

Topic and Research Question

“How do national policy approaches towards the low-carbon energy transition differ between Japan and South Korea across political, environmental, techno-economic, and socio-technical dimensions since 2015?”

Transitioning away from fossil fuels to low-carbon energy sources is one of the defining policy challenges of the post Paris Agreement era. Despite shared international commitments, countries pursue significantly different pathways, shaped by their political institutions, economic structures, and national priorities.

Japan and South Korea present an interesting comparative case study. Both countries share a similar set of structural characteristics such as high fossil-fuel dependence, advanced industrialization, and ambitious decarbonization commitments, yet they have chosen different governance pathways. This thesis applies a comparative, descriptive analysis and examines how national policy approaches differ across four analytical dimensions: political, environmental, techno-economic, and socio-technical.

The thesis contributes to the energy transition literature by demonstrating that shared international commitments do not produce universal national policy approaches, and by providing a comparison of two East Asian cases that remain underrepresented in the predominantly Europe-focused governance literature.

State of the Art

The number of studies on energy transition has significantly increased after the ratification of the Paris Agreement (Kamali Saraji and Streimikiene 2023, 4). However, transition studies currently do not have a dominant methodological approach due to the multidisciplinary nature of the field (Cherp et al. 2018, 175). Moreover, there is no universally accepted definition of the term “energy transition” itself (Cherp et al. 2018; Sovacool 2016).

The existing literature is predominantly focused on techno-economic aspects of the energy transition and on single-country case studies, with European countries remaining the dominant regional focus. While there are various energy transition frameworks, the frameworks proposed by Cherp et al. (2018) and Köhler et al. (2019) were chosen as the foundational works for this thesis. They conceptualize energy transition as a complex and

multi-dimensional process and balance political, environmental, techno-economic, and socio-technical aspects into a comprehensive analytical framework. This thesis addresses the identified gap by applying this framework to the comparative analysis of national policy approaches in Japan and South Korea.

Methodology and Approach

To answer the research question, this thesis adopts a comparative qualitative case study approach. Following the most similar case design, Japan and South Korea were selected as the two case studies, as they share key structural characteristics while developing markedly different governance approaches to the energy transition. This allows the analysis to focus on policy choices rather than structural conditions.

Dimensions	Key targets
Political	Establish supportive policy frameworks
Environmental	- Reduce greenhouse gas (GHG) emissions - Build resilience to climate change
Techno-economic	- Increase the renewable energy share - Promote energy efficiency
Socio-technical	- Strengthen public support - Address distributive justice concerns

Main Facts

POLITICAL

Japan does not have a single carbon neutrality framework, and the energy transition governance mainly relies on strategic planning instruments, primarily coordinated by the Ministry of Economy, Trade and Industry (METI) (Bakshi 2023, 211). South Korea has established a legally binding climate framework through the Framework Act on Carbon Neutrality and Green Growth (2021), however, following the 2022 government change, it underwent significant policy reorientation,

shifting from renewable energy expansion towards nuclear energy expansion (Tachev 2024).

ENVIRONMENTAL

Japan commits to a 46% GHG reduction by 2030 from 2013 levels. The national mitigation targets are mainly outlined in strategic planning documents (METI 2025a). South Korea commits to a 40% GHG reduction by 2030 from 2018 levels, with mitigation targets legally embedded in the Framework Act on Carbon Neutrality and Green Growth (Republic of Korea 2021a). However, the 2024 Constitutional Court ruling found the government's decarbonization pathway insufficient for the period 2031-2049 (NHRCK 2024).

TECHNO-ECONOMIC

Japan mainly relies on price-based mechanisms, transitioning from Feed-in Tariff (FIT) to Feed-in Premium (FIP). As of 2023, renewable energy accounts for approximately 25.7% of electricity generation in Japan (ISEP 2024). South Korea relies on quota-based obligations through the RPS system. Despite ambitious targets, renewable energy accounts for only approximately 8% of electricity generation as of 2023 (IEA 2023d). Regarding energy efficiency, Japan enforces mandatory standards under the Energy Conservation Law, while South Korea predominantly relies on voluntary industry agreements.

SOCIO-TECHNICAL

Japan prioritises building of the public trust, transparency, and step-by-step normalization of the energy transition process, particularly in the context of restoring public trust following the 2011 Fukushima accident (METI 2025b, 103–6). South Korea legally embeds distributive justice into its national climate framework, supported by dedicated institutions and funding mechanisms.

Results

FINDING 1. DIFFERENT GOVERNANCE MODELS

Japan mainly relies on strategic planning and bureaucratic continuity to achieve energy transition goals, which has paradoxically produced greater policy continuity than South Korea's legally embedded framework. Despite having a legally binding climate framework, South Korea underwent significant policy reorientation following the 2022 government change, shifting from renewable energy expansion towards nuclear energy expansion. This shows that legal

embedding alone does not guarantee policy continuity or credibility.

FINDING 2. DIFFERENT POLICY INSTRUMENT MIXES

Japan aims to ensure stability and reduce market risks through state-coordinated, price-based support mechanisms such as FIT and FIP, mandatory energy efficiency standards, and public capital mobilization through the Green Transformation (GX) policy. South Korea, on the other hand, focuses on creating market competition through quota-based obligations, competitive auctions, and market-based compliance mechanisms such as Korea Emissions Trading Scheme (K-ETS) and Renewable Portfolio Standard (RPS). This indicates that Japan stabilizes the energy transition process through state intervention, while South Korea relies on market-based mechanisms to drive technological deployment.

FINDING 3. SHARED STRUCTURAL CONSTRAINTS

Despite those policy choices, Japan and South Korea are facing the same challenges. Both countries are import-dependent economies heavily relying on fossil fuels, making them vulnerable to external shocks and geopolitical risks. Additionally, both countries are facing grid constraints, industrial lock-ins, and limited domestic renewable geography. Therefore, the energy transition strategies of Japan and South Korea are shaped not only by their political goals and choices, but also by their structural constraints.

References

All references can be found in the full version of the MA thesis available at www.xy.at

About the Author

Anastasiia Zagradskaia holds a BA in Linguistics from Moscow State Linguistic University. She recently interned in the United Nations Industrial Development Organization (UNIDO), which inspired this research. After graduation, she looks forward to pursuing a career in international organizations.



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