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Review

Rethinking the Smart Green City Project in South Korea: A Critical Juncture Approach

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Abstract: Over the past 10 years, the Korean government has declared its intention to achieve carbon neutrality to the international community and strived to create smart cities and green cities as a practice to achieve carbon neutrality. In the same context, the Smart Green City project, which began in earnest at the end of 2020, initially attracted national attention due to the strong will of the administration. However, limitations in its performance were revealed. This study aimed to identify the policy mechanisms that led the Korean government to pursue the Smart Green City project using a critical juncture approach and to derive useful implications for policy selection. A critical juncture framework was applied for in-depth analysis, and a descriptive case study based on critical thinking was conducted. The results confirmed that endogenous and exogenous environmental changes surrounding the government at critical junctures were mechanisms for establishing the Smart Green City project. In addition, the government's attempt to differentiate itself from the policies of previous governments was confirmed to be a constraint that actually hindered the project's progress. This study concludes that if a government facing a complex crisis makes hasty policy decisions, it is likely to repeat the policy pattern or institutional path of previous governments. It also argued that in this situation, policy choices that aim to cut a new path may cause the government to choose a wrong path, which may have irreversible consequences.

Keywords: smart green city; smart city; green city; smart sustainable city; carbon-neutral city; critical junctures

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1. Introduction

Despite the frequent occurrence of disasters and calamities due to global warming, the world has neglected this threat because the effects of climate change are neither immediate nor direct. Fortunately, the world has recently recognized climate change as a collective action problem in urgent need of redress, with mounting global cooperation efforts emerging to achieve this [1]. For example, at the 17th Conference of the Parties to the United Nations Framework Convention on Climate Change held in Durban, South Africa, in 2011, an international agreement was reached to impose greenhouse gas reduction obligations on all parties from 2020. This initiative required the comprehensive promotion of greenhouse gas reduction policies in all sectors, from the industrial and transportation sectors to the non-industrial sector. In December 2014, the 20th General Assembly held in Lima, Peru, agreed on each country's Intended Nationally Determined Contribution (INDC) for 2020 and beyond, and 162 countries—including 28 European Union countries—submitted their national contributions to the international community. Regarding the main contents of the submission, the 28 EU Member States, Norway, and Switzerland presented the goal of reducing emissions by 40–50% compared to 1990 levels by 2030, while Mexico aimed to reduce emissions by 25–40% compared to normal by 2030 [2]. Further, in accordance with the Green Deal established in 2019, the European Union has recently planned to implement the Carbon Border Adjustment Mechanism (CBAM) in earnest from 1 January 2026, after a transitional phase starting in 2023 [3]. The United States has also planned to invest

large amounts of money in real energy security and climate change response through the implementation of the Inflation Reduction Act (IRA) in 2022. In contrast, developing countries are in a difficult position due to the enormous economic burden imposed by carbon emission regulations as well as the lack of emission reduction technology that can respond to these strong measures by the EU and the US [4,5]. In the meantime, the energy outlook by IEA predicted that the global demand for coal, oil, and gas will peak in 2030 and then decline, and that the transition to clean energy will proceed faster than expected [6–8]. These global energy trends could ultimately have a significant impact on key policy decision making in each country, including industrial investment, trade flows, electrification, and energy access.

Major countries around the world have been steadily attempting to transition to a low-carbon economic structure. In Korea, the Lee administration launched the presidential "Green Growth Committee" in 2009, to establish an international-level greenhouse gas management system, and enacted the "Framework Act on Low Carbon, Green Growth" initiative in 2010. The Park administration completed the implementation of the greenhouse gas emissions trading system in 2015, and established a greenhouse gas and energy target management system. The Moon administration subsequently designated companies that emit a lot of greenhouse gases and consume a lot of energy as management companies and asked them to pursue and fulfill reduction goals [9,10]. However, Korea has been labelled a "climate villain" by the international community in recent years. In 2023, Korea ranked 60th among 64 countries on the Climate Change Performance Index (CCPI). Korea is also the world's ninth largest energy consumer and ranks seventh in terms of highest greenhouse gas emissions [11–13]. To date, the Korean government has built infrastructure for the establishment of a low-carbon economic system, but failed to monitor its implementation. The promise of carbon reduction was not maintained, and carbon emissions increased [14].

On the other hand, based on the Green New Deal, the Moon administration established Korea's unique Smart Green City project, which aims to create a carbon-neutral city and achieve the green transformation of the city through local government participation from 2021 to 2022 [15–18]. However, previous governments have also been pursuing similar projects, and the United Nations (UN) and the United Nations Educational, Scientific and Cultural Organization (UNESCO) have already emphasized the need to address the climate and environmental crisis and promote the sustainable transformation of cities [19]. In addition, due the joint promotion of U4SSC by UNECE and ITU, a Smart Sustainable City (SSC) initiative that has been combining smart cities and green cities since 2016, questions need to be raised about the fundamental background of the Korean government and their promotion of a separate Smart Green City project similar to it [20,21].

Unfortunately, despite the support of the President, the Smart Green City project, in which approximately KRW 290 billion (approximately USD 210 million) was invested over two years and 25 local governments participated, did not achieve any results [15]. Then, in relation to this, criticisms poured out, such as the short project implementation period, the lack of use of smart technologies including ICT, and poor consideration of the friction between the project and existing urban planning [22–26].

In this context, this study inferred that the Korean government's Smart Green City project may be the result of a combination of related projects promoted by previous governments. It is assumed that attempts to obtain quick results in a short period of time ultimately yielded no results. Based on these inferences and assumptions, this study focuses on the mechanism that led to the full-scale promotion of the Smart Green City project, and to solve these questions, it traces the roots of the Smart Green City project in a historical and institutional context and identifies the crucial changes that occurred before the project began.

This study seeks to reflect the critical juncture framework of historical institutionalism as a methodology for in-depth analysis. Historical institutionalism has been used in comparative social science research for over 60 years. The key concepts of this methodology include path dependence, historical context, and critical junctures. This perspective ex-

plains policy phenomena by identifying how institutions form and operate. In political and policy processes, the scope of policy actors' choices depends on the institutional framework, and policies emerge as a result of the interactions between policy actors within this institutional framework. In other words, policies are viewed as products of institutions. Once institutions are formed, they follow specific paths and exhibit path dependence, whereby policy patterns are maintained. As past choices limit the scope of future choices, it becomes increasingly difficult to deviate from existing paths over time. A critical juncture is the point of choice between two or more alternatives when a particular option is adopted. It is useful for explaining both (1) the historical origin and maintenance of social order and (2) the occurrence of social change through sudden and large leaps [27,28].

While institutions change gradually, they can undergo rapid transformation in response to exogenous and endogenous environmental changes. Therefore, the critical junctures at which social relations and institutions are reshaped in response to political, economic, and environmental crises and challenges are significant for the study of policy change. The critical juncture framework is a theory of institutional emergence and change, and a well-developed set of research methods for analyzing institutional change from a comparative perspective. This methodology has proven effective for identifying the cause of policy change because it emphasizes the role of actors, events, and institutional contexts in creating lasting institutions [29,30].

On the basis of this theoretical framework, this study examines whether past institutional contexts and path dependences influence the initiation and subsequent performance of Smart Green City project at critical junctures. Therefore, the goal of this study is to use a critical juncture approach to identify the mechanism of policy change that led the Korean government to fully pursue the Smart Green City project, and to derive useful implications for future policy choices.

This paper comprises five sections. The introduction section raises the issues of the Smart Green City project, which was launched while Korea was still unable to escape the stigma of being a "climate villain", and presents the research purpose. The literature review section provides a theoretical review of historical institutionalism, path dependences and critical junctures. The third section, comprising the research methodology, covers research frameworks and questions based on the critical juncture framework and provides a case study. The next section presents the results of the analysis, which are divided into the following elements, presented in a table: antecedent conditions, permissive conditions, critical junctures, reactive sequences, counter reactions, outcomes and a summary of the findings. Finally, the discussion section summarizes the main arguments, synthesizes the policy mechanisms and suggests useful implications for future policy choices.

2. Literature Review

2.1. Historical Institutionalism and Path Dependence

Historical institutionalism emerged in the 1970s, when comparative political scientists sought a methodology able to explain policy differences between countries [31–33]. In particular, it quickly emerged as a major approach in the social sciences, amid growing critical awareness of behaviorism and its potential as an alternative. Under historical institutionalism, institutions establish patterns of human behavior over a long period and act as an external constraint on the behavior of individuals or groups. Institutions also constrain the government's ability to formulate and implement policy, and both delimit the actions of and provide opportunities for political and economic actors [34–36]. Historical institutionalism has been used to analyze political, economic, and social processes as interactions between actors and structures under institutional constraints. In other words, the approach focuses on whether institutions shape the power, interests, preferences, and behaviors of actors in relation to other actors [37–40].

As a comparative research methodology, it emphasizes the use of institutions, history, and context as variables that explain policy formation and the differences between countries. Contending that different institutions, histories, and contexts lead to differences in policy,

this qualitative analytical approach derives similarities and differences between policies by examining the history and context of policy case studies based on the existing literature. Moreover, because it focuses on vertical and horizontal institutions and institutional contexts in which individual policies are implemented, and adopts a historical approach to explain such institutional contexts, historical institutionalism can explain the administrative phenomena that appear in accordance with the social, political, and economic systems of a specific country.

The core concept of historical institutionalism, path dependence, refers to the causal influence of early historical events on the development of later events. Once a policy or institution enters a specific path, it rarely deviates from that path, even if the path is later recognized as inefficient. Therefore, path dependence is a process wherein past choices limit the scope of future choices and is characterized by the fact that decision making is connected in a time series [41]. As Table 1 shows, there are two major types of path dependence: self-reinforcing and reactive. Self-reinforcing sequences indicate that policies are continuously reproduced without change. They represent a set of forces or processes that reproduce a particular pattern of events, choices, or activities over time, making it difficult to abolish existing policies. Self-reinforcing sequences can be classified into increasing returns, negative feedback, and cyclical processes. Increasing returns refer to the continuous maintenance or reproduction of the same institution or policy. As the selection and maintenance of a path operates based on a different logic, the path continues even if the actor who chooses the path disappears at a critical point. Path reproduction mechanisms cement a given pattern, ensuring effective reproduction and making it very difficult to abolish. Negative feedback refers to the balancing process as a path unfolds. After the flow appears to deviate from the path for a period of time, negative feedback effects bring the path back into balance. Cyclical processes refer to the occurrence of a cycle between two alternatives.

Table 1. Types of path dependence.

Classification		Description
Reinforcing Sequences	Increasing Return	The maintenance and reproduction of existing institutions and policies
	Negative Feedback	Mechanism of balancing procedure as the path unfolds
	Cyclical Processes	Circulation between two alternatives
Reactive Sequences		The formation of one path as plural events are connected under necessary and sufficient conditions

Source: Mahoney (2000) [24], Bennett and Elman (2006) [39].

Meanwhile, reactive sequences are formed by the accidental combination of several events, which then cause the subsequent event [27,42]. In this sequence, multiple events intersect accidentally in conjunctures, causing subsequent events; these result in a chain of reactions that form a single path of temporally ordered and causally linked events. For events to be dependent on the reactive path, the initiating historical event must be a coincidental combination, and the overall chain of events must have inherent sequentiality. Self-reinforcing sequences are characterized by regenerative processes that reinforce the initial event, while reactive sequences are characterized by repulsive processes that transform and possibly reverse the initial event [27]. However, reactive sequences in the critical juncture period are likely to vary in their capacity to disrupt, transform, or reproduce the institutional outcomes of the critical junctures themselves. Some outcomes may be reinforced or "locked in" by reactive sequences that they effectively channel, creating path-dependent institutional legacies. Others may be transformed by reactive sequences that disrupt initial outcomes and create long-term institutional legacies that sharply diverge from them [40,43].

According to Pierson, the following four factors cause path dependence in institutions and policies. The first is large set-up or fixed costs. In this regard, when actors make a large investment in a specific system, they will try to maintain the system to recover the costs. The second factor is learning effects. When actors work for a long time in a system that moves along a specific path, they become familiar with the system and gain more knowledge, and thus continue maintaining the system for the sake of system efficiency. The third factor is coordination effects, that is, the benefits that a set of actors can gain from following a specific path increase when other actors adopt the same path. The fourth is adaptive expectation, which refers to the fact that when other competitors expect to follow a certain path, they choose an alternative to avoid falling behind [35].

Mahoney proposed the following four explanations of path dependence. The first is the utilitarian explanation, whereby actors ultimately pursue efficiency and rationally reproduce the institution from a cost–benefit perspective. Institutional change occurs when actors who pursue rational self-interest are unable to reproduce a given institution. The second, the functional explanation, holds that institutions are created because of the benefits they will produce. In other words, if a specific institution is adopted because of an accidental event, the adopted institution contributes to the specific function of the system, which leads to the expansion of the institution, strengthening its capacity and ultimately hardening it. Third, the power explanation is similar to the utilitarian explanation in that it assumes that actors make decisions based on cost–benefit. However, it differs in contending that, if the institution distributes costs and benefits unfairly, it will continue if the elite group that benefits from the existing institution has sufficient power to maintain it. Finally, the legitimization explanation holds that the reproduction of an institution is based on the actor's trust in what is right. In this scenario, an institution is path dependent because actors consider it justified and reproduce it voluntarily. Therefore, even if the previous institution had greater legitimacy, the original institution is strengthened because the preferred institution becomes the standard for assessing legitimacy [27].

Meanwhile, Thelen explained the factors of path dependence in terms of layering and conversion. Although the purpose of layering does not change significantly, some elements of the existing policy are partially changed. Conversion refers to a major change in the role and function of existing policies for new purposes [44]. Table 2 summarizes the factors of path dependence according to Pierson, Mahoney, and Thelen.

Table 2. Factors of path dependence identified by Pierson, Mahoney, and Thelen.

Scholars	Factors
Pierson (2000) [32]	Large set-up or fixed costs Learning effects Coordination effects Adaptive expectation
Mahoney (2000) [24]	Utilitarian explanation Functional explanation Power explanation Legitimation explanation
Thelen (2003) [44]	Layering Conversion

2.2. Critical Junctures

Theorizing about critical junctures began in the social sciences in the 1960s. Since then, it has become a mainstay of historically informed social science research. Historical institutionalists emphasize the continuity of institutions and highlight path dependence and unintended consequences when explaining institutional change and development. The theoretical framework of critical junctures is centered on the idea that critical turning points are major macro-level change episodes that produce a lasting legacy. Closely associated with comparative historical research and qualitative methods, the concept of critical junctures

has been applied to case studies on a wide range of topics, including state formation, political systems and democracy, party systems, public policy, government performance, economic development, and cultural norms [45,46].

As seen in Section 2.1, path dependence does not mean the "stagnation" or "fixation" of a path, but a differentiated and self-reinforcing path of institutional development. In this process, critical junctures, that is, "turning points" where the institutional development path diverges, are significant. Not all institutions are products of critical junctures. After all, they sometimes develop gradually, and their specific starting points are not always identifiable. However, if major institutional changes occur over a relatively short period, they can be assumed to be influenced by a critical juncture [28].

Historical institutionalism emphasizes external shocks or crises as factors of institutional change. The occurrence of a critical juncture or specific event in an existing institution results in uncertainty. In this situation, various options, such as drastic institutional change, may be presented. During such periods of uncertainty, key actors must choose from several alternatives to create a long-lasting legacy. Therefore, to identify the institutional changes and consequences resulting from critical junctures, it is necessary to understand antecedent and permissive conditions [47].

Antecedent conditions refer to the pre-critical juncture period and historical factors encompassing the diverse features of the economy, society, and politics that constitute the parameters of subsequent change. Permissive conditions can be defined as factors or conditions that change the underlying context to increase the causal power of agency or contingency, shaping the prospects for divergence. In this process, the mechanisms involved in the reproduction of the previous critical juncture are undermined, creating a new context in which divergence from the previous stable pattern can emerge [28,45].

3. Research Methodology

3.1. A Critical Juncture Framework as a Methodology

To examine the process and causes of change occurring at critical junctures in Korea's Smart Green City project, this study adopts Sorenson's critical juncture framework, which is used for the causal analysis of rapid institutional changes. In Sorensen's critical juncture framework, historical events unfold according to historical sequence. Sorensen proposed the critical juncture framework for examining the change process of urban planning, advancing its value for the causal analysis of theoretical explanations and institutional change processes [28]. In the critical juncture framework, a critical juncture is the point at which an option is selected from two or more possibilities and a diverging or developmental path begins. In particular, a critical juncture is important because once one of the various alternatives is selected, it is difficult to return to the starting point. Sorensen explained that a critical juncture can be defined as a period of significant change that occurs in a distinct way in a country or subunit of analysis, creating a distinct legacy. He argued that critical junctures are caused by a crisis that undermines the legitimacy of existing institutions, making it possible to reorganize them and create new ones [28].

As such, this study analyzed the change process of the Smart Green City project in Korea using Sorenson's analysis structure as a framework. The conceptual definitions of each stage are as follows. (1) Antecedent conditions: These are historical factors that structure the available options and choices at a critical juncture [46]. In this regard, this study investigated the Smart City project promoted before the Smart Green City project in the pre-critical juncture, as well as the Low-Carbon, Green Growth strategy, as antecedent conditions. (2) Permissive conditions: These are factors that permit major changes to institutions or policies, that is, the "cleavage" or "crisis" events that enable institutional change and trigger the critical juncture [46]. This study identified the crisis in political leadership and the emergence of Sustainable Smart City initiatives as permissive conditions. (3) Critical junctures: Shaped by productive conditions, a critical juncture refers to the moments or events that provide an opportunity for institutional change. The productive conditions take into account the antecedent factors of a specific case, the key actors, the

institutional context, and the order of institutional development. In this respect, the critical juncture is the moment in which a new institution or policy (the "legacy") is selected from among multiple possibilities through "mechanisms of production" and becomes path dependent because of "mechanisms of reproduction" [27,47,48]. In this respect, this study focused on the external pressure on the international community's climate crisis response plan and the context that led to the formation of the Smart Green City project according to the beliefs of the political leadership during the critical juncture. (4) Reactive sequence: This refers to sequences of reactions and counter reactions to major changes. It is a reactionary process that transforms and reverses initial events. For this stage, this study investigated the central government's reaction and the local government's counter-reaction in the process of promoting the Smart Green City project. (5) Outcome: The final stage involves the resolution of conflicts over changes made during the critical juncture. This study explored the results of a Smart Green City project promoted by local governments.

3.2. Case Study Approach

3.2.1. Research Questions and Methods

The research framework in Figure 1 illustrates the key analytical elements and research flows implemented by the government within the research timeframe related to the Smart Green City project, based on Sorensen's critical juncture framework.

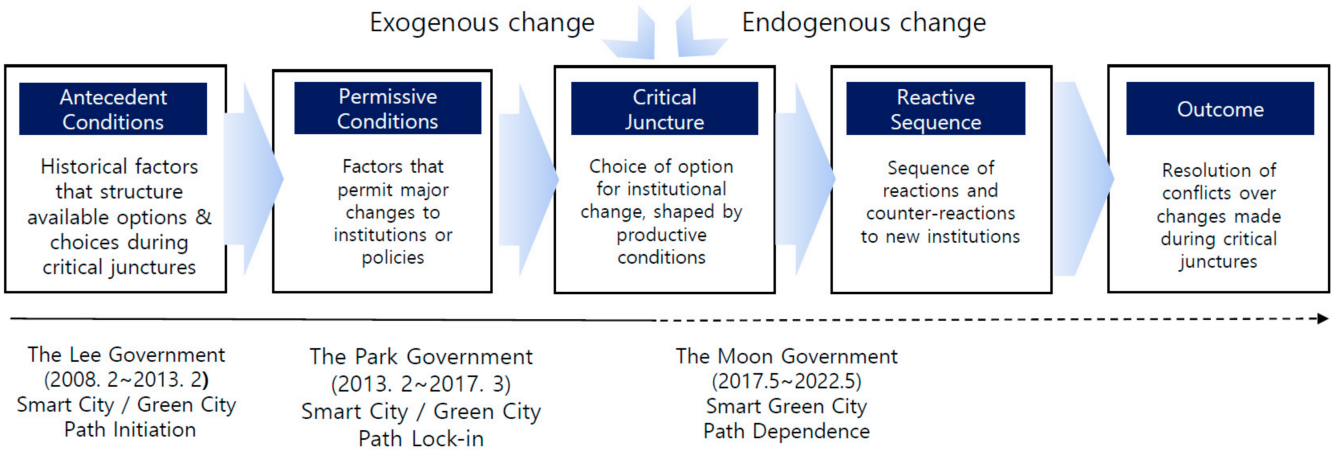


Figure 1. Research framework. Source: Author's Summary.

This study aims to identify the policy change mechanism that led the Korean government to fully promote the Smart Green City project. Accordingly, based on the literature review, the research questions addressed in this paper are as follows:

- How does the Smart Green City project relate to the institutional context of previous governments' smart city and green city policies?
- What role, from the perspective of critical junctures, did the Moon administration play in the birth of the Smart Green City project, and how could the institutional context, key actors, and events be explained?
- What is the path dependence of the Smart Green City project on the relevant policies of previous governments?
- What are the features of relevant policy changes before and after the launch of the Moon administration's Smart Green City project?

Moreover, it employs a descriptive case study method and reviews domestic and international literature related to the Smart Green City project and critical junctures. In other words, literature, statistics, and web documents related to the Smart Green City, smart sustainable city, green city, and ubiquitous city (U-city) published by domestic and international organizations are collected and reviewed. Unlike empirical research, this descriptive case study method focuses on "what is" and "what was" rather than answering the "why" and "how". Therefore, this study emphasizes the identification of variables and

observations based on critical thinking, and analyzes the current situation by reviewing and evaluating past problems and solutions.

Briefly, this study focuses on the Smart Green City project in Korea; deals with two conceptual topics, the smart city and green city, considered to be related to the emergence of the Smart Green City project; and examines the process of change in related policies. In this paper, a smart city is defined as a platform city that improves the quality of life of citizens, strengthens the sustainability of the city, and fosters new industries by utilizing innovative technologies of the Fourth Industrial Revolution [49]. A green city, also called an eco-city or sustainable city, is a city in which the environment and economy coexist, reorganizing all urban structures into a low-carbon system to respond to environmental conservation and climate change, and creating jobs and new growth engines to promote economic growth [50,51]. A U-city is defined as an environmentally friendly and sustainable smart (or knowledge) city that makes ubiquitous computing available to urban elements such as people, buildings, infrastructure and open space [52]. From the perspective of the Smart Green City project, a smart green city is a future environmental city that increases climate resilience, uses resources and energy efficiently, and minimizes pollutant emissions based on local leadership and resident participation to transform the city into an economically prosperous and green city [17].

The temporal scope is set from 2008 to 2022, that is, from when the Lee Myung-bak administration was launched, through the Park Geun-hye administration, to when the Moon Jae-in administration left office.

3.2.2. Overview of Korea's Smart Green City Project

Led by the Ministry of Environment, Korea's Smart Green City project sought to mitigate the threat of the climate and environmental crisis. Indeed, 91.8% of the Korean population lives in cities, and greenhouse gas emissions have reached 75% [53–55].

Korea, which showed a low CCPI in overall sectors, ranked very low in the CCPI greenhouse gas emissions and energy use sectors, and also low in the renewable energy and climate policy sectors [11]. Ironically, as shown in Figure 2, Korea's CCPI greenhouse gas emissions decreased slightly before the launch of the Smart Green City project in 2020, but began to increase again in 2021 when the project actually began; its ranking in CCPI by country also fell from 60th in 2023 to 64th in 2024 [56,57].

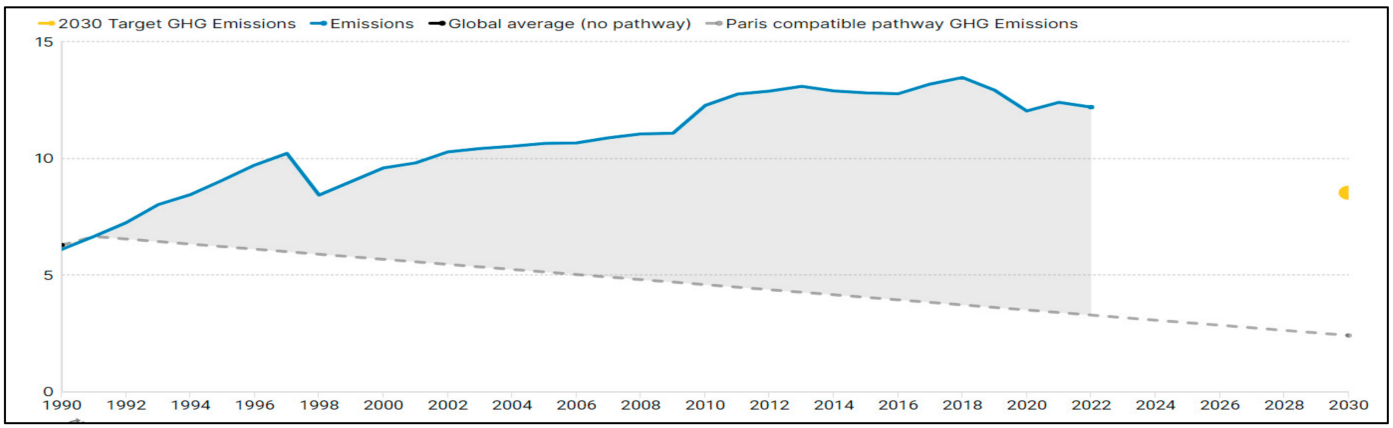


Figure 2. Korea's GHG emissions per capita (CO2 eq., incl. LULUCF). Source: Climate Change Performance Index (CCPI). 2024 [52].

As Figure 3 shows, according to a Ministry of Environment press release, the project envisioned a sustainable "future environmental city" where humans and nature coexist [17,58]. In this regard, a future environmental city refers to the transformation of a city into an economically prosperous and green city by increasing climate resilience, using resources and energy efficiently, and minimizing pollutant emissions based on local leadership and

resident participation. Here, the transition to a green city is understood as the transition from a growth-driven society to an ecological and environmentally sustainable society.

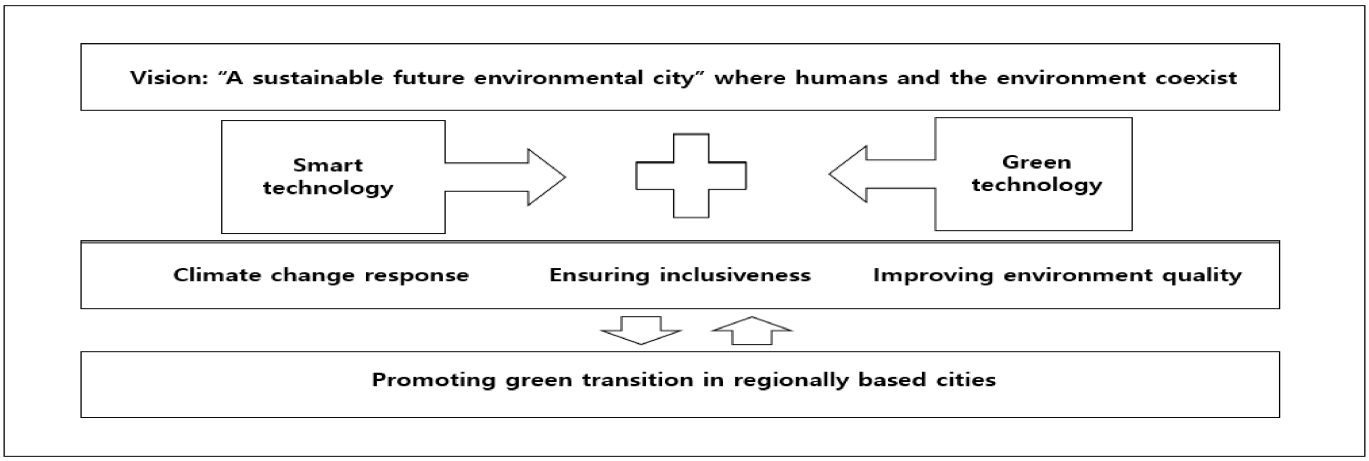


Figure 3. Vision of Smart Green City Project. Source: Ministry of Environment. Press Release. 2020 [17,58].

More specifically, the Smart Green City project identified the following goals:

- Climate change response: Achieve carbon neutrality in order to lay the foundation for a climate-resilient society.
- Inclusiveness: Enhance trust and cohesion through community participation.
- Enhancement of environmental quality: Achieve ecological conservation and a reduction in pollutant emissions based on human–nature symbiosis.

In this context, "green" refers to a traditional method of improving the environment, while "smart" refers to a new and innovative method of improving the environment. The principle of the project is that the region, that is, the local government, should proactively prepare measures to enhance environmental performance to improve the sustainability of urban green transformation, and that the central government should provide financial support, discover innovative projects, and serve as a platform for the expansion of the project.

The Smart Green City project is a representative project for "recovering the city's green ecosystem" among the eight tasks of the Green New Deal announced by Moon's administration. A public offering period of approximately 80 days was set from September 2020, with the project open for public offering until the end of December of that year. Of the project plans submitted, a total of 25 target areas were selected. The total project cost approximately KRW 290 billion (approximately USD 209.9 million), of which 60%—that is, KRW 170 billion (approximately USD 123 million)—was invested by the national treasury, while the remaining 40% (KRW 120 billion, or approximately USD 86 million) was invested by local funds.

As Table 3 shows, the project was divided into four major implementation areas, comprising ten climate and environmental business types.

Table 3. Business types included in the Smart Green City Project Guidelines.

Dimension	Resilience			Low Emissions		Ecological Restoration			Human-Centered	
Basic direction	Build urban resilience to respond to climate change			Establish low-emission support infrastructure to reduce greenhouse gases		Restore the urban ecosystem to preserve and restore the natural environment and enhance accessibility			Improve living conditions, including environmental education and the protection of vulnerable groups	
Business type	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩
	Climate elasticity	Water circulation	Water safety	Future car	Resource circulation	Ecological restoration	Ecological rest	Clean atmosphere	Environmental education	living conditions

Source: Ministry of Environment. Press Release. 2020 [17,58].

In particular, as Figure 4 shows, the project recommended spatial and organic linkages between business types with the potential to create synergies by utilizing applicable smart technologies; this included for example, creating co-benefits by linking environmental issues and smart technologies.

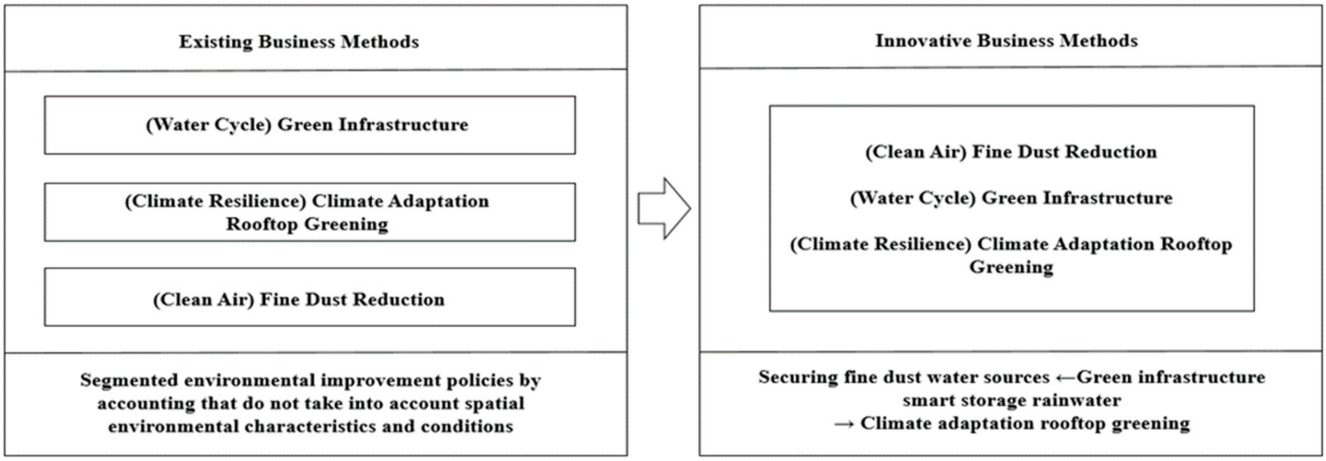


Figure 4. Business methods in the Smart Green City Project. Source: Ministry of Environment. Press Release. 2020 [17,58].

Table 4 presents the two Smart Green City business models. Specifically, the "common model" aimed to create a ripple effect at the community level by combining two or more business types to solve climate problems. If selected, each local government could receive up to KRW 10 billion (approximately USD 7.24 million) in support over a period of two years. Meanwhile, the "general leading model" provided support of up to KRW 16.7 billion (approximately USD 12 million) over a two-year period to each selected local government. This model advocated for the combination of three or more business types with the goal of actively greening urban spaces beyond the community. In both models, regions (local governments) led the project.

Table 4. Common model vs. general leading model.

Category	Common Model	General Leading Model
Main purpose	Local-led solutions to climate and environmental issues	Local-led climate and environmental problem solving + green transition
Applicable unit	Community	Community or more
Number of the linked business types	Combination of 2 or more of 10 business types	Combination of 3 or more out of 10 business types
Selection scale	Around 20 locations	Around 5 locations
Scale of support	Up to KRW 10 billion/2 years	Up to KRW 16.7 billion/2 years

Source: Ministry of Environment. Press Release. 2020 [17,58].

Furthermore, the Ministry of the Environment ran a "Smart Green City Support Group" during a contest period to provide advice and help local governments prepare their business plans. The Green City Support Group was supposed to be limited to agencies under the Ministry of the Environment, with no other participating ministries [17].

4. Results

4.1. Antecedent Conditions

4.1.1. The Lee Government's Low Carbon, Green Growth Strategy

Upon commencing his five-year term in February 2008, President Lee promoted a green growth and ubiquitous strategy. In 2008, he proposed a low-carbon green growth

strategy as a new national growth engine in his National Liberation Day speech. This strategy sought to advance Korea's economic and industrial structure by combining the two values of the environment (green) and growth using green technology, further developing technology, and encouraging the adoption of low-carbon lifestyles [59–61].

However, due to the occurrence of the global financial crisis after the announcement of the aforementioned strategy, the Lee administration promoted the Green New Deal as a means of overcoming the domestic economic crisis. The Green New Deal sought to restore the four major rivers, develop new and renewable energy, improve energy efficiency, and expand the green transportation network. It became the cornerstone of Korea's strategy to overcome the financial crisis and received considerable attention when it provided valuable insights for member countries at the G20 Summit held in London in April 2009 [9]. The Lee government subsequently launched the Presidential Green Growth Committee and enacted the world's first "Framework Act on Low Carbon, Green Growth" in December 2010. The law aimed to establish the foundation necessary for low-carbon green growth and promote the development of the national economy by utilizing green technologies and industries that minimize greenhouse gas and pollutant emissions. It also specified that the government must establish a low-carbon, green growth national strategy to address climate change, energy, and resource issues; expand growth engines; ensure the efficient use of land; and create a pleasant environment [62]. The law affirmed the state's commitment to taking responsibility for global issues. That said, the law contained no expression or explanation of the term "green city" [63].

The Lee government emphasized the three elements of strategy, technology, and financial resources to support and promote green growth as a global architecture. To this end, the government established the Global Green Growth Institute (GGGI) and Green Technology Center (GTC) [64]. Led by the Korean government, the GGGI was officially promoted at the 2012 United Nations Conference on Sustainable Development—also known as Rio + 20—as a treaty-based intergovernmental organization supporting sustainable economic growth in developing countries and emerging economies based on the principles of social inclusion and environmental sustainability [65].

The Green Climate Fund (GCF) was established at the 16th Conference of the Parties on Climate Change (COP 16) held in Cancun, Mexico, in December 2010, and Korea subsequently hosted the GGGI and GCF headquarters in Seoul and Songdo, respectively [66]. Launched in February 2009, the Presidential Green Growth Committee played a key role in reviewing, inspecting, and evaluating major policies related to national low-carbon and green growth, and the establishment of a five-year Green Growth Plan during the President's five-year term.

4.1.2. The Ministry of Land, Transport and Maritime Affairs' U-City Project and the Invisible Smart Green City Under the Lee Government

The predecessor of the smart city, the concept of the ubiquitous city or "U-city", emerged as a topic of discussion in Korea in the late 1990s, and finally came to fruition in 2008, with the enactment of the Ubiquitous Act by the Lee administration [67].

Exemplified by Songdo city, the concept of the U-city predates that of the smart city in Korea. Unlike smart cities, which focus on connectivity inside and outside the city, the U-City focuses on the completeness of the unit city using ubiquitous technology. As the department in charge of the U-city project, the Ministry of Land, Transport, and Maritime Affairs announced their comprehensive plans for a first and second U-city in 2009 and 2014, respectively. The U-city project initially aimed to innovate all aspects of the city, including increasing the convenience of urban life and improving quality of life, safety, and citizen welfare by utilizing ubiquitous information technology. However, issues related to climate change and the global environmental crisis were not addressed.

The Ministry of Land, Transport, and Maritime Affairs also addressed the concept of the green city, that is, a basic spatial unit that improves the quality of life of city residents by reducing and absorbing the greenhouse gases emitted from industry, buildings, and

transportation. Meanwhile, the Ministry of Environment defined a green city as a city that drives green growth by reducing greenhouse gases and environmental pollution, and creating jobs as a new growth engine by reorganizing urban infrastructure and lifestyles into low-carbon ones [68]. However, at that time, research on the technological application of green cities had only been conducted at research institutions and had yet to undergo comprehensive planning and implementation. It thus emerged as an antecedent condition for the Smart Green City project [69,70].

4.2. Permissive Conditions

4.2.1. The Park Government's Creative Economy Strategy and the Phasing Out of Lee's Green Growth Strategy

After taking office in February 2023, the Park administration replaced the previous government's national vision of green growth with one championing a "creative economy". Indeed, green growth virtually disappeared at the beginning of Park's term. The Framework Act on Low Carbon and Green Growth was revised, and the status of the Green Growth Committee—a legal deliberation body that was as a key actor in the previous government's green policy—was reduced from a body under the president to one under the prime minister. Although the Lee government secured a powerful position internationally in the fields of climate change and green growth, it suffered political difficulties domestically throughout its term because of issues with the Four Major Rivers Project. As such, there was little reason for Park's government to continue its legacy [71,72].

In contrast to its predecessor, the Park government focused its climate policy on promoting a creative economy and fostering low-carbon technology-based industries combining cutting-edge science and technology with ICT. During her term, President Park established the Second Five-Year Green Growth Plan and the National Energy Basic Plan, which aimed to reduce national greenhouse gases and revitalize renewable energy. Unable to ignore climate issues at the global level, the Park administration prepared Korea's NDC when the Paris Agreement was adopted in 2015 and came into effect in 2016. As part of these efforts, Korea intends to reduce greenhouse gas emissions by 55 million tons by 2030. Notably, Korea increased its installed solar PV capacity to more than 1 GW by 2015, with the country ranking seventh in the world during Park's presidency [73].

Overall, green growth was not a major national task for the Park administration, and appears to have been used as a response tool to revive the energy industry. Unlike the Lee government, which was the same political party, the Park government was seen as providing a weak response to climate change and global environmental issues as the host country of the GGGI and GCF.

4.2.2. Less Visible Smart Green City Initiatives Under the Park Government

At the global level, the Paris Agreement was unanimously passed at the 2015 United Nations Framework Convention on Climate Change Conference (COP21). With Korea ranked as the seventh largest producer of CO2 emissions in the world, the Park government submitted a plan to significantly reduce emissions. As noted, similar notions such as the ubiquitous eco-city (U-Eco City), carbon-neutral green cities, and low-carbon green cities had already emerged under the previous government. However, during the Park administration, the ITU and UNECE introduced the concept of smart sustainable cities at the global level, resulting in domestic research and the inclusion of projects aiming to solve problems with the living environment in existing smart city projects [74–76].

As such, interest in smart green cities grew during this period, with an increased preference for cities with more advanced smart technologies than U-city. Nevertheless, there were no government-level green city-related projects, and smart green city research had only been conducted at the R&D level. That said, projects that included green city elements were actively promoted as smart city projects at the time. For instance, in 2016, Pohang, a major steel manufacturing city, implemented the "Green Way" project, which combined an open smart city platform with eco-friendly green city factors [77,78].

Under the Park government, the concepts of the U-City and smart city coexisted. The Smart City project was managed by the Ministry of Land, Infrastructure, and Transport, which changed its name to its current name in 2013. These two grounds seem to have influenced how the next administration structured its Smart Green City project.

4.3. Critical Junctures

4.3.1. Pressure from the Global Community During the Moon Administration

Coming to power in 2017, the Moon administration sought to innovate the overall energy structure by emphasizing the safety of the energy mix, reducing nuclear power plants and fostering a new and renewable energy industry. In particular, the Moon administration encouraged the active participation of civil society in the government policymaking process, as well as the phasing out of nuclear power and the expansion of new and renewable energy. In this respect, the government planned to decommission nuclear power plants, reducing the number thereof from 24 in 2017 to 14 by 2038. Plans to build new power plants were canceled, extending the lifespan of existing nuclear power plants was banned, and the country's first nuclear power plant was shut down ahead of schedule [79]. However, despite these energy transition efforts, the Moon administration's interest in climate change—especially in terms of reducing greenhouse gas emissions—appears to have been lacking.

Meanwhile, in October 2018, the IPCC, a UN affiliate, released the Special Report on Global Warming of 1.5 °C [80]. Subsequently, in December 2018, the EC released "A Clean Planet for All", which declared that carbon neutrality should be reached by 2050. Announced in 2019, the European Green Deal Plan included a "strategy to achieve carbon neutrality by 2050", known as a new economic growth engine, climate protection, and industrial strategy. At the global level, the United States, Canada, Japan, and China followed the EU in declaring carbon neutrality goals for 2060.

4.3.2. COVID-19 and the Green New Deal Proposals Under the Moon Government

Under global pressure, the Moon administration faced two challenges. The first was the unexpected threat of COVID-19, which necessitated an economic stimulus package due to the economic downturn. The other was the 2015 Paris Agreement, which required the establishment of a Long-Term Low-Greenhouse Gas Emissions Development Strategy (LEDS) by 2020. In this respect, the Korean government had yet to prepare any such measures. Thus, when the Moon administration announced the Green New Deal in July 2020, its goal was to overcome both the economic crisis caused by COVID-19 and the emergent climate and ecological crises. The Green New Deal comprised 12 major tasks in four areas, with the goal of achieving a carbon-neutral economy from 2020 to 2025. The four areas were as follows: (1) the green transformation of cities, spaces, and living infrastructure; (2) the expansion of low-carbon distributed energy; (3) the development of a green industry innovation ecosystem; and (4) the establishment of a foundation for carbon neutrality (new establishment). As the department in charge of the Green New Deal, the Ministry of Environment announced the 2050 LEDS on 30 December 2020, which established Korea's 2050 vision and the basic direction for achieving climate neutrality by 2050 [79,81].

At the end of its term, the Moon administration officially announced the 2050 carbon-neutrality goal and sought to strengthen the institutional foundation necessary to move toward a carbon-neutral society. As part of this institutional foundation, the Presidential Carbon Neutrality and Green Growth Committee was launched in May 2021, followed by the enactment of the Framework Act on Carbon Neutrality and Green Growth in September 2021. Although the Moon government's institutionalization of the net-zero goal has been evaluated positively, Korea's greenhouse gas emissions increased by 4.2% in 2021 compared with the previous year, raising questions about the feasibility of achieving its neutrality goal. Moreover, a considerable number of NGO group members participated in government

ministries and commissions, eliciting constant objections regarding their qualifications and expertise [79].

4.3.3. Initiation of the Smart Green City Project for Carbon Neutral and Green Society Under the Moon Government

In order to overcome the limitations of the U-city, the Moon government revised the Smart City Act in 2017, announced a smart city promotion strategy in 2018, and established the 3rd Smart City Comprehensive Plan (2019–2023) in 2019. The government also passed the Act on the Promotion of Smart City Development and Industry in 2019, which defined "smart cities" as sustainable cities that improve urban competitiveness and quality of life based on ICT, linking smart cities to sustainable development. President Moon saw the Green New Deal, which included carbon neutrality and greenhouse gas reduction goals, as related to the environment, and designated the Ministry of Environment, rather than the Ministry of Land, Infrastructure, and Transport, as the ministry in charge of the project. As part of the Green New Deal, the Ministry of Environment initiated the Smart Green City project to secure a green urban ecosystem by 2020 [62]. Significantly, the Moon government transformed the Smart Green City project from a research project led by the Ministry of Land, Infrastructure, and Transport under the Park government into a project managed by the Ministry of Environment [82].

4.4. Reactive Sequence

4.4.1. Appointment of the Ministry of Environment to Lead the Project

In August 2020, the Ministry of Environment formed a support group for the Smart Green City public offering project and distributed project guidelines shortly thereafter [83]. The primary goal (vision) of the guidelines was to realize a sustainable future environmental city in which humans and nature coexist, as shown in Figure 2. The secondary goal was to promote locally led urban green transformation using green and smart technology and to improve the response to climate change, inclusiveness, and environmental quality. The project objectives emphasized the use of smart technology, inferring that smart technology was a means of achieving these goals. However, as Table 3 shows, the project's four major areas and basic directions do not clarify why and how smart technology should be used to transform cities into green cities. Although several countries have followed the development framework of Smart Sustainable Cities to solve various social and environmental problems, including carbon neutrality based on smart cities, Korea's Smart Green City project adopted a different approach [84].

4.4.2. Counter Reactions of Local Governments to the Project

A total of 100 local governments participated in the three-month project contest conducted by the Ministry of the Environment, with an average competition rate of 4 to 1. Among the 25 selected local governments, the general leading model received KRW 16.7 billion and the common model received KRW 10 billion in project expenses over a period of two years. Table 5 presents the final 25 Smart Green City project locations, the local governments of which signed an agreement with the Ministry of Environment in March 2021 [85]. As such, the local governments reacted positively to the Ministry of Environment's Smart Green City project. Distinctively, local governments that already had favorable conditions, such as the granting of bonus points, were more active in applying for budget support from the central government.

Table 5. The final list of local governments selected for the Smart Green City Project.

25 Locations	Bucheon city, Seongnam city, Ansung city, Anyang city, Yangju city, Pyeongtaek city, Hwasung city, local governments in Gangwon-do, Gangneung city, Jincheon county, Gongju city, Jangsu county, Jeonju city, Gangjin county, Suncheon city, Jangheung county, Haenam county, Sangju city, Pohang city, Gimhae city, Miryang city, Seo-gu of Incheon city, Dong-gu of Gwangju city, Saha-gu of Busan, Jeju city

Source: Ministry of Environment [85].

4.5. Outcome

However, despite spending 93% of the national treasury funds allocated to the Smart Green City project over the past two years, not a single one of the 25 selected local governments has achieved their goals. In view of these outcomes, the Ministry of Environment was criticized for not allocating enough time to conduct briefing sessions, contests, and the local government selection process, as well as failing to thoroughly review project feasibility or effectiveness. Indeed, during the project period, some local governments voluntarily abandoned the project and several others were explicitly ordered by the Ministry of Environment to halt the project [22–24].

Regarding the cause of these outcomes, it is worth noting that, among the variables that influenced Nakamura and Smallwood's policy implementation, the policy goals were unclear [86]. In other words, since the Ministry of Environment did not present specific measures other than the need to use smart green technology, it seems that the local governments selected for the project had difficulty starting the project immediately. Ultimately, due to the ambiguity of the goal and the lack of specific means to achieve it, it would have been challenging to guarantee the sustainability of the Smart Green City project.

4.6. Summary of Findings

Table 6 presents detailed results. Number (1) to number (3) are the results of the analysis elements within the critical juncture framework. Number (4) and (5) are explanations of the results of preceding numbers (1) to (3).

Table 6. Summary of Smart Green City Project mechanisms.

No.	Elements	Lee Government	Park Government	Moon Government
(1)	Institutional context: Conceptualization of the Smart Green City	Solely use of U-city	Invisibly mixed use of Smart City, Green City, and Smart Sustainable City	Separate use of Smart City and Smart Green City
(2)	Key actors	Presidential Green Growth Committee/Ministry of Land, Transport and Maritime Affairs	Prime Minister's Green Growth Committee/Ministry of Land, Infrastructure and Transport	Carbon Neutrality Commission/Ministry of Environment
(3)	Events	Low Carbon, Green Growth strategy/Green New Deal	Creative Economy strategy/Low Carbon, Green Growth strategy	Carbon Neutrality and Green Growth strategy/Green New Deal
(4)	Type of path dependence	Self-reinforcing sequences		Reactive sequences
(5)	Features and variables of policy change related to the Smart Green City project	Policy initiation/Antecedent condition	Maintaining the existing policy/Permissive condition	Reproducing the existing policies/Critical juncture

(1) Institutional context (process of conceptual change in the Smart Green City): In this regard, this study identified the institutional context that led to conceptual changes from a U-city to a smart city and from a smart city and a green city to a smart green city. Unlike previous governments, the Moon administration appears to have focused on pursuing smart city and smart green city policies separately.

(2) Key actors: Under the Lee government, key players in related policies included the President's Green Growth Committee and Ministry of Land, Infrastructure, Transport, and Maritime Affairs. Under the Park government, the Prime Minister's Green Growth Committee and the Ministry of Land, Infrastructure, and Transport were the responsible ministries. However, under the Moon government, the Carbon Neutrality Committee and Ministry of Environment were key policy actors. A distinctive feature was that the chairmen and ministers of these institutions were all from NGOs.

(3) Events: The Lee government took the lead in responding to climate change by promoting a low-carbon green growth strategy and the Green New Deal plan. Although the Park government established a new energy industry revival strategy called the "creative economy", it attempted to maintain the low-carbon green growth strategy promoted by the

Lee administration. Meanwhile, the Moon government appears to have copied many of the strategic names and concepts used by the Lee government [76,77].

The Lee and Park governments failed to fulfill their promises to the international community, including those related to carbon emission reduction, over their collective ten years in office, while other countries did so to a high level. Facing a sense of crisis and international pressure, the Moon government had no choice but to make strong appeals confirming their commitment to environmental redress, such as suggesting new goals and declaring definitive plans. However, as a change in regime approached, without time to introduce a new institution, the Moon government appears to have chosen a path dependent on existing institutions.

(4) Type of path dependence: As the Park government maintained the Lee government's U-city and green growth policies, its path dependence on existing government policy appears to have been a self-reinforcing sequence type. In contrast, the Moon government appears to have a reactive sequence type, insofar as it attempted to establish a new path by combining events through the Smart Green City project while reproducing the smart city and green city strategies of previous administrations.

(5) Features and variables of policy change related to the Smart Green City project: The Lee government's low-carbon, green growth strategy and Green New Deal were unique Korean policy attempts. This does not mean that similar laws and policies did not exist. As such, the main feature of the Lee government was the initiation of a policy that was an antecedent condition contributing to the shift toward smart green city orientation, rather than policy innovation. The Park government maintained most of the policies of the Lee government. Although no government-level projects were promoted under the Park administration, research on smart green cities was conducted. This seems to have become a permissive condition for the Moon government to launch the Smart Green City project.

The Moon government attempted to differentiate itself from existing government policies by designating the Ministry of Environment as the project enabler. However, local governments that implemented the project did not achieve the results they expected because the Ministry of Environment failed to present clear goals and means for the projects. These facts, under the Moon government, suggest that the Smart Green City project might have been promoted based on political judgment within the framework of the Korean Green New Deal's grand initiative, rather than being purely intended to create a carbon-neutral city to resolve environmental issues [21,87].

The policy change mechanism related to the Smart Green City project was analyzed as follows. Korea's Smart Green City project was conceptually connected to the U-city, smart city and green city in an institutional context. The low-carbon, green growth policy and smart city policy established by the Lee government were weakly maintained by the Park government. The Moon government created the Smart Green City project by combining the policies and programs of previous governments. The Moon government returned to the Lee government's Green New Deal to find a breakthrough during a critical juncture, namely, the intersection of international pressure to reduce greenhouse gases and the economic recession crisis caused by COVID-19, with the Smart Green City project used as a policy means to this end. Therefore, this study argues that the Smart Green City project is the outcome of the Moon government reproducing a significant portion of existing government policies for political intention. Korea's Smart Green City project seems to have emerged as a new pillar of the Green New Deal policy that deals with carbon neutrality, but it has shown limitations in finding a new path due to its path dependency on existing policies. Nevertheless, the Moon government has attempted to differentiate itself from existing government policies by designating the Ministry of Environment, which is unrelated to the smart technology that is the means of this project, as the ministry in charge. They might have judged that Environment Ministers from civil society can most quickly and faithfully implement the Green New Deal plan.

These results imply that governments facing critical junctures such as exogenous and endogenous crises related to the environment and economy may first consider the relevant

policies of previous governments to overcome the crisis and seek to differentiate their policies from previous government policies based on political judgment.

5. Discussion

This study aimed to identify the mechanism of policy change that led the Korean government to fully pursue the Smart Green City project using a critical juncture approach and to derive useful implications for future policy choices.

This case illustrates that when a government facing multiple crises related to the environment and economy makes hasty political policy decisions at a critical juncture without considering sustainability, it is likely to repeat the policy direction or institutional path of the previous government. Moreover, it highlights that policy decisions aimed at differentiation in these situations can set one down an irreversibly incorrect path. The implications through the case analysis are as follows. During a critical juncture, the government's response to multiple crises of exogenous and endogenous changes and the president's will to break away from the reproduction of existing government policies can be the driving force behind large-scale national environmental projects. However, rushing a project in an urgent situation can lead to the reproduction of existing policies and the achievement of unexpected results. In addition, it argues that attempts to differentiate policies that already show path-dependent characteristics with respect to past policies can rather act as a constraint that hinders project implementation. Thus, caution is required in this regard.

The Korea's Smart Green City project was actually halted after the Yoon administration took office. However, though all 25 project locations had a performance achievement rate of zero by the end of the project period in 2022, the current government has conditionally extended the project termination date due to the sunk cost issue, and it is thus being continued. This study treated Korea's Smart Green City project as a single case. Follow-up studies could perform comparative research for countries that have already had similar experiences. It might be also pointed out that there were limitations regarding the accessibility of official work-related documents and web documents because the research subject was a project that was already considered to have been discontinued.

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References

1. Seneviratne, S.I.; Nicholls, N.; Easterling, D.; Goodess, C.; Kanae, S.; Kossin, J.; Luo, Y.; Marengo, J.; McInnes, K.; Rahimi, M.; et al. Changes in climate extremes and their impacts on the natural physical environment. In *Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation*; A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change, (IPCC); Field, C.B., Barros, V., Stocker, T.F., Dahe, Q., Eds.; Cambridge University Press: Cambridge, UK; New York, NY, USA, 2012; pp. 109–230. [CrossRef]
2. Ministry of Environment. White Paper of Environment. 2022. Available online: https://www.kepaedu.or.kr/board/data/view.do?no=473&pageNo=1&schArea=&schType=all&schString (accessed on 10 May 2024).
3. The European Union. Carbon Border Adjustment Mechanism. Available online: https://taxation-customs.ec.europa.eu/carbon-border-adjustment-mechanism_en (accessed on 10 May 2024).
4. The White House. Inflation Reduction Act Guidebook. Available online: https://www.whitehouse.gov/cleanenergy/inflation-reduction-act-guidebook/ (accessed on 15 June 2024).
5. KISTEP (Korea Institute of Science & Technology Evaluation and Planning). Carbon Neutrality Trends and R&D Promotion Strategies in Major Countries. Available online: https://www.kistep.re.kr/gpsIssueView.es?mid=a30101000000&list_no=49118 (accessed on 10 February 2024).
6. International Energy Agency (IEA). World Energy Outlook 2023. Available online: https://www.iea.org/reports/world-energy-outlook-2023 (accessed on 14 May 2024).
7. Iyke, B.N. Climate change, energy security risk, and clean energy investment. *Energy Econ.* **2024**, *129*, 107225. [CrossRef]
8. Arndt, C. Climate change vs. energy security? The conditional support for energy sources among Western Europeans. *Energy Policy* **2023**, *174*, 113471. [CrossRef]

9. Ministry of Environment. White Paper of Environment. 2020. Available online: https://library.me.go.kr/#/search/detail/5880602?offset=1 (accessed on 10 May 2024).
10. Kamal-Chaoui, L.; Grazi, F.; Grazi, F.; Plouin, M. *The Implementation of the Korean Green Growth Strategy in Urban Areas. OECD Regional Development Working Papers 2011/02*; OECD Publishing: Paris, France, 2011. [CrossRef]
11. Climate Change Performance Index. Available online: https://ccpi.org/ranking/ (accessed on 2 February 2024).
12. Korea JoongAng Daily. Don't Be a Climate Villain. Available online: https://koreajoongangdaily.joins.com/2020/05/18/columns/villain-climate-green-new/20200518211100151.html (accessed on 20 January 2024).
13. Climate Home News. South Korea Leads List of 2016 Climate Villains. Available online: https://www.climatechangenews.com/2016/11/04/south_korea_climate_villains/ (accessed on 2 February 2024).
14. The Korea Times. Long Way to Become Climate Leader. Available online: https://www.koreatimes.co.kr/www/opinion/2024/05/638_309344.html (accessed on 7 February 2024).
15. Ministry of Economy and Finance. Korea's Green New Deal: Towards a Low-carbon Society. Available online: https://www.greenclimate.fund/sites/default/files/event/koreas-green-new-deal-moef-international-conference-green-new-deal.pdf (accessed on 22 January 2024).
16. Republic of Korea's Policy Briefing. Korean New Deal. Available online: https://www.korea.kr/briefing/policyBriefingView.do?newsId=148874860#policyBriefing (accessed on 3 February 2024).
17. Korean Broadcasting System News. Ministry of Environment Begins Public Contest to Select Target Areas for Smart Green City Project. Available online: https://news.kbs.co.kr/news/pc/view/view.do?ncd=4534798 (accessed on 2 March 2024).
18. Smart City Korea. Ministry of Environment, Smart Green City Project Target Area Competition. Available online: https://smartcity.go.kr/en/2020/09/08/%ED%99%98%EA%B2%BD%EB%B6%80-%EC%8A%A4%EB%A7%88%ED%8A%B8-%EA%B7%B8%EB%A6%B0%EB%8F%84%EC%8B%9C-%EC%82%AC%EC%97%85%EB%8C%80%EC%83%81-%EC%A7%80%EC%97%AD-%EA%B3%B5%EB%AA%A8/ (accessed on 23 March 2024).
19. UN. From Green Economies to Green Societies. Available online: https://sdgs.un.org/publications/green-economies-green-societies-17502 (accessed on 11 February 2024).
20. UNECE. Smart Sustainable Cities. Available online: https://unece.org/search_unece_content?keyword=u4ssc (accessed on 11 February 2024).
21. Korea Legislation Research Institute. *What Is the Green New Deal for?* Legal Studies; Korea Legislation Research Institute: Sejong, Republic of Korea, 2020; p. 68.
22. Ministry of Environment. Smart Green City, Created by the Ministry of Environment and the Region Together. Press Release. Available online: https://www.korea.kr/briefing/pressReleaseView.do?newsId=156409921 (accessed on 2 February 2024).
23. The Chosun Daily. 158 Billion Won Spent on "Smart Green City" Achievement Rate 0%. Available online: https://www.chosun.com/national/transport-environment/2023/02/03/T23NDQ3EANATXC5OKXDQOGSTZU/ (accessed on 27 February 2024).
24. Korea Construction Newspaper. Smart Green City, Will It End as a 'Fool's Gold'? Available online: http://www.conslove.co.kr/news/articleView.html?idxno=76778 (accessed on 3 March 2024).
25. Energy Newspaper. Will the Problematic 'Smart Green City' Be Achieved This Year? Available online: https://www.energy-news.co.kr/news/articleView.html?idxno=86305 (accessed on 3 March 2024).
26. OhmyNews. Korean New Deal? Updating the Lee Myung-Bak and Park Geun-Hye Policies with New Names. Available online: https://m.ohmynews.com/NWS_Web/Mobile/amp.aspx?CNTN_CD=A0002660263 (accessed on 3 March 2024).
27. Mahoney, J. Path dependence in historical sociology. *Theory Soc.* **2000**, *29*, 507–548. [CrossRef]
28. Sorensen, A. Taking critical junctures seriously: Theory and method for causal analysis of rapid institutional change. *Plan. Perspect.* **2023**, *38*, 929–947. [CrossRef]
29. Mahoney, J.; Thelen, K.A. *Explaining Institutional Change: Ambiguity, Agency, and Power*; Cambridge University Press: Cambridge, UK, 2010.
30. Collier, D.; Munck, G. Building blocks and methodological challenges: A framework for studying critical junctures. *Qual. Multi-Method Res.* **2017**, *15*, 2–9.
31. Evans, P.; Rueschmeyer, D.; Skocpol, T. *(Eds). Bringing the State Back in*; Cambridge University Press: Cambridge, UK, 1985.
32. Hall, P.A. *Governing the Economy: The Politics of State Intervention in Britain and France*; Oxford University Press: Oxford, UK; New York, NY, USA, 1986.
33. Peters, G.B.; Pierre, J.; King, D.S. The politics of path dependency: Political conflict in historical institutionalism. *J. Politics* **2005**, *67*, 1275–1300. [CrossRef]
34. Hall, P.A.; Taylor, R.C. Political science and the three new institutionalism. *Political Stud.* **1996**, *44*, 936–957. [CrossRef]
35. Pierson, P. Increasing returns, path dependence, and the study of politics. *Am. Political Sci. Rev.* **2000**, *94*, 251–267. [CrossRef]
36. Ha, Y.S. *Institutional Analysis: Theories and Issues*; Dasan Publishing: Seoul, Republic of Korea, 2004.
37. Pierson, P.A. *Politics in Time: History, Institutions, and Social Analysis*; Princeton University Press: Princeton, NJ, USA, 2004.
38. Immergut, E.M. The theoretical core of the new institutionalism. *Politics Soc.* **1998**, *26*, 5–34. [CrossRef]
39. Clemens, E.S.; Cook, J.M. Politics and institutionalism: Explaining durability and change. *Annu. Rev. Sociol.* **1999**, *25*, 441–466. [CrossRef]
40. Thelen, K. Historical institutionalism in comparative politics. *Annu. Rev. Political Sci.* **1999**, *2*, 369–404. [CrossRef]
41. Campbell, J.L. *Globalization and Institutional Change*; Princeton University Press: Princeton, NJ, USA, 2004.

42. Bennett, A.; Elman, C. Complex causal relations and case study methods: The example of path dependence. *Political Anal.* **2006**, *14*, 205–267. [CrossRef]
43. Roberts, K.M. Chapter 9 Aftermath: Reactive sequences and institutional legacies. In *Changing Course in Latin America: Party Systems in the Neoliberal Era*; Cambridge University Press: Cambridge, UK, 2015; pp. 229–270. Available online: https://www.cambridge.org/core/books/abs/changing-course-in-latin-america/aftermath-reactive-sequences-and-institutional-legacies/13EAB4849F211502CAE40B36C6357649 (accessed on 20 February 2024).
44. Thelen, K. How institutions evolve: Insights from comparative historical analysis. In *Comparative Historical Analysis in the Social Science*; Mahoney, J., Rueschemeyer, D., Eds.; Cambridge University Press: New York, NY, USA, 2003.
45. Collier, D.; Munck, G. *Critical Junctures and Historical Legacies: Insights and Methods for Comparative Social Science*; Rowman & Littlefield: Lanham, MD, USA, 2022.
46. Collier, R.B.; Collier, D. *Shaping the Political Arena: Critical Junctures, the Labor Movement, and the Regime Dynamics in Latin America*; Princeton University Press: Princeton, NJ, USA, 1991; Chapter 1.
47. Capoccia, G. Critical junctures and institutional change. In *Advances in Comparative Historical Analysis*; Mahoney, J., Thelen, K., Eds.; Cambridge University Press: Cambridge, UK, 2015; pp. 147–179.
48. Soifer, H. The causal logic of critical junctures. *Comp. Political Stud.* **2012**, *45*, 1572–1597. [CrossRef]
49. Smart City Korea. Available online: https://smartcity.go.kr/en/%EC%86%8C%EA%B0%9C/ (accessed on 7 April 2024).
50. Lee, D.C.; Sohn, S.H.; Kim, D.N. Establishing the Concept of Green City and its Approach into Practice. *Urban Des.* **2013**, *14*, 121–137.
51. Breuste, J. The Green City: General concept. In *Making Green Cities—Concepts, Challenges and Practice*; Springer: Berlin/Heidelberg, Germany, 2020; pp. 1–15.
52. Lee, S.H.; Han, H.; Yigitcanlar, T. Towards ubiquitous city: Concept, planning, and experiences in the Republic of Korea. In *Knowledge-Based Urban Development: Planning and Applications in the Information Era*; IGI Global: Hershey, PA, USA, 2008; pp. 148–169.
53. Ministry of Environment. *Guidelines for Smart Green City Project*; Public Offering: Sejong, Republic of Korea, 2020.
54. Smart City Korea. Publication of 2022 Urban Planning Statistics. Available online: https://smartcity.go.kr/en/2023/07/18/2022%EB%85%84-%EB%8F%84%EC%8B%9C%EA%B3%84%ED%9A%8D%ED%98%84%ED%99%A9-%ED%86%B5%EA%B3%84-%EA%B3%B5%ED%91%9C/ (accessed on 3 April 2024).
55. United Nations. Global Sustainable Development Report (GSDR) 2019. Available online: https://sdgs.un.org/gsdr/gsdr2019 (accessed on 15 March 2024).
56. CCPI. Republic of Korea. Available online: https://ccpi.org/country/kor/ (accessed on 17 June 2024).
57. Climate Action Tracker. Available online: https://climateactiontracker.org/countries/south-korea/ (accessed on 17 June 2024).
58. Republic of Korea's Policy Briefing. 25 Smart Green Cities to Be Create, 290 Billion Won Invested over Two Years. Available online: https://www.korea.kr/news/policyNewsView.do?newsId=148877202 (accessed on 10 March 2024).
59. National Archives of Korea. Low Carbon Green Growth. Available online: https://www.archives.go.kr/next/newsearch/listSubjectDescription.do?id=009245&sitePage= (accessed on 3 March 2024).
60. Moonwha Newspaper. Let's Start the Era of Low-Carbon Green Growth. Available online: https://www.munhwa.com/news/view.html?no=2008081601110123029001O (accessed on 17 March 2024).
61. Maeil Business Newspaper. We Need to Save Both the Environment and the Economy with the Green New Deal. Available online: https://www.mk.co.kr/news/special-edition/4657026 (accessed on 9 March 2024).
62. Food and Agriculture Organization of United Nations. Framework Act on Low Carbon, Green Growth. FAOLEX Database. Available online: https://www.fao.org/faolex/results/details/en/c/LEX-FAOC100522/ (accessed on 10 March 2024).
63. The Framework Act on Low Carbon, Green Growth. Available online: https://elaw.klri.re.kr/eng_mobile/viewer.do?hseq=49999&type=part&key=39https://elaw.klri.re.kr/eng_mobile/viewer.do?hseq=49999&type=part&key=39 (accessed on 10 February 2024).
64. Global Green Growth Institute. Available online: https://un-rok.org/about-un/offices/gggi/ (accessed on 17 March 2024).
65. Dong-A Ilbo, M.B. Korea Will Strive to Make the Green Triangle Work. Available online: https://www.donga.com/news/Politics/article/all/20120622/47201589/9 (accessed on 12 May 2024).
66. Green Growth. GGGI Officially Launched, Leading the Green Revolution. Available online: http://17greengrowth.pa.go.kr/?p=57242 (accessed on 20 March 2024).
67. Republic of Korea Policy Briefing. The Lee Myung-Bak Administration's Basic Plan for National Informatization Is Confirmed. Available online: https://www.korea.kr/briefing/pressReleaseView.do?newsId=155326317#pressRelease (accessed on 21 March 2024).
68. Ministry of Land; Transport and Maritime Affairs; Five Other Ministries. *Green City and Building Revitalization Plan*; The 6th Green Growth Committee: Sejong, Republic of Korea, 2009.
69. Choi, H.S.; Song, S.K. Direction for a transition toward smart sustainable cities based on the diagnosis of smart city plans. *Smart Cities* **2023**, *6*, 156–178. [CrossRef]
70. Kim, Y.M.; Lee, J.H. A study on the planning indicator for carbon neutral green city. *Korea Inst. Ecol. Archit. Environ.* **2013**, *13*, 131–139. [CrossRef]

71. Kyunghyang Shinmun. The Park Administration, Erases 'MB traces' and Ministry title 'Green' Disappears. Available online: https://www.khan.co.kr/politics/president/article/201303262215085 (accessed on 10 May 2024).
72. The Korea Herald. Park Ditches 'Green Growth' in Environmental Policy Shift. Available online: https://www.koreaherald.com/view.php?ud=20130328000986 (accessed on 20 April 2024).
73. Kim, Y.R.; New Industries in Energy Sector: Strategy for Extending Results. Korea Institute for Industrial Economics and Technology, Industrial Economy Analysis. Available online: https://www.kiet.re.kr/searchAll?collection=ALL&category=kiet_research&query=%EC%97%90%EB%84%88%EC%A7%80%20%EB%B6%84%EC%95%BC%EC%9D%98%20%EC%83%88%EB%A1%9C%EC%9A%B4%20%EC%82%B0%EC%97%85&sort=RANK&reQuery=1&realQuery=%EA%B9%80%EC%9A%A9%EB%9E%98&listCount=10&startCount=0 (accessed on 3 May 2024).
74. Korea Research Institute for Human Settlements. Successful Realization of a Smart Green City. *Plan. Policy*. 2016. Available online: https://library.krihs.re.kr/library/10110/contents/5869852?checkinId=2147733&articleId=1405797 (accessed on 3 May 2024).
75. Korea Development Institute. Korean Cities, Need a Major Transformation into 'Smart Green Cities'. *Narakyungje*. 2016. Available online: https://eiec.kdi.re.kr/publish/naraView.do?fcode=000020000400001000 01&cidx=10343&sel_year=2016&sel_month=01 (accessed on 25 April 2024).
76. Ryu, S.Y.; Lee, J.W. A governance approach for the Sustainable Smart City. *J. Korean Urban Manag. Assoc.* **2019**, *32*, 81–96. [CrossRef]
77. National Balanced Development Information System. Pohang Railroad Forest Completed, Greenway Unfolded in the City Center. Available online: https://www.nabis.go.kr/outstandRegionDetailView.do?menucd=190&outstandNo=626&appfileNo=13741 (accessed on 4 May 2024).
78. Korea Research Institute for Human Settlements. A Study on Strategic Response to Smart City Types. KRIHS, Research Report. 2019, pp. 13–18. Available online: https://library.krihs.re.kr/library/10180/contents/6166524 (accessed on 6 June 2024).
79. Chung, S.Y.; Lee, G.E. South Korea's Climate Change Policy: Achievements and Tasks Ahead. The Korea Economic Institute of America (KEI). 2022. Available online: https://keia.org/publication/south-koreas-climate-change-policy-achievements-and-tasks-ahead/ (accessed on 20 April 2024).
80. Intergovernmental Panel on Climate Change (IPCC). Summary for Urban Policymakers—What the IPCC Special Report on 1.5C Means for Cities. Available online: https://www.ipcc.ch/site/assets/uploads/sites/2/2018/12/SPM-for-cities.pdf (accessed on 22 April 2024).
81. Cho, B.K.; Chung, J.B.; Song, C.K. National Climate Change Governance and Lock-in: Insights from Korea's Conservative and Liberal Governments' Committees. *Energy Strategy Rev.* **2023**, *50*, 101238. [CrossRef]
82. Choi, H.S.; Park, C.S.; Shin, D.W. Transition Strategy to a Smart Sustainable City. Korea Environment Institute: Seoul, Republic of Korea, 2021; Volume 9.
83. The Constimes. Ministry of Environment Forms Smart Green City Promotion Project Support Group. Available online: https://www.constimes.co.kr/news/articleView.html?idxno=215740 (accessed on 24 April 2024).
84. UNECE. Smart Sustainable Cities. Available online: https://unece.org/housing/smart-sustainable-cities (accessed on 2 May 2024).
85. Ministry of Environment. *Declaration of Vision to Lead Korea to Carbon Neutrality as a Smart Green City*; Press Release; Ministry of Environment: Seoul, Republic of Korea, 2021.
86. Nakamura, R.T.; Smallwood, F. *The Politics of Policy Implementation*; St. Martin's Press: New York, NY, USA, 1980.
87. NEWSTOF. Moon Jae-in's 'Green New Deal' Wandering Between Lee Myung-bak and the Justice Party. Available online: https://www.newstof.com/news/articleView.html?idxno=10819 (accessed on 2 May 2024).

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