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Environmental Sustainability in Japan: A Multi-Level Analysis of Domestic and International Approaches.

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Abstract.

Environmental sustainability encompasses ecological, social, and economic dimensions. In the Japanese context, environmental sustainability is defined in the lens of ethics, economics, and governance. It has emerged as a consequence of domestic and external factors. However, the specifics of approaches to environmental sustainability across different governance levels in Japan remained relatively understudied. This study investigates the approaches to environmental sustainability across four governance levels in Japan which include prefectural, metropolitan, ministerial, and international dimensions. This study aims to uncover the differences in approaches to environmental sustainability across governance levels in Japan, by focusing on what constitutes the construction of environmental sustainability. The study also focuses on the perception of goals, instruments, and challenges associated with pursuing environmental sustainability at the four governance levels in Japan.

This research was conducted as a case study. The officials from the four governance levels were interviewed and asked to explain their perceptions of environmental sustainability's construction, goals, instruments, and challenges. The data was thematically processed and compared with the existing literature and policy frameworks.

Keywords: Japan, environmental sustainability, climate change, governance, green transition

Statement on the Use of AI

AI Statement: AI (Gemini) was used in the early stages for idea generation. AI was also used for partial translation of interviews from Japanese into English.

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1 Chapter 1. Introduction

Environmental sustainability governance has become a central topic in global academic and policy debates. East Asia, and Japan in particular, has a long history of engagement with environmental sustainability, shaped by historical environmental challenges, international commitments, and national economic and security interests. Despite Japan's long-standing engagement with environmental policies and sustainable practices, the exact approaches to environmental sustainability across governance levels in Japan based on the empirical field data remain understudied in existing literature, as the next chapter will underline.

Understanding the approaches to environmental sustainability across governance levels in Japan is important as it explains why Japan's environmental sustainability is formed in a certain way and what influences the emergence of environmental sustainability norms in contemporary Japan. Studying the approaches to environmental sustainability across governance levels in Japan also sheds light on the main goals that Japan pursues through the promotion of environmental sustainability, instruments that Japan uses to facilitate its goals linked with environmental sustainability, and challenges experienced while pursuing environmental sustainability at different governance levels in Japan.

This study defines four main governance levels in Japan: prefectural, metropolitan, ministerial, and international. This research seeks to define the differences in approaches to environmental sustainability across the four governance levels in Japan, based on the analysis of rational, logic, and motivations that shape specific features of Japan's environmental sustainability. Conceptually, this study is based on the idea of environmental sustainability in the Japanese context, which is further discussed in the theoretical framework.

The primary objective of this research is to define how the approaches to environmental sustainability differ across the four governance levels in Japan.

Therefore, the main research question guiding this study is: "How do approaches to environmental sustainability differ across domestic and international governance levels in Japan?" To address this question, the following sub-questions are posed:

1. How are environmental sustainability approaches constructed at prefectural, metropolitan and ministerial governance levels in Japan?

2. How do Japanese governmental organizations construct approaches to environmental sustainability in their international engagement?

3. What goals drive environmental sustainability across prefectural, metropolitan, ministerial, and international governance levels in Japan?

4. What instruments are used to facilitate the implementation of environmental sustainability goals at the four governance levels?

5. What challenges are faced by the actors at the four governance levels in constructing and addressing environmental sustainability?

This research is relevant both academically and from a policy perspective. Academically, it bridges the existing literature gap by connecting earlier studies on environmental sustainability in the Japanese context with the empirical data obtained from the field study. From a policy perspective, the findings offer insights to policymakers in the private and public sector engaged in environmental sustainability initiatives in Japan.

This thesis is structured as follows. Chapter 1 introduces the research background, problem, and research questions. Chapter 2 reviews the relevant literature, conceptualises the term of environmental sustainability, and establishes the research gap. Chapter 3 outlines the research methodology. Chapter 4 analyses environmental sustainability governance at the prefectural level. Chapter 5 analyses environmental sustainability at the metropolitan level. Chapter 6 analyses environmental sustainability at the ministerial level. Chapter 7 analyses environmental sustainability

conducted by Japanese governmental organizations at the international level. Chapter 8 discusses the results in relation to the research questions and existing literature. Chapter 9 is the conclusion. A coding table and ethical agreements are included in the appendices.

2 Chapter 2: Literature Review and Theoretical Framework

Environmental Sustainability has increasingly become a central concern in understanding contemporary developments in the Japanese societal context. This chapter provides a literature review of the earlier works regarding environmental sustainability in Japan. The first section conceptually defines sustainable development and environmental sustainability. The second section reviews the existing literature on environmental sustainability through an ethical lens. The third section reviews the earlier literature on environmental sustainability through technological and economic lenses. The fourth section reviews the earlier literature on environmental sustainability through a governance lens. The fifth section reviews the existing literature on factors that contributed to the emergence of Japan's environmental sustainability through the three lenses. The sixth section defines the literature gap.

2.1 Sustainable Development and Environmental Sustainability: Conceptual Definition.

Environmental sustainability as a concept was first defined as "sustainable development" by the World Commission on Environment and Development and published in the Brundtland Report, 'Our Common Future' in 1987. The Brundtland Report considered sustainable development as a development that is "meeting the needs of the present without compromising the ability of future generations to meet their own needs."[1] It established sustainability as a guiding principle for balancing environmental protection with economic and social development. This definition is internationally acknowledged, as it was further included in other international frameworks, such as the Rio Declaration on Environment and Development adopted by the United Nations in 1992.[2]

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[1] United Nations Documents: Gathering a Body of Global Agreements, *Report of the World Commission on Environment and Development: Our Common Future*, 27.05.2026, p. 17, available at: http://www.un-documents.net/our-common-future.pdf

[2] The United Nations, Report of the United Nations Conference on Environment and Development, 27.05.2026, available at: https://www.un.org/esa/dsd/agenda21/Agenda%2021.pdf

More recent studies further developed the concept of environmental sustainability based on the Brundtland Report. Morelli argued that environmental sustainability is a "condition of balance, resilience, and interconnectedness that allows human society to satisfy its needs while neither exceeding the capacity of its supporting ecosystems to continue to regenerate the services necessary to meet those needs nor by our actions diminishing biological diversity" (Morelli, 2011, p. 5). Shiroyama and his colleagues stated that to achieve sustainability in society "it is necessary to recognize that sustainability has many dimensions including various aspects of environmental, social and economic sustainability" (Shiroyama et alii, 2012, p. 45). Another study in 2025 outlined key principles of environmental sustainability as conservation of biodiversity, maintenance of renewable resources, reduction of waste and pollution, and promotion of sustainable practices in industries and communities (Mishra, Mishra, and Agarwal, 2025, p. 82).

2.2 Environmental Sustainability through an Ethical Lens.

"The ethics of Japan's global environmental policy: the conflict between principles and practice" authored by Midori Kagawa-Fox in 2012 analyzed environmental sustainability through an ethical lens basing the environmental ethics as a foundation of Japan's environmental policy (Kagawa-Fow, 2012).

The core pillar of this study is the emphasis on distinctive features between environmental sustainability in Japan and the West. Four main distinctive features of the Japanese environmental sustainability outlined by the author include ethics, Japanese characteristics, religion, and the teachings of Japanese thinkers and philosophers. For example, the author points out that Japan's religion and ethics affected the emergence of such a mindset as living in harmony with others, which was later reflected in Japan's environmental sustainability. Together, the four elements contribute to the concept of *Minamata-gaku*, which is described by the

author as the Japanese environmental ethics or the Japanese approach to environmental sustainability (Ibid, p. 9).

According to the author, *Minamata-gaku* is the Japanese ethical framework, serving as a guideline to sustainability governance. It is described as a principle built upon ideas and principles derived from the community (Ibid, p. 9). According to the author, the Japanese environmental ethics emerged from societal experiences, while the Western environmental ethics was imposed on the society by academics and policymakers (Ibid, p. 18). The societal experiences include the outbreak of four pollution-caused diseases explained by the author as "*kogai*" cases, including two outbreaks of Minamata-disease (Ibid, p. 16). The Minamata-gaku encompasses three characteristics: it inquires businesses and policymakers into the environmental responsibility, it supports victims of the environmental damage, and it is grounded in the Japanese empirical values, such as "learning from the past mistakes" and sharing this knowledge with others for a more sustainable future (Ibid, pp. 16-17). The impact of severe environmental pollution ("*Kogai*") was also studied by Nakazawa in 2006, with an emphasis on social movements as a response to Minamata-disease outbreaks (Nakazawa, 2006, p. 72).

Both authors, Kagawa-Fox and Nakazawa studied *satoyama* (local ecological studies) as additional elements shaping environmental sustainability through ethical lens in Japan (Kagawa-Fox, 2012, p. 17, Nakazawa, 2006, p. 78).

2.3 Environmental Sustainability through Technological and Economic Lenses.

Environmental Sustainability in Japan through technological and economic lenses was thoroughly studied in "Green Japan: Environmental Technologies, Innovation Policy, and the Pursuit of Green Growth" by Carin Holroyd in 2018 and "Building a new economy: Japan's digital and green transformation" by D. Hugh Whittaker in 2024.

Through these lenses, the concepts of energy transition, decarbonization, and circular economy are widely utilized in the literature. These concepts also appear in themes analysed in the analysis chapters and therefore, they require to be defined. Energy transition refers to shifting from a dominant energy source to another (Yang et alii, 2024, p. 1). The contemporary energy transition refers to "a shift from carbon-based energy, most significantly coal and oil, to lower-carbon energy resources such as gas, wind, solar, and hydropower." (Ibid.) Decarbonization refers to the contemporary energy transition from CO2-producing energy sources to renewable resources with a lower environmental impact. (Falbo et alii, 2025, p. 1). Lastly, circular economy stands for the economic model with a cyclical flow model, which is an alternative to the traditional unsustainable linear "extract-produce-use-dump" material and energy flow model (Korhonen et alii, 2018, p.1). The circular economic model emphasizes product reuse, and utilization of "solar, wind, biomass and waste-derived energy utilization throughout the product value chain" (Ibid.).

Holroyd explains environmental sustainability in Japan through the lens of the "Green Growth" strategy. The book positions the development of green technologies as a central pillar of the Green Growth strategy in Japan, with a focus on economic development while considering environmental goals (Holroyd, 2018, p. 43). Regarding the Green Growth strategy, the author explains it as an integration of environmental and economic objectives through the use of Japan's green technology, with an emphasis on the role of the Japanese government through policies and investment (Ibid, p. 17). Regarding green technology, the United Nations defines it as technology that "has the potential to significantly improve environmental performance relative to other technologies" and is mainly associated with solar, wind, biomass/biogas, and green hydrogen technologies.[3] Furthermore, the United Nations

[3] United Nations Conference on Trade and Development, *Technology and Innovation for Cleaner and More Productive and Competitive Production*, 27.05.2026, p. 4, available at: https://www.un-ilibrary.org/content/books/9789210028295c006

defines that concepts of "green energy, renewables, sustainable energy, and clean energy are related to green energy technologies."[4]

Holroyd also explains a significant role of coexistence that a Japanese society has with nature, which in turn, gives public support for the environment-driven initiatives (e.g. the introduction of the Green Growth strategy) (Holroyd, 2018, p. 31).

Regarding the international dimension of the Green Growth strategy, the author states that Japan maintains its commercial presence on the green technology market in Southeast Asia (Ibid, p. 36). In addition, the author explains Japan's strategies to position itself as an environmental and technological leader, as the country was organizing environment-dedicated events and distributing environmental Official Development Aid (ODA)[5] to developing countries (Ibid).

While examining the Green Growth strategy, the author also critically evaluates the negative sides of the Japanese environmental efforts. One of the criticisms that the author has regarding Japan's Green Growth strategy is the dual nature of environmental projects. This applies both to the ODA allocation and the practice of ecological relocation. Regarding the ODA allocation, the author notes the cases when environmental ODA projects were "damaging" in reality as they targeted resource extraction (Ibid, p. 58). Regarding ecological relocation, the author mentions this practice in Japan between 1970 and 2000, when Japanese industries relocated their plants to neighboring countries to improve Japan's domestic environmental conditions (Ibid, p. 36).

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[4] Ibid.

[5] "Official development assistance (ODA) is government aid that promotes and specifically targets the economic development and welfare of developing countries." Organisation for Economic Co-operation and Development, *Official development assistance (ODA)*, 26.05.2026, available at: https://www.oecd.org/en/topics/official-development-assistance-oda.html

D. Hugh Whittaker also places environmental sustainability in Japan through the lens of economic and technological development. The author explains the green technological transformation as a Japanese strategy to ensure economic growth, where green technologies are fostering the new economic model of Japan (Whittaker, 2024, p. 3). Whittaker is more precise than Holroyd in examining the role of green technology, by considering it also as an instrument for enhancing energy security and broader decarbonization goals (Ibid., p. 202).

Whittaker examines the key policy instruments that form Japan's Green Economy. One of the policies discussed by the author is the GX (Green Transformation) Basic Policy.

The GX Basic Policy supports METI's and Japan's goal of a simultaneous achievement of a stable energy supply, economic growth, and decarbonization.[6] GX Basic Policy was launched in 2022 and it provides guidelines for energy and environmental policies for the next ten years.[7] It serves also as a way "to clear Japan's global commitment of 46% reduction of GHG emissions in FY2030 and achieve net-zero GHG emissions by 2050."[8]

It aims to generate the private-public investment flow of 150 trillion yen and accelerate the transformation from the fossil fuel-centered industrial structure to a new social-economic structure that relies on clean energy with net-zero carbon emissions.[9] The GX Basic Policy combines carbon pricing (the Emissions Trading

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[6] Agency for Natural Resources and Energy, Ministry of Economy, Trade and Industry, *GX Policy Achieving Decarbonization and Economic Growth Together,* 26.05.2026, available at: https://www.enecho.meti.go.jp/en/category/special/article/detail_214.html

[7] Agency for Natural Resources and Energy, Ministry of Economy, Trade and Industry, *Japan's energy policy toward achieving GX (Part 1) Decarbonization will be advanced on the premise of securing a stable supply of energy,* 26.05.2026, available at: https://www.enecho.meti.go.jp/en/category/special/article/detail_178.html

[8] Cabinet Secretariat, *The Basic Policy for the Realization of GX - A roadmap for the next 10 years*, 27.05.2026, p.2, available at: https://www.cas.go.jp/jp/seisaku/gx_jikkou_kaigi/pdf/kihon_en.pdf

[9] Agency for Natural Resources and Energy, Ministry of Economy, Trade and Industry (note 5).

System[10] and carbon surcharges for fossil fuels) and GX Economy Transition Bonds[11] to encourage private investments.[12] Within the GX Basic Policy, an important role plays the development of Japan's next-generation technology. Japan's next-generation technology is identified by METI as advanced solar technology (e.g. perovskite solar cells) and floating offshore wind farms.[13]

Another scholarly work by Hiroshi Ohta and Brendan Barrett examines domestic and international forces driving climate policies and energy transition in Japan. Among the domestic and international driving forces, the study highlights Japan's net-zero carbon targets by 2050 (Hiroshi Ohta and Brendan Barrett, 2023, p. 2), GX Basic Policy (Ibid, p.5), and a global shift to decarbonization, especially as Japanese corporations joined the United Nations Task Force on Climate-related Financial Disclosure (UN TCFD) (Ibid, p. 4). The study also reflects on the role of technology in Japan's energy transition, in particular through the development of renewable energy technology, such as solar technology and hydrogen technology (Ibid, p. 2). The study also analyzes the bottom-up effect regarding the energy transition and climate policies in Japan, particularly the role of local governments and city-led initiatives (Ibid, p. 4).

Furthermore, Whittaker discusses how the geopolitical shifts influence the approach to the energy transition and energy security (Whittaker, 2024, pp. 202-203). Mainly,

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[10] "Emissions Trading System is a market-based policy tool for climate change mitigation that works on the principle of 'cap and trade'.In an emissions trading scheme (ETS), a regulator defines an upper limit (cap) of greenhouse gas (GHG) emissions that may be emitted in clearly defined sectors of an economy (scope and coverage). Emission permits or allowances are given out or sold (allocated) to the entities that are included in the ETS. By the end of a defined time period, each covered entity must surrender a number of allowances corresponding to their emissions during that period. Installations that have emitted less than the number of allowances they hold can sell any excess to other participants in the scheme. Entities with low abatement costs thus have an incentive to reduce their emissions, while those facing higher costs can choose to comply by purchasing allowances from the market." International Carbon Action Partnership, *About Emissions Trading Systems,* 27.05.2026, available at: https://icapcarbonaction.com/en/about-emissions-trading-systems

[11] "Green Transformation (GX) Economy Transition Bonds is the national support for anticipatory investment by the private sector." Agency for Natural Resources and Energy, Ministry of Economy, Trade and Industry (notes 5, 8).

[12] Agency for Natural Resources and Energy, Ministry of Economy, Trade and Industry (note 5, 8, 10).

[13] Agency for Natural Resources and Energy, Ministry of Economy, Trade and Industry, *Japan's Strategy to Expand Renewable Energy Contributes to the World's Efforts toward Tripling Renewable Energy,* 26.05.2026, available at: https://www.enecho.meti.go.jp/en/category/special/article/detail_198.html

the scholar examines how decarbonization intersects with Japan's constraints regarding critical raw materials, global supply chains, food and energy security, emphasizing that green economy transition cannot be isolated from the geopolitical dynamics (Ibid, p. 17).

Lastly, as discussed by Kagawa-Fox and Whittaker, a strong linkage between environmental and trade-related ministries in Japan points on the connection between Japan's environmental and economic strategic goals (Kagawa-Fox, 2012, p. 51., Whittaker, 2024, p. 4).

2.4 Environmental Sustainability through a Governance Lens.

Additionally to studies of environmental sustainability through the ethical, technological, and economic lenses, there is also literature that examines environmental sustainability in Japan through a governance lens.

Environmental governance is "one of the crucial components of environmental sustainability management" (Md Sujahangir Kabir Sarkar et alii, p. 11). Environmental governance has "various dimensions, including environmental policy, institutional arrangement and capacity and political structure and commitment" (Ibid.). Low carbon technology, renewable energy initiatives, and green finance are considered as important tools of environmental governance (Ibid.).

One of the earliest works on environmental governance in the Japanese context was conducted by Hideo Nakazawa in 2006. The scholar examines a specific case of environmental governance in Kamakura city (Nakazawa, 2006, p. 75). The author highlights a trend among local governments in Japan to "sacrifice environmental concerns and allow housing developments in order to increase populations and receive more subsidies" (Ibid, p. 76). The author also examines the role of civic engagements and the role of "networking and advocacy" in the emergence of

"environmental governance Japanese style," especially in restoration of rural areas (Ibid, p. 74, p. 80).

The role of civic engagements and people-to-people interactions in the context of Japanese environmental governance was further discussed by Shiroyama and his colleagues. The scholars identified governance for sustainability as "formal and informal networks/interactions among actors, and systems composed by them, that influence sustainability by integrating various dimensions" (Shiroyama et alii, 2012, p. 46). The authors further explain that "multi-actor governance involves public–private and multi-level interactions, which are needed to get agreement on sustainable actions among actors for designing and establishing resilient systems" (Ibid.). Furthermore, the authors emphasize that sustainability governance requires coordination across international, national, and local levels (Ibid, p. 49). The scholars also introduce the idea of multi-actor governance that exists in Japan as "finding a common framework for the simultaneous achievement of various policy objectives" for achieving sustainable development (Ibid, p. 48).

A more recent case-study on environmental governance in Japanese cities was done in the book by Loorbarch and his colleagues in 2016. In this book, a chapter dedicated to Japan examines the role of city networks in achieving sustainable low-carbon society (Loorbarch et alii, 2016, p. 39). It emphasizes Japan's participation in the 1997 Kyoto Protocol on Climate Change as the country's first commitment to international climate agreement goals (Ibid. p. 41). The study by Loorbarch and his colleagues further observes three government-led sustainability programs in Japan, including "Eco-Model Cities," "Future City," and "Green and Local Autonomy Model City" (Loorbarch at alii, 2016, pp. 39-42). The Eco-Model Cities program started in 2008 and aimed at promoting "the image of a low-carbon society which Japan aspired to be in the future" (Ibid. p. 39). The program included 13 Japanese cities that individually proposed goals, methods and evaluation indexes, engaged the public in

climate action, and benefited from easier access to state subsidies (Ibid. pp. 39-40). The Future City program started in 2011 and aimed at "reducing greenhouse gas, tackling the super-ageing society, and boosting the local economy" (Ibid. p. 40). It targeted 11 municipalities across Japan, and 6 of these municipalities were from the areas that suffered from the 2011 Great Earthquake (Ibid.). The Green and Local Autonomy Model City program started in 2010 and aimed at exchange of sustainability practices within municipalities that included local self-reliance practices for "energy, food, and employment" (Ibid. p. 42). Three municipalities were selected in the beginning of the program and each municipality was allocated 30 million yen for presenting their local experiences across Japan (Ibid. p. 43).

Another study by Ito and Descombe argues that sustainability branding among Japanese municipalities combines top-down and bottom-up approaches, where the top-down approach is presented as institutional recognition and bottom-up approach is expressed as civic participation (Ito and Descombes, 2025, p. 3). The scholars further explain that this integration serves as a "for cross-sectoral partnerships" (Ibid, p. 14). The study also finds that by introducing global goals into local practices Japanese cities transition from "symbolic" brand-building to actual long-term institutional policies (Ibid, p. 15).

There are also studies of environmental governance in Japan based on environmental indexes. Sato and his colleagues based their study on scientific standards and found that Japan succeeds in "human health and welfare and life support functions," rather than in "other environmental functions" (Sato et alii., 2024, p. 544). Particularly, the metrics demonstrate that Japan struggles to improve sustainability in "CO2 emission levels and the eutrophication of freshwater systems" (Ibid, p. 544). This study highlights the impact of Japan's aging population and increased dependency on imported goods on a relationship "between nature and humans" (Ibid, p. 548).

Md Sujahangir Kabir Sarkar and his colleagues comparatively examined Japan's environmental performance based on the Environmental Sustainability Indicators (Md Sujahangir Kabir Sarkar et alii, 2024). The environmental sustainability indicators used in the study include climate change and greenhouse gas emissions, pollution levels, waste management, energy and renewables, forest coverage, and environmental governance. The study shows that Japan has good performance across almost all environmental sustainability indicators, except for climate change and greenhouse gas emissions, as Japan is "one of the leading emitters of carbon in Asia" (Ibid, p. 7). The study concludes that Japan's good performance across the environmental sustainability indicators is mainly due to "good citizen practices and adherence to the rule of law" (Ibid, p. 12).

Another study examines the structural design of national and local governance systems in Japan that support the implementation of the UN Sustainable Development Goals (SDGs) (Morita et alii, 2019, p. 179). The authors define the SDGs as a set of "environmental, social, and economic objectives" applied both to developed and developing countries, which were adopted in 2015 by the United Nations under the 2030 Agenda for Sustainable Development (Ibid.).

Regarding the national governance system, the study observes that the implementation of the SDGs in Japan is led by the SDGs Promotion Headquarters, headed by the Prime Minister (Ibid., p. 183). Regarding the local governance system, the study highlights that there is a low level of inclusion of local governments in the national governance system structure which thereby constrains the effective implementation of sustainable development goals (Ibid., p. 180).

2.5 Factors that Contributed to the Emergence of Environmental Sustainability in Japan.

This section observes factors that contributed to the development of Japan's environmental sustainability. It analyses main factors that caused the emergence and development of environmental sustainability through ethical, economic and technological, and governance lens. The main factors include Japan's environmental pollution history, its dependence on external supply chains, and its international image.

Japan's environmental pollution history serves as a primary factor that caused the emergence of environmental sustainability (Nakazawa, 2006; Kagawa-Fox, 2012; Holroyd, 2018; Whittaker, 2024). Japan's environmental pollution history is regarded in this study as a primary reason for the establishment of environmental sustainability in Japan through ethical and governance lenses. The cases of environmental pollution result from the rapid industrialization and poor environmental management, particularly from the beginning of the 1900-s (Kagawa-Fox, 2012). The environmental pollution in Japan led to the spread of diseases across Japan, particularly Minamata, Itai-itai, and Yokkaichi asthma (Ibid.).

The emergence and spread of severe pollution-related diseases in Japan led to establishment of Japan's first environmental frameworks (Ibid.) Among the earliest frameworks are the Water Quality Conservation Law, 1958 and the Basic Law for Environmental Pollution Control, 1967 (Ibid, p. 45, p. 70). In 1970, Japan's National Diet gave the authority to local governments to establish stricter prefectural regulations on the activities affecting the local environment (Ibid, p. 46). By 1972, "all of Japan's 47 prefectures had pollution-prevention regulations" (Holroyd, 2018, p. 51). In the establishment of environmental frameworks, the relationship among Japan's different ministries plays a significant role. For example, Holroyd observes that a shift to a more responsible environmental governance in the 1970-s was caused by METI's

statement regarding the increase of industrial waste on the landfills (Ibid.). A more recent governance response regarding the environmental pollution was after the Great East Japan Earthquake[14] and the accident at TEPCO's Fukushima Daiichi Nuclear Power Station in 2011.[15]

Japan's dependence on global supply chains serves as a second factor that caused the emergence of environmental sustainability, particularly through the economic and technological lenses. One of the first cases when Japan's dependence on external supply chains revealed the necessity to develop green technology domestically was during the first oil crisis in the 1970-s (Holroyd, 2018, p. 85). Japan's dependence on the global oil supply chains contributed to the development of solar power across Japan within the Sunshine Project in 1974 and largely supported by state-led subsidies (Ibid.). The state-led subsidies largely contributed to Japan's status as a "world leader" in the production and installation of solar cells (Ibid., p. 87). Furthermore, the fluctuations on the global energy market also contributed to the emergence of energy conservation technology in Japan. In 1978, the focus on energy conservation technology was enframed in the Energy Conservation Law, with the practical implementation through the Moonlight Project (Holroyd, 2018, p. 100; Whittaker, 2024, p. 13). More recent geopolitical implications, such as the Russia-Ukraine war started in 2022, revealed Japan's dependence on external energy and food supply chains (Whittaker, 2024, p. 17).

On the other hand, the development of green technology creates global competition over raw materials, which are indispensable for the manufacturing of green technology (DeWit, 2021, p. 1). The dependence on raw materials is particularly

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[14] "A massive earthquake of magnitude of 9.0 occurred Friday 11 March, off the Pacific coast of the northeastern part of the Japanese mainland (Tohoku Region), causing devastating damages. The Japan Meteorological Agency named this earthquake the 2011 Great East Japan Earthquake." Japan Meteorological Agency, *Information on the 2011 Great East Japan Earthquake,* 26.05.2026, available at: https://www.jma.go.jp/jma/en/2011_Earthquake/Information_on_2011_Earthquake.html

[15] Ministry of the Environment, *The Basic Environment Plan,* 27.05.2026, p. 46, available at: https://www.env.go.jp/content/000288877.pdf

relevant for Japan, as a country with "no terrestrial endowments" of critical raw materials and is hugely dependent on China in terms of raw material supply (Ibid., p. 6). The European Council defined critical raw materials as "raw materials of high economic importance, with a high risk of supply disruption."[16] Development of Japan's next generation technology is thus associated with Japan's vulnerability on global raw material supply chains. As outlined by METI, one of the main strengths of the perovskite solar cells is that they can be manufactured domestically as the primary material for their production is iodine, which is procured domestically.[17]

Japan's international image serves as a third factor that caused the emergence of environmental sustainability, especially in the lens of environmental governance. Japan's role in international environmental governance emerged after 1985, when the value of yen was doubled (Wong, 2001, p. 47). Japan's objective to participate in global environmental protection was chosen by the Japanese government as a positive alternative to peacekeeping, which "also enabled them to feel a shared consciousness with the rest of the world" (Ibid., p. 48). Japan's 1988 Environmental White Paper emphasized Japan as being an economically powerful actor that can contribute to global environmental protection through its technological advancement and past domestic experience (Ibid.).

Another significant contribution of Japan in international environmental governance was done in 1997, when Japan ratified the 1997 Kyoto Protocol. The Kyoto Protocol was the first binding international agreement that set quantified greenhouse gas emission reduction targets for industrialized countries.[18] It required a collective reduction of the greenhouse gas emissions up to 5% compared to 1990 levels for 37

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[16] European Council, *Critical raw materials act,* 26.05.2026, available at: https://www.consilium.europa.eu/en/infographics/critical-raw-materials/

[17] Agency for Natural Resources and Energy, Ministry of Economy, Trade and Industry (note 12).

[18] United Nations Framework Convention on Climate Change, *The Kyoto Protocol,* 26.05.2026, available at: https://unfccc.int/process-and-meetings/the-kyoto-protocol

industrialized countries in five years, between 2008 and 2012.[19] Later, in 2015, Japan also ratified the Paris Agreement, which requires both developed and developing countries to contribute to global emission reduction efforts.[20] The Paris Agreement aims to "keep the increase in global average temperature well below 2°C above pre-industrial levels" through decreasing the global emissions by approximately 45% by 2030 and reaching net-zero levels by 2050.[21] Following the Paris Agreement, in October 2020 Japan also established its national goal to "reduce overall GHG emissions to zero by 2050" and in 2021 introduced a mid-term 46% carbon emissions reduction target compared to the levels in 2013 by the year 2030.[22]

2.6 Conclusion and Literature Gaps.

In summary, based on the literature review conducted in this chapter, environmental sustainability has developed as a concept first from the definition of sustainable development introduced in the 1987 Brundtland Report. Environmental sustainability focuses on balancing environmental, economic, and social goals, with a minimal impact on the future societies. Within the Japanese context, environmental sustainability was studied through three lenses: ethical, technological and economic, and at last governance-related. The development of environmental sustainability in these three lenses occurred as a result of three main factors, including Japan's environmental pollution history, its dependence on external supply chains, and its international image.

From an ethical standpoint, environmental sustainability in the Japanese context is strongly linked to the concept of Minamata-gaku and ideas derived from the

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[19] *Ibid.*

[20] United Nations Framework Convention on Climate Change, *The Paris Agreement,* 26.05.2026, available at: https://unfccc.int/process-and-meetings/the-paris-agreement

[21] *Ibid.*

[22] Ministry of Environment, Plan for Global Warming Countermeasures, 27.05.2026, p. 10, available at: https://www.env.go.jp/content/000338677.pdf

experiences in Japanese communities. The concept of Minamata-gaku encompasses Japanese philosophical and religious studies. It also focuses on Japanese environmental experiences and lessons learnt from pollution-related diseases. Environmental sustainability through the ethical lens thus imposes moral obligations toward businesses and policymakers in terms of environmental responsibility. Ethical obligations also drive public attention to the environmental issues, thus forming community-led environmental actions across Japan.

On the other hand, from an economic and technological standpoint, environmental sustainability in Japan is governed by state-led strategic goals aimed at integrating environmental and economic goals. This integration of environmental and economic strategic goals is conducted through the development of green technology, which focuses on renewable energy solutions. As the integration of environmental and economic goals is state-led, the Japanese government serves as a main driver of green technological advancement through investment encouraging instruments, state subsidies, and policy frameworks.

Governance of environmental sustainability encompasses environmental policies, institutional capacity, and political structure. In the context of Japan's environmental governance, it is observed that there is coordination across international, national, and local governance levels. The role of networks and advocacy among actors that influence environmental sustainability is strong and includes both formal and informal ties. Particular examples of networks include city-to-city networks across Japan aimed at solving regional environmental and socio-economic challenges, fostering municipality's positive environmental image, and enhancing economic self-reliance in communities. Lastly, although there is an underrepresentation of local governments in national governance systems, scientific evaluations of Japan's environmental performance remains relatively positive as the overall environmental ethical practices and obedience to the rule of law is high.

Regarding the factors that contributed to the emergence of environmental sustainability in Japan, the earlier literature mainly emphasizes Japan's environmental pollution history, its dependence on external supply chains, and its international image. Japan's environmental pollution history and cases of pollution-related diseases led to the emergence of Japan's environmental ethics and governance frameworks. Japan's dependence on external supply chains contributed to the technological and economic developments of environmental sustainability. Finally, the role of Japan's international image influenced Japan's contribution to international environmental governance and the emergence of Japan's environmental governance domestically.

Despite these valuable contributions, the existing literature reveals three significant gaps. First, it does not examine the difference in approaches to environmental sustainability across different governance levels in Japan. Second, it does not observe why there is a difference in approaches to environmental sustainability initiatives. It does not analyse the differences in goals and policy instruments used for sustainability initiatives across different actors. Third, it does not study the challenges experienced by different governance actors during the implementation of environmental sustainability initiatives. Importantly, while the existing literature provides a significant contribution theoretically, it does not include empirical data from the field, such as the perspectives of Japanese officials directly involved in environmental sustainability governance.

Therefore, three main gaps that this study finds are:

1) A limited systematic comparison of environmental sustainability approaches across different levels governance levels in Japan;

2) A limited attention to the differences in environmental sustainability's goals and instruments, and factors contributing to these differences across different governance levels;

3) A limited examination of challenges experienced by actors at different governance levels while pursuing environmental sustainability.

3 Chapter 3: Methodology

3.1 Research Design

This study is built on a qualitative method with an interpretive research design. Qualitative research aims to understand human experiences and social contexts through the reflective process applied at every stage of the research project (Maxwell, 2008, p. 214). Qualitative research includes "collecting and analyzing data, developing and modifying theory, elaborating or refocusing the research questions, and identifying and dealing with validity threats simultaneously" (Ibid, p. 215).

The aim of this research is not to measure the outcomes of environmental sustainability in Japan quantitatively, but to understand how Japan's environmental sustainability approaches differ depending on the governance level. Furthermore, the qualitative method was chosen as the study aims to examine how Japan's environmental sustainability goals and instruments are interpreted by state actors, how they view environmental sustainability in Japan and what challenges they experience at the implementation stage.

Furthermore, the study is based on a case-study approach. The case-study approach allows to provide in-depth insights in real-life contexts and gain the understanding of environmental sustainability dynamics depending on the governance level in Japan (Baxter and Jack, 2015). The case-study approach allows to capture nuanced decision-making mechanisms rather than gather general understanding of the situation, which facilitates the purposes of this study (Hyett, Kenny, and Dickson-Swift, 2014). Therefore, this approach is well-suited to explore how approaches to environmental sustainability differ across governance levels in Japan.

3.2 Methods and Sampling

This study employs semi-structured interviews with nine public officials in Japan from four governance levels (Table 1). The four governance levels include:

1. Prefectural level
2. Metropolitan level
3. Ministerial level
4. International level

Primary data for this study consists of semi-structured expert interviews conducted with actors involved in environmental sustainability and decarbonization policies and practices in Japan. The format of semi-structured interviews was chosen for this study as it allows both consistency across interviews and flexibility to explore issues specific to each respondent's expertise and role at their organizations. The selection of interview participants was guided by the aim to capture perspectives from actors engaged in environmental sustainability initiatives at different governance levels.

At the prefectural level one group interview was conducted with two officials from the Tottori Prefectural Government (Department of Living Environment, Decarbonized Society Promotion Division) and one individual interview with a representative from Local Governments for Sustainability (ICLEI) Japan. At the Metropolitan level, an interview with one official from the Tokyo Metropolitan Government was conducted. At the Ministerial level, an interview with one official from the Ministry of Economy, Trade, and Industry (METI) was conducted. At the international level, three individual interviews were conducted. Two of the interviews were conducted with officials representing the organizations and one interview was conducted with an independent policy specialist on ASEAN and Japan affairs. Two public organizations operating at the international level include the Japan External Trade Organization (JETRO) and the Japan International Cooperation Agency (JICA).

These organizations were selected due to the following reasons:

1. Tottori Prefectural Government (Department of Living Environment, Decarbonized Society Promotion Division) was selected due to two reasons. The first reason is due to already existing ties with the Tottori Prefectural Government formed during the sustainability-driven student exchange WiseFood project in 2024 between Turku, Finland and Tottori, Japan. The second reason is because Tottori Prefecture is the least populous prefecture of

Japan, with population of 553 407 people as for 2020.[23] Including perspectives of the officials that implement environmental sustainability in the least populous prefecture in Japan was necessary for the purposes of this study. This allows to examine the differences in approaches to environmental sustainability across governance level: between the smallest prefectural level and the largest ministerial and international levels. Existing connections with the prefectural actors facilitated the outreach and data collection.

2. Local Governments for Sustainability (ICLEI) Japan is a "global network that works with more than 2,500 local and regional governments, committed to sustainable urban development."[24] ICLEI Japan is a non-governmental organization (NGO). In Japan, ICLEI works with 26 Japanese member cities and facilitates Japan's local sustainability initiatives. ICLEI Japan was selected as this organization works directly with local governments in Japanese prefectures and therefore, is able to provide valuable insights about environmental sustainability at the prefectural governance level.
3. Tokyo Metropolitan Government was selected as it operates within the Tokyo metropolitan area[25] and therefore, can provide insights about environmental sustainability at the metropolitan governance level. Furthermore, the author was based in Tokyo, so gathering interview data within Tokyo was convenient in terms of the travel time and distance.
4. Japan's Ministry of Economy, Trade, and Industry (METI) was selected mainly to justify whether the environmental sustainability through economic and technological lens described in the previous literature exists in practice. As the Ministry's mission is stated as to "develop Japan's economy and industry by focusing on promoting economic vitality in private companies and smoothly advancing external economic relationships, and to secure stable and efficient supply of energy and mineral resources,"[26] studying actor's perspectives on integrating economic and environmental goals provided a valuable comparison with the existing literature and filled the research gaps.
5. Japan External Trade Organization (JETRO) was selected as this organization operates largely outside of Japan. The organization has 76 overseas offices in

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[23] City Population, *Tottori,* 26.05.2026, available at: https://www.citypopulation.de/en/japan/admin/31__tottori/

[24] ICLEI - Local Governments for Sustainability Japan, *About ICLEI Japan*, 26.05.2026, available at: https://japan.iclei.org/en/about-us/

[25] "Tokyo Metropolitan Government is located in the Kanto Plain, almost in the center of the Japanese archipelago, and consists of the central ward areas, the Tama area, and the island areas (Izu Islands and Ogasawara Islands). Mountainous and hilly areas such as Okutama and Mt Takao, as well as the island areas with rich nature, are designated as natural parks. The Ogasawara Islands are also registered as a World Heritage Site. TMG is the capital of Japan and the country's political, economic, and cultural center, with a large number of governmental agencies and major corporations. It is one of the largest cities in the world with a population of about 14 million." ICLEI - Local Governments for Sustainability Japan, *ICLEI Japan Member Information*, 27.05.2026, available at: https://japan.iclei.org/en/member-list/member_tokyo/

[26] Ministry of Economy, Trade, and Industry, *METI's Mission,* 26.05.2026, available at: https://www.meti.go.jp/english/aboutmeti/data/meti_mission.html

56 countries and "works to promote mutual trade and investment between Japan and the rest of the world" with a focus to "promote foreign direct investment into Japan and help small to medium size Japanese firms maximize their global export potential."[27] This organization was selected as it could assist in justifying the existing literature regarding the technological and economic lens of environmental sustainability. Furthermore, studying Japanese actors' perspectives regarding environmental sustainability at the international level was one of the objectives of this research.

6. Japan International Cooperation Agency (JICA) was selected as this organization operates largely outside of Japan. The organization has 96 overseas operational offices and promotes a mission to "work on human security and quality growth."[28] This organization was selected to assist the justification of the existing literature by bringing a development-oriented perspective. Furthermore, studying Japanese actors' perspectives regarding environmental sustainability at the international level was one of the objectives of this research.

This study provides a reflective interpretation of environmental sustainability governance dynamics. In-depth interviews were chosen as a method of data collection as this method allows to capture participants' perceptions (Cleave et alii, 2016). The interviews focused on the approaches to environmental sustainability in policymaking at the particular level, actors' perceptions of environmental sustainability goals, instruments implemented to address environmental sustainability, and challenges that actors experience when approaching environmental sustainability in local contexts. Open-ended questions were aimed to minimise bias.

All interviews were conducted by the author of this study from September 2025 to January 2026, scheduled according to the availability of both the public officials and the researcher. Most interviews were conducted in person, primarily in Tokyo, with interviews involving Tottori Prefectural Government officials conducted in Tottori. The interview with an independent policy specialist on ASEAN and Japan affairs was taken online via Zoom. Interviews were conducted in Japanese and English, depending on the preference of the interviewee. Each interview lasted approximately 60 minutes.

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[27] Japan External Trade Organization, *What is JETRO?*, 26.05.2026, available at: https://www.jetro.go.jp/en/jetro/

[28] Japan International Cooperation Agency, *JICA's Vision*, 26.05.2026, available at: https://www.jica.go.jp/english/about/basic/vision/index.html#vision

Table 1. List of interviewed officials at the prefectural, metropolitan, ministerial, and international level.

	Official	Role	Affiliation	Governance Level	Interview Date
1	Mizuho Toi	Assistant Section Chief	Tottori Prefectural Government, Department of Living Environment, Decarbonized Society Promotion Division	Prefectural	September 18th, 2025
2	Hisao Yamamoto	Assistant Section Chief	Tottori Prefectural Government, Population Strategy Promotion Headquarters, Population Strategy Division	Prefectural	September 18th, 2025
3	Togo Uchida	Secretary General, Executive Director	ICLEI Japan (General Incorporated Association)	Prefectural	September 24th, 2025
4	Toshiyuki Andoh	Deputy Director for Planning, Bureau of Environment	Tokyo Metropolitan Government	Metropolitan	October 27th, 2025
5	Masafumi Sugano	Senior Director for Energy and Environment Policy	Ministry of Economy, Trade, and Industry (METI)	Ministerial	January 12th. 2026
6	Rosemaryrinka Kimura	Manager, Sustainable Business Division, Overseas Business Support Center	Japan External Trade Organization (JETRO)	International	October 16th, 2025
7	Ai Noguchi	Manager, Office for Sustainability Management, Operations Strategy Department, JICA.	Japan International Cooperation Agency	International	October 9th, 2025
8	Anonymous respondent	Independent policy specialist on ASEAN and Japan affairs		International	January 30th, 2026

3.3 Data Analysis: Thematic Analysis

This study employs thematic analysis to identify and categorise patterns across the interview data. Thematic analysis was chosen because it allows to identify and interpret complex interview data and capture contradictory perspectives (Nowell et alii, 2017). Thematic coding was conducted through an iterative process. Initial themes were identified based on repeated patterns in the interview responses. Then, these primary codes were organized in groups of broader thematic categories and refined according to the research question and sub-questions.

In the open coding phase, interview transcripts were segmented to identify expressions related to the perception of environmental sustainability, environmental sustainability goals, instruments, or challenges. For example, the phrase 'conducting awareness-raising and educational activities on global warming and climate change issues' was coded as an environmental sustainability instrument, while the phrase 'when it comes to decarbonization, many Japanese people still do not know the term itself' was coded as a domestic perception of environmental sustainability. In the second coding phase, primary codes were organized in groups of broader thematic categories based on relational patterns. For example, codes such as 'to achieve carbon neutrality by 2050', 'to achieve a circular economy' and 'to realize a decarbonized society' were clustered under the sub-theme describing the goals and motivations of pursuing environmental sustainability initiatives. Finally, these sub-themes were synthesized according to the research sub-questions: approaches to environmental sustainability, goals and motivations behind sustainability initiatives, policy instruments and financial tools supporting environmental sustainability, challenges experienced in implementing environmental sustainability initiatives.

To enhance transparency the themes, sub-themes, codes, and examples of quotations are summarised in Table 2.

To enhance the credibility of this study and reduce the reliance on a single form of evidence, the interview data was supported with the relevant sources for the frameworks and definitions mentioned by the respondents during the interview. Furthermore, the findings from the thematic analysis were analytically compared with existing academic literature in the Discussion chapter. Therefore, the interview responses are not treated as the only form of evidence, but they are interpreted through the official policy frameworks and academic debates.

Table 2: Thematic framework of environmental sustainability In Japan at the four governance levels.

Themes	Sub-themes	Codes	Representative Quotations
Construction of approaches to environmental sustainability	Alignment with International environmental frameworks	carbon neutrality by 2050, emissions reduction by 46%, emissions reduction by 60%, align with tParis Agreement, based on the United Nations	"every new JICA project must be aligned with the Paris Agreement.."
	Alignment with local agenda	each municipality, local targets, balancing goals, regional revitalization, regional coexistence, balance, balanced way	"each municipality implements these goals depends on its culture, economy, and environment."
	Alignment with national agenda	economic growth, trade, governmental organization, technology	"Sustainability agenda is very much driven not just by environment initiatives, the Paris Agreement and the Kyoto Protocol, but it's actually largely driven by economics, by existing trades in environmental services."
	Alignment with Japan's environmental frameworks	Japan's net-zero targets, Ministry of Environment, national goals	"The Japanese government has created a roadmap for Japan, including targets for 2030 and carbon neutrality. "
Goals of environmental	Public environmental	awareness-raising, educational activites,	"awareness-raising and educational activities on global

sustainability	awareness building	understand the world, receive information, learn from others	warming and climate change issues"
	Enhancing local public's engagement in environmental initiatives	connect with people, foster student organizations, cultural exchange, small actions	"gain new partnerships, create opportunities for new activities, and receive a lot of valuable information"
	Environmental leadership building	global model, high-level vision, leader, brand, solve global challenges	"Tokyo has a strong, high-level vision of becoming a global model city for decarbonization"
	Enhancing economic growth	economic growth, economic opportunity	"connect these efforts to economic growth along a sustainable growth trajectory"
	Enhancing technological competitiveness	key value-added component, supply chains, key role	"we want to create conditions where Japanese companies play key roles in this landscape, whether domestically or internationally"
	Expanding market opportunities	domestic market, growing markets, enlarging markets, population	"For Japan, domestic options are very limited and the market is also very small"
	Ensuring energy security	energy dependence, volatile regions, single energy source, fossil fuel	"reducing fossil fuel input decreases dependence on oil, coal, and natural gas from volatile regions"
Instruments of environmental sustainability	Narratives of environmental sustainability	symbolise, discuss, talk, interesting, attractive, remember, feeling, promote	"with this sense of crisis, Japan is now trying to move things forward and actively promote sustainability-related efforts"
	Human resource capacity	nurture people, young people, capacity development, foster community, exchange, community engagement	" important to first nurture young people who have knowledge about these issues and can carry them forward"
	Partnerships and networks	work, collaborate, dialogue, know-how, connections	"cooperation starts at the government-to-government level between Africa and Japan, including startups"

	Green technology	Japanese technology, next-generation technology, innovation, solar, solar perovskite cells, hydrogen, wind power, green technology	"priority projects, for example, next-generation solar cells, and hydrogen initiatives"
	Financial mechanisms	subsidies, ODA, bonds, green bonds, JCM, ETS, GX Bonds, investment	"the funds obtained through GX bonds are ring-fenced to serve as seed investment in various green transformation fields"
Challenges of environmental sustainability	Communication	English, international, communication, language, promotion, weak, visible, interest	"promotion is weak and many people living in Japan are not very interested"
	Implementation	progress, slow, exact timing	"the slow progress is not limited to energy"
	Economic viability	cost, expensive, afford, high, investment	"that's when these projects will start to become economically viable. But I would not expect that to happen in the next five years. It will be at least 15 years"

3.4 Ethics

Ethical approval was obtained from all the participants. Prior to each interview, the purpose of the study was explained and oral and written consent was obtained. Participation was entirely voluntary, and participants were informed about their right to decline to answer specific questions or terminate their participation in the interview at any point of the interview or after the interview was conducted. Seven officials gave their permission to present their views with their names, while the eighth official preferred to remain his/her name and the organization's name anonymously, giving the opinion as an independent policy specialist on ASEAN and Japan affairs.

Interviews were conducted in either Japanese or English, depending on participant preference. Interview recordings and transcripts were stored securely. No sensitive personal data was collected. The research did not involve vulnerable populations.

3.5 Limitations

This study has two main limitations. First, the respondents are affiliated with public organizations. Although this provides valuable perspectives, it may also strongly reflect institutional viewpoints rather than broader public opinion. Second, the number of participating organizations was limited. For example, with 47 prefectures in Japan only two organizations represented the views on environmental sustainability at the prefectural level. The same applies to ministerial and international levels, with only one ministry and three Japanese governmental organizations operating abroad. Third, as some interviews were conducted in Japanese, there may be minor interpretive limitations.

4 Chapter 4: Environmental Sustainability at the Prefectural Level.

This chapter provides a thematic analysis of two interviews with officials at the prefectural governance level in Japan. The main aim of this chapter is to determine how environmental sustainability is approached at the prefectural governance level. To address the main aim of this chapter, this chapter focuses on the construction, goals, instruments, and challenges of environmental sustainability at the prefectural governance level in Japan. The thematic analysis is based on two interviews with representatives from two organizations operating at the prefectural level: the Tottori Prefectural Government (Department of Living Environment, Decarbonized Society Promotion Division) and the Local Governments for Sustainability (ICLEI) Japan. Two officials from the Tottori Prefectural Government participated in a group interview, while one official from ICLEI Japan took part in an individual interview. Both interviews were conducted in Japanese. Interview questions included:

1) Are there any particular actions towards promotion of environmental sustainability in your organization?

2) What kind of environmental sustainability objectives do you aim to achieve?

3) How do you approach international audiences for environmental sustainability cooperation?

4) What challenges do you experience when approaching environmental sustainability?

This main set of questions was selected to assist in answering the research question and research sub-questions. Furthermore, this set of questions assisted in building parallels with the existing literature and policy papers.

This chapter consists of five sections. Each section corresponds to a research sub-question and based on themes identified from the interviews. Section one analyses how environmental sustainability is constructed at the prefectural level. Section two

analyses its main goals. Section three examines the instruments used to support its implementation. Section four observes the challenges faced by prefectural governance actors in implementing and addressing environmental sustainability. Section five synthesises the findings and clarifies how environmental sustainability is approached at the prefectural governance level in Japan.

4.1 The Construction of Environmental Sustainability at the Prefectural Level: the Role of International Environmental Frameworks and the Local Agenda.

This section analyses how environmental sustainability is constructed at the prefectural governance level in Japan. This section emphasises two key points of how environmental sustainability is built at the prefectural governance level. These points result from the thematic analysis of the interviews with the officials from Tottori Prefectural Government and ICLEI Japan. They include:

1) The role of international environmental frameworks in the emergence of prefectural environmental sustainability governance;

2) The role of local agenda and Japan's guidelines in the emergence of prefectural environmental sustainability governance.

The first key point is the role of international environmental frameworks in the emergence of prefectural environmental governance in Japan. Based on the themes recognized and constructed from the interviews, this study frames ICLEI Framework of Five Pathways to Sustainability, United Nations Sustainable Development Goals, and the Paris Agreement as the main international environmental frameworks that affect the construction of environmental sustainability at the prefectural level. For example, the official from the ICLEI Japan expressed that the ICLEI Five Pathways[29] developed

[29] "These pathways (zero emission development pathway, nature-based development pathway, equitable development pathway, resilient development pathway, circular development pathway) are part of the ICLEI São Paulo Strategic Vision 2024 – 2030, which guides the work of the ICLEI network. The pathways were originally released as part of the ICLEI Montréal Commitment and Strategic Vision 2018-2024. Local and regional governments use these pathways as a guide for sustainable urban

by ICLEI's Global[30] are being implemented in Japan *"within the same overall direction and strategy"* (Uchida T., 24.09.2025). The official from ICLEI Japan also noted that prefectural environmental sustainability initiatives are consistent with global frameworks such as the United Nations Sustainable Development Goals (UN SDGs). Another example is the role of the Paris Agreement in constructing environmental sustainability at the prefectural level. Officials from the Tottori Prefectural Government, for instance, explained the alignment of the prefectural sustainability trajectory within the Paris Agreement goals. The officials described the prefectural environmental sustainability targets as *"achieving carbon neutrality by 2050"*[31] and *"reducing carbon dioxide emissions by 46% compared to 2013 levels by 2030"* (Toi M., 18.09.2025). This shows that international environmental agreements impact the guidelines of local environmental frameworks in Japanese prefectures.

The second key point derived from the thematic analysis of the interview data is the role of local agenda in the emergence of prefectural environmental governance. This observation is important, as it highlights that environmental sustainability at the prefectural governance level is guided not solely by the international norms. Instead, the construction of the prefectural environmental sustainability is a complex process involving the consideration of the prefecture's specific local agenda and Japan's national environmental sustainability guidelines for local governments in prefectures.

In this context, the role of international environmental frameworks is complementary to the local and national environmental sustainability agenda. For example, the Paris Agreement's goals were described by the officials in the Tottori Prefectural Government as *"intermediate voluntary targets"* (Toi M., 18.09.2025). This reference

development through systemic change." ICLEI - Local Governments for Sustainability, *Our approach,* 27.05.2026, available at: https://iclei.org/our_approach/

[30] "ICLEI – Local Governments for Sustainability (known as ICLEI) is a global network working with more than 2500 local and regional governments committed to sustainable urban development." ICLEI - Local Governments for Sustainability, *ABOUT OUR ORGANIZATION,* 27.05.2026, available at: https://iclei.org/

[31] Tottori Prefecture Center for the Promotion of Global Warming Prevention Activities, *About Zero Carbon Tottori* (鳥取県地球温暖化防止活動推進センター、*ゼロカーボンとっとりについて*), 27.05.2026, available at: https://www.t-ccca.org/zero-carbon-tottori/about/

highlights that global sustainability frameworks are selectively chosen and cautiously and incrementally adapted in local policies depending on the prefectural agenda.

The local sustainability agenda depends on the prefecture. In Tottori Prefecture, for example, the primary agenda recognized from the themes was linked to the aging population and demographic decline. In this context, environmental sustainability refers to a broader agenda of maintaining *"a viable society as the population decreases"* (Toi M., 18.09.2025). The official from ICLEI Japan further approved this observation by describing a significant autonomy of local governments across Japan when it comes to the implementation of global sustainability frameworks. As described by the official from ICLEI Japan, municipalities are able to adapt global sustainability guidelines according to their specific local agenda based on a local *"culture, economy, and environment"* (Uchida T., 24.09.2025).

Furthermore, it is observed that prefectural environmental sustainability is significantly based on local community's acceptance and the role of local governments. The official from ICLEI Japan pointed out that local governments in prefectures aim to implement environmental sustainability *"without burden"* on the communities and make environmental initiatives "*acceptable in people's daily lives*" (Uchida T., 24.09.2025). In addition, as explained by the official from ICLEI Japan, prefectural governments play a significant role in implementing environmental sustainability in local communities as they *"understand the realities of people's lives"* (Uchida T., 24.09.2025).

The official from ICLEI Japan further explained that the prefectural agenda in implementing environmental sustainability is outlined in Japan's national environmental policies. For example, Japan's national "Regional Revitalization" (Chihōsōsei)[32] policy targets environmental goals alongside efforts to sustain local economies and communities. As explained by the official from ICLEI Japan, *"even*

[32] Cabinet Secretariat, *Regional Revitalization 2.0.* (内閣官房、*地方創生 2.0.)*, 27.05.2026, available at: https://www.cas.go.jp/jp/seisaku/chihousousei2_0/index.html

when pursuing decarbonization, the government emphasizes economic and social revitalization in local communities" (Uchida T., 24.09.2025). The officials from the Tottori Prefectural Government mentioned the role of balancing environmental, social, and economic goals as well. Particularly, the officials from Tottori Prefectural Government referred to balancing several goals when introducing the circular economy, which was described as *"balancing natural environments and biodiversity while maintaining social and economic activity"* (Yamamoto H., 18.09.2025). Japan's guidelines to balance environmental, social, and economic goals in prefectures result from Japan's experience in natural disasters, as explained by the official from ICLEI Japan.

4.2 The Goals of Environmental Sustainability at the Prefectural Level: Building Public Environmental Awareness and Enhancing Social Engagement in Environmental Initiatives.

This section analyses goals that guide environmental sustainability at the prefectural governance level in Japan. This section emphasises two key goals driving environmental sustainability at the prefectural governance level. These goals are defined from the thematic analysis of the interview data with the officials from the prefectural governance level. The two goals of environmental sustainability at the prefectural governance level are:

1) Building public environmental awareness;

2) Enhancing the local public's engagement in environmental initiatives.

The first goal understood from the thematic analysis of the interviews is to build public awareness regarding sustainability-related concepts and environmental issues. This aim is defined at the prefectural governance level due to low public awareness regarding the environmental issues and specific sustainability-related concepts. For example, as explained by the officials from ICLEI Japan and Tottori Prefectural Government, in Japanese society there is a long-standing problem of low

environmental awareness. The official from ICLEI Japan pointed out that a broader scope of environmental issues is *"invisible"* for the public, even despite Japan's experience in dealing with pollution-caused diseases (Uchida T., 24.09.2025). The so-called invisible issues include mainly climate change, biodiversity loss, microplastics, and impacts of consumption through global supply chains. Furthermore, officials from the Tottori Prefectural Government noted low public awareness regarding sustainability terms and practices, such as decarbonization. As emphasised by the officials from the Tottori Metropolitan Government, "*many Japanese people still do not know the term decarbonization itself, or what kinds of actions actually count as decarbonization*" (Toi M., 18.09.2025).

The second goal understood from the thematic analysis of the interviews is to enhance the local public's engagement in environmental initiatives. This aim is linked to the logic of knowledge and cultural exchange and partnership building, domestically and internationally. As described by the official from the Tottori Prefectural Government, enhancing the local public's engagement in environmental initiatives domestically and internationally enables the prefecture to *"learn from others," "understand the world,"* and *"improve ourselves"* (Toi M., 18.09.2025). This indicates that the goal of enhancing local public engagement in international and domestic environmental initiatives is primarily driven by the logic of knowledge exchange. Furthermore, the officials from the Tottori Prefectural Government outlined that enhancing the local public's engagements in environmental initiatives does not pursue *"very large or ambitious"* outcomes and it is mainly oriented on gaining insights and sharing local practices (Toi M., 18.09.2025).

Another logic of enhancing the local public's engagement in environmental initiatives is to facilitate cultural exchange. As described by the official from Tottori Prefectural Government, social engagements led by environmental sustainability agenda facilitate not only the exchange of technical knowledge. Instead, they also reveal social and cultural norms that influence sustainability practices, described by the

official as "*cultural aspects can encourage certain behaviours*" (Yamamoto H., 18.09.2025). For example, as clarified by the officials from the Tottori Prefectural Government, there are local environmental practices that are considered *"normal"* in Japan (e.g *"using resources fully or sorting waste properly")* but are less widespread abroad (Yamamoto H., 18.09.2025). In addition to exchanging cultural specifics of environmental practices, there is also a rationale that prefecture-specific sustainable practices may gain *"recognition internationally"* and thus also reinforce the importance of local practices domestically (Toi M., 18.09.2025).

Lastly, there is also a logic of partnership building behind the aim to enhance local public's engagements in environmental initiatives. The role of building international partnerships does not have strategic goals at the prefectural governance level. It is driven by pragmatic knowledge exchange described by the officials from Tottori Prefectural Government as *"creating new opportunities and receiving valuable information"* (Toi M., 18.09.2025). Environmental problems are framed by the officials at the prefectural governance level as *"worldwide problems,"* which thereby require global efforts (Toi M., 18.09.2025). International partnerships are thus framed as forming *"allies"* to *"tackle big issues,"* which stands for environmental issues (Yamamoto H., 18.09.2025). Therefore, expanding international and domestic partnerships through the local public's proactive engagement in environmental initiatives is seen at the prefectural level as a way to solve common environmental problems. Additionally, expanding the international network serves to enhance the prefecture's visibility within Japan. In this context, higher prefecture's visibility is considered by the official from Tottori Prefectural Government as a measure to support regional revitalization efforts (e.g coping with prefecture's declining population). This was described by the official from Tottori Prefectural Government as *"we saw it [participation in international engagements] as an opportunity…going there allows students to connect with the world, and Tottori can become attractive for them"* (Yamamoto H., 18.09.2025).

4.3 Instruments Assisting the Implementation of Environmental Sustainability at the Prefectural Level: Adjusting the "Sustainability" Narratives, Human Resource Development, and Informal City-to-city Networks.

This section analyses instruments that assist the implementation of environmental sustainability at the prefectural governance level in Japan. This section emphasises three key instruments that assist the implementation of environmental sustainability at the prefectural governance level. These instruments are identified from the thematic analysis of the interview data with the officials from ICLEI Japan and Tottori Prefectural Government. The three instruments include:

1) Adjusting the narratives of environmental sustainability;
2) Developing human resource capacity;
3) Using informal city-to-city networks.

The first instrument understood from the thematic analysis of the interview is adjusting the narratives of environmental sustainability. This means that instead of using specific environmental and sustainability concepts in communicating with local communities, local prefectural governments explain environmental sustainability through well-known practices and culturally-embedded images.

As explained by the officials from the Tottori Prefectural Government, despite the lack of sustainability-specific knowledge, Japanese communities have been practising environmentally-friendly initiatives for a long time. Therefore, by explaining environmental sustainability through the practices that the public is already familiar with, the prefectural government *"helps people understand they are already doing things connected to decarbonization"* (Yamamoto H., 18.09.2025). For example, the local government in Tottori explains the term decarbonization as *"easy measures"* that include *"switching off lights, consuming locally produced food, and riding bicycles"* (Yamamoto H., 18.09.2025). The analysis of this instrument further suggests that while

environmental practices may already be included in people's everyday lives, they are not necessarily recognized as part of environmental sustainability by the public.

Additionally to providing simpler explanations to complex sustainability terms, the prefectural government in Tottori also uses culturally-embedded images to promote sustainability in the community. This approach was taken by the local government to present sustainability as a more attractive practice toward the public, as often sustainability is perceived as *"boring"* (Toi M., 18.09.2025). Explaining sustainability strategies (e.g a local sustainability strategy named Tottori Reborn initiative) solely through the sustainability-linked terms was believed to be not *"attractive"* to the public (Toi M., 18.09.2025). Therefore, a more visually appealing and culturally familiar *"Doraemon-like"* image was created as a logo for the local Tottori Reborn strategy (Toi M., 18.09.2025).

The second instrument understood from the thematic analysis of the interview is developing human resource capacity. Importantly, human resource capacity development is long-term oriented and targets primarily youth engagement and education. For example, the Tottori Prefectural Government organises youth sustainability-driven exchanges abroad. A distinctive feature of this approach is that participants of the exchange programs are expected to *"engage in activities in their local communities"* upon their return back to Tottori and *"promote the global sustainability efforts to the residents of Tottori Prefecture"* (Toi M., 18.09.2025). Officials from the Tottori Prefectural Government Respondents also observed that youth-led exchanges facilitate the enhancement of public environmental awareness, foster environmental leadership and strengthen local initiatives. Therefore, youth exchange programs conducted at the prefectural governance level in Japan target community education rather than individual learning.

The third instrument understood from the thematic analysis of the interview is using informal city-to-city networks. Officials from both Tottori Prefectural Government and ICLEI Japan outlined the significant role of informal city-to-city diplomacy in

progressing the local environmental sustainability agenda. This is mainly because city-to-city networks at the prefectural governance level are shaped by individual actors and are independent from the national geopolitics, which makes these interactions flexible and informal. For example, as the official from ICLEI Japan noted, participation in international environmental initiatives may occur *"not because of a formal agenda, but simply because the mayor wants to be involved in international discussions"* (Uchida T., 24.09.2025). Another case of the Tottori-Turku partnership illustrates that city-to-city partnerships may develop from a chance encounter to subsequent informal exchanges. The official from Tottori Prefectural Government explained the city-to-city interaction between Tottori and Turku as *"the Tottori-Turku connection started when we met the mayor of Turku at COP28;*[33] *before that, Iris from Turku City visited Tottori Prefecture, and Yamamoto-san guided her here, which further became the foundation for our current cooperation"* (Toi M., 18.09.2025). Furthermore, informal city-to-city interactions are more pragmatic than the national-level interactions. As explained by the official from ICLEI Japan, while relations between countries, such as Japan, South Korea, and China may be *"delicate"* due to historical and political tensions, local governments often bypass these complexities and focus on shared practical challenges *"without being constrained by broader diplomatic concerns"* (Uchida T., 24.09.2025). Sustainability cooperation is also described by the official from ICLEI Japan as *"easier at the municipal level"* (Uchida T., 24.09.2025). Therefore, as understood from the analysis, informal city-to-city networks enable a more open and solution-oriented dialogue.

4.4 Key Challenges.

This section analyses the challenges faced by the officials at the prefectural level while constructing and addressing environmental sustainability. These challenges are

[33] The Conference of the Parties to the Convention (COP) was launched three decades after the Rio Summit and the launch of the United Nations Framework Convention on Climate Change (UNFCCC). COP convenes member countries annually to determine ambition and responsibilities, and identify and assess climate measures. COP28 was taking place from 30 November to 12 December 2023 at Expo City, Dubai in the United Arab Emirates. Conference of the Parties to the Convention 28, *What is COP?* 27.05.2026, available at: https://www.cop28.com/en/what-is-cop

identified from the themes recognized and constructed from the interviews with officials from ICLEI Japan and Tottori Prefectural Government. The themes are sorted in two primary categories: the challenges related to domestic sustainability engagement and challenges associated with international engagement. These challenges reveal constraints that shape sustainability governance at the prefectural level.

At the domestic level, officials from ICLEI Japan and Tottori Prefectural Government emphasized two integrated challenges: low public awareness of "invisible" environmental issues and the persistence of siloed administrative structures. As discussed in earlier sections, many contemporary environmental problems in Japan are not immediately perceptible in everyday life. This lack of visibility contributes to low levels of public awareness and engagement. Therefore, for local governments that work directly with people, the lack of public awareness exposes the primary challenge, requiring structural changes in public education and communication.

In parallel, the internal organization of local governments presents an institutional challenge. Sustainability-related initiatives are often concentrated within a single administrative division, limiting opportunities for cross-sectoral integration. As an official from Tottori Prefectural Government noted, while local sustainability-driven initiatives such as Tottori Reborn represent a comprehensive guideline for sustainability, their implementation remains within one specific department *"..within government offices, decarbonization is often limited to just one division"* (Yamamoto H., 18.09.2025). This reduces potential systematic impact of sustainability initiatives.

When it comes to international engagement, for example, during youth exchanges or city-to-city networking, the primary challenge identified by the officials from both ICLEI Japan and Tottori Prefectural Government is related to limited linguistic capacity. The language barrier is particularly related to English, described by the official from Tottori Prefectural Government as *"the language barrier is a big issue in Japan because*

most people speak Japanese and are not used to communicating in English or other foreign languages" (Yamamoto H., 18.09.2025).

4.5 Conclusion.

In conclusion, based on the thematic analysis of the two interviews (one group interview with the officials from Tottori Prefectural Government and one individual interview with the official from ICLEI Japan), this chapter outlines four main conclusion points.

Firstly, the environmental sustainability at the prefectural governance level is constructed through the adaptation of international environmental frameworks to the local environmental and socio-economic agenda. The adaptation process is highly incremental, citizen-oriented, and consensus based. The local agenda is shaped by the immediate and long-term prefectural priorities. Importantly, a significant role in the adaptation of international environmental frameworks to local agenda is played by a broader Japanese mindset. The Japanese mindset emerged in Japan as a result of experiences in natural disasters and it refers to balancing multiple objectives, including environmental, social, and economic. Local prefectural governments play a decisive role in adapting the global sustainability norms to specific local environmental agenda and policies.

Secondly, the main goals to promote environmental sustainability at the prefectural governance level is to raise public environmental awareness and enhance local public's engagement in environmental initiatives domestically and internationally. The aim to raise public awareness mainly refers to enhancing public knowledge of environmental issues and sustainability-related concepts. The aim to enhance local public engagement in environmental initiatives is driven by the logic of knowledge sharing and partnership building. Importantly, the goals driving environmental sustainability at the prefectural governance level are citizen-oriented and they do not include strategic targets.

Thirdly, the main instruments supporting the implementation of environmental sustainability at the prefectural governance level are adjusting the narratives regarding environmental sustainability, developing human resource capacity, and using informal city-to-city networks. Adjusting the narratives regarding environmental sustainability refers to interpreting locally familiar sustainable practices as the actions of environmental sustainability and using culturally embedded images to show sustainability as an "attractive" concept. Human resource capacity development as an instrument of environmental sustainability implementation at the prefectural level occurs mainly through youth engagements and indicates the long-term oriented approach. Regarding the third instrument, using informal city-to-city networks, it mainly serves to facilitate international engagements between local prefectural governments and international audiences. City-to-city networks are driven by pragmatic agenda and individual actors, and are decentralized from a broader national agenda. The interactions between Japan's local prefectural governments and international audiences is flexible and developed incrementally. Together, the three instruments demonstrate the importance of communication, public education, and social engagement in implementing environmental sustainability at the prefectural governance level in Japan.

Fourthly, the thematic analysis identified three challenges linked to the implementation of environmental sustainability at the prefectural governance level. The challenges include low environmental awareness within the Japanese public, institutional structural constraints, and linguistic barriers that limit sustainability-driven interactions between Japan's local governments and international audiences.

5 Chapter 5: Environmental Sustainability at the Metropolitan Level.

This chapter provides a thematic analysis of an interview with the official at the metropolitan governance level in Japan. The main aim of this chapter is to determine how environmental sustainability is approached at the metropolitan governance level. To address the main aim of this chapter, this chapter focuses on the construction, goals, instruments, and challenges of environmental sustainability at the metropolitan governance level in Japan. The thematic analysis is based on one interview with an official from the Tokyo Metropolitan Government. The interview was conducted in Japanese. Interview questions included:

1) Are there any particular actions towards promotion of environmental sustainability in your organization?

2) What kind of environmental sustainability objectives do you aim to achieve?

3) How do you approach international audiences for environmental sustainability cooperation?

4) What challenges do you experience when approaching environmental sustainability?

This main set of questions was selected to assist in answering the research question and research sub-questions. Furthermore, this set of questions assisted in building parallels with the existing literature and policy papers.

This chapter consists of five sections. Each section corresponds to a research sub-question and based on themes identified from the interviews. Section one analyses how environmental sustainability is constructed at the metropolitan level. Section two analyses its main goals. Section three examines the instruments used to support its implementation. Section four observes the challenges faced by the metropolitan governance actor in implementing and addressing environmental sustainability.

Section five synthesises the findings and clarifies how environmental sustainability is approached at the metropolitan governance level in Japan.

5.1 The Construction of Environmental Sustainability at the Metropolitan Level: the Alignment of International Environmental Frameworks with Local Strategic Environmental Governance.

This section analyses how environmental sustainability is constructed at the metropolitan governance level in Japan. This section emphasises three key points of how environmental sustainability is built at the metropolitan governance level. These points result from the thematic analysis of the interview with an official from the Tokyo Metropolitan Government.

They include:

1) The role of international environmental frameworks in the emergence of metropolitan environmental governance;

2) The role of local environmental frameworks in the metropolitan environmental governance;

3) The role of local communities and the private sector in constructing environmental sustainability at the metropolitan governance level.

The first key point is the role of international environmental frameworks in the emergence of metropolitan environmental governance in Japan. Based on the thematic analysis of the interview, this research frames the Paris Agreement as the main international environmental framework that affects the construction of environmental sustainability at the metropolitan level. For example, the main sustainability goals were described by the official from Tokyo Metropolitan Government as realising a *"decarbonized society by 2050"*[34] and *"contributing to global*

[34] The Conference of the Parties to the Convention (COP) was launched three decades after the Rio Summit and the launch of the United Nations Framework Convention on Climate Change (UNFCCC). COP convenes member countries annually to determine ambition and responsibilities, and identify and

net-zero emissions" (Andoh T., 27.10.2025), which demonstrates the alignment with the Paris Agreement. The official from the Tokyo Metropolitan Government also emphasized additional carbon reduction goals, such as *"carbon emission reductions by 60% by 2035 and by 50% by 2030"*[35] (Andoh T., 27.10.2025), which also demonstrates the alignment of metropolitan environmental frameworks with the Paris Agreement. In addition to the alignment with the Paris Agreement goals, the official from the Metropolitan Government also emphasized the role of international environmental initiatives. For example, environmental initiatives suggested during the Summit G20[36] "*became the trigger"* for the net-zero targets domestically (Andoh T., 27.10.2025).

The second key point is that the scope of environmental sustainability is strategic at the metropolitan governance level. As analysed through the interview data, the sustainability at the metropolitan level encompasses circular economy, plastic reduction, biodiversity preservation, thus becoming framed as an integrated urban system. The official from the Metropolitan Government included specific goals when constructing environmental sustainability, which aim to "*reduce energy consumption by more than 50%"* and *"increase the share of renewable energy to over 60%"* by 2035, [37] and reduce the amount of *"plastic waste that is incinerated"* (Andoh T., 27.10.2025).

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assess climate measures. COP28 was taking place from 30 November to 12 December 2023 at Expo City, Dubai in the United Arab Emirates. Conference of the Parties to the Convention 28, *What is COP?* 27.05.2026, available at: https://www.cop28.com/en/what-is-cop

[35] *Ibid.*

[36] "The G20, or Group of Twenty, is an intergovernmental forum of the world's major developed and developing economies. It comprises 19 countries (Argentina, Australia, Brazil, Canada, China, France, Germany, India, Indonesia, Italy, Japan, Republic of Korea, Mexico, Russia, Saudi Arabia, South Africa, Turkey, UK, USA), the African Union and the European Union (EU). Collectively, the G20 accounts for more than 85% of global GDP, 75% of international trade and two-thirds of the world population, making it the premier forum for international economic cooperation. Starting in 1999 as a meeting for the finance minister and central bank governors, the G20 has evolved into a yearly summit involving the Head of State and Government." Group of Twenty, *G20,* 27.05.2026, available at: https://g20land.org/g20/

[37] "For the energy consumption reduction rate, the total energy consumption of all facilities in Tokyo must be at least the target reduction rate for 2030 indicated in the standard timeline defined by TMG. Renewable electricity must account for at least 50% of electricity used by all facilities in Tokyo. Facilities using 100% renewable electricity must account for at least 20% of all facilities in Tokyo." Tokyo Metropolitan Government, Bureau of Environment, *Efforts from FY 2025 in the climate change programs for existing buildings based on the Ordinance on Environmental Preservation to Secure the Health and Safety of Citizens of the Tokyo Metropolitan Area,* 27.05.2026, p. 5, available at: https://www.kankyo.metro.tokyo.lg.jp/documents/d/kankyo/effortsfrom2025

Recycling and waste management efforts were significantly emphasized by the official from Tokyo Metropolitan Government, with a particular example of *"fluorocarbon gas"*[38] emission management in the area surrounding the waste treatment facility (Andoh T., 27.10.2025). Based on the themes, environmental sustainability at the Metropolitan level is embedded within the environmental frameworks. These frameworks mentioned by the official from the metropolitan government include Zero Emission Tokyo Strategy[39] and Tokyo Zero Emission Master Plan, Tokyo 2050 Strategy,[40] Tokyo Residents' Growth Strategy,[41] and 31 targets[42] facilitating the main goal of reducing carbon emissions by 60% by 2035. This analysis shows that environmental sustainability at the metropolitan level is more strategic compared to the prefectural level, as it relies on particular frameworks and systematically updated roadmaps.

The third key point derived from the thematic analysis is the role of local communities and the private sector in constructing environmental sustainability at the metropolitan governance level. For example, in constructing the environmental frameworks, the official from the Metropolitan Government pointed out that although the local environmental frameworks are structured strategically, they are

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[38] "Fluorinated gases (F-gases) are a family of man-made gases that play a vital role in modern society. They are used throughout the cold chain to keep food fresh and safe to eat, in air conditioning units and heat pumps by providing the 'working fluid' of these heating and cooling systems, and as high-performance blowing agents to make insulation foams and fire suppressants. F-gases are also used as propellants in medical devices and other technical aerosol products. The use of F-gases by manufacturers has increased steadily since the 1990s due to the phase-out of chlorofluorocarbons (CFCs), which have been banned by the Montreal Protocol to protect the Earth's ozone layer." The European FluoroCarbons Technical Committee, *What are F-gases?,* 27.05.2026, available at: https://www.fluorocarbons.org/

[39] "The Zero Emission Tokyo Strategy is a Climate Action Plan that aims to achieve net zero CO2 emissions by 2050. Published in December 2019, the strategy summarises Tokyo's vision for realising this goal, as well as tangible measures and roadmaps." C40 Cities, *Zero Emission Tokyo Strategy,* 27.05.2026, available at: https://www.c40.org/case-studies/zero-emission-tokyo-strategy/

[40] The Tokyo 2050 Strategy is a new compass that integrates policies to be implemented by 2035 to realize the "Vision" of what Tokyo aims to be in the 2050s. The Tokyo Strategy was announced in March 2025." Tokyo Metropolitan Government, *Tokyo 2050 Strategy: Unlocking a Better Future,* 27.05.2026, available at: https://www.english.metro.tokyo.lg.jp/w/000-101-004130

[41] Tokyo Residents' Growth Strategy is embedded within The Future Tokyo: Tokyo's Long-Term Strategy (2021) and Tokyo 2050 Strategy (2025). Tokyo Metropolitan Government, *Future Tokyo: Tokyo's Long-Term Strategy,* 27.05.2026, available at: https://www.english.metro.tokyo.lg.jp/w/001-101-000052

[42] Japan Climate Initiative, *Tokyo* (気候変動イニシアティブ, *東京都),* 27.05.2026, available at: https://japanclimate.org/member/tokyo-metropolitan-government/

also adapted to the residents in an "*easy-to understand format*" (Andoh T., 27.10.2025). Furthermore, environmental sustainability is constructed and implemented incrementally, with the engagement of local communities and the private sector in the decision-making process. For example, when introducing green technology, the Tokyo Metropolitan Government received certain concerns from the public, such as *"whether the landscape will be negatively affected"* and whether fishing activities will be affected (Andoh T., 27.10.2025). Therefore, the official from Tokyo Metropolitan Government emphasised the importance of a *"regional coexistence"* when including various actors in decision-making regarding environmental solutions (Andoh T., 27.10.2025). With the private sector consensus-building also does not occur immediately. The official from the Metropolitan Government explained that rather than enforcing a regulation immediately (e.g a requirement on solar panels' installation on all the new buildings within the Tokyo area), the metropolitan government conducts negotiations with the private stakeholders directly for years, informing them about the new policy plan. This incremental strategy resulted in achieving a consensus with the private sector and mandating the policy as a *"baseline for residential construction going forward"* (Andoh T., 27.10.2025), which demonstrates how an incremental approach can normalize policies in the long-term.

5.2 The Goals of Environmental Sustainability at the Metropolitan Level: Global Leadership Building and Enhancing Economic Growth.

This section analyses goals that guide environmental sustainability at the metropolitan governance level in Japan. This section emphasises two key goals driving environmental sustainability at the metropolitan governance level. These goals are defined from the thematic analysis of the interview data with an official from the metropolitan governance level in Japan. The two goals of environmental sustainability at the metropolitan governance level are:

1) Building Tokyo's image as a global environmental leader;

2) Enhancing economic growth.

The first goal understood from the thematic analysis of the interview is to build Tokyo's image as a global environmental leader. As emphasised by the official from Tokyo Metropolitan Government, environmental sustainability initiatives are being developed with the aim to build *"a city that serves as a global model"* (Andoh T., 27.10.2025). Regarding environmental sustainability, the official from the Tokyo Metropolitan Government stated that *"Tokyo has a strong vision of becoming a global model city for decarbonization"* (Andoh T., 27.10.2025).

The second goal understood from the thematic analysis of the interview data is to enhance Japan's economic growth. The official from the Metropolitan Government emphasised the ambition to *"connect the sustainability efforts to economic growth"* (Andoh T., 27.10.2025). Furthermore, the official noted that globally there is already competition among cities in using climate change as an economic opportunity, stating that *"if we do not take action now, we will miss that opportunity"* (Andoh T., 27.10.2025).

5.3 Instruments Assisting the Implementation of Environmental Sustainability at the Metropolitan Level: Green Technology, Financial Mechanisms, Human Resource Capacity, and International Collaborations.

This section analyses instruments that assist the implementation of environmental sustainability at the metropolitan governance level in Japan. This section emphasises four key instruments that assist the implementation of environmental sustainability at the metropolitan governance level. These instruments are identified from the thematic analysis of the interview data with an official from the Tokyo Metropolitan Government. The four instruments include:

1) Introducing green technology across urban ecosystems;

2) Using financial mechanisms;

3) Developing human resource capacity;

4) Enhancing international collaborations and city-to-city networks.

The first instrument understood from the thematic analysis of the interview is introducing green technologies across urban ecosystems. Particularly, the emphasis is given by the official from the Tokyo Metropolitan Government on developing *"the Japanese next-generation technologies"* (Andoh T., 27.10.2025). Among the so-called next-generation technologies, the official from the Metropolitan Government outlined the development of hydrogen technologies, solar perovskite cells, and dual-type offshore wind farms. Importantly, the focus on these three types of green technologies is given due to their relevance to the Japanese domestic environment. For example, solar perovskite cells are being currently developed and installed on the buildings due to their lightweight design and flexibility, which is important for Japan's high-intensity earthquake-prone landscapes. Similarly, the dual-type offshore wind farms were described by the official as particularly *"suitable for the Izu region"* (Andoh T., 27.10.2025). Furthermore, the next-generation technological solutions were linked by the official to additional goals. For instance, in addition to the electricity generation, the official from the metropolitan government mentioned the biodiversity objectives performed by the dual-type offshore wind farms as "*habitats for fish are created under the structure floating on the water*" (Andoh T., 27.10.2025).

Furthermore, the official noted the Metropolitan's determination to develop the next-generation technologies and keep the technological leadership on the international renewable energy market. For example, as explained by the official from the Metropolitan Government despite the unpredictable demand for hydrogen and foreign companies *"withdrawing from hydrogen projects"*, the Tokyo Government organizes symposiums *"focused on the green hydrogen"* and proposes the introduction of *"several hundred green hydrogen powered taxis"* (Andoh T., 27.10.2025).

In addition to the focus on developing the next-generation generation technologies, the official from the metropolitan government stated the general efforts to integrate green technology in the broader urban ecosystem. This includes both the immediate introduction of green technology (e.g. high-insulation windows on the urban buildings) and the long-term circular economy solutions.

The second instrument understood from the thematic analysis of the interview is using financial mechanisms. There are two main financial mechanisms supporting the implementation of sustainability initiatives that were discussed by the metropolitan official during the interview.

The first financial mechanism was explained by the metropolitan official as the 10 billion yen financial scheme provided by the Tokyo Metropolitan Government to the private sector. As explained by the metropolitan government's official, this funding is allocated through the Tokyo Metropolitan *"bonds"*[43] for sustainability-driven projects, serving as an incentive for the private investors and companies to invest in sustainability-driven projects. The official from the Metropolitan Government explained that "bonds" are divided into *"blue"*[44] and *"green"*[45] bonds (Andoh T., 27.10.2025). Blue bonds refer to *"marine conservation"* and green bonds refer to *"a*

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[43] "The Tokyo Metropolitan Government has set the goal of achieving "Zero Emission Tokyo" to help realize net zero carbon dioxide emissions globally by 2050. On the financial side, in order to create a virtuous circle of the environment and economy and to strongly advance Tokyo's environmental projects, the TMG issued Tokyo Green Bonds in October 2017. The updated version of the strategy, formulated in January 2024, then repositioned the bonds by upgrading them to Tokyo Green and Blue Bonds. Tokyo Green and Blue Bonds are compliant with the Green Bond Principles 2021 of the International Capital Market Association (ICMA) and the Practitioner's Guide for Bonds to Finance the Sustainable Blue Economy 2023 published by the ICMA, International Finance Corporation, United Nations Global Compact, United Nations Environment Programme – Finance Initiative, and Asian Development Bank." Tokyo Metropolitan Government, *Tokyo Green and Blue Bonds Framework,* 27.05.2026, p. 1, available at: https://www.english.metro.tokyo.lg.jp/documents/d/english/greenbluebond_fw_202409

[44] Categories of projects scheduled to be allocated proceeds from the Tokyo Green Bonds issued in FY2024 include "Realization of zero emissions through decarbonization of energy systems and the sustainable use of resources, Realization of a prosperous society in harmony with nature that continues to benefit from ecosystem services, and Realization of a better urban environment that ensures the safety and health of Tokyo residents." Tokyo Metropolitan Government, *Tokyo Green and Blue Bonds Framework,* 27.05.2026, pp. 9-10, available at: https://www.english.metro.tokyo.lg.jp/documents/d/english/greenbluebond_fw_202409

[45] The project scheduled to be allocated proceeds from the Tokyo Blue Bonds issued in FY2024 is "Development of a blue carbon ecosystem at the Port of Tokyo." *Ibid.,* p.11.

broader environmental protection" (Andoh T., 27.10.2025). As explained by the official from the metropolitan government, the bond system *"creates a structure where public and private funds are combined to support sustainable business and environmental initiatives"* (Andoh T., 27.10.2025). Therefore, based on the thematic analysis and supporting sources, the 10 billion yen financial scheme by the Metropolitan Government can be seen as a system where the public funding and private investments are combined to enhance the sustainability initiatives in Tokyo.

The second financial mechanism was explained by the metropolitan government's official as state subsidies for the private sector for the efforts related to the circular economy. The official from the metropolitan government referred to the circular economy as a *"2R"* system,[46] which states for "*reduce and reuse"* practices (Andoh T., 27.10.2025). The purpose of Tokyo's 2R subsidy was explained by the official from the metropolitan government as to *"reduce plastic waste"* in the Tokyo area (Andoh T., 27.10.2025). Examples of the 2R subsidy to the private sectors defined from the themes include practices of *"collecting reusable cups, washing them, and putting them back in circulation"* and *"introducing reusable bento boxes"* (Andoh T., 27.10.2025). In addition, the 2R subsidies were explained by the official from the metropolitan government as support measures to "*reduce financial burden on companies"* and embed circular economy efforts in the urban ecosystem in the long-term *"as viable business models"* to realize a *"systemic change"* (Andoh T., 27.10.2025).

The third instrument understood from the thematic analysis of the interview is developing human resource capacity. This includes environmental awareness building activities targeting a broader public and specialized educational sessions targeting specific groups of population. The official from the metropolitan government described the efforts targeting the development of human resource capacity as a measure to *"ensure that people become aware of and understand these [environmental*

[46] Tokyo Metropolitan Government, Bureau of Environment, *Promoting the transition to a circular economy aimed at plastic resource circulation* (東京都環境局, プラスチック資源循環に向けたサーキュラーエコノミーへの移行推進), 27.05.2026, available at: https://www.kankyo.metro.tokyo.lg.jp/resource/recycle/single_use_plastics/circular_innovation

sustainability] initiatives" (Andoh T., 27.10.2025). Human resource capacity building regarding environmental sustainability at the metropolitan level starts from primary education and includes *"experimental learning programs that combine hands-on experiences with learning"* (Andoh T., 27.10.2025). Furthermore, the human resource capacity building regarding environmental sustainability at the metropolitan level also includes educational programs designed for the professionals. For example, the official from the metropolitan government explained educational programs for the staff at the waste management facilities to prevent *"fluorocarbon gas leaks"* and housing manufacturers in terms of *"technical support in residential construction"* (Andoh T., 27.10.2025).

The fourth instrument understood from the thematic analysis of the interview is enhancing international collaborations and city-to-city networks. This instrument was described by the official from the metropolitan government as to support Tokyo's efforts in the environmental leadership image building. The international collaborations are primarily formal and organized as international sustainability-driven forums. The official from the metropolitan government emphasised "Time to Act"[47] and "G-NETS"[48] sustainability-driven forums held in Tokyo and supported by the Tokyo Metropolitan Government to *"communicate Tokyo's sustainability efforts internationally"* (Andoh T., 27.10.2025). Domestic sustainability-driven interactions are also formal, targeting the participation of regional leaders. Therefore, based on the themes from the interview, it can be seen that at the metropolitan governance level the interactions are strategic. Rather than pursuing mutual learning and knowledge sharing, the metropolitan government pursues building global sustainability

[47] "TIME TO ACT" is the Tokyo Metropolitan Government's climate action movement that calls for effective global action and collaboration among cities, businesses, and NGOs worldwide to advance decarbonisation efforts." Tokyo Metropolitan Government, Bureau of Environment, *TIME TO ACT Climate Action,* 27.05.2026, available at: https://www.kankyo.metro.tokyo.lg.jp/time-to-act-climate-action

[48] "In 2022, the Tokyo Metropolitan Government launched the Global City Network for Sustainability (G-NETS) , a collaborative forum uniting the world's leading cities to solve pressing urban challenges. Profiting from members' international perspectives, each year the G-NETS network brings together mayors/governors, senior officials, and working-level staff from around the globe to proactively exchange insights and skills, spark collaboration, and drive real change." Global City Network for Sustainability, *About G-NETS,* 27.05.2026, available at: https://www.g-nets.metro.tokyo.lg.jp/en/

leadership by enhancing the visibility of Tokyo's environmental policies and technological solutions. There are two examples identified through the analysis of the interview that show how city-to-city collaborations enhance visibility of Tokyo-led policies.

The first case is a collaboration between Tokyo and Kuala Lumpur. The official explained that this engagement was aimed at exchange of Tokyo's experience in introducing the carbon emissions trading system, described as an engagement to *"introduce the carbon trading system to Kuala Lumpur, based on Tokyo's experience"* (Andoh T., 27.10.2025). The second case is a collaboration between Tokyo and New York, which was aimed at exchange of Tokyo's experience in introducing the *"urban cap-and-trade system"*[49] (Andoh T., 27.10.2025). These two cases demonstrate that rather than pursuing mutual learning and experience sharing as it was at the prefectural level, the goal at the metropolitan level now shifts to building a leadership role based on the experience of policy introduction. The official from the metropolitan government further supported this argument by explaining the city-to-city interactions as *"initiatives that can serve as references for other cities' effective environmental policies"* (Andoh T., 27.10.2025). Based on the analysis of the themes, it can be also seen that despite the primarily strategic goals of the city-to-city interactions at the metropolitan level, the role of individual actors is still high. For example, as explained by the official from ICLEI Japan, the partnership between Tokyo and Kuala Lumpur is partly driven by personal connections and prior experiences of the leaders, *"Kuala-Lumpur's long-standing experience in city collaborations, including those with Japanese cities, and mayor Maimunah's international connections"* (Uchida T., 24.09.2025).

[49] "The Tokyo Metropolitan Government's (TMG) Cap-and-Trade Program was launched in April 2010 and is Japan's first mandatory ETS. It covers around 20% of the metropolitan area's emissions. The TMG's Cap-and-Trade Program's fourth compliance period started in April 2025. The program covers ~1,200 facilities that annually use the energy equivalent to or more than 1,500 kL of crude oil for three consecutive fiscal years. All allowances are freely allocated." International Carbon Action Partnership, *Japan - Tokyo Cap-and-Trade Program*, 27.05.2026, p. 1, available at: https://icapcarbonaction.com/system/files/ets_pdfs/icap-etsmap-factsheet-51.pdf

5.4 Key Challenges.

This section analyses the challenges faced by an official at the metropolitan level while constructing and addressing environmental sustainability. These challenges are identified from the themes recognized and constructed from the interview with an official from the Tokyo Metropolitan Government. These challenges include three main issues associated with the implementation gap, technological constraints, and economic barriers.

First, the implementation gap is demonstrated through the difference between the sustainability goals and actual achievements. The progress was described by the official from the metropolitan government as *"very limited"* (Andoh T., 27.10.2025). As explained by the official from the metropolitan government, in 2025, carbon reduction in Tokyo was around 10%, which is far behind the goal of 50% reductions by 2030. The official from the metropolitan government stressed out that *"only a few years left, and reducing emissions so drastically in such a short time is extremely difficult"* (Andoh T., 27.10.2025). The implementation gap exists in other spheres of sustainability, for example, *"the goal to reduce plastics by 50% has also barely progressed"* (Andoh T., 27.10.2025).

Second, the technological introductions were described by the official from the metropolitan government as *"still insufficient,"* therefore, not scalable yet (Andoh T., 27.10.2025). For example, the solar perovskite cells *"are still in the demonstration phase and cannot yet be mass-produced"* (Andoh T., 27.10.2025). Another technological constraint is that the effect of technological advancements, such as securing renewable energy capacity, *"does not appear right away"* (Andoh T., 27.10.2025). Achieving the renewable energy security is therefore challenged *"until this technology spreads much more widely"* (Andoh T., 27.10.2025).

Third, the official from the metropolitan government also explained that there are economic barriers which limit the scalability of sustainability initiatives. As explained

by the official from the metropolitan government, *"whether it is renewable energy or circular economy, the core issue is economic rationality"* (Andoh T., 27.10.2025). The primary reason for the existing economic barriers is the necessity of *"large upfront investments"* required to introduce the green infrastructure in the urban ecosystems (Andoh T., 27.10.2025). Moreover, the economic barriers exist not only due to the need for investment in technology, but to *"change the system"* in the long-term (Andoh T., 27.10.2025). For example, in a circular economy, because the plastic has to be *"collected, washed, and reused,"* there are more resources required than in the linear economy where *"you simply throw things away"* with no extra cost (Andoh T., 27.10.2025).

5.5 Conclusion.

In conclusion, based on the thematic analysis of the interview with the official from the Tokyo Metropolitan Government, this chapter outlines four main conclusion points.

Firstly, the environmental sustainability at the metropolitan governance level is constructed through the alignment of international environmental frameworks within the metropolitan's environmental frameworks after the consideration of the policies with local communities and the private sector. Environmental sustainability at the metropolitan governance level in Japan is constructed incrementally, it is oriented in the long-term, and it encompasses a variety of sectors: from biodiversity to circular economy. Local environmental frameworks are quantified, strategic, and aligned with global sustainability frameworks. Interests of local communities and the private sector are included in the decision-making process. In the decision-making process, a priority is given to balancing regional coexistence in a society over immediate technological or policy decisions. The consensus building process is therefore deliberately incremental, particularly if it requires mandating the policy.

Secondly, the main goals to promote environmental sustainability at the metropolitan governance level is to build Tokyo's image as a global environmental leader and enhance Tokyo's economic growth. The first goal is to build an image of Tokyo as a global model for decarbonization. The second goal refers to connecting sustainability efforts to the economic growth of Tokyo. These two goals are strategic, long-term oriented, and interconnected. By promoting Tokyo as a leader in sustainability and green technology, the metropolitan government increases global interest in Japanese technology and sustainability-related policy making, thus enhancing economic growth.

Thirdly, the main instruments supporting the implementation of environmental sustainability at the metropolitan governance level are introducing green technology across urban ecosystems, using financial mechanisms, developing human resource capacity, and enhancing international collaborations. These four instruments are introduced by the Tokyo Metropolitan Government and thereby, the metropolitan government plays a central role in facilitating environmental sustainability efforts at the metropolitan governance level. Regarding green technology, a special focus is given to the development of green technology which is relevant for the Japanese domestic environment and technology that generates renewable energy, mainly solar, wind, and hydrogen power. Certain green technology is framed as the Japanese next-generation technology, which indicates the linkage with Tokyo's environmental image building strategic goals. Tokyo's financial mechanisms mainly support the generation of public-private investment flow in sustainability projects and green technology. The financial mechanisms also lower entrance barriers for the private sector to the urban circular economy by reducing risks associated with initiating circular economy practices. Regarding human resource capacity development, there is a significant role played by the public awareness building educational programs. The environmental awareness building programs are tailored to specific audiences, varying from young students to skilled professionals. Lastly, international collaborations and city-to-city networks at the metropolitan governance level are mainly formal, institutionalized,

and driven by national or metropolitan strategic agenda (e.g. the promotion of Tokyo's image as an environmental leader). In the international collaborations, there is a significant role played by the exchange of Tokyo's environmental policies and technological solutions. Personal connections and experiences of leaders facilitate international interactions between Tokyo and its international partners.

Fourthly, the thematic analysis identified three challenges linked to the implementation of environmental sustainability at the metropolitan governance level. The challenges include a high gap between sustainability goals and actual results, technological constraints as the majority of green technology is not available on the market at the sufficient scale, and economic barriers caused by the insufficient investment flow in green technology.

6 Chapter 6: Environmental Sustainability at the Ministerial Level

This chapter provides a thematic analysis of an interview with the official at the ministerial governance level in Japan. The main aim of this chapter is to determine how environmental sustainability is approached at the ministerial governance level. To address the main aim of this chapter, this chapter focuses on the construction, goals, instruments, and challenges of environmental sustainability at the ministerial governance level in Japan. The thematic analysis is based on one interview with an official from the Ministry of Economy, Trade, and Industry (METI). The interview was taking place in English. Questions asked during the interview included:

1) Are there any particular actions towards promotion of environmental sustainability in your organization?
2) What kind of environmental sustainability objectives do you aim to achieve?
3) How do you approach international audiences for environmental sustainability cooperation?
4) What challenges do you experience when approaching environmental sustainability?

This main set of questions was selected to assist in answering the research question and research sub-questions. Furthermore, this set of questions assisted in building parallels with the existing literature and policy papers.

This chapter consists of five sections. Each section corresponds to a research sub-question and based on themes identified from the interviews. Section one analyses how environmental sustainability is constructed at the ministerial level. Section two analyses its main goals. Section three examines the instruments used to support its implementation. Section four observes the challenges faced by the ministerial governance actor in implementing and addressing environmental sustainability. Section five synthesises the

findings and clarifies how environmental sustainability is approached at the ministerial governance level in Japan.

6.1 The Construction of Environmental Sustainability at the Ministerial Level: International Environmental Frameworks Aligned with the Economic Growth Policy Logic.

This section analyses how environmental sustainability is constructed at the ministerial governance level in Japan. This section emphasises three key points of how environmental sustainability is built at the ministerial governance level. These points result from the thematic analysis of the interview with an official from METI. They include:

1) The role of international environmental frameworks in the emergence of ministerial environmental governance;
2) The role of economic growth as a policy logic.

The first key point identified from the interview's thematic analysis is the role of international environmental frameworks in the emergence of ministerial environmental governance in Japan. Based on the thematic analysis of the interview, this research frames the Paris Agreement as the main international environmental framework that affects the construction of environmental sustainability at the ministerial level. For example, the main sustainability goal was described by the official from METI as realising *"2050 Japan's net-zero target"*[50] with *"interim targets for 2040 and 2035"* and *"2030 target of a 46% reduction"*[51] (Sugano M., 12.01.2026), indicating the alignment with the Paris Agreement and Japan's national carbon neutrality goals. The official from METI also outlined Japan's aim to transition to *"cleaner"* energy in the overall energy mix (Sugano M., 12.01.2026). Particular

[50] "In October 2020, Japan declared that it aims to achieve carbon neutrality by 2050." Ministry of Economy, Trade, and Industry, *Green Growth Strategy Through Achieving Carbon Neutrality in 2050,* 27.05.2026, available at: https://www.meti.go.jp/english/policy/energy_environment/global_warming/ggs2050/index.html

[51] "Net zero by 2050 and to meeting the interim targets for FY2030, FY2035, and FY2040 (with a reduction of 46%, 60%, and 73% FY2013)." Ministry of Economy, Trade, and Industry, *Japan Climate Transition Bond Framework,* 27.05.2026, p. 2, available at: https://www.meti.go.jp/policy/energy_environment/global_warming/transition/jcr_climate_transition_bond_framework_spo_en.pdf

goals in the energy transition identified from the interview include increase of the renewable and nuclear power generation, and decrease in the use of fossil fuels.

Regarding the electricity generated from renewable power sources, the official from METI expressed the Ministry's intentions to *"increase it to 40%-50% from the current 22.9%"*[52] (Sugano M., 12.01.2026). Among the renewable energy sources, a particular emphasis was given by the METI's official to the *"solar, wind, hydro, geothermal, biomass, and nuclear power"* (Sugano M., 12.01.2026). Notably, the role of nuclear energy is dominant in that power mix, with an objective to increase the nuclear power to *"around 20% from the current 8.5%"*[53] (Sugano M., 12.01.2026). Furthermore, the official from METI highlighted Japan's efforts to return to the pre-nuclear disaster levels in 2011, when the share of electricity generated by the nuclear power in Japan was around 30%.[54] On the other hand, the official from METI also expressed that the share of thermal power, which is currently "*at 68.6%",*[55] is expected to decline to *"around 30%-40%"* (Sugano M., 12.01.2026). These themes indicate that the process of energy transition occurring in Japan is gradual.

Importantly, the energy transition goals described by the official from METI function as an "official forecast" of the Ministry for the domestic industries.[56] This is described by the

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[52] "Renewables share of total electricity generation in Japan is 22.817% in 2023." The International Energy Agency (IEA), *Share of renewables in energy consumption,* 27.05.2026, available at: https://www.iea.org/countries/japan/renewables

[53] Agency for Natural Resources and Energy, Ministry of Economy, Trade and Industry, *A Detailed Outline of the Latest Strategic Energy Plan—Insights into Japan's Energy in a Drastically Changing World (Part 2),* 27.05.2026, available at: https://www.enecho.meti.go.jp/en/category/special/article/detail_211.html

[54] "Up until 2011, Japan was generating some 30% of electricity from its reactors and this was expected to increase to at least 40% by 2017. The plan is now for at least 20% by 2030, from a depleted fleet." The World Nuclear Association, *Nuclear Power in Japan,* 27.05.2026, available at: https://world-nuclear.org/information-library/country-profiles/countries-g-n/japan-nuclear-power

[55] "Thermal power still held the dominant share at 68.6% in FY2023, which needs to be reduced to achieve decarbonization." Agency for Natural Resources and Energy, Ministry of Economy, Trade and Industry, *A Detailed Outline of the Latest Strategic Energy Plan—Insights into Japan's Energy in a Drastically Changing World (Part 2),* 27.05.2026, available at: https://www.enecho.meti.go.jp/en/category/special/article/detail_211.html

[56] "The FY2040 energy mix is projected on the basis of ambitious goals, such as a 73% reduction in GHG emissions in FY2040 (compared to FY2013) and achieving net zero by 2050. Electricity generation is forecast to increase substantially in FY2040, reaching 1.1 to 1.2 trillion kWh, with the energy self-sufficiency ratio being 30 to 40%. Renewables will account for 40 to 50% of the total power source mix in FY2040, with nuclear power at 20% and thermal power at 30 to 40%." Agency for Natural Resources and Energy, Ministry of Economy, Trade and Industry, *A Detailed Outline of the Latest Strategic Energy Plan—Insights into Japan's Energy in a Drastically Changing World (Part 2),* 27.05.2026, available at: https://www.enecho.meti.go.jp/en/category/special/article/detail_211.html

official from METI as *"we always keep in mind this 2040 forecast so that we can ease industry players toward this target"* (Sugano M., 12.01.2026).

International emissions standards also serve a significant role in METI's guidelines for the industries regarding the environmental sustainability and energy transition efforts. As explained by the official from METI, Japan *"follows international standards"* regarding the emissions regulations (Sugano M., 12.01.2026). These regulations also apply to *"the major greenhouse gases, such as carbon dioxide and methane"* (Sugano M., 12.01.2026). However, the particular type of international emissions standards that METI uses in its policies were not identified during the interview analysis.

The second key point identified through the thematic analysis of the interview is the role of economic growth as a policy logic in approaching environmental sustainability. This key point suggests that at the ministerial level, environmental sustainability is constructed within the logic of economic growth and embedded in national economic and industrial strategy. As explained by the official from METI, *"we do want to reduce emissions. At the same time, we want to make sure we have economic growth"* (Sugano M., 12.01.2026). Furthermore, the official from METI clearly emphasised the use of environmental sustainability as a tool to assist Japanese companies to *"make money"* (Sugano M., 12.01.2026).

6.2 The Goals of Environmental Sustainability at the Ministerial Level: Enhancing Technological Competitiveness, Ensuring National Energy Security, and Building Japan's Global Environmental Leadership.

This section analyses goals that guide environmental sustainability at the ministerial governance level in Japan. This section emphasises three key goals driving environmental sustainability at the ministerial governance level. These goals are defined from the thematic analysis of the interview data with an official from METI. The three goals of environmental sustainability at the ministerial governance level are:

1) Enhancing Japan's technological competitiveness;
2) Ensuring national energy security;
3) Building Japan's global environmental leadership.

The first goal understood from the thematic analysis of the interview is to enhance Japan's technological competitiveness in the renewable technology global supply chains. The official from METI explained this goal as to *"make the Japanese industries more competitive in the future market"* (Sugano M., 12.01.2026). In this context, green technology was further framed by the official from METI as the new market opportunities where Japanese companies are provisioned to play *"a key role, domestically or internationally"* (Sugano M., 12.01.2026). The official from METI explained that the focus is given on research and development of the innovative next-generation technologies. Among the next-generation technologies, the official from METI outlined perovskite solar panels, hydrogen fueled technology, and steel technology (e.g. *"revolutionary electric furnaces"* (Sugano M., 12.01.2026)). In total, METI identifies 14 sectors[57] where green technology is being researched and introduced. These sectors were described by the official from METI as *"steel, chemicals, paper/pulp, cement, households, automobiles, ships, aviation, semiconductors, storage batteries, gas batteries, sustainable aviation fuel, hydrogen, carbon capture and storage, next-generation renewable energy, nuclear power, and the circular economy"* (Sugano M., 12.01.2026). The selection of these sectors was explained by the METI's official as these areas *"work"* in the context of the Japanese industries (Sugano M., 12.01.2026). As METI is focused on advancing the strong sides of the Japanese industries, the official explained that the development of green technology in Japan may include areas that are not located within the global technological trends, such as hydrogen fueled technology development.

Furthermore, the thematic analysis of the interview suggests that the goal to raise Japan's industrial competitiveness results from the growing industrial dominance of China in the green technology market. For example, the official from METI expressed that without enhancing the technological competitiveness of the Japanese industries, the risks caused by the overdependence on Chinese technology may emerge. The risks described by the METI official include geopolitical instability in the Japan-China bilateral relations and domestic unemployment in Japan. However, on the other hand, the official from METI acknowledged

[57] "Green Growth Strategy through Achieving Carbon Neutrality in 2050 specifies 14 promising fields that are expected to grow, and provides them with action plans from the viewpoints of both industrial and energy policies." Ministry of Economy, Trade, and Industry, *Green Growth Strategy Through Achieving Carbon Neutrality in 2050,* 27.05.2026, available at: https://www.meti.go.jp/english/policy/energy_environment/global_warming/ggs2050/index.html

Japan's limitations in competing with China on the green technology market in the near future, especially on the solar and wind technology market. This was expressed by the official from METI as *"Japan has not been able to corner a strong market in those two technologies"* and Japan *"may not dominate in the next round of technologies in 15-20 years"* (Sugano M., 12.01.2026). Considering both the need to stay competitive on the green technology market and the current limitations, METI aims to position Japanese industries as the key players in the global supply chains. The official from METI described this approach as ensuring that *"key value-adding components"* of Japan's renewable technology are manufactured domestically, even if some components or raw materials such as *"cement and steel"* are sourced from abroad (Sugano M., 12.01.2026).

The second goal understood from the thematic analysis of the interview data is to ensure Japan's national energy security. The official from METI emphasised Japan's national interests in reducing dependence on energy imports, especially from *"volatile regions"* (Sugano M., 12.01.2026). Importantly, METI aims to reduce dependence not only on the imported energy, but also dependence on a single technology or component, especially if those are imported from a *"single country"* (Sugano M., 12.01.2026). This strategy was described by the official from METI as *"whether solar or wind power, we do not want to rely on cornerstone technologies or key renewable components that could lead to dependency"* (Sugano M., 12.01.2026).

The third goal understood from the thematic analysis of the interview data is to build Japan's image as a global environmental leader. As emphasised by the official from METI, environmental sustainability initiatives are being developed with the aim to contribute to the *"sustainability around the world"* (Sugano M., 12.01.2026). The official from METI also emphasised that *"different countries are at different stages"* of the energy transition process and Japan's goal is therefore to *"decarbonize ourselves, and in the process, contribute to global decarbonization and solutions outside Japan"* (Sugano M., 12.01.2026). Building an environmental leadership is also associated with the aim to avoid reputational risks if Japan does not join the global environmental agenda. For example, the official from METI noted the potential risk of being internationally criticised for using the fossil fuel in the production of hydrogen fuel as *"if you use hydrogen produced by fossil fuels, you're going to be criticized by environmental NGOs and Europeans"* (Sugano M., 12.01.2026).

6.3 Instruments Assisting the Implementation of Environmental Sustainability at the Ministerial Level: Green Transformation (GX) Economy Transition Bonds, the Joint Credit Mechanism (JCM) and International Collaborations Driven by the Asia Zero Emission Committee (AZEC).

This section analyses instruments that assist the implementation of environmental sustainability at the ministerial governance level in Japan. This section emphasises three key instruments that assist the implementation of environmental sustainability at the ministerial governance level. The three instruments combine both financial and policy mechanisms to facilitate environmental sustainability, and they mainly target energy transition of the Japanese industries. These instruments are identified from the thematic analysis of the interview data with an official from METI. The three instruments include:

1. The Green Transformation (GX) Economy Transition Bonds;
2. The Joint Credit Mechanism (JCM);[58]
3. Enhancing international collaborations through the Asia Zero Emission Committee (AZEC).

The first instrument understood from the thematic analysis of the interview is the Green Transformation (GX) Economy Transition Bonds. The GX Bonds were described by the official from METI as the foundational financial instrument within the GX Basic Policy introduced in 2023. Particularly, the official from METI referred to the GX Bonds as the *"seed money"* of 20 trillion yen,[59] provided by the Japanese government to the private sector to accelerate the investment in the energy transition sector (Sugano M., 12.01.2026). The official from METI also explained that the ministry aims to accelerate 150 trillion yen of total public-private

[58] "The Joint Credit Mechanism is a system to cooperate with developing countries for reducing greenhouse gas emissions, under which the amount of emission reduction is assessed as contribution by both partner countries and Japan. The JCM aims to facilitate diffusion of leading decarbonizing technologies and infrastructure, etc., through investment by Japanese entities, thereby contributing to GHG emission reductions or removals and sustainable development in partner countries. The JCM contributes to the achievement of both countries' NDCs (the Nationally Determined Contributions) by evaluating Japan's contributions in a quantitative manner and acquiring the part of credit." Ministry of Foreign Affairs of Japan, *Joint Crediting Mechanism (JCM),* 27.05.2026, available at: https://www.mofa.go.jp/ic/ch/page1we_000105.html

[59] "More specifically, the government will issue GX Economy Transition Bonds to provide support in the order of 20 trillion yen for advance investment by the private sector over the coming ten years." Agency for Natural Resources and Energy, Ministry of Economy, Trade and Industry, *GX Policy Achieving Decarbonization and Economic Growth Together,* 27.05.2026, available at: https://www.enecho.meti.go.jp/en/category/special/article/detail_214.html

investment in the energy transition sector as a result of the initial state support by the GX Bonds.[60] The GX Bonds were explained by the official from METI as the mechanism supporting the development of *"renewable technology, hydrogen and ammonia co-firing, nuclear technology, and energy efficiency programs"* (Sugano M., 12.01.2026).

The GX Bonds were also explained by the official from METI as the mechanism to ease the financial burden for the private sector entering the energy transition sector as *"investments are difficult for the private sector to undertake alone"* (Sugano M., 12.01.2026). However, as further noted by the official, the primary function of the GX Bonds is not simply to fund projects directly, but to raise significantly larger volumes of investment through private and public sector participation. This was emphasized by the official from METI as *"we do not give companies cash, and we do not lose money"* as the state-given GX Bonds are *"paid back"* after some time (from 10 to 20 years) as the investment flow is generated (Sugano M., 12.01.2026).

It was also identified from the analysis that to support the repayment of the 20 trillion yen of GX Bonds and accelerate the energy transition efforts of the public and private sectors, METI introduced another core financial instrument named the Emissions Trading System (ETS). As identified from the analysis of the themes, the ETS serves as an instrument for pricing carbon emissions. It was described by the official from METI as *"a tax on fossil fuels, a compulsory way to place a price on carbon emissions"* (Sugano M., 12.01.2026).

The thematic analysis of the interview suggests that the pricing of carbon emissions in Japan is introduced incrementally. For example, based on the interview analysis, first Japan introduces the emissions trading systems on a voluntary basis and encourages companies to participate in the ETS to receive subsidies from the government. However, from 2033, the thematic analysis suggests that the ETS becomes mandatory for companies, requiring them to purchase and sell their emissions on the market. At the same time, the government maintains a significant regulatory role in the ETS by imposing price floors and ceilings, described by the official from METI as the *"upper and lower limits,"* within the market price to ensure market stability (Sugano M., 12.01.2026). In this sense, as explained by the official

[60] "The scale of investment toward achieving GX is expected to be 150 trillion yen, which will be made through public-private collaboration over the coming ten years." *Ibid.*

from METI, if the emissions *"prices exceed those limits,"* the GX Acceleration Agency[61] will *"intervene to keep prices within the range"* (Sugano M., 12.01.2026).

Therefore, as the thematic analysis indicates, the GX Basic Policy within the GX Bonds and the Emissions Trading System serve to generate revenues from local companies, described by the official from METI as *"to start receiving money from industry players"* (Sugano M., 12.01.2026).

The second instrument understood from the thematic analysis of the interview is the Joint Credit Mechanism (JCM). The JCM was described by the official from METI as the mechanism that promotes emissions reduction outside of Japan through the *"green investment"* and *"use of Japanese technology and Japanese finances"* on foreign markets (Sugano M., 12.01.2026). Therefore, based on the analysis of the themes, while the GX Bonds support Japanese companies in the energy transition projects domestically, the JCM facilitates access for the Japanese companies to foreign energy transition markets. As further explained by the official from METI, the JCM functions as a framework between the Japanese government and a host government under which both of the countries agree on the emission reduction project and share the carbon *"credits"*[62] generated from that project after it is completed (Sugano M., 12.01.2026). Therefore, as understood from the themes, both Japanese and foreign companies benefit from participating in the JCM project, as *"when emissions go down, and the credits are split between Japan and the partner country*" (Sugano M., 12.01.2026).

In total, there are 32 countries as for 2026 involved in JCM.[63] As understood from the themes, these countries receive funding from Japan and it serves as a primary incentive to engage in energy transition projects with Japanese companies. The Japan-led investment in the JCM projects abroad comes both from the private and public sector. Similarly to the GX

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[61] "The GX Acceleration Agency is an organization established as part of the Japanese Government's GX (Green Transformation) policy initiative to realize GX investment of over 150 trillion yen in the next 10 years." Green Transformation Acceleration Agency, *About Us,* 27.05.2026, available at: https://www.gxa.go.jp/en/

[62] "Carbon credits are tradable permits that allow a company or organization to emit a certain amount of carbon dioxide or other greenhouse gases." Investopedia, *Carbon Credits: What They Are, How They Work, and Who Buys Them,* 27.05.2026, available at: https://www.investopedia.com/terms/c/carbon_credit.asp

[63] Ministry of Foreign Affairs of Japan, *Joint Crediting Mechanism (JCM),* 27.05.2026, available at: https://www.mofa.go.jp/ic/ch/page1we_000105.html

Bonds, the JCM functions to accelerate larger volumes of investment in the long-term, which was explained by the official from METI as *"we don't necessarily want to dump money on foreign projects, it doesn't really help the world in the long run"* (Sugano M., 12.01.2026). As further understood from the themes, the Japanese companies participating in the JCM projects benefit not only from accessing the foreign markets, but also from an opportunity to reduce up to "*10% of their emission reduction obligations"*[64] (Sugano M., 12.01.2026). As recognized from the themes, the limitation to 10% serves to ensure domestic emission reductions as well, which was explained by the official from METI as "*if a company is just allowed to buy credits abroad, then they will never make an effort to reduce the CO_2 emissions in their domestic power plants"* (Sugano M., 12.01.2026).

The third instrument understood from the thematic analysis of the interview is enhancing international collaborations, mainly through the Asia Zero Emission Committee (AZEC) platform. AZEC represents a platform for the international collaborations at the ministerial level driven by the carbon neutrality agenda in Asia across 11 countries: Japan, Australia, Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Philippines, Singapore, Thailand, and Viet Nam.[65] According to the thematic analysis of the interview, at the ministerial level, the international collaborations are strictly formalised and driven by Japan's national strategic goals. As explained by the official from METI, AZEC was established by the former Prime Minister of Japan Fumio Kishida in 2022 and it holds *"leadership summit meetings"* with its members (Sugano M., 12.01.2026). AZEC was further described by the official from METI as a *"mutual learning"* and *"know-how exchange"* platform (Sugano M., 12.01.2026). The official also explained that AZEC-run projects are funded mainly by the Japanese organizations, such as Japan Bank for International Cooperation (JBIC), the Japanese Export Credit Agency (NEXI) and the investments from the private sector. Lastly, as also derived from the themes, AZEC promotes Japan-led energy transition mechanisms (e.g. the ETS) and the Japanese green technology funded through the GX Bonds, particularly solar perovskite panels and hydrogen technology.

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[64] "Up to 10% of an entity's compliance obligation may be met by external credits." International Carbon Action Partnership, *Japan transitions its GX-ETS to the mandatory phase*, 27.05.2026, available at: https://icapcarbonaction.com/en/news/japan-transitions-its-gx-ets-mandatory-phase

[65] Ministry of Economy, Trade, and Industry, *Asia Zero Emission Community (AZEC),* 27.05.2026, available at: https://www.meti.go.jp/english/policy/energy_environment/global_warming/azec/azec_en.html

6.4 Key Challenges.

This section analyses the challenges faced by an official at the ministerial level while constructing and addressing environmental sustainability. These challenges are identified from the themes recognized and constructed from the interview with an official from METI. These challenges include two main issues associated with low economic viability of the energy transition projects and fossil-fuel dependency.

The first challenge refers to the economic viability of the energy transition projects supported by METI. The official from METI explained that some energy transition projects (e.g. hydrogen-fueled technology) are still in the research and development stage, meaning that they are not *"expected to be commercially viable*" in the near future (Sugano M., 12.01.2026). Furthermore, to make economic profits from these projects, the official from METI emphasised the necessity to begin the emissions taxation and decrease the cost of the green technology. In developing countries, the official from METI projected a minimum of 15 years until *"the decrease in technology costs and the gradual rise of the carbon price will meet"* and the energy transition projects will be *"economically viable"* (Sugano M., 12.01.2026).

The second challenge is associated with a gradual transition from the use of fossil fuel, meaning that the fossil fuel still plays a significant role in the energy generation in Japan and a broader Asian region. The official from METI explained the green energy transition as a commitment without timing as *"we have not committed to an exact timing"* for phasing out coal and other *"traditional fossil fuels"* (Sugano M., 12.01.2026). Furthermore, the liquid natural gas (LNG) will remain *"a key element"* in the energy transition (Sugano M., 12.01.2026). The official from METI explained that partial use of fossil fuel, mainly LNG, is necessary to maintain the economic viability of the projects, especially when it comes to the use of fossil fuel in the production of hydrogen fuel.

6.5 Conclusion.

In conclusion, based on the thematic analysis of the interview with the official from METI, this chapter outlines four main conclusion points.

Firstly, the environmental sustainability at the ministerial governance level is constructed through the alignment of international environmental frameworks within Japan's economic growth policy logic. METI frames environmental sustainability as an economic and industrial policy project, not only an environmental one. METI-led approach to environmental sustainability is aligned with international sustainability targets, but it is not aimed at bringing immediate results. Instead, it aims to support a gradual, risk-averse economic transition from fossil fuels to renewable energy across Japanese industries while creating industrial opportunities in new sectors emerging through the energy transition process. Environmental sustainability at the ministerial level is highly government-coordinated, incremental, and competitiveness-driven.

Secondly, the main goals to promote environmental sustainability at the ministerial governance level is to enhance technological competitiveness of Japanese industries, ensure Japan's energy security, and build Japan's image as a global environmental leader. Enhancing technological competitiveness of Japanese industries is connected with METI's objective to position Japanese companies as key players in the global supply chains. METI identifies the priority sectors of the energy transition and frames certain green technology as the Japanese next-generation technology. A focus is given to developing renewable energy technology, mainly solar and hydrogen energy generating solutions. Furthermore, METI outlines the focus on developing the green technology suitable for the Japanese domestic environment and the Japanese industrial strengths. Ensuring energy security is another Japan's strategic goal associated with the energy transition and a broader concept of environmental sustainability. Energy security refers to reducing dependency on fossil fuels, a single energy source, or a single supplier. Lastly, there is a goal to build Japan's image as a global environmental leader. This goal refers to achieving decarbonization goals domestically in Japan and contributing to achieving decarbonization targets globally through promoting Japan's technological and policy solutions. This goal also carries a reputational character, as by developing renewable technology, Japan reduces the international criticism regarding its use of fossil fuel.

Thirdly, the main instruments supporting the implementation of environmental sustainability at the ministerial governance level are the Green Transformation (GX) Economy Transition Bonds, the Joint Credit Mechanism (JCM), and international

collaborations driven by the Asia Zero Emission Committee (AZEC) platform. These three instruments demonstrate a hybrid model of sustainability governance, which combines market mechanisms with strong state guidance and industrial policy. Financial schemes enforced in the GX Basic Policy (e.g GX Bonds and the Emissions Trading System) and the JCM demonstrate the role of the Japanese government in enhancing the market demand for green technology and facilitating energy transition processes across the industries. The government encourages the Japanese industries to be a part of the energy transition process by reducing the risks associated with initiating the energy transition and developing green technology. The financial schemes are oriented in the long-term and the mandatory requirements regarding the carbon taxation are introduced gradually, thus allowing the private sector to adapt to new models. International collaborations, mainly driven by AZEC, are strictly formalized and driven by Japan's strategic goals, mainly environmental leadership building and enhancing technological competitiveness of Japanese industries.

Fourthly, the thematic analysis identified two challenges linked to the implementation of environmental sustainability at the ministerial governance level. The challenges include low economic viability of the energy transition projects and Japan's prolonged fossil-fuel dependency despite the energy transition efforts.

7 Chapter 7: Environmental Sustainability at the International Level

This chapter provides a thematic analysis of three interviews with officials from the three Japanese governmental organizations operating at the international governance level. The main aim of this chapter is to determine how environmental sustainability is approached at the international governance level by the Japanese governmental organizations. To address the main aim of this chapter, this chapter focuses on the construction, goals, instruments, and challenges of environmental sustainability at the international governance level by the three Japanese governmental organizations. The thematic analysis is based on three individual interviews. Two interviews were conducted with officials from two Japanese governmental organizations operating outside of Japan and one interview with an independent policy specialist on ASEAN and Japan affairs. The organizations are Japan External Trade Organization (JETRO) and the Japan International Cooperation Agency (JICA). The interview with the official from JETRO was taking place in Japanese. The interviews with the official from JICA and an independent policy specialist on ASEAN and Japan affairs were taking place in English. Questions asked during the interview included:

1) Are there any particular actions towards promotion of environmental sustainability in your organization?
2) What kind of environmental sustainability objectives do you aim to achieve?
3) How do you approach international audiences for environmental sustainability cooperation?
4) What challenges do you experience when approaching environmental sustainability?

This main set of questions was selected to assist in answering the research question and research sub-questions. Furthermore, this set of questions assisted in building parallels with the existing literature and policy papers.

This chapter consists of five sections. Each section corresponds to a research sub-question and based on themes identified from the interviews. Section one analyses how environmental sustainability is constructed at the international level by the Japanese organizations. Section two analyses its main goals. Section three examines the instruments used to support its implementation. Section four observes the challenges in implementing and addressing environmental sustainability faced by the Japanese actors at the international governance levels. Section five synthesises the findings and clarifies how environmental sustainability is approached at the international governance level by the Japanese governmental organizations.

7.1 The Construction of Environmental Sustainability at the International Level: International and National Environmental Frameworks Aligned with Japan's Strategic Policy Logic.

This section analyses how environmental sustainability is constructed by Japanese organizations at the international governance level. This section emphasises two key points of how environmental sustainability is built at the international governance level by Japanese organizations. These points result from the thematic analysis of the three interviews with two officials from JETRO and JICA, and an independent policy specialist on ASEAN and Japan affairs. They include:

1) The role of international and national environmental frameworks in the emergence of international environmental governance by the Japanese organizations;
2) The role of Japan's national strategic policy logic.

The first key point identified from the interviews' thematic analysis is the role of international environmental frameworks in the emergence of environmental governance at the Japanese organizations operating internationally. Based on the thematic analysis of the interviews, this research frames the Paris Agreement as the main international environmental framework that affects the construction of environmental sustainability at the Japanese governmental organizations operating at the international level. For example, the official from JICA outlined that Paris Agreement's *"carbon neutrality"* goals are generally aligned with *"every new JICA's project"* from the first stages of project's delivery and

embedded in the 2023 JICA Sustainability Policy (Noguchi A., 09.10.2025).[66] The Paris Agreement was described by the official from JICA as *"the highest-level guideline for climate change"* that *"many countries agreed on"* (Noguchi A., 09.10.2025).

In addition to the role of the Paris Agreement, the themes suggest that there is also a significant role played by the global institutions, such as the World Bank and the Asian Development Bank. For example, the official from JICA described JICA's sustainability governance as an alignment with different sustainability policies, as *"we think how to manage climate change based on the Paris Agreement, the Japanese government's policies, and the approaches of organizations such as ADB and the World Bank"* (Noguchi A., 09.10.2025). The official from JICA further emphasised the role of Japan's domestic sustainability policies as *"we check the Japanese government's roadmap for Japan, including targets for 2030 and carbon neutrality"* (Noguchi A., 09.10.2025). The official from JETRO further connected JETRO Sustainability Division's mission to *"unify green and climate-related efforts"* with Japan's national strategy as *"the government expresses its intention to strongly promote sustainability"* (Kimura R., 16.10.2025). The official from JICA also mentioned the role of the international forums and discussions on sustainability in the organization's sustainability governance, such as the COP as *"we participate in summits and introduce our projects, and this year next month, we will participate in COP30"* (Noguchi A., 09.10.2025).

The second key point identified from the interviews' thematic analysis is the role of Japan's national strategic policy logic in the emergence of environmental governance at the Japanese organizations operating internationally. The analysis suggests that this is mainly due to the nature of the organizations, as all of them are Japan's state organizations and therefore, they promote Japan's national strategic goals. For instance, the official from JETRO explained the role of the organization as a *"safe intermediary"* between Japan's and foreign governments and private sectors (Kimura R., 16.10.2025). Furthermore, an independent policy specialist on ASEAN and Japan affairs explained Japan's approach to

[66] "On October 30, the Japan International Cooperation Agency (JICA) announced the JICA Sustainability Policy. This policy outlines JICA's mid- to long-term targets and the direction of initiatives related to sustainability management, such as its aim of achieving carbon neutrality for the organization by 2030 and implementing all new projects in a manner aligned with the goals of the Paris Agreement." Japan International Cooperation Agency, *Announcement of the "JICA Sustainability Policy"*, 27.05.2026, available at: https://www.jica.go.jp/english/information/press/2023/20231030_11.html

sustainability in international projects as *"multifaceted,"* encompassing *"economics and trade in environmental services"* (Anonymous, 30.01.2026). The specialist explained that this approach is due to constant balancing of Japan's multiple strategic goals and requests from the ASEAN members.

7.2 The Goals of Environmental Sustainability at the International Level: Expanding Market Opportunities and Building Japan's Global Environmental Leadership.

This section analyses goals that drive environmental sustainability by the Japanese organizations operating at the international level. This section emphasises two key goals driving environmental sustainability at the international level by the Japanese organizations. These goals are defined from the thematic analysis of the two interviews with officials from JETRO and JICA, and an independent policy specialist on ASEAN and Japan affairs. They include:

1. Expanding market opportunities for Japanese companies;
2. Building Japan's global environmental leadership.

The first goal understood from the thematic analysis of the interview is to expand market opportunities for Japanese companies. The official from JETRO explained this goal as to *"support Japanese companies"* in accessing international markets focused on green technology (Kimura R., 16.10.2025). The official further explained that the goal to expand market opportunities for Japanese green technology companies is approached by first *"introducing Japanese technologies to the new regions"* and then by *"increasing the global demand for green solutions"* (Kimura R., 16.10.2025).

Among the market opportunities for the Japanese industrial players, there are two areas emphasised during the interviews: the African region and the Southeast Asian region. For instance, an independent policy specialist on ASEAN and Japan affairs highlighted ASEAN's *"enlarging market"* with *"about 650 million people overall"*[67] as the main motivation of Japan to engage with ASEAN (Anonymous, 30.01.2026). Based on the themes, within ASEAN,

[67] ASEAN Statistics Division, *ASEANSTATS Key Indicators*, 27.05.2026, available at: https://data.aseanstats.org/

Indonesia represents the largest market opportunity for Japanese green technology as the country has the biggest domestic market in ASEAN. An independent policy specialist on ASEAN and Japan affairs further emphasised that sustainability-driven *"exchange of technologies and investments"* will continue to develop especially in *"the next five to ten years"* (Anonymous, 30.01.2026). The official from JETRO similarly identified parts of Africa and the Middle East as a *"rapidly increasing"* market that offers Japanese companies a *"significant potential for growth"* (Kimura R., 16.10.2025). Despite Japan's focus on accessing the emerging markets, the European Union continues to be Japan's *"main partner"* for hydrogen technologies (Kimura R., 16.10.2025).

The official from JICA also emphasised the central goal to expand market opportunities for Japanese companies. As explained by the official from JICA, developmental projects open access for *"rapidly growing markets of developing countries,"* while the Official Development Aid (ODA) funded projects help *"build long-term relationships with developing countries"* (Noguchi A., 09.10.2025). Considering *"limited domestic options,"* the official from JICA outlined that building relationships with developing countries is a *"very important goal for Japan,"* as it brings long-term benefits for the Japanese private sector (Noguchi A., 09.10.2025).

The second goal understood from the thematic analysis of the interview data is to build Japan's image as a global environmental leader. For example, the official from JETRO explained that the organization has the goal to promote the *"Japan brand"* internationally because the organization is governmental (Kimura R., 16.10.2025). Generally, the officials from the organizations outlined the goals of environmental sustainability as to *"take initiatives in environmental issues"* and *"take initiatives in clean technologies"* (Kimura R., 16.10.2025), *"share Japan's experiences"* and *"contribute both to Japan and globally"* (Noguchi A., 09.10.2025). Therefore, the thematic analysis suggests that building Japan's image as a global environmental leader aims to promote Japan's environmental policy and technological solutions.

7.3 Instruments Assisting the Implementation of Environmental Sustainability by the Japanese Organizations at the International Level: Narratives of Japan and its Environmental Experiences, Narratives of Climate Change and Japan's Technological Solutions, International Collaborations, and Financial Instruments.

This section analyses instruments that assist the implementation of environmental sustainability at the international level by the Japanese organizations. This section emphasises four key instruments that assist the implementation of environmental sustainability at the international level by the Japanese organizations. These instruments are defined from the thematic analysis of the interviews with officials from JETRO and JICA, and an independent policy specialist on ASEAN and Japan affairs. They include:

1) Using the narratives of Japan's environmental experiences and Japan's general perception;
2) Using the narratives of the urgency of climate change and Japan's green technology;
3) Enhancing international collaborations and government-to-government networks;
4) Using financial mechanisms.

The first instrument understood from the thematic analysis of the interviews is using the narratives of Japan's environmental experiences and Japan's general perception. The thematic analysis suggests that the narrative of Japan's environmental experiences is built around Japan's experiences in natural disaster prevention and Japan's transition to the green economic and industrial model. For example, the official from JICA outlined Japan's *"strengths in disaster prevention"* (Noguchi A., 09.10.2025). The analysis also suggests that the organizations employ the narrative of Japan's transformation from *"historically not a very green country"* with particular examples of *"building coal plants"* and *"environmental diseases in Kyushu"* (Noguchi A., 09.10.2025). Japan's environmental experiences are therefore framed as sources of practical knowledge and translated as *"techniques and know-how"* for developing countries where the three organizations operate (Noguchi A., 09.10.2025). For example, the official from JICA emphasised the *"Fukuoka method"*[68] as a

[68] "The Fukuoka method is a high tech waste disposal method that has been successfully adopted throughout Japan and is very transferable due its simplistic design and low costs of operations,

source of Japan's practical knowledge in waste management (Noguchi A., 09.10.2025). A distinctive feature of this method pointed out by the official from JICA is that it *"does not emit methane"* (Noguchi A., 09.10.2025).

Importantly, Japan is not positioned as a sustainable country or a *"perfect green country*" by the officials from the two organizations (Noguchi A., 09.10.2025). Instead, they refer to Japan as a *"transition model"* country (Noguchi A., 09.10.2025). The official from JICA outlined Japan's *"strong capabilities in climate change management and biodiversity"* and Japan's example of *"how to transition from a brown country to a green country"* (Noguchi A., 09.10.2025). As mentioned by the official from JICA, this makes Japan's environmental experiences relevant for developing countries that are currently transitioning from a *"brown"* type of an economic model (Noguchi A., 09.10.2025). In addition, as explained by the official from JICA, Japan's environmental experiences enable a gradual introduction of a green economic model in developing countries, instead of its radical enforcement.

In addition to the narrative of Japan's environmental experiences, the narrative of Japan's broader positive perception is also being employed. For example, an independent policy specialist on ASEAN and Japan affairs indicated that high trust and positive perception of Japan among ASEAN member states facilitate the cooperation between Japan and ASEAN. As explained by this official, Japan's "*very favorable image among all ASEAN countries"* applies to Japan's general perception, not only regarding the nation's environmental efforts (Anonymous, 30.01.2026). The role of Japan's ODA was highlighted by the independent specialist as a factor contributing to the positive perception of Japan in ASEAN and environmental cooperation between Japan and ASEAN. Therefore, as the themes indicate, the environmental sustainability cooperation between Japan and ASEAN is significantly facilitated by Japan's high trust ranking, Japan's *"very good relations"* with the ASEAN countries, and Japan's strong environmental ODA presence in ASEAN (Anonymous, 30.01.2026).

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management and maintenance. The Fukuoka method involves consolidating waste through a series of pipes assembled at the bottom of the landfill that due to their perforated structure, guarantee optimum aeration and decrease the release of toxic gases. The pipes also allow leachate to easily discharge from the landfill into a secure retention pond before being transferred to a nearby sewage facility for treatment and release." The United Nations Human Settlements Programme (UN-Habitat), *Exposing the value of waste through urban development,* 27.05.2026, available at: https://unhabitat.org/exposing-the-value-of-waste-through-urban-development

The second instrument understood from the thematic analysis of the interviews is using the narratives of the urgency of climate change and Japan's green technology. For example, the narrative of the urgency of climate change is expressed by the official from JETRO as "*if we do not (act), the world will face serious consequences"* (Kimura R., 16.10.2025). The urgent risks of climate change explained by the official from JETRO result from *"using oil and gas"* and include *"rising temperatures"* and *"damaged environment"* (Kimura R., 16.10.2025). In the urgency of climate change, the official from JETRO outlined the role of Japan as *"if countries like Japan do not engage in green initiatives, our living environments will become unsustainable"* (Kimura R., 16.10.2025). Therefore, based on the themes, the narrative of the urgency of climate change outlines the important role of Japan in solving global environmental challenges.

Additionally, the themes suggest that there is also a narrative of Japan's effective green technology. The themes suggest the narrative of Japan's green technology is used to promote Japan's green technology on the overseas markets. For example, the official from JETRO emphasised the narrative of Japan's *"very high standards"* in technology to promote Japan's green technology abroad (Kimura R., 16.10.2025). Among the green technology, the official from JETRO emphasised the development of hydrogen-fueled technology as JETRO's *"top priority"* (Kimura R., 16.10.2025).

An independent policy specialist on ASEAN and Japan affairs further emphasised the perception of Japan among the ASEAN countries as a nation *"big on the technological aspect,"* which facilitates the cooperation on *"technology developed in Japan"* (Anonymous, 30.01.2026). An independent policy specialist on ASEAN and Japan affairs further emphasised that Japan's green technology *"actually shapes what happens most in the sustainability area between Japan and ASEAN"* (Anonymous, 30.01.2026).

According to the themes, the key sectors of technological cooperation between Japan and ASEAN are renewable (e.g hydrogen) technology and waste management technology. As explained by an independent policy specialist on ASEAN and Japan affairs, ASEAN's main interest in cooperation with Japan in the waste management and gas-capturing technologies is driven by ASEAN's aim to "*to move away from landfills"* (Anonymous, 30.01.2026). Therefore, the themes suggest that the two narratives (the urgency of climate change and

Japan's green technology) are interconnected: within the urgency of climate change, Japan's technology is framed as a solution to *"climate change challenges"* and an instrument of *"Japanese sustainability-related efforts"* (Kimura R., 16.10.2025).

The third instrument understood from the thematic analysis of the interviews is enhancing international collaborations and government-to-government networks. The themes indicate that although the three organizations mainly target the private sector's participation, the role of governments' engagement is significant. As explained by the official from JETRO, the engagement between the Japanese and foreign private sector begins at the *"government-to-government level"* as *"first, connections are built between governments, and then the process moves on to connections between companies"* (Kimura R., 16.10.2025). This process was further explained by the official from JETRO as connecting "*directly with African private companies is difficult for the Japanese green tech companies, and thus, the process goes through African governments first"* (Kimura R., 16.10.2025).

The official from JICA described building international collaborations as a process of *"long negotiations - one or two years"* to ensure that *"local governments recognize the importance of complying with the very strict contract requirements"* (Noguchi A., 09.10.2025). The progress of negotiations especially refers to JICA's grant-in-aid projects, where the discussion with the partner side includes planning on *"how the facilities will be used 10 or 20 years later"* (Noguchi A., 09.10.2025). The incrementalism in international environmental collaborations was explained by the official from JICA as the organization does not target an immediate effect in developing countries. This is connected to the costs of the green transition projects, explained by the official from JICA as *"a swift shift to green in developing countries would be very high-cost and unrealistic"* (Noguchi A., 09.10.2025). Therefore, projects are carefully adapted to each country's local conditions and sources, which was explained by the official from JICA as *"first we need to understand the situation of each country, make a plan, and then gradually implement projects step by step"* (Noguchi A., 09.10.2025).

Lastly, in the international collaborations there is also a role of informal and youth-led interactions. For example, an independent policy specialist on ASEAN and Japan affairs mentioned the environmental *"capacity building"* initiatives between Japan and ASEAN

including *"policy roundtable dialogues, workshops, and webinars"* (Anonymous, 30.01.2026). Among the capacity building programs, an independent policy specialist on ASEAN and Japan affairs emphasised the role of AZEC platform and webinars dedicated to Emissions Trading System, which clearly indicates the connection with METI's strategic goals and instruments. Among the youth-led programs, an independent policy specialist on ASEAN and Japan affairs outlined the *"ASEAN-Japan Young Environmental Leaders Network"* regional environmental youth leadership program (Anonymous, 30.01.2026).

The fourth instrument understood from the thematic analysis of the interviews is using financial mechanisms. The themes indicate that the three organizations promote international environmental efforts mainly through the funding from the Japanese government and investment from the Japanese and foreign private sector. For example, the official from JETRO explained that *"JETRO works together with the Japanese government to provide subsidies and financial support to startups so they can grow"* (Kimura R., 16.10.2025). Similarly, the official from JICA explained that Japanese private companies join JICA's international cooperation projects because it *"helps companies access funding and sustainability bonds"* (Noguchi A., 09.10.2025). One of the examples of collaborative efforts between JICA and the private sector observed during the thematic analysis is the construction of the Monsoon Wind Power Project in Laos,[69] which became *"the largest wind power plant in Southeast Asia"* (Noguchi A., 09.10.2025). An independent policy specialist on ASEAN and Japan affairs also emphasised access to funding as the main incentive for the ASEAN countries to engage with environmental projects with Japan. One of the particular funding bodies described an independent policy specialist on ASEAN and Japan affairs is Japan-ASEAN Integration Fund (JAIF)[70] based in Jakarta. The JAIF was described an independent policy specialist on ASEAN and Japan affairs as an organization that funds *"a lot of sustainability initiatives,"* works *"with government bodies in ASEAN and Japan,"* and facilitates the access for funding *"as long as there is a Japanese institution or a Japanese company ready to implement that program"* (Anonymous, 30.01.2026).

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[69] "The 600MW Monsoon Wind Power Project is a landmark initiative, featuring a 500kV transmission line that links Laos to Vietnam. It is slated for completion by 2025. It is the first wind farm in Laos and the largest in Southeast Asia." Monsoon Wind, *Monsoon Wind Power,* 27.05.2026, available at: https://www.monsoonwindasia.com/

[70] Japan-ASEAN Integration Fund, *JAIF's Role in Transforming ASEAN*, 27.05.2026, available at: https://jaif.asean.org/en

7.4 Key Challenges.

This section analyses challenges in constructing and addressing environmental sustainability faced by the officials from JETRO and JICA, and an independent policy specialist on ASEAN and Japan affairs, regarding Japan's environmental approaches at the international level. These challenges are identified from the themes recognized and constructed from the interviews with the three officials. These challenges include low economic viability of the environmental projects, capacity constraints in developing countries, and communication challenges.

The first challenge refers to the economic viability of the environmental projects supported by the Japanese organizations internationally. For example, as explained by the official from JETRO, the return of investment in green technology is slow as *"green projects do not immediately generate clear numbers"* (Kimura R., 16.10.2025). Furthermore, the majority of green technology is in the development phase, which means that the revenue *"is not being generated yet"* and therefore, *"turning sustainability into a viable business takes a long time"* (Kimura R., 16.10.2025). Low economic viability of green projects in developing countries imposes a challenge of attracting investment flow as *"instead of investing in green initiatives"* it is more common in the developing countries to *"focus on making profits without going green"* (Kimura R., 16.10.2025). The official from JICA also noted a challenge of attracting the investment flow in developing countries, as low economic viability of green projects makes sustainability seen as *"optional"* by the private sector and partner governments (Noguchi A., 09.10.2025).

Additionally, as the organizations mainly operate in developing countries with emerging markets, there is an issue of the relative high cost of Japan's green technology that the developing countries cannot afford to purchase. All the three officials noted that Japan's green technology is considered as *"expensive"* in the developing countries (Kimura R., 16.10.2025). Furthermore, an independent policy specialist on ASEAN and Japan affairs pointed out another challenge related to the competition for Japanese investment within the ASEAN nations. The independent policy specialist on ASEAN and Japan affairs described this challenge as the ASEAN governments *"competing with each other"* to get the investment

from Japan because *"why would you fund a solar panel investment in Indonesia versus the Philippines?"* (Anonymous, 30.01.2026).

Due to the low economic viability of the green projects, the energy transition in the developing countries is happening at a limited pace, as explained by an independent policy specialist on ASEAN and Japan affairs, *"renewable energy production is expensive and the volume of the energy produced is not yet enough to replace fossil fuels"* (Anonymous, 30.01.2026). The official from JICA also emphasised the slow pace of energy transition, especially when it comes to developing countries that are *"still in a brown phase"* (Noguchi A., 09.10.2025).

The second challenge refers to the capacity constraints in developing countries hindering the effectiveness of environmental projects led by the three Japanese organizations. The capacity constraints include technical and institutional capacity constraints. For example, as explained by an independent policy specialist on ASEAN and Japan affairs, although there are regulations regarding the carbon trading mechanism in ASEAN and particularly, in Indonesia, the actual implementation of the mechanism is limited. The independent policy specialist on ASEAN and Japan affairs explained this situation as *"the bar [of the carbon trading mechanism] is too high for a lot of Indonesian companies"* and local companies cannot *"comply with the minimum requirements"* (Anonymous, 30.01.2026).

Furthermore, the official from JICA identified that the data regarding local emissions rate is limited in some developing countries. The effective categorization of the development projects requires *"adequate climate estimation"* and as explained by the official from JICA, *"in some developing countries, there is no data available on greenhouse gas emissions or the number of people affected"* (Noguchi A., 09.10.2025). Therefore, the projects are categorized without clear estimates, which has an impact on their effectiveness.

The third challenge refers to the communication challenges faced by the organizations while conducting environmental projects abroad. Communication challenges occur both with domestic and international audiences. Regarding the domestic audience, the official from JICA expressed difficulties in shaping the domestic perception of JICA. The official from JICA explained that the Japanese public views JICA as an organization that *"helps"* developing countries without *"clear benefits"* for Japan, and therefore, *"the number of people who have*

negative views on ODA is increasing" (Noguchi A., 09.10.2025). Regarding the communication with international audiences, the official from JETRO emphasised cultural challenges hindering the promotion of Japanese products on foreign markets. The official from JETRO further explained that Japanese companies are particularly challenged by adapting their communication style *"in a way that resonates with European audiences"* (Kimura R., 16.10.2025).

7.5 Conclusion

In conclusion, based on the thematic analysis of the interviews with officials from JETRO and JICA, and an independent policy specialist on ASEAN and Japan affairs, this chapter outlines four main conclusion points.

Firstly, environmental sustainability led by the Japanese governmental organizations at the international level is constructed through the alignment of international environmental frameworks within Japan's strategic policy logic. In the two organizations, the international environmental frameworks are embedded in organizations' sustainability frameworks. However, in addition to the international environmental frameworks, the organizations also consider Japan's national sustainability goals and Japan's broader strategic agenda. A broader strategic agenda encompasses a variety of sectors, with a primary focus on balancing economic growth and trade with environmental solutions.

Secondly, the main goals to promote environmental sustainability by the two Japanese organizations at the international level is to expand market opportunities for Japanese companies and build Japan's image as a global environmental leader. The two organizations approach environmental sustainability as an opportunity to expand overseas markets for Japanese technologies. Particularly, the organizations aim at expanding developing markets in ASEAN, Africa, and the Middle East. At the same time, the organizations aim to position Japan as a global environmental leader that is capable of taking initiative in international environmental governance.

Thirdly, the main instruments supporting the implementation of environmental sustainability by the two organizations at the international governance level combine strategic narratives, international collaborations, and financial mechanisms. The two

organizations employ Japan's environmental experiences and positive perception of Japan as a transition model for developing countries that are starting their green transformation. Notably, rather than presenting Japan as a perfect green leader or a sustainable country, these organizations emphasise Japan's practical experiences in balancing economic development and green transition. At the same time, the urgency of climate change is closely linked to the promotion of Japanese green technologies, especially renewable energy and waste management technology. Therefore, Japan is framed by the two organizations and an independent specialist as a key actor that provides practical solutions to the environmental challenges. In international collaborations and government-to-government networks, the two organizations act as intermediaries between the Japanese government and a foreign government and the private sector. International collaborations are formalised, incremental, and long-term oriented. They encompass a variety of programs, from the business matchmaking opportunities to capacity building programs oriented at youth and professional development. Lastly, the financial mechanisms mainly include subsidies from the Japanese government to the Japanese private sector engaged in the energy transition programs abroad and direct investments from the Japanese public and private sector to the environmental projects abroad.

Fourth, the thematic analysis identified three challenges linked to the implementation of environmental sustainability by the Japanese organizations at the international level. The challenges include low economic viability of the energy transition projects, capacity constraints in developing countries, and communication challenges due to cultural differences and linguistic barriers.

8 Chapter 8: Discussion

This chapter discusses the results of the thematic analysis in relation to the research questions, existing literature and policy frameworks. Based on the themes obtained from the field, this study contributes to understanding the difference in approaches to environmental sustainability across four governance levels in Japan: prefectural, metropolitan, ministerial, and international. This section walks through the themes that emerged during the analysis process and establishes a connection between the findings of this research and the prior research discussed in the literature review section of this thesis. This chapter also explores findings that emerged during the research but were omitted from the literature review section. By comparing the outcomes with existing research, the validity of the findings of this study are determined.

8.1 Conceptual Contribution

The concept of sustainable development introduced by the Brundtland Report in 1987 continues to serve as a foundation pillar of environmental sustainability in the contemporary social and environmental sciences. This term encompasses environmental, economic and social dimensions and refers to balancing a variety of societal needs without exceeding the limited capacity of natural resources and broader ecosystems.

The earlier literature analysis defined three main factors that affected the emergence of Japan's environmental sustainability, including Japan's environmental history, its dependence on external supply chains, and its international image, and the thematic findings of this study confirm this observation. Additionally, the literature analysis defined that environmental sustainability in the Japanese context is approached through the three lenses: ethical, economic, and governance, and the thematic findings of this study confirm that. In this framing of environmental sustainability, it can be seen that the Japanese conceptualisation of environmental sustainability is

closely aligned with the globally acknowledged concept of environmental sustainability defined by the Brundtland Report, as it also encompasses environmental, economic, and social dimensions.

Thematic analysis of this study further confirms the definitions of environmental sustainability suggested by Morelli as a condition of balance, resilience, and interconnectedness. The themes also confirm the suggested definition of environmental sustainability by Shiroyama and his colleagues regarding various dimensions of sustainability including environmental, social, and economic sustainability. Lastly, the themes also confirm that environmental sustainability engages conservation of biodiversity, renewable resources, waste and pollution reduction, and promotion of sustainable practices, as suggested by Mishra and his colleagues.

Furthermore, the themes also confirm the definition of environmental governance as a crucial component of environmental sustainability management that includes such tools as green technology, renewable energy, and green finance, suggested earlier by Md Sujahangir Kabir Sarkar and his colleagues.

In a word, although the existence of a uniquely Japanese understanding of the concept of environmental sustainability cannot be established, the practical implementation of such a concept is based on factors that are unique to the Japanese social, economic, and geopolitical context.

8.2 Practical Contribution

8.2.1 Construction of Environmental Sustainability Across the Four Governance Levels in Japan

Thematic analysis of this study defined that environmental sustainability in the Japanese context is constructed through the alignment of international environmental frameworks with the local agenda at the prefectural and metropolitan

levels and Japan's strategic agenda at the ministerial and international levels. In this section, these thematic findings are further discussed and compared with the earlier literature and policy frameworks.

8.2.1.1. The Role of International Environmental Frameworks in the Construction of Environmental Sustainability at the Four Governance Levels in Japan.

The main international environmental frameworks defined through the themes are the 1997 Kyoto Protocol and the 2015 Paris Agreement, with the main aim of decreasing the global emissions by approximately 45% by 2030 and reaching net-zero levels by 2050. Policy frameworks on Japan's carbon neutrality goals by 2050 and carbon emissions reduction goals by 2030 further confirm this thematic observation regarding a significant role played by the international environmental frameworks in Japan's domestic environmental policymaking. Thematic analysis confirms the earlier study by Hiroshi Ohta and Brendan Barrett, who examined domestic and international forces driving climate policies and energy transition in Japan. The scholars outlined Japan's net-zero carbon targets by 2050 and the United Nations Task Force on Climate-related Financial Disclosure as the driving forces in Japan's domestic environmental policymaking. Thematic findings of this study further confirm the earlier study by Loorbarch and his colleagues, which stated the role of the 1997 Kyoto Protocol in Japan's first commitment to climate goals.

Additionally, the thematic analysis showed the role of the United Nations Sustainable Development Goals (UN SDG) in the Japanese environmental frameworks, which confirms the study by Morita who observed the national and local governance systems in Japan supporting the UN SDGs.

8.2.1.2. The Role of Local Agenda in the Construction of Environmental Sustainability at the Prefectural and Metropolitan Levels in Japan.

As defined through the themes, at the prefectural and metropolitan governance levels, international environmental frameworks are aligned with local environmental and socio-economic agenda. Among the local agenda, thematic analysis recognizes balancing several societal goals simultaneously, considering economic, environmental, and social needs of communities.

Thematic findings suggest that this mindset emerged as a result of the country's experiences in natural disaster management. Furthermore, thematic analysis shows that this mindset was further framed in Japan's regional revitalization policy and principles of regional coexistence. Thematic analysis confirms the earlier work by Kagawa-Fox, who suggested that the principle of "living in harmony with others" constitutes one of the core pillars of the Japanese approach to environmental sustainability. Furthermore, thematic findings confirm Kagawa-Fox's suggestion that Japan's environmental ethics emerged from societal principles, ideas, experiences, and values, such as learning from mistakes and sharing the knowledge with others.

The principles of regional revitalization and regional coexistence derived from the themes explain Japan's focus priority on community welfare rather than immediate results in environmental indexes. This therefore confirms the earlier finding by Sato about Japan's better performance in human health, welfare, and life support functions, rather than Japan's environmental performance. The focus on regional revitalization also confirms the findings by Sato on the impact of the aging population on the nature and human relationship in Japan.

Thematic findings also confirm the study by Loorbarch and his colleagues regarding balancing the emission reduction goals, demographic challenges and economic self-reliance across municipalities in Japan. Thematic findings also support the earlier study by Md Sujahangir Kabir Sarkar and his colleagues regarding the strong relationship between nature and society in Japan, when good citizen practices and adherence to the rule of law contribute to the overall environmental performance in Japan. Thematic findings regarding Japan's principles of regional coexistence and the

inclusion of different actors in decision-making process, further confirm the work by Holroyd regarding public support for the environment initiatives and prefectural autonomy in establishing local environmental frameworks. However, thematic analysis does not reveal the observation made by Nakazawa that local governments in Japan tend to sacrifice environmental concerns over residential developments to increase prefecture's populations.

8.2.1.3. The Role of Japan's Strategic Agenda in the Construction of Environmental Sustainability at the Ministerial and International Levels in Japan.

Based on the themes, at the ministerial and international levels, international environmental frameworks are aligned with Japan's strategic agenda (e.g. Japan's economic growth strategy). As the analysis suggests, environmental sustainability is placed to facilitate the nation's economic growth strategy by triggering the development of green technology and creating trade opportunities. Thematic findings confirm previous study by Hugh Whittaker who suggested that the emergence of a new economic model in Japan was a result of Japan's green technology's development.

Furthermore, thematic findings confirm the earlier work by Holroyd who explained environmental sustainability in Japan through the lens of the "Green Growth" strategy which focuses on economic development while pursuing environmental goals. Holroyd also explained the Green Growth model as a strategy that utilizes development and commercialization of green technology as a means to enhance economic growth.

8.2.2 Different Environmental Sustainability Goals across Governance Levels.

Thematic analysis of this study defined that the goals of environmental sustainability are pragmatic and community-oriented at the prefectural level, and strategic at the

metropolitan, ministerial and international levels. In this section, thematic findings are further discussed and compared with the earlier literature and policy frameworks.

8.2.2.1. Environmental Sustainability Aimed at Enhancing Public Environmental Awareness and Engagement in Sustainability Initiatives at the Prefectural Level.

As defined from thematic analysis, at the prefectural level, environmental sustainability targets public environmental awareness-building and public engagement in sustainability initiatives. Particularly, the analysis suggests that sustainability-related concepts are not widely known among the Japanese public. Furthermore, because of the lack of knowledge, the environmental practices are perceived as not interesting among the Japanese public.

Therefore, due to the low level of environmental awareness in the public, the primary goal of environmental sustainability at the prefectural level defined through thematic analysis is to enhance public awareness regarding local and global environmental issues, environmental practices, and sustainability related concepts. The second goal of environmental sustainability at the prefectural level defined through thematic analysis is to enhance public engagement in sustainability initiatives, domestically and internationally. Public engagement in sustainability initiatives is aimed at knowledge and cultural exchange regarding environmental issues and environmental practices, and creating partnerships outside of the prefectural network.

This empirical finding was not previously observed in the earlier literature. Loorbarch and his colleagues observed examples of public engagements in environmental initiatives across Japanese prefectures, but they did not state it as a main goal of environmental sustainability at the prefectural level.

8.2.2.2. Environmental Sustainability Aimed at Building Environmental Leadership, Expand Market Opportunities and Secure Energy Supplies at the Metropolitan, Ministerial, and International levels.

As observed through the themes, at the metropolitan, ministerial, and international levels, the goals of pursuing environmental sustainability obtain a more strategic character. At these levels, environmental sustainability is aimed at building a leadership image in environmental sustainability, expanding market opportunities, and securing energy supplies.

The first goal of environmental sustainability at the three levels defined from the themes is to build an image of environmental leadership. Interview data shows that at the three levels, Japan is perceived as a nation with strengths in energy transition and therefore, is capable of contributing to global decarbonization efforts. This finding confirms the earlier work by Loorbarch and his colleagues who observe environmental leadership-building initiatives in Japan, aimed to promote the image of Japan as a low-carbon future society.

The second goal of environmental sustainability at the three levels defined from the thematic analysis is to expand market opportunities for Japanese industries. This goal is primarily oriented for the Japanese industries that develop green technology. Southeast Asia, the Middle East, and the African continent are recognized from the themes as potential markets for the Japanese industries producing green technologies. This finding confirms the observation by Holroyd regarding the international dimension of the Green Growth strategy and Japan's aim to maintain its commercial presence on the green technology market in Southeast Asia. Furthermore, as defined from the themes, Japan aims to position its green technology also as key players in the global supply chains, despite a growing Chinese presence in the green technology sector. This thematic observation was not studied in the existing literature.

The third goal of environmental sustainability at the three levels understood from the thematic analysis is to maintain national energy security. This goal is linked to the logic of reducing dependence on a single supplier or a single energy source. In this context, however, fossil fuel (mainly LNG) will continue to be one of the main energy

sources in Japan throughout the country's energy transition process. This thematic finding confirms the earlier observation by Whittaker regarding how the geopolitical shifts influence the approach to the energy transition and energy security. Furthermore, the thematic analysis and policy framework by METI confirm the study by DeWit regarding Japan's dependence on external raw material supply chains, suggesting that the development of green technology (e.g. perovskite solar cells) domestically is aimed to avoid relying on external raw material supply chains.

8.2.3 Different Implementation Mechanisms Across Governance Level: Civic Engagements, Green Technology and Financial Mechanisms, and Narratives of Sustainability and Japan's Environmental Efforts.

Thematic analysis of this study defined that the instruments facilitating environmental sustainability mainly include civic engagements, green technology and financial mechanisms, and narratives of sustainability and Japan's environmental efforts. In this section, thematic findings are further discussed and compared with the earlier literature and policy frameworks.

8.2.3.1. Civic Engagements as an Instrument of Environmental Sustainability at the Four Governance Levels in Japan.

Thematic analysis suggests that at the four governance levels in Japan, civic engagements serve as a main instrument that facilitates environmental sustainability efforts. Notably, the character of civic engagements differs across the four levels, from informal networks to formalized strategic engagements. At the prefectural level, the collaborations are informal, driven by personal connections, and pragmatic, focused on solving challenges in the communities and engaging student networks in international collaborations. This finding confirms the previous study by Nakazawa who observed the role of civic engagements in environmental governance in Japan, particularly in rural areas, defining civic networks as a form of environmental governance in the Japanese style. Furthermore, this finding also confirms the study by

Hiroshi Ohta and Brendan Barrett, which examined the community-to-government effect in the energy transition process and climate policies in Japan, particularly the role of local governments-led initiatives. Thematic finding also confirms the observation by Shiroyama regarding the role of civic engagements, people-to-people networks, and formal and informal connections in Japanese environmental governance.

At the metropolitan, metropolitan, and international levels, as understood from the themes, international collaborations are formal, structuralized and built to achieve Japan's strategic goals, such as enhancing national economic growth. This finding was not present in the current literature.

8.2.3.2. Green Technology and Financial Mechanisms as Instruments of Environmental Sustainability at the Metropolitan, Ministerial, and International Levels.

Thematic analysis suggests that at the metropolitan, ministerial, and international level, green technology and financial mechanisms serve as two main interconnected instruments that facilitate environmental sustainability efforts.

Based on the themes, green technology serves to facilitate Japan's energy transition efforts and the term mainly describes renewable technology that generates electricity from solar, wind, and hydrogen power sources. Also the themes observe the emergence of Japanese next-generation technology, which relates to the renewable technology developed and manufactured inside Japan. This technology encompasses hydrogen technology, solar perovskite cells, and offshore wind power plants. Based on the analysis, green technology is developed within 14 sectors, based on the capabilities of Japanese industries, Japan's domestic needs and environmental specifics. This finding confirms the earlier observations by Holroyd regarding the role of Japan's green technology in the Green Growth strategy and by Whittaker regarding the role of green technology in fostering Japan's economic model. On a

policy level, the finding is supported by METI's frameworks regarding Japan's next-generation technology and the crucial role of solar and wind technology in Japan's energy transition.

Furthermore, as derived from the themes, financial mechanisms form Japan's additional instrument that facilitate environmental sustainability efforts. Financial mechanisms are embedded in Tokyo's and Japan's national frameworks. As understood from the themes, these frameworks include Tokyo's green and blue bonds, Tokyo's subsidies supporting the introduction of a circular economy across the urban industries, and Japan's national frameworks. The frameworks facilitating environmental efforts domestically and discussed in the interviews are the Green Transformation (GX) Economy Transition Bonds and the Emissions Trading System (ETS) embedded in the Green Transformation (GX) Basic Policy. To facilitate environmental efforts at the international level, Japan employs the Joint Credit Mechanism (JCM), the Official Development Aid (ODA), and investments from the private sector and Japanese public funding organizations. Therefore, the findings confirm the earlier observation by Whittaker regarding the role of financial mechanisms, mainly, the GX Basic Policy, in Japan's energy transition. The policy frameworks by METI also support the thematic data. However, the themes did not observe any negative effects of Japan's environmental ODA, as it was examined by Holroyd. The themes also did not detect any financial mechanisms given for the implementation of environmental initiatives at the prefectural level, although Loorbarch had observed financial support for environmental programs at municipalities in Japan.

8.2.3.3. Narrative of Sustainability and Japan's Environmental Efforts as an Instrument of Environmental Sustainability at the Prefectural and International Level.

Based on thematic analysis, narratives of sustainability and Japan's environmental efforts serve as an instrument that facilitate environmental sustainability efforts at the prefectural and international levels.

At the prefectural governance level, the narratives of environmental sustainability have a community-oriented pragmatism: they serve to enhance public engagement in environmental initiatives and raise public environmental awareness. The narratives of environmental sustainability are carefully adjusted to the local context by interpreting environmental sustainability as locally known sustainable practices or as images embedded in popular culture.

At the international level, the narratives of environmental sustainability are built strategically to facilitate Japan's national goals. The narratives use the urgency of climate change to promote Japan's green technology as a solution to the crisis. Additionally, the narratives use Japan's environmental experiences to legitimize Japan's image as an expert in solving environmental challenges and promote Japan's green technology and environmental policies globally. Therefore, thematic analysis confirms the earlier study by Wong who observed the role of Japan's international image in undertaking global environmental initiatives. It also confirms Wong's observation regarding Japan's narrative as an economically sufficient nation that is capable of solving global environmental issues through the distribution of its technology and environmental experiences domestically.

8.2.4 Challenge in pursuing environmental sustainability across governance levels in Japan: communication, implementation, and economic viability limitations.

Thematic analysis of this study defined that there are three main challenges associated with the implementation of environmental sustainability at the four governance levels in Japan. These challenges encompass limitations in communication, implementation, and economic viability.

Based on these themes, communication challenges are present at the prefectural and international levels. They are mainly associated with linguistic and cultural barriers hindering the outreach to foreign audiences. Implementation challenges refer to the difficulties in realization of environmental goals, such as transitioning from fossil fuel-based energy generation and achieving the Paris Agreement goals. Challenges associated with economic viability mainly refer to high economic barriers and low revenue generation of introducing green technology in the urban ecosystems.

In the existing literature, however, only the implementation challenges were mentioned in the studies by Md Sujahangir Kabir Sarkar and Sato, where Japan's poor performance in emissions reduction was observed. The challenges associated with communication and economic viability were not studied in the existing literature.

9 Chapter 9: Conclusion

Following the discussion above, it is time to answer the research question this thesis set out to solve in the beginning: "How do approaches to environmental sustainability differ across domestic and international governance levels in Japan?". In order to give the most complete answer to this research question, each subsection answers one of the subquestions it gave birth to. The subresearch questions will be dealt with in the order in which they appear in the introduction.

9.1 How are Environmental Sustainability Approaches Constructed at Prefectural, Metropolitan and Ministerial Governance Levels in Japan, and How do Japanese Governmental Organizations Construct the Approach to Environmental Sustainability in their International Engagement?

The answer to this question is that approaches to environmental sustainability differ across domestic and international governance levels in Japan. At the prefectural and metropolitan level, environmental sustainability is constrained by the habits and practices of citizens, which governments do not wish to radically upset. Thus at those levels, environmental sustainability is seen as a means to improve quality of life. Prefectures and the Tokyo metropolis attempt to align the international sustainability frameworks to their local agenda. At the ministerial level, the approach is different. These international frameworks are built into national strategy for economic growth. At this level, environmental sustainability sets the framework regarding the manner in which economic growth ought to be achieved, not the other way around. Similarly, Japanese international organizations such as JETRO and JICA conceive their international engagement in favour of environmental sustainability on the basis of these international norms. However, their engagement is also constrained by the national policies of Japan. Their actions must also favour Japanese economic growth and export trade.

9.2 What Goals Drive Environmental Sustainability across Prefectural, Metropolitan, Ministerial, and International Governance Levels in Japan?

Also, as mentioned in the previous chapter, the goals of environmental sustainability differ across governance levels. At the prefectural level, the main goal remains awareness-raising amongst citizens. At higher levels, starting from the metropolitan level to the international one, the goal is two-pronged. On the one hand, it is to promote Japan or Tokyo internationally as green actors, as reliable and trusted leaders of the green transition. However, internationally Japan does not portray itself as the perfect example to follow towards green transition for fear of alienating partners.

On the other hand, it is to ensure economic growth and economic partnership for Japan and its companies. In this case, environmental sustainability is used as a driver of economic transformation for the future of Japan. Environmental sustainability is viewed and in Japan's policies developed as an opportunity for growth rather than a constraint that limits companies activities. At the international level, Japanese governmental organizations, such as JETRO or JICA, integrate environmental sustainability in their new projects, which have to meet Japanese targets and comply with Japanese national policy. For instance, regarding JETRO, Japan tries to boost its economic growth and export trade using environmental sustainability as an argument, setting it apart, and thus helping Japanese companies to conquer new markets. For JICA, the environmental focus of new ODA projects is designed to promote Japan's image as a green power.

9.3 What Instruments are Used to Facilitate the Implementation of Environmental Sustainability Goals at the Four Governance Levels?

The tools used to implement environmental sustainability at the four different governance levels examined in this thesis vary in order to meet the goals each governance level has set itself. In this thesis four have been established. They are the

reinforcement of human resources capacities, the adjustment of narratives, the use of policy and financial tools to incentivize companies, and the reliance on international collaborations.This last instrument is shared by all levels of governance in Japan.

At both the prefectural and metropolitan governance levels, the development of human resource capacities serves as one of main instruments to facilitate environmental sustainability efforts and ensure the implementation of policies.

Adjusting the narratives of environmental sustainability according to the audience is used as one of the main instruments at the prefectural and international governance levels. At the prefectural level, adjusting the narratives of environmental sustainability is used to raise public environmental awareness by interpreting the concepts of sustainability through examples of local sustainable practices, so that environmental sustainability is perceived as a natural part of citizens' daily lives rather than an external imposition from the prefecture. Meanwhile at the international level, Japan adjusts the narratives of environmental sustainability and particularly its own environmental experiences, to facilitate Japan's broader strategic goals, such as reinforcing its image as a green power and assisting its companies entering new markets.

Financial and policy mechanisms are commonly used at the metropolitan, ministerial, and international governance levels. For instance the GX bonds and the JCM are designed to stimulate the development of green technology while at the same time facilitating Japan's economic growth. With these mechanisms, at first Japan financially helps companies not to feel the economic burden of the green transition, and therefore incentivizes them to develop greener technologies. However, these mechanisms are in time designed to sustain and finance themselves so as not to hinder Japan's economic growth.

The fourth and final instrument is the development of international collaborations. At the lower level of governance, prefectural and metropolitan, these collaborations

heavily depend on the dynamism and network of governors. They still remain to a large extent dependent on interpersonal relations. While at the higher levels of governance, ministerial and international, these collaborations become much more institutionalized. They become both constrained and promoted by Japan's strategic goals and diplomatic relations.

9.4 What Challenges are Faced by the Actors at the four Governance Levels in Constructing and Addressing Environmental Sustainability?

At last, the analysis conducted in this thesis revealed a few common challenges. Firstly, communication on environmental sustainability is an issue across all governance levels. At the prefectural level, crafting a message that appeals to and can be accepted and understood by the local population to raise awareness on environmental issues has been difficult. Similarly, on the other hand of the spectrum, at the international level, Japan's initiatives has been struggling to find the right codes to appeal to European customers and enter the European market.

Secondly, some projects designed to support environmental sustainability and transitioning towards a greener economy such as the development of hydrogen-based solutions are not economically viable. Similarly, some goals such as the ones regarding the reduction of carbon emission, or adjusting Japan's power mix are irrealistic in the current expected timeframe, for the technological and capacity constraints to overcome are too important.

These identified challenges underline that Japanese policies regarding environmental sustainability have set sustainability targets Japan does not have the capacity to achieve. There is a gap between sustainability goals and the means allocated to attain them.

9.5 Summary.

In a word, although instruments used and challenges faced are common between the four governance level analysed in this thesis, the approach to environmental sustainability and its goals are different. The prefectural and metropolitan governance level conceive and use environmental sustainability at the service of their local citizenry, who also constrain the manner in which these governance levels can implement environmental sustainability. At the ministerial and international level, because Japan made the choice to become a green power, this paradigm is reversed. Environmental sustainability becomes the framework that constrains policy and actions.

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