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Analysis of the Policy Network for the “Feed-in Tariff Law” in Japan: Evidence from the GEAPON Survey

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Energy policy is known to have higher path dependency among policy fields (Kuper and van Soest, 2003; OECD, 2012; Kikkawa, 2013) and is a critical component of the infrastructure development undertaken in the early stages of nation building. Actor roles, such as those played by interest groups, are firmly formed, making it unlikely that institutional change can be implemented. In resource-challenged Japan, energy policy is an especially critical policy area for the Japanese government. In comparing energy policy making in Japan and Germany, Japan’s policy community is relatively firm (Hartwig et al., 2015), and it is improbable that institutional change can occur. The Japanese government’s approach to energy policy has shifted incrementally in the past half century, with the most recent being the 2012 implementation of the “Feed-In Tariff Law” (Act on Special Measures Concerning Procurement of Renewable Electric Energy by Operators of Electric Utilities), which encourages new investment in renewable electricity generation and promotes the use of renewable energy. Yet, who were the actors involved and the factors that influenced the establishment of this new law? This study attempts to assess the factors associated with implementing the law as well as the roles of the relevant major actors. In answering this question, we focus on identifying the policy networks among government, political parties, and interest groups, which suggests that success in persuading key economic groups could be a factor in promoting the law. Our data is based on the “Global Environmental Policy Network Survey 2012-2013 (GEAPON2)” which was conducted immediately after the March 11, 2011 Great East Japan Earthquake with respondents including political parties, the government, interest groups, and civil society organizations. Our results suggest that the Feed in Tariff (FIT) Law’s network structure is similar to the information network and support network, and that the actors at the center of the network support the FIT Law. The strength of our research lays in our focus on

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political networks and their contributing mechanism to the law's implementation through analysis of the political process. From an academic perspective, identifying the key actors and factors may be significant in explaining institutional change in policy areas with high path dependency. Close examination of this issue also has implications for a society that can promote renewable and sustainable energy resources.

Introduction

Since the Great East Japan Earthquake occurred on March 11, 2011, energy policy has become a hotly debated policy field throughout the world. Particularly in Japan, the discourse concerning energy policy has evolved into multiple policy trajectories with competing preferences. On one hand, there are assertions that even though Japan experienced a major accident involving nuclear power, policy concerning nuclear power has not evolved into complete de-nuclearization. Proponents of this policy who are concerned about maintaining Japan's economy claim that there is a need for Japan to re-open the nuclear energy power plants that were shut down shortly after the March 11, 2011 nuclear accident at the Fukushima Dai'ichi nuclear power plant. On the other hand, there are critics of this policy line who advocate serious consideration of the development of safe, non-nuclear energy resources and who assert that expanding new sources of energy will provide tremendous benefits to the country in the future.

From a theoretical point of view, among the various policy fields that are intrinsic to creating national policies, energy policy is arguably the most important and is said to have a higher path dependency compared to other policy areas (Kuper and van Soest, 2003; OECD, 2012, Kikkawa, 2013). Determining energy policy, which is strongly connected to a nation's economic growth and political stability, requires inputs from multiple actors, identifying current energy needs, and forecasting future requirements. Yet, despite the possibilities for fluid and abrupt change owing to extenuating circumstances, actor roles, such as those played by interest groups, are firmly formed, making it unlikely that institutional change can be implemented (Hartwig et al., 2015).

In resource-challenged Japan, energy policy is an especially critical policy area for the Japanese government. In comparing energy policy creation in Japan and Germany, where the accident at the Fukushima Dai'ichi nuclear power plant had a major impact on energy policy, the range of actors in Japan's policy community is relatively stable (Hartwig et al., 2015). Furthermore, the Japanese government's approach to energy policy has shifted incrementally in the past half century, with the most recent being the 2012 implementation of the "Feed-In Tariff Law" (Act on Special Measures Concerning Procurement of Renewable Electric Energy by Operators of Electric Utilities), which encourages new investment in renewable electricity generation and promotes the use of renewable energy. Yet, who were the actors involved and the factors that influenced the establishment of this new law?

This study attempts to assess the factors associated with implementing the law as well as the roles of the relevant major actors. In answering this question, we focus on identifying the policy networks among government, political parties, and interest groups, which suggests that success in persuading key economic groups could be a factor in promoting the law.

Background of renewable energy in Japan

Legal framework promoting renewable energy in Japan

Japan's energy policy is regulated under the Basic Act on Energy Policy (promulgated in June 2002) that was enacted in order to ensure basic policy for energy resource utilization, and each energy resource, including nuclear energy and renewable energy, is regulated under this law.

In addition, utilization of renewable energy resources is regulated under "Sophisticated Methods of Energy Supply Structures" which aims at promoting the use of the renewable energy resources by energy supply companies. Renewable energy includes non-fossil energies that can be used sustainably (Article 2.3). More specifically, solar energy, wind power energy, low-head hydro power, geothermal energy, aerothermal energy, earth thermal energy, and other types of renewable energy resources are included under this law (Decree Article 4).

New energy types that refer to one of the renewable energy resources are regulated under the "Law Concerning Special Measures to Promote the Use of New Energy (New Energy Law)" which aims at promoting the use of new energy resources that are comparably not as widespread. Due to their relative novelty and development costs, it is disadvantageous for energy companies to invest heavily in these resources at this time because of the high costs in supplying such resources initially borne by energy supply companies. More specifically, such new energy resources defined under this law include solar energy, wind power energy, solar thermal application, temperature difference energy, waste power energy and biomass energy.

Historical Background

Figures 1 and 2 show shifts in domestic demand for primary energy supply in Japan. As Figure 2 shows, fossil energy resources, such as crude oil, coal and natural gas, have been used traditionally as the main energy resources in Japan. For example, crude oil, coal and natural gas provided 92.1% of Japan's primary energy supply during 2012. On the other hand, renewable energy, such as hydro power and geothermal energy, make up a smaller portion of Japan's energy supply (7.2% of primary energy supply in 2012). As shown, nuclear energy provided only 0.7%, and this low figure is due to the suspension of almost all nuclear energy generating plants after the Fukushima Dai'ichi incident in March 2011. However, prior to suspending operations in the plants, nuclear power provided approximately 10% of Japan's primary energy supply from the end of the 1980s to 2010. In other words, Japan's energy supply structure has been composed mainly of fossil-fuel energy sources, and nuclear energy and renewable energy have been used as a secondary resource base to accommodate any shifts in primary energy supply for domestic demand.

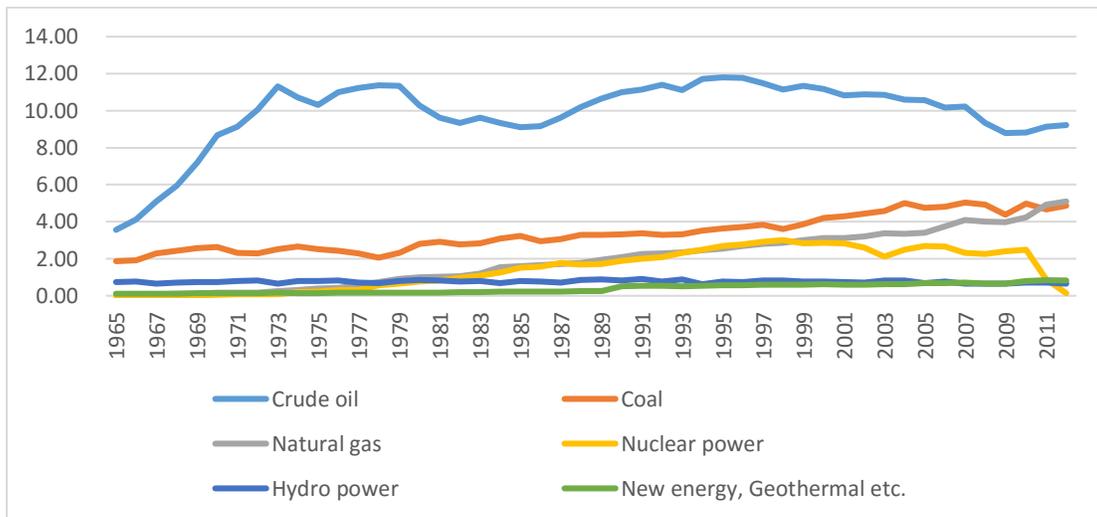


Figure 1: Resource shifts in Japan's domestic energy supply, 1965 to 2011 (Unit: 1018J)
 Source: Ministry of Economy, Trade and Industry (Ed.) (2014). *The Cabinet Approved the 2014 Annual Report on Energy (Japan's Energy White Paper 2014)*, Figure 211-3-1
 (<http://www.enecho.meti.go.jp/about/whitepaper/2014html/2-1-1.html>). (Access Date: 2015/09/24)

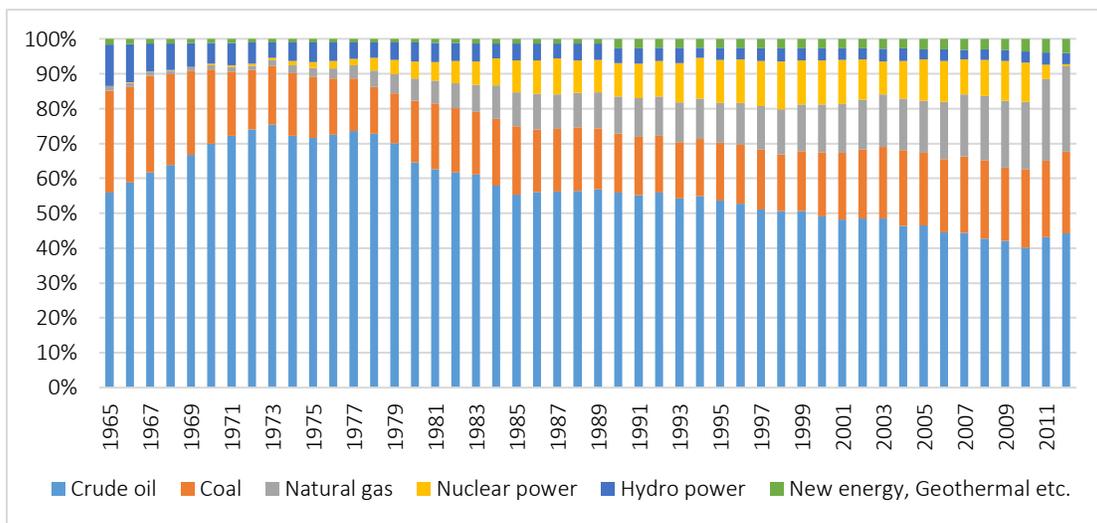


Figure 2: Composition shifts in Japan's domestic energy supply (Unit: %)
 Source: Ministry of Economy, Trade and Industry (Ed.) (2014). *The Cabinet Approved the 2014 Annual Report on Energy (Japan's Energy White Paper 2014)*, Figure 211-3-1
 (<http://www.enecho.meti.go.jp/about/whitepaper/2014html/2-1-1.html>). (Access Date: 2015/09/24)

As shown in Figure 2, since 2011, Japan's reliance on nuclear energy has decreased dramatically (owing to the government's decision to shut down almost all of the country's nuclear power plants in the wake of the Fukushima Dai'ichi incident. As of the summer of 2015, there was only one nuclear plant operating in Japan.

Literature Review: Determinants of Japan's Energy Policies

What kind of factors affect political decisions regarding Japan's energy policy? In general, energy supply system has not changed dramatically. One reason may be because energy policy is known to have a higher path dependency among policy fields (Berkhout 2002; Kuper and van Soest, 2003; Okumura, 2007; OECD, 2012; Kikkawa, 2013) and is a critical component of the infrastructure development undertaken in the early stages of nation building. Actor roles, such as those played by interest groups, are firmly formed, making it unlikely that institutional change can be implemented. Okumura Norihiko suggests that new global energy strategies and modeling based on the path dependency and lock-in (Okumura, 2007) may provide some clues as to how energy policy shifts occur. The OECD's Green Growth Studies analysis reports that the energy sector posed a particular challenge in the context of green growth due to its size, complexity and path dependency (OECD, 2012: 5).

Regarding Japan's energy policy, the features of post-war policy organization in Japan include principles of a shared management system, preliminary policy reviews by the ruling political party (coalition leader), and a dual system of government administration involving the bureaucracy and the political party in power. Among those features, mutually autonomous organization of the ministries form the core of what Morita (2000, 103) refers to as the *shōchōkyōdōtai* (ministerial consortium) composed of the bureaucracy, elected politicians who are aligned with specific policy groups, and for-profit organizations. Able to circumvent the cabinet, this ministerial consortium has exerted a major influence on policy-making. Within this system, in particular, Morita (2000, 106) notes that "in the case where a new issue is discovered that lies outside existing issue areas, a 'turf war' develops which multiplies the adverse effects." Global environmental policy is precisely such an issue. The ministerial consortium charged with the objective of protecting the environment finds itself in the position wherein it must promote measures that conflict with its influential counterpart composed of industry groups, lawmakers, and business administrators. This leads to environmental policy becoming a policy area that is polarized between two ministerial consortia. As a result, a conflict structure composed of proponents and opponents with competing measures is formed (Kubo, 2012: 135).

Kubo Haruka investigated the influence of political restructuring and government reorganization since the 1990s on environmental policy in general with particular attention to measures concerning global warming. Identifying five factors, including relationships among main actors concerning policy formation, adjustment area and stages, the scope of the policy area, the relationship between the measures that involve the policy, and policy direction, Kubo examined the presence or absence of policy transformation and analyzed the content of such transformation. Kubo found that there was an observed transformation in the latter half of the 2000s. Along with expansions of the range of the Cabinet Secretariat's planning functions, there was also change in how inter-ministerial adjustments were conducted through an increase in joint committee meetings and joint administration projects. Furthermore, transformation was also propelled by the expanding political power of environmental NGOs (non-government organizations) and a change in consciousness within the Ministry of the Environment. The overall result was a relative reduction in inter-ministry conflict. As such, these identified elements led to what could be perceived as a change in policy output (Kubo, 2012).

In addition, using ozone depletion treaties as a case study, Kubo also explored how obligations imposed by international treaties were being fulfilled domestically and analyzed the national implementation framework and process. Kubo's results showed that through the activation of cross-border activities of companies and environmental NGOs, each organization's international network contributed to resolving issues. Furthermore, she identified coalesced policy areas occupied by the public and private sectors, as well as international and domestic policy areas.

There has also been research investigating Japan's energy policy from international perspectives. Watanabe Rie analyzed the political process of climate change and energy policies in Japan and Germany, and suggests that international progress on the climate change laws and international debate progress on climate change have been the major factors in determining Japan's climate and energy policies. She does not suggest that progress has been made in altering Japan's energy policy. The Liberal Democratic Party of Japan (LDP) has been dominant in Japan's political system from 1955 to 2009 and, as a result, political opportunities to make fundamental changes in energy policy have been relatively closed (Watanabe, 2011). In resource-challenged Japan, energy policy is an especially critical policy area for the Japanese government. Compared to other countries such as Germany where the policy community is more dynamic, Japan's policy community is relatively stable, and it is improbable that institutional change can occur (Hartwig et al., 2015).

Framework and Methodology

Framework

We assume that direct and indirect connections between industrial and environmental sectors enhance environmental policy-making processes. Gesine Foljanty-Jost suggests that the German policy-making network in 1990s was more tightly integrated than its Japanese counterpart (Foljanty-Jost 2005). She indicates that NGOs in Japan lacked personnel resources and are not located in influential positions in the network. In this paper, we use data from the "Global Environmental Policy Network Survey (GEPON2)."⁵ In order to target our analysis, we focus on the integration of the feed-in tariff policy-making process.

The other perspective in our analysis is flexibility within the policy network. As noted above, the Japanese renewable energy policy-making network is considered to be relatively stable and stationary. In order to assess if acquiring flexibility might be associated with the enactment of the feed-in tariff law, we analyze different types of networks to investigate differences between policy communities and issue networks.

⁵ The "Global Environmental Policy Network Survey II" (GEPON2), directed by Professor Yutaka Tsujinaka of the University of Tsukuba, was conducted between December 2012 and June 2013. The respondent rate was 62.2% (target population of 172 organizations, responses gained from 107 organizations including political parties, the government, interest groups, and civil society organizations).

Methodology

We calculated the centrality measures, drew the feed-in tariff policy-making networks, and set organization-level and sector-level units as vertices. The organization-level units are organizations regarded as major actors in global environmental policy. The edges represent daily communication or lobbying activities between them. The sector-level units are categories based on legal status and activity. We attach more weight to betweenness than degree centrality in order to clarify which actors contribute to integration.

We drew the networks according to the following manner. The sizes of the vertices is proportional to the square root of betweenness centrality. Each edge is weighted by the number of linking organizations when we deal with sector-level networks. And vertices are positioned by the Fruchterman-Reingold algorithm.

First, we identified the network that relates to “information” as the “information network” and similarly identified “human and material support” network as the “support network.” These networks describe the daily exchanges related to climate change and energy policy in general and are best understood to be universal networks that do not focus on a particular policy. By comparing the two networks, we can measure their flexibility. If the two networks vary considerably, we expect that the FIT (feed-in-tariff) policy-making network will be similar to the issue network that can change in response to a particular policy (Hecllo, 1978; Smith, 1991). In contrast, the results that do not vary significantly suggest that the FIT network maintains a fundamentally stable formation similar to the political community.

Data sources⁶

As noted above, our data source is the GEPON2 Survey. Table 1 shows the proportions of the target population and response rates received between December 2012 and June 2013. The target population for the survey was determined as follows. Within the survey, “organizations that influence policies regarding global warming” were positioned as the target population for the survey. Thus, the survey was not conducted via random sampling, but rather, used multiple references to identify the organizations that were considered to be influential. After this identification process, these organizations were used as the target population for the survey. Table 2 shows the five main categorizations of organizations.

Table 1: GEPON2 Target population and response rates

Organization type	Target population (N)	Responses (N)	Response rate (%)
Governmental office	23	17	73.9
Independent administrative corporation/special corporation under civil law	9	8	88.9

⁶ For further details regarding the GEPON 2 Survey, refer to Kobashi & Tsujinaka (2014).

Party-affiliated/multi-party Diet members	7	6	85.7
Economic/industrial organization	19	15	78.9
Public company/business corporation	41	21	51.2
Environmental NGO	19	12	63.2
Incorporated foundation	30	15	50.0
Mass media	13	6	46.2
Other private organization	11	7	63.6
Total	172	107	62.2 (avg.)

Table 2: Indicators used to verify survey targets

Category	Index
A. Actors, government agencies, or scholars participating in national and international policy formation (83 organizations)	Participants in both COP15 ⁷ and COP17 ⁸ , participants in Ministry of the Environment (MOE) commission meetings as well as parliamentary hearings of related bills, representatives from the top five parties in terms of legislative seats of the House of Representatives.
B. Actors involved in implementing national policies for the reduction of industrial greenhouse gas emissions (26 organizations).	High-ranked greenhouse-gas-emission-producing organizations according to governmental documents, major domestic companies with business plans involving renewable energy according to news reports in the <i>Asahi</i> newspaper and the <i>Nihon Keizai</i> newspaper.
C. Actors, NGOs and mass media participating indirectly in policies aimed at reducing greenhouse gas emissions (29 organizations)	NGOs with resources and interest in global warming, mass media organizations.

⁷ 15th Conference of the Parties (COP 15) to the United Nations Framework Convention on Climate Change (UNFCCC) held in 2009.

⁸ 17th Conference of the Parties (COP 17) of the UNFCCC.

D. Actors considered to be important as identified by global warming policy specialists in 1997 (87 organizations)	Organizations that responded to the first GEPON survey conducted in 1997.
E. Other (12 organizations)	Researchers' judgement.

We used the following questions for our analysis.

Policy community 1: Information network

Responses to the following two questions in the GEPON 2 Survey were used to map the information network.

Question 7: With regards to policy responses to climate change, who does your organization give information to? (Multiple answers)

Question 8: With regards to policy responses to climate change, from whom does your organization obtain information? (Multiple answers)

Policy community 2: Support network

Responses to the following two questions in the GEPON 2 Survey were used to map the support network.

Question 9: With regards to policy responses to climate change, to whom does your organization give personnel and physical support (not information)? (Multiple answers)

Question 10: With regards to policy responses to climate change, from whom does your organization obtain personnel and physical support (not information)? (Multiple answers)

Issue network

Question 35 in the GEPON 2 Survey asked respondent organizations to indicate with whom they work with regarding the FIT Law (multiple responses were allowed) from the organizations listed in Table 3.

Table 3: Actors involved in the FIT Law

Actor	Actor
A. Prime Minister's Office and/or Cabinet Secretariat	K. Electricity and/or gas industry
B. Democratic Party of Japan (DPJ)	L. Renewable energy industry
C. Liberal Democratic Party of Japan (LDP)	M. Transportation industry
D. Related factions within political parties and/or parliamentary coalition	N. Trading companies

E. Ministry of the Environment and/or its related organizations	O. International NGOs (including their domestic branches within Japan)
F. Ministry of Economy, Trade, and Industry and/or its related organizations	P. Domestic environmental NGOs and/or NPOs, as well as citizens' groups
G. Japan Business Federation	Q. Mass media
H. Japan Association of Corporate Executives	R. International organizations
I. Japan Chamber of Commerce and Industry	S. Foreign governments
J. Manufacturing industry	T. Domestic public opinion

Attitude network

Responses to the following two questions in the GEAPON 2 Survey were used to map attitudes toward the FIT Law.

Question 33: Within the 2011 FIT Law, promotion of the use of renewable energy resources by the government and increasing power rate were crucial issues. What was your organization's attitude towards these issues?

- (a) Did you agree with the government's promotion of the use of renewable energy resources? (Response choices: Agree, somewhat agree, somewhat disagree, disagree, or not interested.)
- (b) Did you acknowledge the increases in consumer power rates associated with the promotion of the use of renewable energy resources? (Response choices: Could acknowledge, acknowledge to a certain extent, did not acknowledge to a certain extent, did not acknowledge, or not interested.)

Two different organizational categories were used for this analysis. We used the category of Question 35 to analyze the data with regards to Question 35, and used (a) the legal status and (b) the category based on the activities with regards to other questions.

Results⁹

As mentioned above, we describe policy community from information network and support network, and compare it with issue network with regards to Japan's FIT Law. In addition, we use the "group category" such as National NGO, global NGO, parties, METI and so on to analyze Figure 3, Figure 6 and Figure 9 while we analyze the institution itself to make Figure 4, Figure 5, Figure 7 and Figure 8.

⁹ The basic statistics are shown in the Appendix.

Information network

First, we drew the information network from the responses to Question 7 (identifying information recipient organization) and Question 8 (identifying information provision organization).

Figure 3 shows the information network that we drew from responses to these two questions. Situated in the center of Japan's information network are the Ministry of Economy, Trade, and Industry (METI), and national NGOs, while economic and industrial organizations (including trade organizations, economic organizations, energy organizations, and manufacturing organizations) and political parties stand at the periphery. Composed of other actors, such as MOE and media, their presence lies between the center and the periphery. We confirmed a strong tie between METI and the national NGOs from Figure 3 as well.

Figures 4 and 5 show the information networks that we drew from the questions above. The colors show the four classifications that were formed on the basis of attitudes towards Japan's FIT Law: Blue denotes agreement with FIT group, red denotes disagreement with FIT group, yellow denotes the ministries, and gray denotes "no answer".

Situated in the center of Japan's information network are the ministries and the group that agrees with the FIT Law, while those that disagree with the FIT Law are located at the periphery. In other words, we confirmed that there was fundamental agreement with regards to the FIT Law between the actors who are situated at the center of the information network such as ministries and the "agreement" groups.

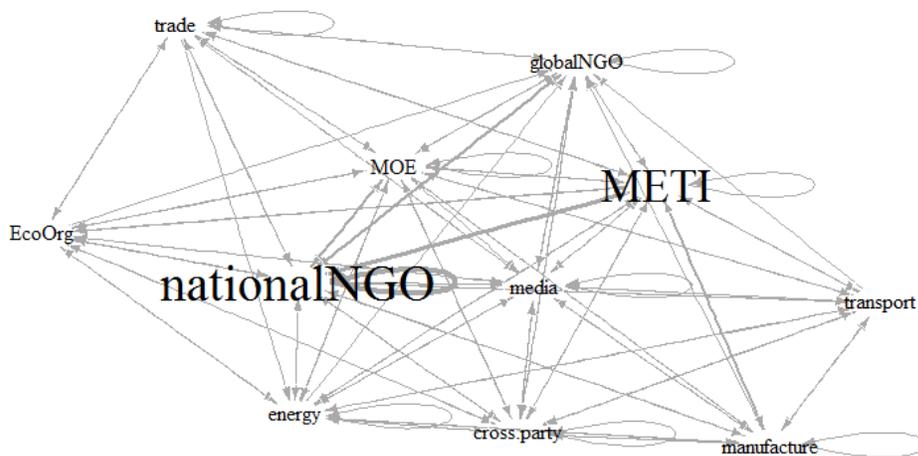


Figure 3: Information exchange (Q7 and 8)

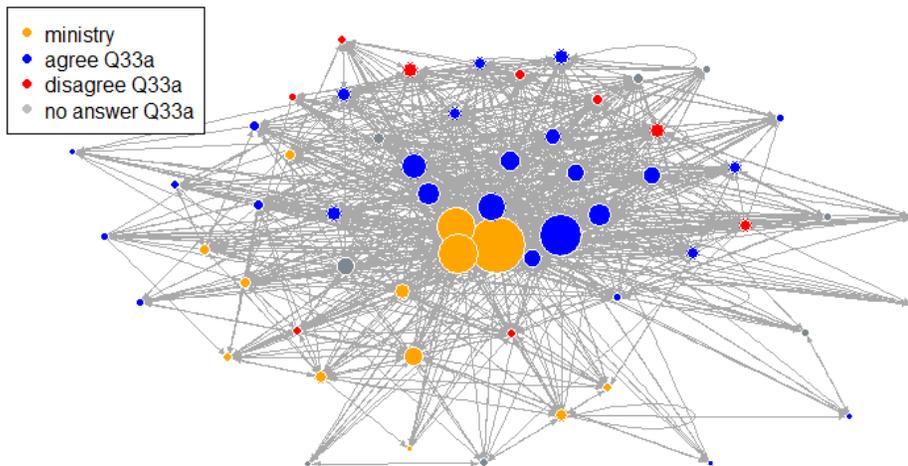


Figure. 4: Information and attitude network (Q7, 8, Q33a)

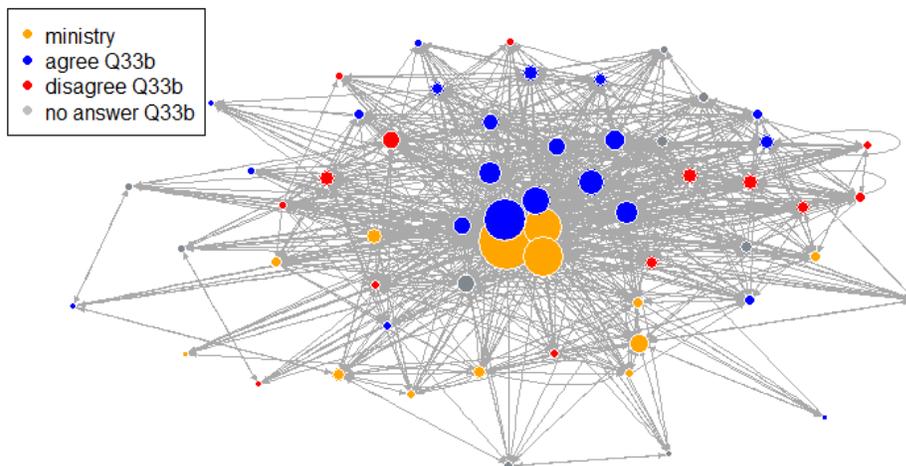


Figure 5: Information and attitude network (Q7, 8, Q33b)

Support network¹⁰

Turning to the policy community support network, we drew the network from the following two questions:

Question 9: With regards to policy responses to climate change, to whom does your organization give personnel and physical support (not information)? (Multiple answers)

Question 10: With regards to policy responses to climate change, from whom does your

¹⁰ The data for the support network includes missing values, and we acknowledge that could provide bias to our result.

organization obtain personnel and physical support (not information)? (Multiple answers)

Figure 6 shows the support network that we drew from the responses to these two questions. Situated in the center of Japan's support network are METI and national NGOs, and trade organizations are relatively centered as well. However, the economic and industrial organizations, such as economic organizations, energy organizations and manufacturing organization, political parties, and MOE stand at the periphery. We confirmed a strong tie between METI and the national NGOs from Figure 7 as well.

Figures 7 and 8 show the support network that we drew from the questions above. The "agreement" groups were positioned at the center of Japan's support network, while the "disagreement" groups and ministries lie at the periphery. However, the tie between the "agreement" groups and the "disagreement" groups exists, and they are not separated completely.

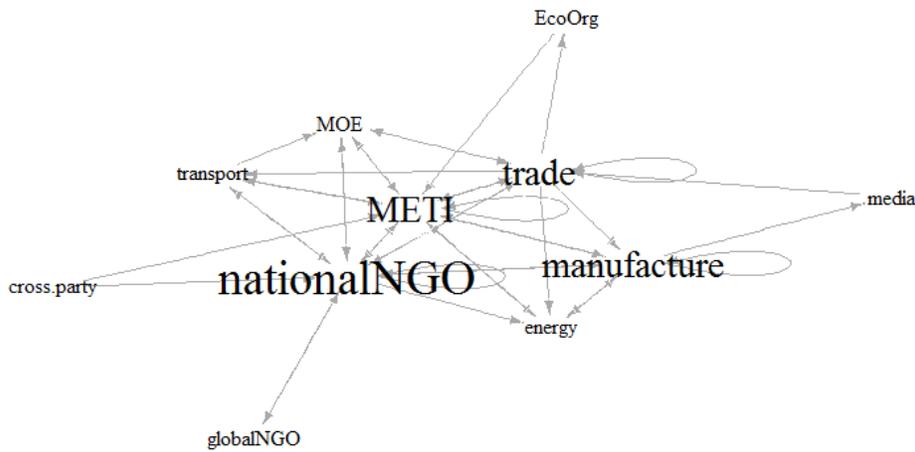


Figure 6: Support network (Q9, 10, Q35)

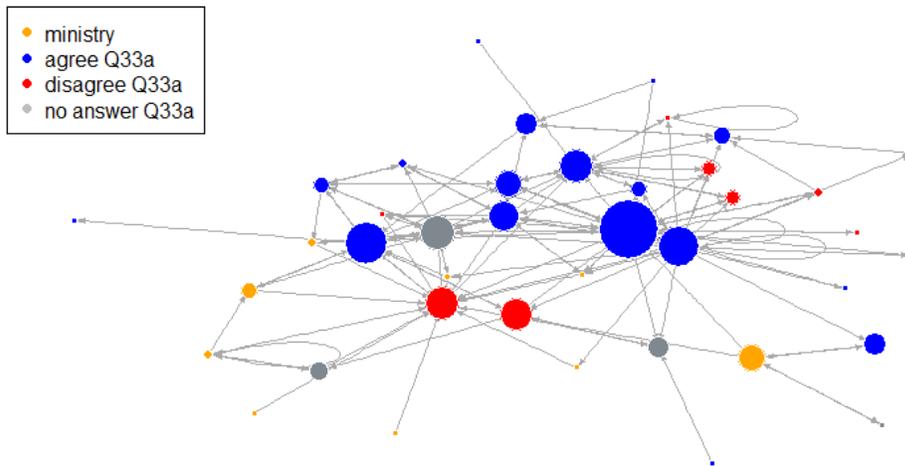


Figure 7: Support network (Q9, 10, Q33a)

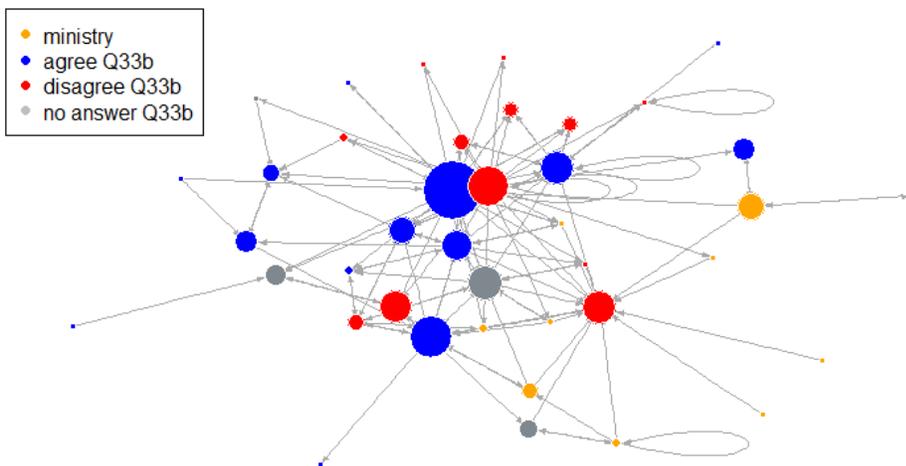


Figure 8: Support network (Q9, 10, Q33b)

FIT network

Turning to Japan’s issue network with regards to FIT Law, we drew the network using the following question: Q35. With whom does your organization work regarding the FIT law? (Multiple answers)

Figure 9 represents the issue network that we drew from the question above. Situated in the center of Japan’s issue network are METI and MOE, and the national NGOs and global NGOs lies near these ministries, while the economic and industrial organizations, such as manufacturing organizations, economic organizations, trade organizations, transport organizations and energy organizations, stands at the periphery.

Our network mapping in Figure 9 indicates that the issue network shows a tie between METI and national NGOs and global NGOs, and a tie between MOE and the economic organizations and manufacturing organizations. In other words, we were able to confirm a relatively firm tie between the economic and industrial groups and the environmental groups, and they are not separated completely.

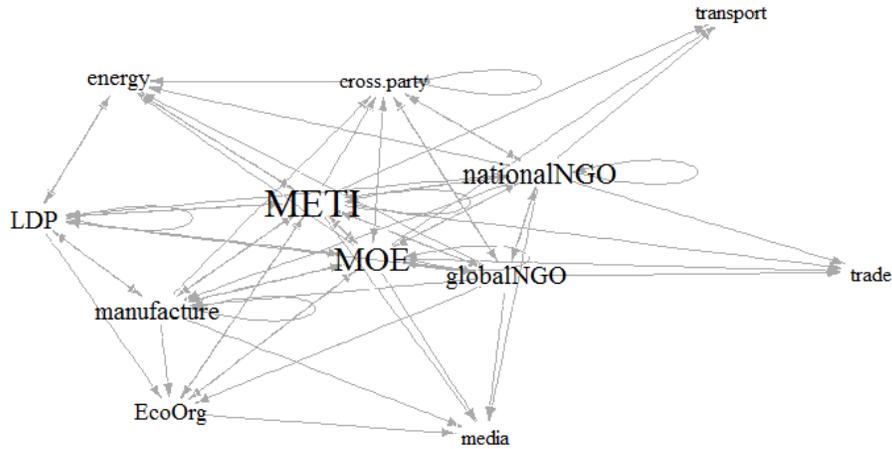


Figure 9: Issue network (Q35)

Comparison

As noted earlier, by comparing the information networks, support networks, and the FIT policy-making network, we can measure their flexibility. If the two networks vary considerably, we expect that the FIT policy-making network will change in response to a particular policy (Hecklo, 1978; Smith, 1991). In contrast, as there is not a significant variance, our results suggest that the FIT network maintains a fundamentally stable formation similar to the political community.

Based on the information network and support network, METI and the national NGOs are at the center of the network, while economic and industrial organizations are at the periphery. Moreover, the actors at the center of the network agree with the FIT law, while cautious actors are at the periphery. However, the two different groups are not separated completely and there are ties between METI and the national NGOs, as well as between MOE and the economic and industrial organizations.

On the other hand, based on the FIT network, METI and MOE are at the center of the network and the national NGOs and global NGOs are clustered around them. The economic and industrial organizations are farther away at the periphery. Here as well, there are the ties between METI and NGOs, as well as between MOE and the economic and industrial organizations.

By comparing two networks, we can confirm the FIT policy-making network is similar to the information network and support networks that describe the daily exchanges related to

climate change and energy policy in general in terms of the following two points. First, the network structures are likely to be similar; METI and MOE are at the center of the network, and the national and global NGOs are around them, and the economic and industrial organizations are more at the periphery. Second, there are the ties between METI and the NGOs, as well as between MOE and the economic and industrial organizations, and they are not separated completely. These results allow us to suggest that the FIT network maintains a fundamentally stable formation similar to the political community.

These policy network structures could explain that the reason why the FIT Law was enacted. The FIT policy-making network is similar to the information network and support network, demonstrating firmness and stability. Moreover, the political actors at the center of the network are in agreement with the FIT Law. That suggests that political agreement between actors has been built gradually through primary political adjustments such as councils. As a whole, the FIT Law has been an enduring political issue during the short-lived DPJ administration (2009 to 2012) and the resurgence of the LDP government in the general election of December 2012. This connection to political processes and policy formation could explain how the FIT Law came to be enacted after March 2011.

Table 4: Comparison

	Information network	FIT network
The center	METI and national NGOs	METI and MOE
The middle	—	National & global NGOs
The periphery	Economic and industrial organizations	Economic and industrial organizations
Attitude toward the FIT	Actors in the center of the network agree with FIT	—
Other features	Ties between METI & NGOs, and between MOE & economic and industrial organizations	Ties between METI & NGOs, and between MOE & economic and industrial organizations

Conclusion and future directions

As mentioned above, energy policy fields are said to maintain a higher path dependency. However, despite of this fundamental policy feature, the FIT Law was enacted in 2011 in Japan. This study attempted to assess the factors associated with implementing the FIT Law as well as the roles of the relevant major actors. More concretely, through this comparison, we discovered that the FIT policy-making network is similar to the information and support networks that describe the daily exchanges related to climate change and energy policy. We were also able to measure flexibility. As a result, we can confirm the fact that the network structures are likely to be similar and that there are the ties between METI and the NGOs, as well as between the MOE and the economic and industrial organizations. That the results do not vary significantly suggests that the FIT network maintains a fundamentally stable formation similar to the political community.

These results could explain that the reason why the FIT Law was enacted. The FIT policy-making network maintains similar features—firmness and stability—to those of political communities. Moreover, the political actors at the center of the network are in agreement with the FIT Law. This result suggests that political agreement between actors has gradually been built through primary political adjustments such as the councils. In the past five years, the FIT Law has been a political issue from its inception to its enactment after March 2011.

The strength of our research lays in our focus on political networks and their contributing mechanism to the law's implementation through analysis of the political process. From an academic perspective, identifying the key actors and factors may be significant in explaining institutional change in policy areas with high path dependency.

In the future, we will continue this line of inquiry with regards to other policy initiatives involving the energy sector, including the deregulation of electricity companies (which is set to come into force within the next three years in Japan). By assessing the policy networks for individual issues and comparing them over time, we believe that we can reveal new dimensions in political relationships and policy formation. While this research has focused on close examination of the FIT Law, the wider implications suggest a framework for assessing how societies can promote renewable and sustainable energy resources.

References

- Berkhout, F. (2002). Technological regimes, path dependency and the environment. *Global Environmental Change*, 12, 1-4.
- Foljanty-Jost, G. (2005). NGOs in environmental networks in Germany and Japan: The question of power and influence. *Social Science Japan Journal*, 8(1), 103-117.
- Gerard, K., & van Soest, D. P. (2003). Path-dependency and input substitution: implications for energy policy modeling. *Energy Economics*, 25, 397-4-7.
- Hartwig Manuela, Kobashi Yohei, Okura Sae, & Tkach-Kawasaki Leslie. (2015). Energy Policy Participation through Networks Transcending Cleavage: an Analysis of Japanese and German Renewable Energy Promotion Policies. *Quality and Quantity*, 49(4), 1485-1512.
- Hecl, H. (1978). Issue Networks and the Executive Establishment. In A. King (Ed.), *The New American Political System*. Washington, DC: AEI (pp. 87-124).
- Kikkawa, T. (2013). *Japan's Energy Problems* (Nihon no enerugī mondai). Japan: NTT Publishing.
- Kobashi, Y., & Tsujinaka, Y. (2014). "The Aim and Abstract of the Survey (Chōsa no neraito jissai gaiyō)". In *Global Environmental Policy Network Survey, 2 (GEAPON 2): An Interim Report*. Ibaraki, Japan: The University of Tsukuba (pp. 3-17).
- Kubo, H. (2005). "Domestic Policy implementation and Process for Treaty for the Protection of the Ozone Layer: Evidence from Activities of Domestic Companies (Ozon sō hogo jōyaku no kokunai jissai taisei to katei: Kokunai jijōsha no torikumi ni shōten wo atete)". In Shiroshima H. and Yamamoto R. (eds). *Dissolving Borders, Transcending Law 5*

- Environment and Life (Tokeru sakai koeru hou 5 kankyō to seimei)*: University of Tokyo Press (pp.233-273).
- Kubo, H. (2012). “Global Environmental Policy: Shifts in Climate Change Policy and Realignment of Politics and Ministries (Chikyū kankyō seisaku: Ondanka taisaku no henyō to seikai saihei shōchō saihei)”. In Morita, A. and Kanai, T (eds). *Shifts in Policies and Institutional Design: The administration around Realignment of Politics and Ministries (Seisaku henyō to seido sekkei: seikai shōchō saihei zengo no gyōsei: Mineruva shōbo* (pp.133-178).
- Morita, A. (2000). *Administration in Modern Japan (Gendai no gyōsei)*: The Open University of Japan.
- OECD. (2012). OECD Green Growth Studies: Energy. OECD Publishing. Retrieved from <http://www.oecdilibrary.org/docserver/download/9711081e.pdf?expires=1445176133&id=id&accname=ocid74023650&checksum=C6CB1372EB9CA0936281C3252631C4E4>
- Okumura, N. (2007). Path dependency, lock-in and the economy of global energy strategies (*Keiro izon, rokku in to gurōbaru enerugī senryaku*). *Energy Economics*, 33(2), 33-39.
- Smith, M. J. (1991). From Policy Community to Issue Network: Salmonella in Eggs and the Politics of Food. *Public Administration* (Vol. 69, pp. 235-255).
- Watanabe, R. (2011). *Climate Policy Changes in Germany and Japan: A Path to Paradigmatic Policy Change*. Oxford: Routledge.

Appendix

Appendix Table 1: Network Characteristics

	Information network	Support network	Information (group)	Support (group)	Q35 (group)
Density	0.324	0.090	0.780	0.311	0.515
Transitivity	0.567	0.266	0.920	0.574	0.726
Reciprocity	0.724	0.529	0.936	0.703	0.581
N	59	40	12	12	12

Appendix Table 2: Means of Centrality Measures (Information Network)

Category	In-degree	Betweenness	PageRank	N
Ministry	20.385	94.353	0.017	13
Govt. related	22.333	76.472	0.018	6
Party	35.500	59.595	0.034	2
Cross-party	14.000	9.553	0.014	1
Company	11.857	3.070	0.010	7
Economic	16.000	18.239	0.016	2
Industrial	15.000	8.300	0.013	10
Media	37.000	73.218	0.034	2
NGO	23.286	15.896	0.022	7
Foundation	13.833	15.366	0.014	6
Other	13.667	6.654	0.015	3
Total	18.814	39.407	0.017	59

Appendix Table 3: Means of Centrality Measures (Support Network)

Category	In-degree	Betweenness	PageRank	N
Ministry	1.556	15.162	0.010	9
Govt. related	9.250	251.651	0.051	4
Party	0.000	0.000	0.004	1
Company	6.000	125.896	0.030	5
Economic	1.000	0.000	0.004	2
Industrial	2.286	33.452	0.023	7
Media	2.000	38.000	0.013	1
NGO	4.750	67.721	0.052	4
Foundation	3.000	79.093	0.024	5
Other	3.000	18.475	0.021	2
Total	3.525	68.700	0.025	40

Appendix Table 4: Centrality Measures (Group Level Information Network)

Category	In-degree	Betweenness	PageRank
LDP	0	0.000	0.013
Cross-party	10	0.000	0.117
MOE	10	0.000	0.109
METI	11	35.500	0.077
Economic Org.	7	0.000	0.113
Manufacturer	8	0.000	0.046
Energy	10	0.000	0.098
Transport	7	0.000	0.094
Trade	7	0.000	0.080
Global NGO	11	0.000	0.113
National NGO	11	51.500	0.048
Media	11	0.000	0.090

Appendix Table 5: Centrality Measures (Group Level Support Network)

Category	In-degree	Betweenness	PageRank
Cross-party	0	0.000	0.014
MOE	4	0.000	0.110
METI	9	14.500	0.250
Economic Org.	1	0.000	0.032
Manufacturer	5	17.000	0.116
Energy	4	0.000	0.100
Transport	3	0.000	0.095
Trade	5	16.000	0.130
Global NGO	1	0.000	0.020
National NGO	8	44.500	0.092
Media	1	0.000	0.041

Appendix Table 6: Centrality Measures (Q35)

Category	In-degree	Betweenness	PageRank
LDP	7	1.500	0.119
Cross-party	6	0.000	0.070
MOE	8	10.167	0.108
METI	8	18.750	0.134
Economic Org.	5	0.250	0.082
Manufacturer	6	1.250	0.082
Energy	6	0.250	0.086
Transport	3	0.000	0.052
Trade	4	0.000	0.057
Global NGO	4	1.417	0.058
National NGO	5	3.417	0.063
Media	6	0.000	0.088