects in the policy implementation stage is public awareness and support. 31 interviewees emphasised the significance of this factor. It was reported by 19 representatives of urban regeneration stakeholders that the majority of residents in urban regeneration areas rarely have an interest in climate change issues. According to the Public Environmental Awareness Survey performed by the Korea Environment Institute, people regard the environment as relatively important but it points out that it is insufficient for individuals to adopt environmentally-conscious practices. In other words, it is interpreted that individual environmental awareness does not lead to active environmental practice (Ahn, Oh and Yoon, 2021). Even in Sangdo 4-dong and Jangwi-dong, where climate measures are partially integrated, it is reported that most residents do not have a high level of awareness and interest in climate change issues (INT37; INT38; INT39; INT42; INT47).

As the urban regeneration revitalisation plan is supposed to be a bottom-up plan, it is important to collect opinions from residents during the process of formulating it. Urban redevelopment was promoted by the government and companies, which resulted in a variety of side effects such as gentrification, whereas urban regeneration aims to promote resident participation and the gathering of residents' opinions. Therefore, when designing a project to regenerate an entire community, procedures are supposed to be in place to ensure the receipt of opinions from residents through numerous seminars and meetings in every urban regeneration area in Seoul. Since the four communities that this dissertation includes as study areas are pilot areas chosen by the city government, the process of collecting residents' opinions and needs about their neighbourhood is shorter than that of the recent urban regeneration in Seoul (INT16). An interviewee working in the Seoul Urban Regeneration Support Centre states:

> The urban regeneration system itself is a bottom-up plan. We are adopting a method that reflects the needs of community residents. In the pilot projects, it happened less, but anyway, this system in the past was an urban planner or an architect drew a blueprint, established a land-use plan, and approached it from a macroscopic point of view. Currently, the structure is one in which the urban

> regeneration revitalisation plan is formed while collecting opinions from the stakeholders living in affected areas (INT16).

However, in the cases of Garibong-dong and Amsa-dong, overall, there was a problem with the lack of resident participation and interest in climate change and energy sectors INT21; INT23; INT30; INT32). When an urban regeneration area has many issues and different opinions about the urban development of their neighbourhood, it is difficult to find a direction for urban regeneration. In the case of Garibong-dong, although there were many meetings to collect residents' opinions on decision-making for urban regeneration projects, many times there were physical fights resulting from disagreements between residents (INT25). A resident who participated in the process of urban regeneration plan in Garibong-dong states:

> If you ask residents' opinions, this is when the boat goes to the mountain.[49] I've never had a meeting end well… They talk only about themselves. If they think they will lose out by doing something, people who used to be brothers and sisters in the neighbourhood will fight. So, I had to mediate those things… but you can think of this as an eternal discord. Because it has to do with their incomes, they can't help it. I felt the limits (INT25).

There are two reasons for this lack of awareness and interest in climate change.

First, it seems that most residents in urban regeneration areas do not perceive the effect of climate change issues or feel the effectiveness of climate measures. Residents view climate change issues as a public, not personal, matter. Although the residents are experiencing the impact caused by climate change, they do not regard the problems of climate change as something that can impact daily life. It is necessary to increase the sensitivity to climate change issues in a language that can empathise with the consequences of climate change, rather than one that focuses on terms for its adaptation or reduction (INT21; INT23). This could lead to a sense of necessity for climate measures.

Second, most urban regeneration residents do not have much information about climate change, which is related to a lack of publicity on this subject to residents. As both civil servants and residents do not have much information on climate change issues (INT4), they cannot empathise with climate change projects or the need for actions to respond to climate change.

In particular, it is difficult for civil servants to forcibly include climate measures in urban regeneration in a situation where residents show no interest. This is because civil servants who directly intervene in urban regeneration areas at the implementation stage are afraid of civil

[49] If there are too many boatmen, the boat goes to a mountain. This is a Korean proverb that has the same meaning as 'Too many cooks spoil the broth'.

complaints (INT16). For example, in the case of Amsa-dong, there was an attempt to open a small park located within the urban regeneration area to provide a green space for residents due to a lack of green spaces. However, there were too many complaints from residents near the park that if it were opened it would be used as a place for homeless people to stay or for teenagers to smoke. Ultimately, the park was not opened (INT31). When residents' awareness of climate change is low, the most efficient way to integrate climate change projects into urban regeneration is to require legal regulations or a strong policy will from the central and city governments (INT16). Urban regeneration stakeholders at city and community levels argue:

> We need some change to the direction in the direction of national policy that allows us to meet eco-friendly standards to some extent when we build anchor facilities. Who can decide this? We can't. How would officials in cities and community governments do it while listening to the opposition of the residents?... It should be compulsory. It's better to say, "You have to follow this to be able to have urban regeneration funding." With this method, there is no more rejection (INT16).

> Rather than gathering opinions, I just think, for example, that this [the integration of climate measures into urban regeneration projects] should be legally manualised. When doing an urban regeneration project, for example, how much public benefit will there be? I think it should be legislated first. If you want to do this through negotiation, every decision has to be approved by over a certain percentage of the residents. This is not possible. Among them, some people disagree, and those who form a strong public opinion that we should gather together in opposition. So, since this is impossible, I think that when it comes to urban regeneration in Seoul, it should be made a legal requirement which is then imposed by law enforcement (INT25).

Alternately, in Sangdo 4-dong and Jangwi-dong, there were opportunities and contexts for resident participation and awareness improvement, which contributed to the increase of sympathy and understanding of climate measures in urban regeneration.

Sangdo 4-dong shows that the high interest of residents' can increase the level of climate measures included in urban regeneration projects. Residents in Sangdo 4-dong who have been working toward the energy transition of the community have played a significant role in incorporating environmental objectives and projects in the urban regeneration revitalisation plan (INT13). The community leader of the Energy-Independent Village Project was in charge of the Green Department in the residents' council of urban regeneration, and the department played a vital role in publicising climate change issues and measures to the residents (INT41; INT42). Although most residents in Sangdo 4-dong still lack awareness of climate change issues, the department acted to increase the level of it (INT41; INT42).

Some residents of Jangwi-dong actively engaged in climate change-related projects by connecting them to 'The Resident Public Offering Project'.[50] Understanding and awareness of climate change-related projects were high due to existing policies such as the rainwater management policy in Seongbuk-gu.

Jangwi-dong tried to collect opinions from residents more than other communities and put a lot of effort into public relations to improve awareness of the environment and urban regeneration (INT43; INT49). Considering the improvement of environmental awareness as the most important objective, the urban regeneration on-site support centre made lots of effort to achieve it, such as holding workshops and distributing promotional materials (INT47). Also, it was the only project area to have a village vote for project selection when formulating the urban regeneration revitalisation plan (INT43).

It is said that the reason that climate-related activities are operating in Jangwi-dong is that rainwater collecting and gardening are activities that are repeated every day in the daily life of the residents, so these activities can make them constantly aware of the environment. If climate change activities are one-time events, the interest of the residents would be easily lost, but continuous activities can be an important part of raising awareness (INT47).

Such resident participation and efforts to improve resident awareness were shown in a community gathering called 'Descendants of the Sun' in Jangwi-dong. This group continues its activities, such as making eco-friendly products and educating elementary school students through after-school activities after two years of involvement in the Energy-Independent Village Project (INT47; INT49). A few residents who first gathered in the form of a resident's council developed personal skills and knowledge as they received environmental and resident leadership education through the urban regeneration project (INT46; INT49). There are about 20 to 30 residents involved in Jangwi-dong eco-friendly activities, energy-independence village activities, Descendants of the Sun group activities, and gardening. Although it is a very small group of the community, the group hopes participation will grow to include more residents (INT47).

<u>Pecuniary matters of residents</u>

This factor is frequently mentioned by urban regeneration stakeholders at community levels and by residents. It is challenging to integrate the different opinions of residents in urban regeneration areas while making important decisions throughout the process of urban regeneration. During many meetings of urban regeneration projects, residents tend toward egoism, the NIMBY (Not In

[50] The Resident Public Offering Project is a project in which Seoul recruits and selects residents who carry out specific projects and subsidises the project costs.

My Back Yard) phenomenon, or a high level of interest in their own benefits (INT9; INT16; INT25). In particular, residents of urban regeneration areas find difficulty welcoming projects related to the public interest, such as climate change. This aspect is the second most highlighted barrier among external factors to the integration of climate measures in urban regeneration projects during the policy implementation stage. A total of 26 urban regeneration stakeholders at national, city, and community levels emphasised this factor. For residents, the goals to achieve in urban regeneration projects are those that focus on individual benefits such as the increase in property values. What residents want is the improvement of the old built environment (specifically parking). Residents expect that housing prices will increase due to improvements in the physical environment through urban regeneration projects (INT44; INT23). Usually, at the first urban regeneration briefing session, many residents attend and try to determine if there are any individual benefits to them. However, many do not attend it anymore when they find out there will be no personal benefit from any development to the environment of their properties. A resident who participated in the process of urban regeneration plan in Garibong-dong argues:

> Even during public hearings, every person talked about potential personal benefits. For example, if my house is here, I ask them to develop here. It's not like we're talking about a place that everyone uses (INT26).

In particular, Garibong-dong's residents had high expectations for property value increase and financial gain through urban regeneration because they had to do it as an alternative to a new town development (INT26; INT25; INT27). Therefore, it seems that they did not pay much attention to activities for the public interest due to their perception of it as unprofitable in Garibong-dong. A resident who participated in the process of urban regeneration plan in Garibong-dong states:

> Landlords want redevelopment to happen quickly, but Seoul Housing Corporation or the Land and Housing Corporation gave up the urban redevelopment project here because of its financial infeasibility. People who live here will have to be pushed to the outskirts when the urban redevelopment happens, and people who are in favour of redevelopment are trying to make more money by raising their buildings a little higher. So now, when it comes to urban regeneration, people don't think about the public benefit or anything like that, but they're all focused on how they're going to increase their private property (INT25).

Landlords' interest in property values had a negative impact on the Caring Housing project in Amsa-dong. Gandong-gu government adopted a so-called 'win-win agreement' which made three parties, landlords, tenants, and Gandong-gu, agree that rent would be fixed for the next three years after the housing repairing project is completed. The purpose of the agreement is to protect tenants from an increase in rent and at the same time improve the condition of the houses. It is

reported that the Caring Housing project in Amsa-dong is not active because of objections to this 'win-win agreement' (INT29).

The residents' interest in pecuniary benefits is not limited only to property values. It has been reported that participation in urban regeneration activities is low if no financial support or money is given, and if there is support but no support is given due to the end of the project, there is no longer any gathering (INT33; INT38; INT42).

Moreover, it is argued that participation in adopting climate measures in urban regeneration is low because residents have to pay for the installation of climate-related facilities. Although urban regeneration is a support project from the government, facilities/money cannot be provided free of charge to individuals. To adopt climate-related projects (e.g. gardening, solar panel installation, energy-saving repairs of housing) into privately owned buildings, residents still have to pay some of the project costs, making residents less likely to apply for the subsidies (INT6; INT30; INT32; INT37; INT42; INT43). An urban regeneration stakeholder at community level argues:

> If they have a budgetary burden and there's no benefit to them, they don't participate. About the installation of solar panels, if it is obligatory to install them without [governments] supporting any cost [of the installation of solar panels], few people will install them. Honestly, there is no one. However, if this is installed and they can feel that the real electricity saving effect is huge, then residents are going to install them (INT45).

7.2.2 Characterisation of the problem at hand

<u>Lack of facilities and spaces to adopt climate measures</u>

It is reported that there is not enough space to install facilities to respond to climate change through urban regeneration, because the density of buildings is high in residential areas which are designated for urban regeneration (INT19). Although urban regeneration can improve deteriorated built environments in existing residential spaces and introduce climate measures, there are limitations in planning new spaces as a response to climate change (INT19). In Garibong-dong, it is reported that there is no leftover land to plant a tree (INT26).

Integrating climate measures in urban regeneration areas is more difficult than planning climate change mitigation and adaptation goals in new urban development (INT1; INT13). For example, installing solar panels requires related infrastructures. Areas with new urban development can provide some spaces in existing utility-pipe conduits easily without taking up extra space. On the other hand, the distribution boards needed to install solar panels in urban regeneration areas that have no utility-pipe conduits require greater space (INT13). There are not enough climate measure options that can be applied to old residential areas (INT2).

In Seoul, the population density is high and the infrastructure is ill-equipped, so there is not enough space to install solar panels. For these reasons, Seoul Metropolitan Government is operating a 'solar citizen expedition' programme[51] that finds spaces where solar panels can be installed, mainly in public sites (INT11). In urban regeneration areas, the only place where solar panels can be installed is on the rooftops of residential buildings. However, the residents who have rooftops usually prefer to use the space as storage or something else rather than using the space for the installation of solar panels (INT16; INT29). In Amsa-dong, the participation of residents in installing solar panels in individual households was not high. One of the obstacles was the use of rooftop space (INT30; INT29). Also, there is a rooftop space for the anchor facility, so when installing solar panels in the building, residents argued that it would be preferable to have a space with an open roof. Moreover, it is said that they did not install a solar panel on the roof because the building was not suitable to support the weight of solar panels (INT31; INT35). An interviewee working in the urban regeneration on-site support centre in Amsa-dong states:

> There was a bit of discussion on whether to install solar panels on the rooftop of the anchor facility… There was a consultative body for each project, where residents who were interested in the project were gathered. The anchor facility business consultative body gathers mainly people who are interested in operating anchor facilities, and they discuss what and how to install anchor facilities and how to use them. The residents said 'I just wish the rooftop was an open space'. There were many such desires, so solar panels were not installed on the rooftop (INT31).

The biggest problem with solar installation is that an old house cannot withstand the load of the panel and it is not easy to manage after urban regeneration projects are completed. There are also safety concerns if the panel falls or breaks. One community tried to install the solar panel on the rooftop of the anchor facility, but it is said that the building was so old and weak it could not be installed.

<u>Fear of absence of government financial support on climate facilities after the project</u>

Since urban regeneration is the pump-priming project, there is government support during the project periods. After that, the residents manage solar panels, rainwater collectors, and vegetable gardens that are supported by their own initiative. However, it was reported by stakeholders in Amsa-dong and Jangwi-dong that climate-related projects did not continue because they were often poorly managed and lacked support.

In particular, a solar panel is known to be difficult to maintain, so residents often hesitate to install it because of the burden of waste or maintenance after the initial support from the government is

[51] A solar panel expedition programme is a programme in which Seoul citizens look for spaces to install solar panels.

over (INT13; INT29; INT32; INT46). Also, although Amsa-dong once provided rooftop vegetable gardens to the residents as urban regeneration projects, it did not continue because of poor management of the gardens by residents (INT32).

To overcome such difficulties, Jangwi-dong did not end up installing a rainwater collector but thought about how to utilise it and connect it with other elements to continue the project (INT45). An urban regeneration stakeholder in Jangwi-dong states:

> When it comes to a rainwater collector, it is not just a matter of putting them in, but it is also a matter of how to use them. It is not the end just because it collects rainwater, but the rainwater collected from the rainwater collector should be used for other activities such as urban agriculture, gardening, etc. There might be people who received rainwater, but later do not use it. Thus, we educated them on where to use it, and inform them that there are such options (INT45).

7.2.3 Lack of private sector support

As discussed in Section 6.2.2, there is an absence of private sector support in urban regeneration policies. Urban regeneration is highly driven by the public sector in Seoul. It is argued that the participation of the private sector is crucial to making urban regeneration more sustainable in the long run. There is little involvement of the private sector in urban regeneration projects at community levels. One of the main purposes of the urban regeneration revitalisation plan is to establish a Community Regeneration Corporation after the completion of urban regeneration projects.

As the involvement of the private sector is rare in urban regeneration projects, the lack of private sector support for the integration of climate measures in urban regeneration projects does not seem to be highlighted by the stakeholders of urban regeneration. However, the lack of involvement of businesses and companies in urban regeneration projects in Korea is criticised and the public promotes the participation of residents and businesses (INT17).

Although the four communities all established a Community Regeneration Corporation after the completion of urban regeneration projects, the main visions and business of the corporations are nothing to do with climate change issues or measures.

7.2.4 Cognitive factors

<u>Divergent priorities</u>

One of the important external factors in the policy implementation stage is that the priorities of residents living in urban regeneration areas do not include climate change issues. This factor is directly related to public awareness and support. The reason why residents lack awareness of

climate change and there is a lack of support is that climate change issues are not considered an important priority of urban regeneration. This aspect also affects the internal cognitive factor—e.g. divergent priority at the community government and urban regeneration support centre—in the policy implementation stage. Stakeholders who design the urban regeneration revitalisation plan find local problems by gathering residents' opinions. Since climate change issues were rarely addressed by residents in urban regeneration areas, it is difficult to integrate climate measures in urban regeneration revitalisation plans. Within the limited budget of urban regeneration projects, prioritised projects that the residents would prefer to focus on include issues of a lack of car parks, waste disposals, and safety from crimes. None are related to climate change issues (INT5; INT6; INT13; INT16).

In the process of establishing an urban regeneration revitalisation plan, all urban regeneration areas go through a process of collecting residents' opinions. Their demands for their neighbourhoods through urban regeneration are presented in Table 7-6.

Table 7-6 Prioritised issues in the four urban regeneration areas

Community	Prioritised issues
Garibong-dong	• Physical decline (restrictions on development activities and new construction, deterioration of residential environment) • Poor living infrastructure (poor road conditions, absence of dong-office) • Demographic and social decline (continuous decrease in residents, increase in basic recipients and the elderly) • Increased inflow of Chinese people (38.5 percent of Garibong population, conflict among residents due to cultural differences) (Source: Garibong-dong Urban Regeneration Revitalisation Plan)
Amsa-dong	• Community (expansion of shared facilities, operation of educational and cultural programmes) • History and culture (improving access to prehistoric sites) • Economy (strengthening competitiveness in Amsa market) • Environmental improvement (expansion of safety facilities from crime) • Infrastructure (roads, shared car parks) (Source: Amsa-dong Urban Regeneration Revitalisation Plan)
Jangwi-dong	• Maintenance of pedestrian environments such as alleyways • Improvement of deteriorated buildings • Convenience facilities for residents • Local economy revitalisation • Energy saving • Community programme development

	• Cultural space installation (Source: Jangwi-dong Urban Regeneration Revitalisation Plan)
Sangdo 4-dong	• Car park installation • Children's facilities and safety alleys from crime • Expansion of parks and open spaces • Security enhancement • Waste problem resolution • Revitalisation of the alley market • Reinforcement of retaining wall safety (Source: Sangdo 4-dong Urban Regeneration Revitalisation Plan)

Source: own compilation based on Seoul Metropolitan Government (2017b, 2017a); Seoul Metropolitan Government and Dongjak-gu (2017); Seoul Metropolitan Government and Gangdong-gu (2017)

This is similar to the situation not only in general residential areas in Seoul but also in general residential areas across the country. Stakeholders who set up national urban regeneration policies also argued that most complaints from the residents in urban regeneration areas referred to a lack of car parks and garbage disposals (INT5). The important things for residents in urban regeneration areas in the country are related to projects for the improvement of the physical environment in front of their houses (INT5; INT7; INT9). An interviewee who is involved in the national urban regeneration policy states:

> I wonder if climate change topics would be such a welcome agenda from the point of view of community residents. From their point of view, it would be good for my house to get better right away, and it would be good if I didn't have to pay for it. They prioritise economic logic in a broader sense (INT6).

7.3 RELEVANT FACTORS AND GAPS REGARDING FACTORS IN THE CONCEPTUAL FRAMEWORK

Sections 7.1 and 7.2 explained descriptions of internal and external factors in the policy implementation. This section identifies relevant factors and gaps regarding factors of the climate policy integration in the conceptual framework. It also discusses implementation gaps between policy development and policy implementation.

The results that are discussed in this section are based on content analysis supplemented by process tracing. The most frequently mentioned factors affecting the integration of climate measures into urban regeneration plans by stakeholders of urban regeneration and climate change policies fall under political factors, organisational factors, resources, and residents' support. The most frequently mentioned drivers fall under political factors, organisational, the

characterisation of problems at hand, and residents' support. The most frequently mentioned barriers come under organisational factors, resources, residents' support, and the characterisation of the problems at hand.

The most frequently highlighted internal factors are: (1) supportive regulatory framework, (2) lack/absence of information about climate measures, (3) expertise (interest in climate issues) of the civil servant of urban regeneration in the community government, (4) governance and cooperation, (5) expertise (interest in climate issues) of the urban regeneration support centre (community level) and master planner, (6) cooperation with climate change departments, and (7) the political support of the mayor of Seoul and general policy direction of the city government. These factors belong to political factors, organisational factors and resources. The most frequently highlighted internal drivers are: (1) the political support of the mayor of Seoul and the general policy direction of the city government, (2) the existence of local features that can be integrated with the urban planning theme, and (3) governance and cooperation. The most frequently highlighted internal barriers are: (1) lack/absence of information about climate measures, (2) supportive regulatory framework, (3) expertise (interest in climate issues) of the civil servant of urban regeneration in the community government, and (4) a supportive regulatory framework.

The most frequently highlighted external factors are: (1) public awareness and support, (2) pecuniary matters of residents, and (3) lack of facilities and spaces to adopt climate measures. The most frequently highlighted external drivers are: (1) public awareness and support and (2) pecuniary matters of residents. The most frequently highlighted external barriers are: (1) pecuniary matters of residents, (2) public awareness and support, and (3) lack of facilities and spaces to adopt climate measures.

By combining results from process tracing and content analysis, the following paragraphs identify the most important factors. This dissertation examined four study areas in Seoul; the level of integration of climate measures in urban regeneration projects of two neighbourhoods is evaluated as harmonisation and the other two neighbourhoods are evaluated as no-integration and coordination (weak integration) based on the criteria of the level of climate policy integration in Roeck, Orbie and Delputte (2018). Investigating factors by categorising drivers and barriers clearly shows what made these neighbourhoods successful or unsuccessful in integrating climate measures in the stage of policy implementation.

<u>Drivers for the integration of climate measures in urban regeneration projects</u>

Evidence of important drivers in policy implementation is shown in the case of Jangwi-dong and Sangdo 4-dong in Seoul. These two neighbourhoods both had important actors that helped to

highlight climate measures in urban regeneration projects: the head of the community government (Seongbuk-gu) for Jangwi-dong's case and the community leader for Sangdo 4-dong's case. Climate measures and activities initiated by these actors were continued and incorporated into urban regeneration projects. To be specific, rainwater management projects in Jangwi-dong, which was one of the main policies of the head of Seongbuk-gu, became one of the characteristics and resources that the neighbourhood already had. These motivated stakeholders and the master planner to set a vision of urban regeneration including an eco-friendly village creation project. In Sangdo 4-dong's case, existing climate activities related to the Energy-Independent Village Project from residents in Sangdo 4-dong became one of the neighbourhood characteristics. The participation of the community leader who initiated the climate activities positively affected the setting of agendas in the urban regeneration revitalisation plan to include climate objectives. The policy direction of the city government and involvement of the Urban Regeneration Headquarters in Seoul Metropolitan Government in setting agendas for urban regeneration revitalisation plans influenced the stakeholders who formulated the plans in Jangwi-dong and Sangdo 4-dong. The subsidies from the city government related to climate measures such as financial support for installing solar-panels, rooftop vegetable gardens, and rainwater collectors played vital roles in the integration of these measures in urban regeneration projects because residents who had an interest in these measures were likely to adopt them with financial support from the government. Good cooperation between stakeholders of urban regeneration plans in these neighbourhoods is one of the important elements that lead to the implementation of measures. As a variety of stakeholders are involved in the whole process of urban regeneration in the neighbourhoods, the leadership of an important actor should be supported by a good level of governance. As shown in Jangwi-dong and Sangdo 4-dong, governance and cooperation among stakeholders were also a positive influence in sustaining the level of integration from the agenda-setting process to the implementation stage. Specifically, residents in Jangwi-dong who participated in the process of urban regeneration have continued their climate activities even after the completion of urban regeneration, which is a good indicator of resident support for urban regeneration. For this cooperation, the urban regeneration on-site support centres in these two neighbourhoods also served to negotiate and meditate conflicts and opinions between the public and private sectors.

From the cases of Jangwi-dong and Sangdo 4-dong, the most relevant internal and external drivers are (1) the political support of the head of community governments (policy direction), (2) the general policy direction of the city government, (3) the existence of local features that can be integrated with the urban planning theme, (4) public awareness and support, (5) pecuniary matters of residents, (6) governance and cooperation among stakeholders, and (7) expertise (interest in climate issues) of the urban regeneration support centre (community level) and master planner.

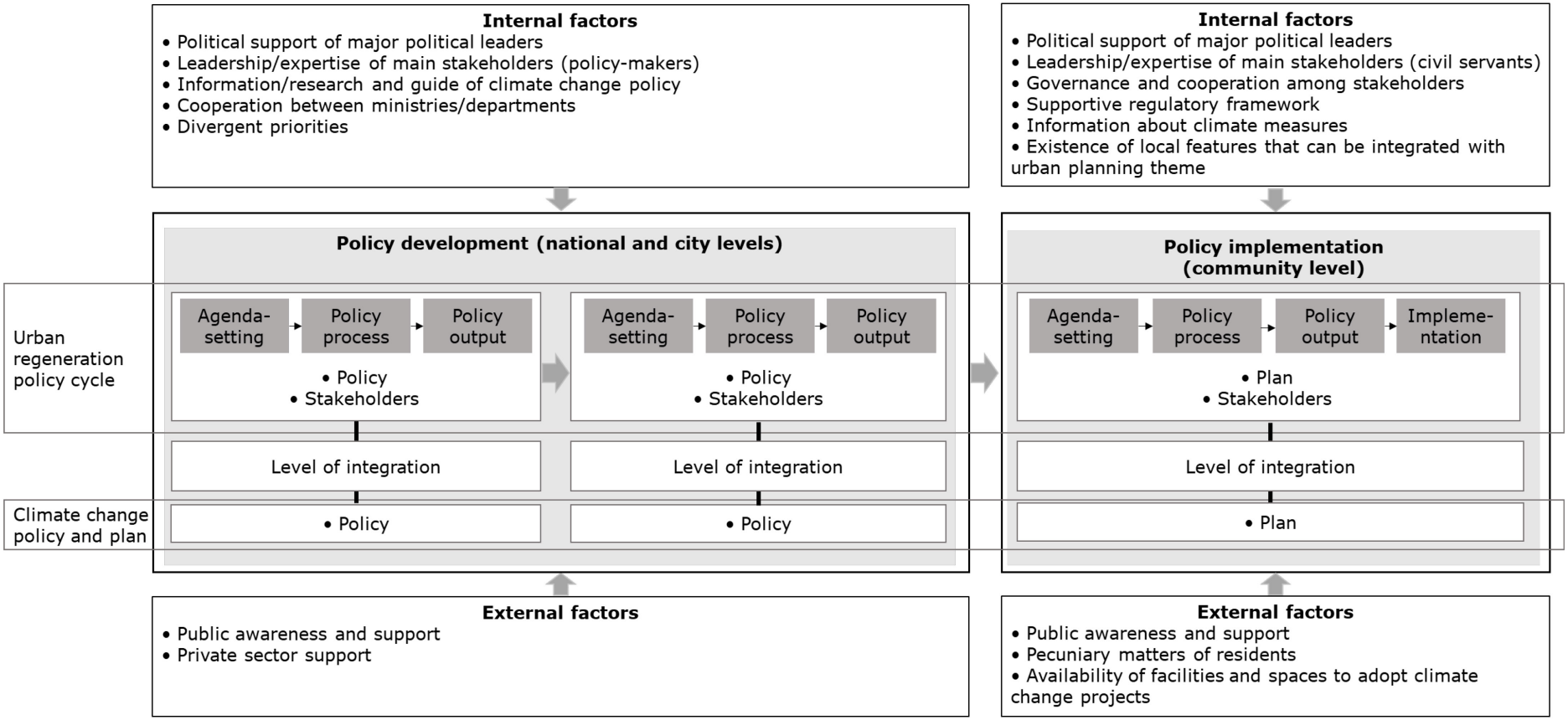
Barriers to the integration of climate measures in urban regeneration projects

The most relevant barriers are found in two neighbourhoods that are evaluated as no-integration in terms of the level of the integration of climate measures in urban regeneration projects. Amsa-dong and Garibong-dong did not have important actors who highlighted climate issues/measures in the process of urban regeneration. In this environment, a variety of aspects were lacking and are regarded as inhibiting factors as discussed in the previous Sections 7.1 and 7.2. In the context of the absence of leadership from important actors, one of the most impactful lacking factors is a supportive regulatory framework. Also, information about climate measures serves as a driving force for the civil servants of the community government to consider the options of climate measures in urban regeneration projects. As urban regeneration projects encounter spatial issues and involve interactions with residents in the policy implementation stage, external factors also influence internal factors. The absence of resident support is the most relevant factor because urban regeneration projects were chosen based on residents' needs in their neighbourhoods. A lack of general public awareness and support for climate measures as well as the pecuniary matters of residents (e.g. the financial burden to adopt climate measures and interest in property values) negatively affect the climate policy integration in urban regeneration projects. In addition, spatial issues such as a lack of facilities and spaces to adopt climate change projects in urban regeneration areas are critical barriers that influenced residents to not consider adopting climate measures in their neighbourhoods.

In summary, the most relevant internal and external barriers are (1) supportive regulatory framework, (2) lack/absence of information about climate measures, (3) expertise (interest in climate issues) of the civil servant of urban regeneration in the community government, (4) public awareness and support, (5) pecuniary matters of residents, and (6) lack of facilities and spaces to adopt climate change projects.

The dissertation proposes a new conceptual framework for climate policy integration in urban regeneration based on the results of this research. This framework contains relevant factors that were investigated in the case of Seoul. It can be utilised in other studies/cities that aim to enhance the level of climate policy integration in urban regeneration by investigating relevant factors in the policy cycle (Figure 7-1).

Figure 7-1 Conceptual framework of climate policy integration in urban regeneration



Source: Own compilation

Gaps regarding factors in the conceptual framework

The dissertation identifies gaps regarding factors in the conceptual framework. As this dissertation investigates climate policy integration specifically in the domain of urban regeneration, different factors are newly suggested in comparison to the study of Runhaar *et al*. (2018). New internal factors in policy implementation that were not included in the conceptual framework are short-termism, a short-term performance-oriented system, expertise of stakeholders (e.g. urban regeneration support centre, master planner, urban planning company), the existence of local features that can be integrated with urban planning theme, and the difficulty of measuring performance/effectiveness of climate measures. New external factors in policy implementation that were not included in the conceptual framework are pecuniary matters of residents and the lack of facilities and spaces to adopt climate change projects. These factors are mostly related to the context of urban regeneration.

7.4 DISCUSSION AND IMPLEMENTATION GAPS BETWEEN POLICY DEVELOPMENT AND POLICY IMPLEMENTATION

This chapter continues to explain internal and external factors for the integration of climate measures in the policy implementation of urban regeneration. This follows Chapter 6 which investigates internal and external factors in the policy development of urban regeneration. Similar to the policy development stage, internal factors in the policy implementation stage are separated into five categories: political factors, organisational factors, resources, cognitive factors, and the characterisation of problems/opportunities at hand. Political factors consist of the political support of the mayor of Seoul, the general policy direction of the city government, and the political support of the head of community governments (policy direction). Organisational factors include the supportive regulatory framework, expertise (interest in climate issues) of the civil servant of urban regeneration in the community government, governance and cooperation among stakeholders, cooperation with climate change departments, and short-termism, a short-term performance-oriented system. Resources include the lack/absence of information about climate measures, expertise (interest in climate issues) of the urban regeneration support centre (community level) and master planner, budgets and resources, the urban planning company hired by the government, and expertise (interest in climate issues) of the urban regeneration support centre (city level). The only cognitive factor is divergent priorities (at the community government and urban regeneration support centre). The characterisation of problems/opportunities at hand consists of the existence of local features that can be integrated with urban planning theme, the difficulty of measuring the performance/effectiveness of climate measures, overlapping objectives for climate change and urban regeneration projects, the existence of local features that can be integrated with urban planning theme, the difficulty to adopt additional projects on the

already planned urban regeneration projects, and the inability to regulate private property (e.g. buildings).

External factors in the policy implementation are more detailed in comparison to policy development as urban regeneration at a community level involves a variety of interactions with residents. Thus, external factors are categorised into residents' support, the characterisation of problems at hand, a lack of private sector support, and cognitive factors. Residents' support includes public awareness and support and the pecuniary matters of residents. The characterisation of problems at hand includes the lack of facilities and spaces to adopt climate change projects and a fear of the absence of government financial support for climate facilities after the project. The lack of private sector support is the only private sector. There is also only one cognitive factor, divergent priorities.

After the examination of detailed internal and external factors, Section 7.3 identified the most important drivers and barriers in policy implementation by combining results from content analysis and process tracing. The most significant internal and external drivers are (1) the political support of the head of community governments (policy direction), (2) the general policy direction of the city government, (3) the existence of local features that can be integrated with urban planning theme, (4) public awareness and support, (5) the pecuniary matters of residents, (6) governance and cooperation among stakeholders, and (7) expertise (interest in climate issues) of the urban regeneration support centre (community level) and master planner. The most relevant internal and external barriers are (1) the supportive regulatory framework, (2) the lack/absence of information about climate measures, (3) expertise (interest in climate issues) of the civil servant of urban regeneration in the community government, (4) public awareness and support, (5) the pecuniary matters of residents, and a lack of facilities and spaces to adopt climate change projects.

Identification of factors by their characteristic (driver and barrier) helps achieve a deeper comprehension of the situation. Similar to the policy development stage, political support is the most significant enabling factor in policy implementation. A combination of different enabling internal and external factors affects the integration of climate measures in urban regeneration projects in the neighbourhoods. It is noteworthy that aspects not only inside organisational factors but also outside of them come into play in the policy implementation (political support of major political leaders, the characterisation of opportunities at hand, public awareness and support, and the pecuniary matters of residents). On the other hand, as discussed in Section 6.3, components mostly under political factors and organisational factors are evaluated as the most significant drivers in the policy development stage. In other words, the empirical case of Seoul

demonstrates that climate policy integration can be driven by political factors and organisational factors during the policy development stage of urban regeneration. However, there are also opportunities to increase the level of integration of climate measures in urban regeneration projects in neighbourhoods with other strong driving forces such as the leadership of important actors (the head of community government or community leader) or pecuniary benefits for residents in adopting climate measures. These opportunities should be reinforced by public awareness and support, good governance and cooperation among stakeholders, and the expertise of stakeholders (the urban regeneration on-site support centre and master planner).

There were implementation gaps between the policy development and policy implementation stages. Whereas national and city governments pursued the integration of climate objectives/measures in urban regeneration policies and plans, most urban regeneration areas do not consider climate measures. These implementation gaps resulted from both enabling and inhibiting factors in the policy implementation of urban regeneration. The four neighbourhoods (two good practices of the integration among urban regeneration areas and two no-integration practices) in Seoul show critical factors that resulted in the occurrence of implementation gaps related to internal factors (political factors, organisational factors, and resources) and external factors (residents' support and the characterisation of problems/opportunities at hand). The table below presents the relevant factors that affected implementation gaps. These factors are selected based on the most relevant drivers and barriers in the policy implementation stage. The list does not include some drivers that serve as support for the main drivers to continue to be implemented successfully. For example, political support is evaluated as the most important driver and included in the list of factors that affect the implementation gaps, since the absence of this driver can be referred to as an important barrier. However, two drivers, the general policy direction of the city government and the existence of local features that can be integrated with the urban planning theme, are not included in the list of factors that lead to implementation gaps (see Table 7-7).

Table 7-7 Factors that affect gaps between policy development and policy implementation

Internal factors	Political factor	Political support of the community government
	Organisational factor	Supportive regulatory framework
		Expertise of the civil servant in the community government
		governance and cooperation among stakeholders
	Resource	Expertise of stakeholders (the urban regeneration support centre and master planner)
		lack/absence of information about climate measures

External factors	Residents' support	Public awareness and support
		Pecuniary matters of residents
	Characterisation of problems at hand	Lack of facilities and spaces to adopt climate change projects.

Source: own compilation

The empirical evidence of Seoul's urban regeneration shows that a variety of internal and external factors—especially those that fall under political factors, organisational factors, resources, residents' support, and the characterisation of the problem at hand—impact the gaps in implementing climate objectives and measures through urban regeneration projects. In other words, the implementation gap of climate policy integration resulted from these factors. Runhaar *et al*. (2018) argue that the implementation gap of climate policy integration resulted from a lack of sustained political commitment from higher levels and the lack of cooperation between key stakeholders. In addition, it further argues that the implementation gap is not closely related to a lack of knowledge or financial sources. However, the empirical evidence from Seoul shows that the lack/absence of information about climate measures and financial resources is one of the most critical factors related to the implementation gap. The dissertation conforms to other relevant factors that are highlighted by Runhaar *et al*. (2018), such as political will, cooperation between departments as well as between key stakeholders, and leadership. However, the factor of 'focusing events', which is one of the most highlighted enabling factors, is not relevant in this dissertation. Although stakeholders and policymakers of urban regeneration are aware of climate events, it is not found that these events affected attempts at climate policy integration in urban regeneration.

8 CONCLUSIONS: RECOMMENDATIONS TO ENHANCE THE LEVEL OF INTEGRATION OF CLIMATE MEASURES INTO URBAN REGENERATION

This chapter synthesises the previous chapters of this dissertation. It then discusses the limitations of the research and makes suggestions for further research related to the topic. This dissertation aims to contribute not only to the wider academic discussion but also to practical applications. Discussion of the implications and suggestions for both academic discussions and practice help to elaborate on the contribution of this dissertation.

8.1 SYNTHESIS OF THE DISSERTATION

Urban regeneration policy in Seoul pursues the integration of different sectors of policy. The integration of climate measures into urban regeneration policy provides opportunities to increase the effectiveness of both policies. Several studies already acknowledge the wide range of opportunities possible from the successful integration of climate policy into urban regeneration. They highlight that urban regeneration can contribute to climate change mitigation and adaptation, as well as increase the climate resilience of urban areas. For example, using abandoned land in inner cities and existing building stock for urban regeneration projects promotes compact urban forms which contribute to climate mitigation. In addition, urban regeneration measures such as retrofitting existing buildings with climate-friendly solutions, creating green spaces, and constructing green infrastructure and buildings, can be an opportunity for climate change policy to be implemented effectively. Many countries and cities have seized these opportunities and contributed to a growing international trend of integrating climate measures into urban regeneration policy and planning. Currently, one of the top policy agendas of the national government of the Republic of Korea is urban regeneration policy, and the government has put a significant amount of public funds into urban regeneration policy and projects nationwide. Although both the government and researchers in Korea have acknowledged the necessity of incorporating climate change measures in urban regeneration policy, this has yet to be fully realised.

To increase the level of climate policy integration in urban regeneration policy, it is necessary to investigate the internal and external factors that affect the integration of climate measures in urban regeneration policy and planning. However, there is still a lack of empirical evidence for these factors, which has driven the hypothesis of the research question, 'How do factors affect the integration of climate measures into urban regeneration in Seoul?'

This dissertation has explored the theoretical concepts of different responses to climate change, urban regeneration, and climate policy integration. Several international trends and academic discussions of the integration of climate measures into urban regeneration have been discussed. The main conceptual framework of this dissertation was developed based on three conceptual bases. The main conceptual basis of this dissertation is presented in the study of Persson and Runhaar (2018) which provides the structure of the framework. The framework is suitable for this study, as it investigates internal and external factors at different stages of policy (policy development and policy implementation). As the framework is rather simplified in terms of the list of factors presented and the division of the policy cycle, the dissertation adopted a list of detailed factors for climate policy integration in environmental and non-environmental policy sectors from Runhaar *et al*. (2018) and detailed policy cycles of climate policy integration from Roeck, Orbie and Delputte (2018). Although the conceptual framework provides a strong foundation for the dissertation, there are still research gaps regarding factors such as the existing studies of climate policy integration focusing mainly on internal factors. There are also limited studies about the implementation gaps between policy development and policy implementation stages. These theoretical and conceptual backgrounds let the dissertation formulate more detailed research questions.

The dissertation adopted a qualitative case study approach. The main data for the study came from 50 semi-structured interviews with stakeholder representatives from urban regeneration policy, planning, and projects, supplemented by documents obtained on-site and online. It adopted three different analyses—content analysis, process tracing, and document analysis—to increase the credibility of the results. Chapter three described detailed research design and methods. The case study area is Seoul—a city that has actively implemented urban regeneration policy and climate change policy for many years; this is the rationale for the examination of the process of urban regeneration and factors of climate policy integration in Seoul. Four neighbourhoods in Seoul were examined. Chapter four explored the context, features of Seoul, and the four study areas in Seoul—Jangwi-dong, Sangdo 4-dong, Amsa-dong, and Garibong-dong.

The following paragraphs summarise the empirical results which are organised by sub-research questions discussed in Chapters 5, 6, and 7 of this dissertation.

<u>Research question 1: What is the existing urban regeneration process and how does it incorporate climate measures in Korea?</u>

There are different stages of urban regeneration. In general, three different levels of government are involved in the process. The national government (Ministry of Land, Infrastructure and Transport) established the Special Act on Promotion of and Support for Urban Regeneration, Basic

Policy for National Urban Regeneration, Guidelines for the Formulation of Strategic Plans for Urban Regeneration, and Guidelines for the Formulation of Neighbourhood Regeneration Revitalisation Plans. Complying with the national policy, Seoul Metropolitan Government (Urban Regeneration Headquarters) established a Strategic Plan for Urban Regeneration. Both national and city governments actively designated urban regeneration revitalisation areas in Korea. In Seoul, eight pilot urban regeneration areas were designated. The dissertation chose four areas (neighbourhoods) as study areas. The four community governments (Seongbuk-gu, Dongjak-gu, Gangdong-gu, and Guro-gu) that the selected neighbourhoods belong to established urban regeneration revitalisation plans. This dissertation investigated detailed policy cycles of these different levels of government and stakeholders who were involved in each stage. The policy cycle of development for urban regeneration policy at national and city levels consists of agenda-setting, policy process, and policy output. The policy cycle of implementation for urban regeneration policy at community level consists of agenda-setting, policy process, policy output, and implementation. Chapter 5 described the process of urban regeneration policy and plan at national, city, and community levels and stakeholders (see Section 5.1). It then introduced climate change policy at different levels of government (see Section 5.2).

The hypothesis behind the question of the level of integration of climate measures in urban regeneration was that it rarely considers climate measures in urban regeneration policy, planning, and projects. However, examination of document analysis, process tracing, and semi-structured interviews have enabled the finding of different levels of integration efforts in the process of urban regeneration policy. Based on the framework of Roeck, Orbie and Delputte (2018), this dissertation has evaluated the level of integration of climate measures in urban regeneration and has classified levels as 'no integration', 'coordination', 'harmonisation', and 'prioritisation' based on the criteria of the level of climate policy integration in Roeck, Orbie and Delputte (2018). Policy development of urban regeneration at national and city levels has been evaluated as 'coordination' throughout the whole policy cycle, except for the policy process stage of urban regeneration policy at city level (no integration). In the policy implementation stage, two neighbourhoods demonstrated 'harmonisation' and two neighbourhoods displayed no integration, although these 'no integration' practices did demonstrate coordination at the end of the implementation stage. The evaluation of the level of integration of climate measures in the urban regeneration process was described in Section 5.3.

Research questions 2 and 3: Which are the relevant internal and external factors for integrating climate measures in urban regeneration policy and plans?

Chapters 6 and 7 have discussed detailed relevant internal and external factors for the integration of climate measures in urban regeneration during policy development and policy implementation stages. The hypothesis of these two research questions was developed based on the frameworks of Persson and Runhaar (2018) and Runhaar *et al*. (2018). To be specific, the factors listed in the study of Runhaar *et al*. (2018) helped to formulate a hypothesis about relevant factors (see Section 2.5.2). The empirical results of this dissertation have demonstrated that internal and external factors from the study conform to many factors that have already been presented in the existing studies. Relevant internal factors from the empirical results consist of five categories—political factors, organisational factors, resources, cognitive factors, and the characterisation of the problem at hand. Some factors in these categories are relevant in both the policy development and policy implementation stages. Common factors observed in both the policy development and implementation stages are political support, cooperation with other sectors/departments, leadership/expertise of civil servants, supportive regulatory framework, different levels of policy hierarchy between sectors, information, guidance and research, budgets and resources, the expertise of key stakeholders, divergent priorities, and different objectives between sectors. These are also highlighted in existing studies of climate policy integration. However, some internal factors are only found in particular policy cycles. In regard to organisational factors, in the policy development stage, a high turnover of civil servants is a relevant factor, as this factor hinders the continuity of developing the concept of climate policy integration based on the expertise of the civil servant. In the policy implementation stage, short-termism is a relevant factor. Firstly, it inhibits the stakeholders of urban regeneration to consider incorporating climate measures, which require longer-term implementation, and secondly, discussions and negotiations between key stakeholders of urban regeneration. There are many relevant internal factors under the category of characterisation of the problem at hand in policy implementation, that are not found in policy development (see Table 8-1).

Table 8-1 Relevant internal factors in policy development and policy implementation

Internal factors		
Policy development	Policy implementation	Common
Political factors		
· Political support of major political leaders	· Political support of major political leaders	√

Organisational factors		
· Cooperation with other sectors/departments · Leadership/expertise of the civil servant · Supportive regulatory framework · Different levels of policy hierarchy between sectors · High turnover of civil servants	· Cooperation with other sectors/departments · Leadership/expertise of the civil servant · Supportive regulatory framework · Different levels of policy hierarchy between sectors · Short-termism, short-term performance-oriented system	√ √ √ √
Resources		
· Information, guide and research · Budgets and resources · Expertise of key stakeholders	· Information, guide and research · Budgets and resources · Expertise of key stakeholders	√ √ √
Cognitive factors		
· Divergent priorities · Uncertainty of effectiveness/performance of climate measures	· Divergent priorities	√
Characterisation of the problem at hand		
· Different objectives between sectors · Different timescale	· Different objectives between sectors · Existence of local features that can be integrated with urban planning theme · Difficulty of measuring performance/effectiveness of climate measures · Difficulty in adopting additional projects into urban regeneration projects which have already been planned · Inability to regulate private property (e.g. buildings)	√

Source: own compilation

There is a lack of empirical evidence about external factors from existing studies. The most commonly highlighted external factors in the field of climate policy integration are public awareness and support and private sector support. These two factors are also found in this dissertation and are both relevant for policy development and policy implementation. However, other factors are relevant only for policy implementation. One of the main reasons that this dissertation investigated multiple factors as external factors impacting policy implementation, is that the implementation of urban regeneration policy involves interactions between the public

and private sectors, as well as a lack of space in neighbourhoods. Most of the external factors in policy implementation are related to barriers that cause a decrease in awareness and support from the public and private sectors (Table 8-2).

Table 8-2 Relevant external factors in policy development and policy implementation.

External factors		
Policy development	Policy implementation	Common
· Public awareness and support · Private sector support	· Public awareness and support · Private sector support · Pecuniary matters of residents · Lack of facilities and spaces to adopt climate change projects · Fear of an absence of governmental financial support on climate facilities after project completion · Divergent priorities	√ √

Source: own compilation

<u>Research question 4: Which are the most important factors and gaps regarding factors in the conceptual framework of policy development, and what are the implementation gaps of the integration of climate measures in urban regeneration projects?</u>

The hypothesis regarding this research question was that there are additional factors that are not highlighted in existing studies. Specifically, the lack of studies on climate policy integration in the urban regeneration sector influenced this dissertation to explore additional internal and external factors that affect climate policy integration. Also, as there is a lack of study on this topic, the dissertation aimed to find empirical evidence which contributes to the existing academic discussion of climate policy integration and urban regeneration. The most important internal and external factors have been discussed in Section 6.3 and Section 7.3. The empirical results of this dissertation hypothesise the key factors for policy development are political support, leadership/expertise of the civil servants involved in urban regeneration, information and guidance on climate change policy, lack of relevant research, cooperation between departments, divergent priorities, and lack of public awareness and support (Section 6.3). Although these factors are also significant factors in policy implementation, identified factors in policy implementation show slightly different aspects. As discussed in Section 7.3, the lack/absence of information on climate measures and supportive regulatory framework were highlighted as more critical factors in the policy implementation stage. In addition, external factors such as pecuniary matters of residents and spatial matters (lack of facilities and spaces to adopt climate change projects) were significant factors in policy implementation.

There were gaps regarding factors from the conceptual framework. In policy development of urban regeneration, geographical focus, which is highlighted in the conceptual framework, is not relevant in the context of Seoul. In addition, the factor of high turnover of civil servants leading to a lack of continuity was relevant in the empirical results. In policy implementation of urban regeneration, new internal factors of policy implementation that were not included in the conceptual framework are short-termism, the expertise of stakeholders, the existence of local features that can be integrated with the urban planning theme, and the difficulty of measuring performance/effectiveness of climate measures. New external factors in policy implementation that were not included in the conceptual framework are pecuniary matters of residents and a lack of facilities and spaces to adopt climate change projects. It can be argued that these gaps resulted from a lack of relevant studies, especially on the external factors of climate policy integration and the examination of the urban regeneration sector for the study of climate policy integration.

Four study areas have commonality and differences in terms of factors that affected the (dis)integration of climate measures into urban regeneration projects. All four neighbourhoods share inhibiting factors to integrating climate measures in their urban regeneration revitalisation plans, such as the absence of a supportive regulatory framework, information about climate measures, the absence of resident support, the pecuniary matters of residents, and a lack of facilities and spaces to adopt climate change projects in urban regeneration areas. A primary difference between the four neighbourhoods is the leadership of important actors that helped to highlight climate measures in urban regeneration projects: the head of the community government (Seongbuk-gu) for Jangwi-dong's case and the community leader for Sangdo 4-dong's case. The existence of these actors influenced the integration of climate measures and activities in formulating urban regeneration revitalisation plans in Jangwi-dong and Sangdo 4-dong. Amsa-dong and Garibong-dong, on the other hand, did not have important actors who highlighted climate issues/measures in the process of urban regeneration. The level of cooperation between stakeholders is also an important aspect that influenced the level of integration of climate policy integration in four neighbourhoods' urban regeneration. As shown in Jangwi-dong and Sangdo 4-dong, governance and cooperation among stakeholders (e.g. civil servants, residents, and urban regeneration on-site support centres) was also a positive influence in sustaining the level of integration from the agenda-setting process to the implementation stage. On the other hand, the case of Amsa-dong and Garibong-dong presents that the stakeholders of urban regeneration are either not interested in participating in urban regeneration projects (Amsa-dong) or having severe conflicts on the agendas of urban regeneration projects between stakeholders (Garibong-dong).

Section 7.4 discussed the implementation gaps between policy development and policy implementation of climate policy integration into urban regeneration. Both internal and external factors play significant roles which impact the implementation gaps. The gaps are mostly related to the political support of the community government, supportive regulatory framework, the expertise of the key stakeholders, cooperation among key stakeholders, lack of information, public awareness and support, pecuniary matters of residents, and lack of facilities and spaces to adopt climate change projects.

8.2 LIMITATIONS OF THE RESEARCH AND FURTHER RESEARCH

This dissertation has been impacted by several limitations, including data limitation, the problem of generalisation, and a limited perspective from the climate change sector.

Data limitation

The results obtained from the combination of content analysis, document analysis, and process tracing method have helped to analyse the current status of how the policymakers adopted climate objectives and measures in urban regeneration policy documents. However, there was limited data to investigate factors that affected the integration of climate objectives into national urban regeneration policy. For example, this dissertation was not able to include the exact causes that led to either the adoption or elimination of the suggested climate objectives from the suggested research or expert consultations. Also, the boundary between agenda-setting and the policy process in national urban regeneration is vague because of a lack of data. Compared to obtaining the urban regeneration policy of Seoul Metropolitan Government, obtaining available information on the policy process of the national urban regeneration policy was more challenging. It is highly probable this dissertation did not gather all the potentially relevant information about the government's internal policy-making processes, such as that from informal internal meetings. Although the data collection was collected from a representative group of urban regeneration policymakers and stakeholders, the analysed results are based on data taken from available interviews and documents.

In addition, there is an issue concerning the representation of the interviewee group. Although this dissertation researches the process of urban regeneration policy covering the period from 2013 to the present, each interviewee could only represent the group for a specific period of the policy process. Although the study conducted 50 semi-structured interviews to broaden the range of data and address the issue of data limitation, the representation issue is still relevant.

Problem of generalisation

The research adopted a qualitative, single case study approach. Although the case study approach is suitable for the research to understand situations that exist in the real world, the method is often criticised in terms of the issue of generalisation. Although the empirical findings and recommendations from this dissertation are drawn from the case of Seoul, these findings can be also applicable to other metropolitan cities in Korea (e.g. Busan, Daegu, Daejeon, Incheon, Gwangju, and Ulsan) because they have similar government administrative structures with urban settings similar to Seoul—e.g. high demands for urban regeneration policy because of deteriorated buildings and infrastructures, a lack of community cohesion, and the economic decrease in their neighbourhoods. The urban regeneration stakeholders such as policymakers and researchers can refer to this dissertation to adopt the methodology (especially, the conceptual framework) for their policies or/and research that pursue to enhance the level of integration of climate measures into urban regeneration policies.

Cities that adopt strategies such as an urban regeneration approach to dealing with different urban problems can learn from other cities in similar situations that have experienced similar common issues and themes within urban regeneration policy. In this regard, this dissertation still aims to contribute to the discussion of urban regeneration in other cities and pursues the expansion of a range of policy domains covering not only existing urban regeneration issues—such as economic revitalisation, social inclusions, and infrastructure provisions—but also climate change response measures.

Limited perspectives from the climate change sector

Although interviews were performed both in the urban regeneration and climate policy sectors, there is a limited perspective from the climate change sector. Civil servants from the Ministry of Environment were not included in the list of semi-structured interviews. As this dissertation takes urban regeneration as a policy domain and considers climate change as a measure to be integrated into the urban regeneration policy domain, the dissertation has focused on an examination of detailed policy processes and the stakeholders of urban regeneration in the whole policy cycle. Although four interviewees of policymakers and stakeholders from the climate change sector provided relevant information for the topic, more input from this sector would have enriched the empirical results with perspectives from climate change policymakers.

Further research

This study facilitates further discussion on the topic of the integration of climate measures into urban regeneration policy by adding more important empirical evidence. The conceptual

framework, as well as the relevant factors that this dissertation has identified, can be further developed by other empirical cases. As identified in the discussion about the limitations of this research, findings from this single case study cannot be generalised to explain the complete situation. Further empirical evidence is needed to explain relevant factors for the integration of climate measures in urban regeneration for the development of the framework in this topic.

In addition, as the investigation of relevant internal and external factors for climate policy integration in different policy domains is still innovative in its approach in this field (Persson and Runhaar, 2018), further studies could explore the mechanism between the different factors to better comprehend the complexities—bringing about further development of the conceptual framework. It was difficult to define a linear pattern that explains how one factor affects the other in this dissertation, although the author has thoroughly examined the relationships between these investigated factors. Further research to explore the relations among factors supplemented by a process-tracing method would contribute to the development of the framework of climate policy integration. These relationships among factors can be visualised with word clouds or MAXMaps from the software MAXQDA.

Furthermore, this dissertation adopted a qualitative case study approach to examine internal and external factors that affect climate policy integration in urban regeneration. Although this approach is useful for an in-depth investigation of the real-world phenomenon, the credibility of the results about the significance of these identified factors can be enhanced with quantitative research methods. One of these methods is the analytic hierarchy process (AHP) analysis which presents identified factors organised by different weights of significance. It can also allow the research to formulate the whole structure of factors in addition to presenting of the significance of factors.

Lastly, more data from a number of interviewees in the field of climate change policy will be helpful to understand the perspectives from both the policy sectors of urban regeneration and climate policy. This dissertation focused more on the investigation of the process of urban regeneration policy. Thus, a majority of interviewees were from the sector of urban regeneration. Through semi-structured interviews, the author observed that both sectors see each other as if the other sector does not actively initiate efforts to integrate climate measures into urban regeneration. Opinions of policymakers and how these opinions affect the results of policy outcomes are crucial information because these can also be a highly relevant organisational factor for the integration of climate measures into urban regeneration.

8.3 IMPLICATIONS FOR ACADEMIC DISCUSSION AND PRACTICES

Theoretical contributions

The development of the conceptual framework is based on three main studies. Among them, the framework of Persson and Runhaar (2018) provides the structure of this framework. As their study uses a simplified framework, this framework can be relevant for other researchers wishing to adopt further framework development based on the purpose of the research. The conceptual framework of this dissertation provides a more detailed structure, in that it provides detailed factors and policy cycles. It also contains two different sectors that can be linked—the urban regeneration and climate change sectors. Using this framework has several benefits for any further research. First, the development of this detailed framework allows other research to investigate relevant factors impacting different policy stages in the process of climate policy integration. The examination of factors in different policy stages helps to comprehend implementation gaps between policy development and policy implementation of climate policy integration. Secondly, by exploring internal and external factors, practitioners and researchers can outline relevant policy and strategies targeted at appropriate stakeholders and institutions.

Considering that literature on climate policy integration lacks empirical evidence detailing factors that affect policy implementation (Smit and Wandel, 2006; Persson and Runhaar, 2018), this dissertation aims to contribute to the academic discussion of relevant factors for climate policy integration by providing empirical results. The lack of knowledge and research regarding relevant internal and external factors of climate policy integration, especially in the policy implementation stage and policy outcomes, has been addressed in current academic discussions (Runhaar *et al.*, 2018; Price, 2019). This dissertation has disclosed detailed internal and external factors—especially by defining the factors as drivers and barriers—that support not only the current studies that identify important factors for climate policy integration but also further studies that pursue the confirmation of these relevant factors with more empirical evidence.

The empirical results of this dissertation revealed relevant internal and external factors specifically in the context of climate policy integration in urban regeneration policy during the development and implementation stages. Identification of different factors in different policy cycles allowed relevant factors to be determined that are related to the implementation gaps between policy development and policy implementation. This dissertation confirmed the relevant factors that other current studies have highlighted, such as political will, organisational factors (cooperation between different policy sectors and between key stakeholders, expertise/leadership of civil servants, and supportive regulatory framework), resources (expertise of key stakeholders, information, and knowledge), and external factors such as public

awareness and support, and private sector support. However, this dissertation found additional factors that are relevant in the context of Seoul's urban regeneration and climate measure integration. The list of relevant and new factors on the integration of climate measures in urban regeneration policy aims to open academic discussion that explores 'what works' within climate policy integration in urban planning. More specifically, the investigated factors would be beneficial for the discussion of climate policy integration in urban planning that involves community participation and a variety of stakeholders.

Contributions to the practice

Findings from this case study of Seoul's urban regeneration can contribute to other cities which pursue the adoption of an integrative approach for both policy sectors of climate change and urban regeneration. Different cities possess different urban issues, and they take various approaches to resolve the problems with their public/private funds, policies, and programmes. Some cities like Seoul take the approach of urban regeneration—by allocating a significant amount of public funds/subsidies to selected community governments—to deal with issues raised by community governments and residents. Although there are international trends in the integration of climate measures in urban regeneration policy, programmes, planning, and projects (Section 2.4), many cities still deal with prioritised issues raised by residents and governments—such as the economic revitalisation of communities, the renovation of deteriorated buildings, provision of essential infrastructure, and so on. By investigating the case of Seoul which has established urban regeneration policies since 2000 and actively implemented them up until now, this dissertation has hypothesised relevant internal and external factors for integrating climate measures into urban regeneration throughout the policy process. The findings of this dissertation would be useful for cities that (1) take an urban regeneration, urban renewal, or urban redevelopment approach, and establish climate change policy actively, (2) have a top-down government structure but pursue a bottom-up urban regeneration process, (3) do not have strong private/business involvement but need to motivate them to be involved, and (4) do not have residents with a strong awareness about climate issues, and instead have stronger interests in the potential pecuniary benefits from urban regeneration. These cities can include cities in the Republic of Korea and other cities in East Asia (e.g. Hong Kong and Taiwan). Developing and developed cities in Europe can also use these findings because many European cities pursue an integrative policy approach to urban regeneration, guided by the EU's various programmes.

8.4 RECOMMENDATIONS

The dissertation proposes several recommendations for different levels of government, including the Korean national government, Seoul Metropolitan Government, community governments in

Seoul, academic institutions including government subordinate research institutes and universities and environmental NGOs. The recommendations in this section are organised by theme, regulatory framework, organisational structures for good governance between the public and private sectors, and capacity building for key actors.

Regulatory framework (law, regulations, guidelines, and incentives)

a. Incentives for cooperation between departments

The Korean government has already acknowledged the silo effect occurring between different ministries and between departments. As urban regeneration requires a large amount of effort for successful cooperation between different policy sectors, there were already strategies in place to motivate active cooperation, such as a trans-sectoral urban regeneration committee at a national level and a responsible administrative council at city and community levels. Although these committees and councils are responsible for essential policy processes for urban regeneration, these were not effective in terms of integrating climate measures into urban regeneration policy and projects in Korea. Civil servants are likely to consider cooperative projects with other administrations as extra work for their current job. However, cooperative work is essential for urban regeneration. Thus, to encourage more civil servants to accept these jobs and be more engaged in the tasks of the jobs, the provision of incentives—such as additional points for staff performance evaluation and promotions—is recommended. Although the staff evaluation points for cooperation are already used in Seoul Metropolitan Government and Seongbuk-gu Government, they were not enough to motivate civil servants to become actively involved in cooperative projects. A revision of staff evaluation systems is required to provide more benefits and encourage more active cooperation between different sectors. This should be applied to all levels of government, all ministries, Seoul Metropolitan Government, and community governments.

b. Revisions of the Special Act and policies to incorporate climate measures

For urban regeneration projects, which are one of the major urban development sectors in Seoul, laws and ordinances should be revised in order to integrate climate measures into urban regeneration projects effectively. Each urban regeneration revitalisation plan includes at least one public building, called an anchor facility, for community activities and provides a space for the Community Regeneration Corporation. Some of these buildings in Seoul have adopted climate measures, such as installing rooftop gardens or solar panels. Climate measures must be integrated into anchor facilities under urban regeneration regulations; this enables anchor facilities to contribute to measures against climate change and publicise the significance of climate change

issues and the ways to increase climate resilience in the community. Currently, the existing guidelines for building anchor facilities recommend that the buildings should be energy efficient and install solar panels. Since Seoul Metropolitan Government and the national Korean government actively establish climate mitigation and adaptation policies, the anchor facilities can work to achieve this climate policy target. As the Special Act on Promotion of and Support for Urban Regeneration contains statements about anchor facilities, revisions to the document can describe this climate measure inclusion at anchor facilities.

The special act has statements of designation on urban regeneration revitalisation areas. The criteria for designating urban regeneration should include neighbourhoods that are vulnerable to climate change impact. So far, the act only includes designation criteria for general areas and special urban regeneration areas (which are vulnerable to natural hazards, but mostly they are related to areas that have experienced a significant scale of hazards, such as earthquakes and major flooding). Vulnerability assessments of climate change should be considered and incorporated into the criteria.

c. Revision of Seoul Urban Regeneration Strategic Plan

As the Seoul Urban Regeneration Strategic Plan provides a general vision and outline of the selection process for urban regeneration revitalisation areas, one of the general vision focus areas should be climate mitigation, adaptation, and resilience. A comparison between the first version (2015) and the second version (2018) of the plan shows that the latter highlights climate objectives with a higher priority. However, it still presents a limited level of climate policy integration. The plan should clearly state the goal as part of the primary vision of urban regeneration in Seoul. This should be followed by the revision of the designation criteria of urban regeneration revitalisation areas. These designation criteria are one of the effective driving forces for community governments to include climate measures in their plans.

d. Cooperative projects and programmes that provide incentives for different stakeholders

One of the relevant factors for the integration of climate measures into urban regeneration in policy implementation is related to pecuniary matters of residents. Currently, the subsidies in urban regeneration are limited to solar panel installation, provisions of rooftop gardens/vegetable gardens, rainwater collectors, and retrofitting housing for energy-saving/efficiency. Although these measures still contribute to climate mitigation and adaptation, the scope of the contributions from these activities is rather passive; furthermore, these measures are not significantly popular among residents in the neighbourhoods. The development of climate

measures that can be incorporated into urban regeneration areas is essential, and offering incentives for implementing measures should be considered. Introducing climate measures into urban regeneration with subsidies should be part of a sustainable vision; for example, these activities and measures could lead to a long-term project working with the government, or the establishment of a community corporation, which provides benefits to all stakeholders.

e. City and community governments' ordinance for construction review guidelines incorporating climate measures

It was reported that Seongbuk-gu had construction review guidelines for incorporating climate measures into urban regeneration. As urban regeneration also involves new construction activities in the area, and there is no regulation to regulate private buildings in Seoul, this measure was advanced compared to other urban regeneration cases. City and community governments' ordinances should include construction review guidelines that regulate newly constructed buildings into incorporating climate mitigation and adaptation measures.

<u>Organisational structures for good governance between the public and private sectors</u>

a. Role of Seoul Urban Regeneration Support Centre

An intermediary agent, such as the Seoul Urban Regeneration Support Centre, serves as a bridge between the public and private sectors. As the centre is funded and managed by Seoul Metropolitan Government, the characteristics of the centre are closer to the public sector. However, it is open for further networking with other sectors, as well as institutions. More active cooperation with environmental NGOs or businesses would facilitate not only the integration of climate measures into urban regeneration but also the development of innovative projects that the government has not considered yet. Active cooperation with the private sector will help urban regeneration projects become more effective and sustainable in the long term.

In addition, cooperation with a climate change government sector—such as the Korea Adaptation Centre for Climate Change at the Korea Environment Institute—would provide a variety of opportunities to develop cooperative projects and to educate climate change adaptation for the key stakeholders of urban regeneration.

b. Community Regeneration Corporation

In Seoul, during the entire urban regeneration policy cycle, there was a lack of input from the private sector such as private funds or involvement from businesses. The role of the private sector is crucial; it is an important driving force to sustain urban regeneration long term. A Community Regeneration Corporation is usually established at the end of the urban regeneration process.

However, the private sector should become involved much earlier in the process of urban regeneration, rather than after its completion. While formulating an urban regeneration revitalisation plan, key stakeholders should already be actively seeking private sector stakeholders, who can synergise and work together during the whole process of urban regeneration.

Capacity building for key actors

a. Development and sharing of information, knowledge, and research

The lack of information, knowledge, and research was one of the relevant barriers both in the policy development and policy implementation stages. Research institutes and universities should develop technical research about the effectiveness of the performance of climate measures. Technical research about climate mitigation and adaptation measures should be developed—the research can then be adopted into urban regeneration projects. The findings could be summarised in the form of a research brief and they should be reported or publicised to the key stakeholders of urban regeneration policy, including the Ministry of Land, Infrastructure and Transport, the Urban Regeneration Headquarters in Seoul Metropolitan Government, and the Seoul Urban Regeneration Support Centre.

Civil servants and other key stakeholders of urban regeneration should also have information and knowledge about climate measure options and clearly understand the benefits of adopting them. Based on the research, this information and knowledge can be developed by Seoul Metropolitan Government, or the Seoul Urban Regeneration Support Centre, and should then be publicised widely to civil servants in community governments and other key stakeholders, including the heads and coordinators of urban regeneration on-site support centres, master planners, urban planning companies, and residents.

b. Climate change education programmes in anchor facilities

Anchor facilities that are established by urban regeneration projects provide opportunities and space to hold climate change education programmes, as well as climate activities. Environmental NGOs, businesses, and government institutions (Korea Adaptation Centre for Climate Change) can be involved in the programmes and activities. The cooperation requires efforts of networking and corporation initiated by an intermediary agent, such as the Seoul Urban Regeneration Support Centre, or by the urban regeneration on-site support centre in each community.

8.5 OVERALL CONCLUSION

This dissertation began by highlighting the opportunities to integrate climate measures into urban regeneration in academic discussion and practices. As urban regeneration policy has already been actively implemented in Korea, especially in Seoul, without implementing best practices actively compared to good practices observed elsewhere around the world, this dissertation has pursued an investigation into the process of urban regeneration and aims to identify relevant internal and external factors impacting the integration of climate measures into urban regeneration throughout the entire process. This research has developed a conceptual framework based on other studies that also investigate the factors impacting climate policy integration in different policy domains, and the evaluation of the levels of integration of climate policy. Using a conceptual framework with a theoretical background in the field of urban regeneration, climate measures, and climate policy integration allows the design of a systematic structure for which to discuss the findings of the dissertation. Based on the hypotheses of the relevant factors which impact climate policy integration, this dissertation adopts a qualitative case study approach by combining different analysis methods, content analysis, process tracing, and document analysis with data from semi-structured interviews with relevant stakeholder representatives, and a set of various other documents. Fifty semi-structured interviews conducted during the process of this dissertation provided sufficient information to examine the relevant internal and external factors, but the process tracing and document analysis supplemented the credibility of the results from content analysis of semi-structured interviews.

This dissertation identifies the relevant internal and external factors that impacted the integration of climate measures in urban regeneration in Seoul. As existing studies have already highlighted, political factors, organisational factors, and resources are crucial factors in both policy development and policy implementation. However, this dissertation investigates more detailed factors under these categories and examines them closely by categorising them into internal and external factors in policy development and policy implementation stages. In this way, the empirical results present clear implementation gaps between the policy development and policy implementation stages, as well as clear characteristics of factors that come from inside and outside the government.

Choosing four units (neighbourhoods) in a single case study (Seoul) has enabled the understanding of the detailed characteristics of different factors as drivers or barriers. Two neighbourhoods that demonstrated positive actions for the integration of climate measures (evaluated as 'harmonisation') also provide evidence of drivers and barriers to the integration. In these neighbourhoods, the leadership of important actors—such as the head of community government and a community leader—allowed the neighbourhoods to implement climate

activities. These activities of the neighbourhoods become the planning sources for stakeholders to formulate urban regeneration revitalisation plans. Although Seoul Metropolitan Government has already started to highlight and incorporate climate vision and action into urban regeneration policy—by (1) revising the Strategic Plan for Urban Regeneration, and (2) formulating relevant cooperative projects in urban regeneration projects—most neighbourhoods, including Amsa-dong and Garibong-dong, still demonstrate 'no-integration' in their projects. The implementation gaps are related to a variety of internal factors including political support, supportive regulatory framework, the expertise of the civil servants, and cooperation among key stakeholders. In addition, resource factors—such as the expertise of key stakeholders, and lack of information and research—are the most relevant barriers that have resulted in the implementation gaps discussed. However, the external factors contributing to implementation gaps should be highlighted in that there is a lack of empirical evidence of external factors in the implementation stage. The investigated factors are relevant for the climate policy integration not only in urban regeneration but also in urban planning that pursues more community participation. The most relevant external factors that have brought about the implementation gaps are public awareness and support, pecuniary matters of residents, and spatial issues (such as lack of facilities and spaces to adopt climate measures).

Urban regeneration involves a variety of urban problems. The main stakeholders of urban regeneration—including civil servants, researchers, master planners, urban planning companies, staff in urban regeneration support centres, and residents—all have different demands and self-interests in the neighbourhood's regeneration. Different stakeholders prioritise different issues, which makes the urban regeneration process complicated. So far, climate change issues are not a priority agenda in many neighbourhoods in Seoul. As a result, the integration of climate measures into the urban regeneration process is currently challenging. However, integrating climate change issues with general issues faced by neighbourhoods can facilitate positive change such as community cohesion and can enhance climate change resilience in the neighbourhood. Climate measures for the poor and elderly living in designated neighbourhoods of urban regeneration schemes can contribute to a decrease in the climate change impact. This dissertation suggests that the entry point to solving the lack of integration of climate measures in urban regeneration should be fruitful information, knowledge, and research about the effectiveness of the performance of climate measures. Furthermore, a list of options of climate measures should be provided that can be applied to urban regeneration revitalisation plans, detailing benefits for the neighbourhood—for example, the development of climate-related businesses leading to a community corporation that generates shared profits, climate activities for enhanced community cohesion, and more diverse physical climate measurement options.

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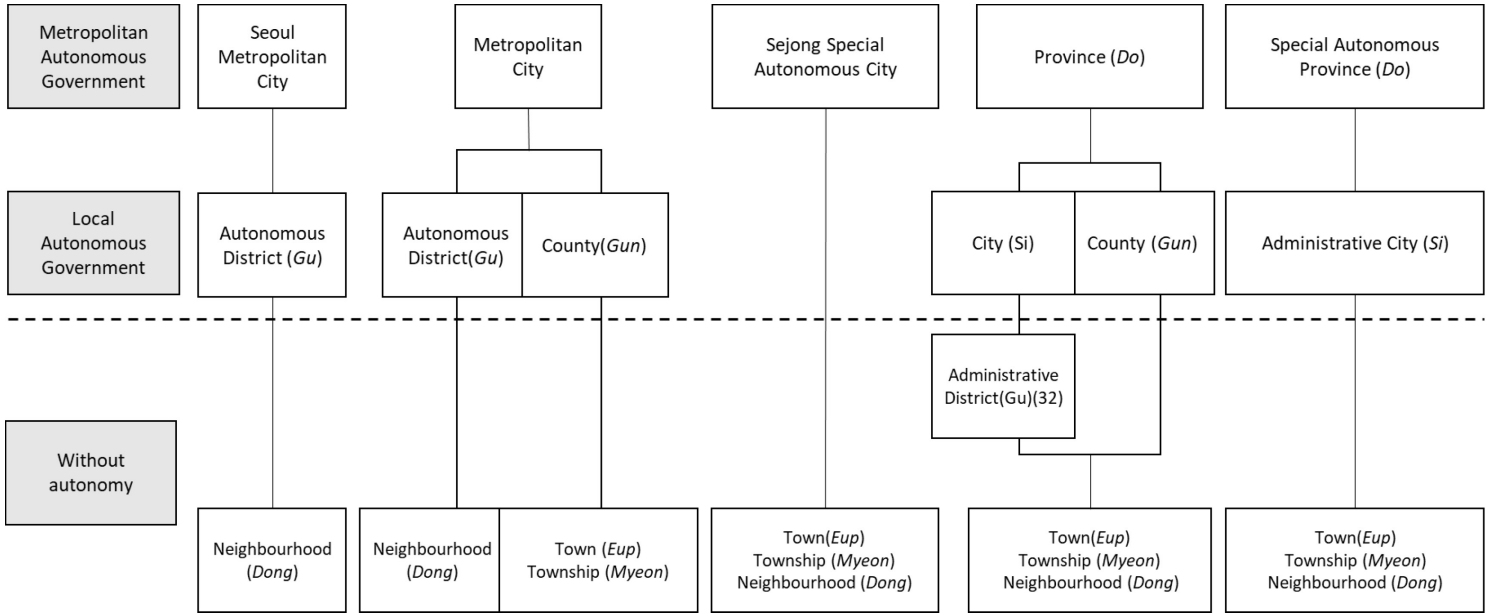
APPENDIX

1. Administrative Structure of the Republic of Korea

Figure 1. Administrative structure of the Republic of Korea



Note: Korean language terms are italicised

Source: own compilation based on Lee (2016); Ministry of Land, Infrastructure and Transport (2019b)

Regarding the case of Seoul, Seoul Metropolitan Government and autonomous districts have their own autonomy, although district governments highly rely on the city government due to a lack of budgets and resources. In this dissertation, 'community government' refers to an autonomous district.

2. List of interview participants

Level	Organisation	In-text Reference	Interview date
National	Land & Housing Institute	INT1	14.07.2020
	Korea Environment Institute	INT2	28.08.2020
	Korea Environment Institute	INT3	25.08.2020
	Korea Environment Institute	INT4	15.07.2020
	Land & Housing Institute	INT5	30.07.2020
	Land & Housing Institute	INT6	14.07.2020
	The Ministry of Land, Infrastructure and Transport	INT7	05.08.2020
	Korea Research Institute for Human Settlements	INT8	17.07.2020
	Korea Research Institute for Human Settlements	INT9	17.07.2020
	Korea Housing & Urban Guarantee Corporation	INT10	16.07.2020
City	Seoul Metropolitan Government	INT11	19.08.2020
	Seoul Metropolitan Government	INT12	08.07.2020
	Seoul Metropolitan Government	INT13	15.08.2020
	Seoul Urban Regeneration Committee	INT14	22.07.2020
	Seoul Urban Regeneration Committee	INT15	20.07.2020
	Seoul Urban Regeneration Support Centre	INT16	13.07.2020
	Seoul Urban Regeneration Support Centre	INT17	27.07.2020
	Seoul Urban Regeneration Support Centre	INT18	29.07.2020
	The Seoul Institute	INT19	09.07.2020
Neighbourhood (Garibong-dong)	Community government	INT20	06.07.2020
	Master planner	INT21	03.08.2020
	Urban planning company	INT22	18.08.2020
	Urban Regeneration On-site Support Centre	INT23	13.07.2020
	Urban Regeneration On-site Support Centre	INT24	12.08.2020
	Residents' Council	INT25	18.08.2020
	Residents' Council	INT26	01.08.2020
	Residents' Council	INT27	12.08.2020
	Residents' Council	INT28	20.08.2020
Neighbourhood (Amsa-dong)	Community government	INT29	07.07.2020
	Community government	INT30	13.08.2020
	Urban Regeneration On-site Support Centre	INT31	23.07.2020

	Urban Regeneration On-site Support Centre	INT32	21.07.2020
	Urban Regeneration On-site Support Centre	INT33	21.07.2020
	Residents' Council	INT34	28.07.2020
	Residents' Council	INT35	21.07.2020
Neighbourhood (Sangdo 4-dong)	Community government	INT36	20.08.2020
	Master planner	INT37	24.07.2020
	Urban Regeneration On-site Support Centre	INT38	01.08.2020
	Urban Regeneration On-site Support Centre	INT39	08.07.2020
	Residents' Council	INT40	20.08.2020
	Residents' Council	INT41	21.08.2020
	Residents' Council	INT42	10.08.2020
Neighbourhood (Jangwi-dong)	Community government	INT43	07.08.2020
	Master planner	INT44	13.08.2020
	Urban planning company	INT45	04.08.2020
	Urban Regeneration On-site Support Centre	INT46	29.07.2020
	Urban Regeneration On-site Support Centre	INT47	06.08.2020
	Residents' Council	INT48	26.08.2020
	Residents' Council	INT49	10.08.2020
	Residents' Council	INT50	10.08.2020

3. Interview guide

Interview Guide (1)

Institutions: (1) Ministry of Land, Infrastructure, and Transport, (2) Korea Research Institute for Human Settlement, (3) Architecture & Urban Research Institute, (4) Korea Land & Housing Corporation

Date:	Location:
Interviewee:	Time:

Introduction

Thank you for taking the time to meet me today. My name is Jiyoon Song, and I am a doctoral candidate at the Technical University Dresden. I am doing my research on the integration of climate measures into urban regeneration, and the internal and external factors that affect the integration in the process of urban regeneration policy cycles.

The interview will take about an hour. With your permission, I will record the session so I do not miss any of your comments. All responses will be kept confidential. Your interview responses will be used only for the purpose of my dissertation. I will ensure that your identity is not disclosed in my dissertation. You do not need to talk about anything you do not want to, and you may end the interview at any time.

Do you have any questions regarding the interview? Are you willing to participate in the interview? [Ask the respondent to sign the consent form]

Questions

Introduction

· Could you tell me the role of the institution and your personal responsibilities for your job?

The level of integration (understanding the decision maker's view on the level of the integration)

· The interviewer describes climate measures incorporated in the Special Act, Basic Policy, and Guidelines of urban regeneration. [Policy documents highlighting climate measures related parts to be shown]

- How do you see the level of integration? [Survey sheet of the level of integration to be shown]

Internal factors

· What affects the integration of climate change measures in the process of formulating the policy?

· Who is involved in developing a vision, purpose, and plans for the policy? What are the roles of each stakeholder (Ministry of Land, Infrastructure, and Transport, Korea Research Institute for Human Settlement, Architecture & Urban Research Institute, Korea Land & Housing Corporation)?

· What is the motivation to incorporate climate measures into urban regeneration policy?

· What is your opinion about drivers and barriers to incorporating climate measures into urban regeneration policy? [Survey sheet of factors to be shown]

How much general knowledge and resource availability concerning climate change do you think exists for institutions and stakeholders?

External factors

· What is the national issue related to climate measures in urban regeneration policy? Do you think climate issues are perceived as significant issues in the country?

· What is your view on the level of public awareness and support for climate change among stakeholders in urban regeneration?

· How much support from stakeholders for incorporating climate change measures into urban regeneration do you think there is?

Decision maker's view on the drivers and barriers to the integration

· What are the most important drivers and barriers to integrating climate measures into urban regeneration policy? [survey sheet]

· What is your perspective on increasing the degree of integration of climate measures into urban regeneration policy?

	Policy implementation gaps
	· In the whole process of policymaking, was there any consideration for the integration of the climate measures into the policy? And was it applied to the policy?
Relevant policy documents and supplementary materials	**Policy documents**
	· Special Act on Promotion of and Support for Urban Regeneration
	· Basic Policy for National Urban Regeneration
	· Guidelines for the Formulation of Strategic Plans for Urban Regeneration
	· Basic Plan for Coping with Climate Change
	· Measures for Adaptation to Climate Change
	Supplementary materials
	· Consent form
	· Survey sheet of the level of the integration
	· Survey sheet of the factors
	Documents to be requested to obtain
	· Meeting minutes of review of experts
	· Consulting research report

Interview Guide (2)

Institutions: Seoul Metropolitan City Government, The Seoul Institute, Seoul Housing and Communities Corporation

Date:	Location:
Interviewee:	Time:

Introduction

Thank you for taking the time to meet me today. My name is Jiyoon Song, and I am a doctoral candidate at the Technical University Dresden. I am doing my research on the integration of climate measures into urban regeneration, and the internal and external factors that affect the integration in the process of urban regeneration policy cycles.

The interview will take about an hour. With your permission, I will record the session so I do not miss any of your comments. All responses will be kept confidential. Your interview responses will be used only for the purpose of my dissertation. I will ensure that your identity is not disclosed in my dissertation. You do not need to talk about anything you do not want to, and you may end the interview at any time.

Do you have any questions regarding the interview? Are you willing to participate in the interview? [Ask the respondent to sign the consent form]

Questions

Introduction

· Could you tell me the role of the institution and your personal responsibilities for your job?

The level of integration (understanding the decision maker's view on the level of the integration)

· The interviewer describes climate measures incorporated in the Strategic Plan for Urban Regeneration. [Policy documents highlighting climate measures related parts to be shown]

- How do you see the level of integration? [Survey sheet of the level of integration to be shown]

Internal factors

· What affects the integration of climate change measures in the process of formulating the plan?

· Who is involved in developing a vision, purpose, and plans for the plan? What are the roles of each stakeholder (Seoul Metropolitan City Government, City Council, Administrative agencies, Urban Regeneration Committee, Residents)?

· What is the motivation to incorporate climate measures into urban regeneration plans?

· What is your opinion about drivers and barriers to incorporating climate measures into urban regeneration plan? [Survey sheet of factors to be shown]

· How much general knowledge and resource availability concerning climate change do you think exists for institutions and stakeholders?

· How do you view the cooperation between government departments? Does cooperation lead to more climate objectives being achieved?

External factors

· What are the city's issues related to climate issues in urban regeneration planning? Do you see the significance of climate issues in the city?

· What is your view on the level of public awareness and support for climate change measures among stakeholders in urban regeneration?

· What do you think is the extent of stakeholders' support for incorporating climate change measures into urban regeneration?

Decision maker's view on the drivers and barriers to the integration

· What are the most important drivers and barriers to integrating climate measures into urban regeneration plans? [survey sheet]

· What is your perspective on increasing the degree of integration of climate measures into urban regeneration plans?

	Policy implementation gaps · In the whole process of policymaking (public hearing, hearing of opinion from city council, discussion with relevant administrative agencies, review from urban regeneration committee), was there any voice/opinion about the integration of climate measures in the plan? And were they applied to the plan? If not, why do you think that is?
Relevant policy documents and supplementary materials	**Policy documents** · Strategic Plan for Urban Regeneration · Climate Change Adaptation Detailed Action Plan (city level) **Supplementary materials** · Consent form · Survey sheet of the level of the integration · Survey sheet of the factors **Documents to be requested to obtain** · Meeting minutes of (1) public hearing, (2) hearing of opinion from City Council, (3) discussion with relevant administrative agencies, (4) review from urban regeneration committee

Interview Guide (3)

Institutions: District Government, Urban Regeneration Support Centre, Urban Regeneration Consultative Group of Residents

Date:	Location:
Interviewee:	Time:

Introduction

Thank you for taking the time to meet me today. My name is Jiyoon Song, and I am a doctoral candidate at the Technical University Dresden. I am doing my research on the integration of climate measures into urban regeneration, and the internal and external factors that affect the integration in the process of urban regeneration policy cycles.

The interview will take about an hour. With your permission, I will record the session so I do not miss any of your comments. All responses will be kept confidential. Your interview responses will be used only for the purpose of my dissertation. I will ensure that your identity is not disclosed in my dissertation. You do not need to talk about anything you do not want to, and you may end the interview at any time.

Do you have any questions regarding the interview? Are you willing to participate in the interview? [Ask the respondent to sign the consent form]

Questions

Introduction

· Could you tell me the role of the institution and your personal responsibilities for your job?

The level of integration (understanding the stakeholders' view on the level of the integration)

· The interviewer describes climate measures incorporated in the urban regeneration revitalisation plan. [Policy documents highlighting climate measures related parts to be shown]

- How much integration do you think exists currently? [Survey sheet of the level of integration to be shown]

Internal factors

· What affects the integration of climate change measures in the process of formulating the plan?

· Who is involved in developing a vision, purpose, and plans for the plan? What are the roles of each stakeholder (District government, Local Urban Regeneration Support Centre, Urban Regeneration Consultative Group of Residents, Project Implement Consultative Group)?

· What is the motivation to incorporate climate measures into urban regeneration revitalisation plans?

· What is your opinion about drivers and barriers to incorporating climate measures into urban regeneration revitalisation plan? [Survey sheet of factors to be shown]

How much general knowledge and resource availability concerning climate change do you think exists for institutions and stakeholders?

· What is the cooperation like between the public and private sectors? Does cooperation lead to the achievement of more climate objectives?

External factors

· What are the local issues related to climate change in urban regeneration revitalisation plans? Do you see the significance of climate issues in your community?

· What is your view on the level of public awareness and support concerning climate change among stakeholders in urban regeneration?

· What is the extent of stakeholders' support for incorporating climate change measures into urban regeneration?

Decision maker's view on the drivers and barriers to the integration

· What are the most important drivers and barriers to integrating climate measures into the strategic plan for urban regeneration? [Survey sheet]

· What is your perspective on increasing the degree of integration of climate measures into the strategic plan for urban regeneration?

Policy implementation gaps

· In the whole process of formulating the urban regeneration revitalisation plan, (public hearing, discussion with relevant administrative agencies, review from urban regeneration committee), was there any voice/opinion about the integration of climate measures in the plan? And were they applied to the plan? If not, why do you think that was?

Relevant policy documents and supplementary materials

Policy documents

· Urban Regeneration Revitalisation Plan

· Climate Change Adaptation Detailed Action Plan (local level)

Supplementary materials

· Consent form

· Survey sheet of the level of the integration

· Survey sheet of the factors

Documents to be requested to obtain

· Meeting minutes of (1) public hearing, (2) discussion with relevant administrative agencies, (3) review from urban regeneration committee, and (4) any workshops/meetings to develop the revitalisation plan

4. Consent form for participation in an interview (English and Korean versions)

Doctoral dissertation title (working title): Integration of climate measures into urban regeneration (Researcher: Jiyoon Song) (English Version)

I agree to participate in a PhD research project of Jiyoon Song from Dresden Leibniz Graduate School, Germany. The purpose of this document is to specify the terms of my participation in the project through being interviewed.

1. I have been given sufficient information about this research project. The purpose of my participation as an interviewee in this project has been explained to me and is clear.

2. My participation as an interviewee in this project is voluntary. There is no explicit or implicit coercion to participate whatsoever.

3. Participation involves being interviewed by Jiyoon Song. The interview will last approximately 60 minutes. I allow the researcher to take written notes during the interview. I may also allow the audio recording of the interview. It is clear to me that in case I do not want the interview to be recorded, I am at any point in time fully entitled to withdraw from participation.

4. I have the right not to answer any of the questions. If I feel uncomfortable in any way during the interview session, I have the right to withdraw from the interview.

5. I understand that my identity will remain anonymous in the abovementioned doctoral dissertation.

6. I agree that quotes from my interview can be used in the abovementioned doctoral dissertation.

7. I have read and understood the points and statements of this form. I voluntarily agree to participate in this study.

8. I have been given a copy of this consent form co-signed by the researcher.

_____ _____

Participant's Signature Date

_____ _____

Researcher's Signature Date

For further information, please contact: Jiyoon Song, Dresden Leibniz Graduate School, Germany (TEL: +49) 1788172405, E-mail: j.song@dlgs.ioer.de)

인터뷰 참여 동의서 (Korean Version)

박사 논문 (가제): 도시재생에 기후요소 통합 (연구자: 송지윤)

나는 드레스덴 라이프니츠 대학원에 송지윤의 박사논문 연구에 참여하는 것에 동의한다. 본 문서의 목적은 인터뷰를 통한 연구참여의 조건을 명시하는데 있다.

1. 나는 본 연구에 대해 충분히 정보를 제공받았다. 본 연구의 인터뷰 대상자로서 나의 참여 목적은 나에게 설명되었다.

2. 본 연구에서 인터뷰 대상자로서 나의 참여는 자발적이며 참여에 대한 노골적인 혹은 무언의 강제는 없었다.

3. 본 연구참여는 송지윤에 의한 인터뷰와 관련된 것이다. 본 인터뷰는 약 60 분이 소요될 것이다. 나는 연구자가 인터뷰가 진행되는 동안 메모하는 것을 허용한다. 나는 또한 인터뷰의 녹음을 허용할 수도 있다. 만약 내가 인터뷰가 녹음되는 것을 원치 않을 경우, 언제든지 중단할 권리가 있다.

4. 나는 질문 중 일부를 답하지 않을 수 있는 권리가 있다. 인터뷰 중 어떠한 이유로 불편하다면 나는 인터뷰를 중단할 권리가 있다.

5. 나는 위에 언급된 박사 논문에서 나의 신원이 익명으로 유지될 것이라는 것을 이해하고 있다.

6. 나는 본 인터뷰의 인용이 위에 언급된 박사논문에 활용될 수 있다는 것에 동의한다.

7. 나는 본 양식의 진술을 모두 읽었고 이해했다. 나는 본 연구에 자발적으로 참여할 것을 동의한다.

8. 나는 본 연구자가 공동성명한 이 동의서의 복사본을 제공받았다.

_____ _____

참여자 서명 날짜

_____ _____

연구자 서명 날짜

추가 정보 문의: 송지윤, 독일 드레스덴 라이프니츠 대학원 (전화: +49) 1788172405, 이메일: j.song@dlgs.ioer.de)

5. Use area and use district (Land-use and zoning)

Enforcement Decree Of The National Land Planning And Utilization Act[52]

SECTION 2 Special-Purpose Areas, Special-Purpose Districts, and Special-Purpose Zones

Article 30 (Subdivision of Special-Purpose Areas)

1. A residential area:

(a) An exclusive residential area: An area required for protecting favorable residential environments:

(i) A class I exclusive residential area: An area required for protecting favorable residential environments centered around independent housing;

(ii) A class II exclusive residential area: An area required for protecting favorable residential environments centered around multi-unit housing;

(b) A general residential area: An area required for creating convenient residential environments:

(i) A class I general residential area: An area required for creating convenient residential environments centered around low-floor housing;

(ii) A class II general residential area: An area required for creating convenient residential environments centered around mid-floor housing;

(iii) A class III general residential area: An area required for creating convenient residential environments centered around mid- and high-floor housing;

(c) A quasi-residential area: An area required for supplementing a part of the commercial function and business functions to support it by centering around residential function;

2. A commercial area:

(a) A central commercial area: An area required for expanding the commercial and business functions in the center and subcenter of a metropolis;

(b) A general commercial area: An area required for the general commercial function and business function;

(c) A neighboring commercial area: An area required for supplying the daily necessities and services in the neighboring area;

(d) A circulative commercial area: An area required for increasing the circulation function in the city and between the areas;

3. An industrial area:

[52] This is an English translation provided by the government official website, Korean Law Information Center (*Korean Law Information Center*, no date).

(a) An exclusive industrial area: An area required for admitting mainly the heavy chemical industry, pollutive industries, etc.;

(b) A general industrial area: An area required for allocating the industry not impeditive to the environments;

(c) A quasi-industrial area: An area for admitting the light industry and other industries, but in need of supplementing the residential, commercial functions and business function;

4. A green area:

(a) A green conservation area: An area requiring conservation of natural environment, scenery, forest and green areas in the city;

(b) A green production area: An area requiring reservation on development for the main purpose of agricultural production;

(c) A green natural area: An area requiring preservation for securing green area space, prevention of city's expansion, supply of future city sites, etc., in which restrictive development is allowed for only inevitable cases.