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ENERGY MARKET LIBERALIZATION FOR UNLOCKING COMMUNITY-BASED GREEN FINANCE

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Abstract

There are increasing expectations of community-based financing for local renewable projects in Japan and in France: In both France and Japan, it has been about 10–20 years since the power market has been open to competition, where France is ahead, having fully liberalized its market to households in 2007, compared with that of Japan in 2016.

With this as a background, a number of local governments are now able to establish power producer suppliers (PPS) to develop and supply renewable energy.

Local renewable projects of the PPS, if properly designed, can function as a mechanism to create circular financial flow, where profits associated with electricity sales and the associated financial benefits may stay in the communities to form a shared stock for residential benefits.

This paper illustrates cases in Japan and France, where both electricity markets were once centralized but are now open to new entrants, to identify if and how the projects have come about, and what the key factors are of creating community benefits. It also analyzes financial and credibility barriers through the case studies, to draw lessons for further community renewable development. The findings will help to understand the importance of community financial flow for community sustainability, and how the communities gained access to finance and investment.

Keywords: power producer and suppliers, community energy, renewable energy, value added, hometown investment trust funds

JEL Classification: Q20, H23, R51

Contents

1. INTRODUCTION

Renewable energy has been increasing its share in the energy markets under global political pressures related to climate change and resources depletion. While continued investment is required to further ensure the constant growth of renewables and achieve sustainable energy systems, energy markets reforms have a significant impact onto the renewable development.

Over the past few decades, a number of countries have started on a policy path of electricity market liberalization. The movement involves the key element of introducing competition in traditionally state-controlled and regulated sectors. There are various paths toward competitive electricity markets among different countries, where the effects of the process vary significantly in terms of economic and environmental benefits.

The French and Japanese energy markets, for example, experienced liberalization. In both France and Japan, power markets have been open to competition for the past 10–20 years. France is ahead, having fully liberalized the market to households in 2007, compared with that of Japan in 2016.

As is well known, there are similarities between France and Japan, as both countries have (or had) a strong nuclear dependency, with a relatively centralized regulatory control over the power companies. France is currently trying to decrease its nuclear share in electricity production, whereas in Japan, the Fukushima nuclear plant accidents in 2011 triggered most of the nuclear power plants to hold their operations. In both countries, the power companies are anxious to maintain nuclear energy in their portfolio and for it to continue to influence the national energy policy.

Nevertheless, there are also slight differences between France and Japan on the impact of power market reform in terms of unlocking community renewable development. This paper will first highlight how community renewable developments are taking shape in Japan against the background of the power market reform. It identifies what the financial benefits are that have been brought into communities through the establishment of a local power company. It then proceeds to analyze the French power reform to assess the degree of its influence over the community renewable development. This paper then discusses key elements for local green financing though similarities and differences between French and Japanese practices.

2. JAPANESE ELECTRICITY MARKET

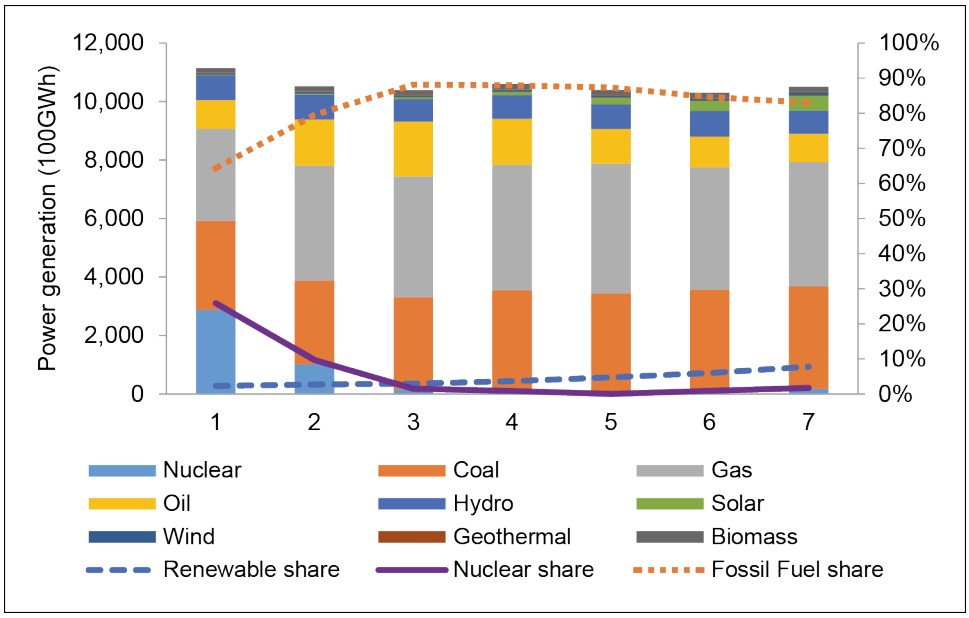
2.1 Market: Structure and Reorganization

Electricity market reform in Japan started during the 1990–2000, and further proceeded in 2016, when the market fully opened to allow households and small businesses to choose their electricity suppliers. With this as a background, a number of local governments established power producer suppliers (PPS), often with the cooperation with local stakeholders, to develop and supply renewable energy sources available to their community. The PPS renewable energy development is expected to play an important role both in economic and social integration: as is widely known, Japan is facing rapid aging and community decline problems, where local revenues from household and business taxes are declining, and the locally produced electricity often functions to enhance community financial income through sales of the electricity.

Japan is endowed with few indigenous fossil fuel reserves, which makes the country heavily reliant on imported energy sources. According to the International Energy Agency, the energy self-sufficiency rate of Japan was about 6% in 2014 (IEA 2015). Historically, the Japanese government has encouraged utilities to take up energy efficiency and diversification strategies, shifting from oil to LNG, nuclear and, to some extent, renewable energy, especially after the oil crisis (Suwa 2009).

Yet, as of 2015, the country still uses fossil fuels, which account for over 70% of the total power generation. The Great East Japan Earthquake on 11 March 2011 also became the backdrop for the high level of dependency on fossil fuel: after the catastrophic accidents in the Fukushima First Nuclear Plant, over 50 nuclear power plants, regardless of region in which they were located, were ordered to suspend their operations. The share of nuclear energy within the portfolio of utilities decreased, while LNG and coal power generation were taken to make up the electricity deficiency, forcing utilities to import fossil fuels (Figure 1). This led Japan to spend $250 billion on total fuel imports in 2012, a third of its total import expenditure (Taghizadeh-Hesary et al. 2017a).

Figure 1: Trends of Power Generation in Japan



Source: Agency for Natural Resources and Energy, figure created by the authors.

The March 2011 earthquake and nuclear meltdown thus revealed the vulnerabilities of the nation's power system. It had significant impacts on price elasticity of the energy fuels, especially on imported crude oil prices (Taghizadeh-Hesary et al. 2017b). The power shortage and the fragile market and infrastructure conditions that were experienced after the nationwide nuclear suspension led to the experts and the government recognizing the need to restructure the power market, where the debate over the legitimacy of the *laissez-faire* electricity market structure was stimulated, including questioning the ownership of the power infrastructure for production, transmission, distribution, and sales.

As a result, electricity market reform, which had originally started during 1990–2000 when the nation facilitated retail competition for high-voltage customers, further proceeded in April 2016. The market was fully opened to allow about 85 million households and small businesses to choose electricity suppliers for the first time. The retail market liberalization will be followed by thorough market reform programs. It is expected to separate electricity distribution functions from the utilities by 2020, by creating an independent transmission system operator that would oversee the nationwide power distribution (Takahashi 2011). Electricity utility companies, as a result, became concerned about their continuous dominance over the energy market, to the extent that they decided to diversify their business portfolio by, for example, entering into the gas market to compete with the existing big regional gas suppliers.

This reorganization, in theory, should develop a stable supply of electricity, lower rates, and more choices by creating spaces for diversified energy generation. It was expected to encourage non-utility entrance to the power production sector. At the moment of writing (December 2017), the liberalization process has a limited impact on the retail market, with less than 5% of customers having changed suppliers so far (OCCTO 2017). This may be as a result of Japanese customers' conservatism over the choice of suppliers, lack of information as to energy and sustainability issues, as well as the marginal financial and other benefits to the customers upon changing suppliers.

The liberalization of the energy retail market, nevertheless, certainly opened up a possibility for expanded parties to venture into power production. There are over 300 business entities that have started to supply electricity directly to customers. Many of them appeal to customers due to electricity price discounts, e.g., packaged concessions with telephone and mobile packet subscriptions. In contrast, there are some new entrants who are mindful of cooperative energy development models and are actively promoting decentralized, renewable electricity.

Among these new entrants, there are a number of local governments, groups, and businesses that have started to develop renewable electricity using resources available to their community. Community-based renewable electricity development is envisaged as being able to play an important role both in economic and social integration senses: as is widely known, Japan is facing rapid aging and community decline problems, which means that decreased income tax revenue is plausible, and there are increasing expectations that locally produced electricity will become a tool to gain financial income through the sales of the generated electricity via the national renewable support schemes. It would then create capital that can benefit the localities. The next section describes how the public renewable mechanisms have evolved in Japan, and how that has links with community energy development.

2.2 Renewable Policies: Renewable Portfolio Standard to Feed-in Tariff and the Community Energy Development

With scarce local fossil fuel reserves, renewable energy deployment has been, at least, on the Japanese government energy policy agenda for decades. After the oil crisis, a significant amount of the government budget was allocated to renewables research and development. The Japanese government initiated a series of projects to support renewable technologies. Its primary focus, however, was mainly on technology research and development, while less attention was paid to public policy to support and deploy the renewables (Suwa and Jupesta 2012).

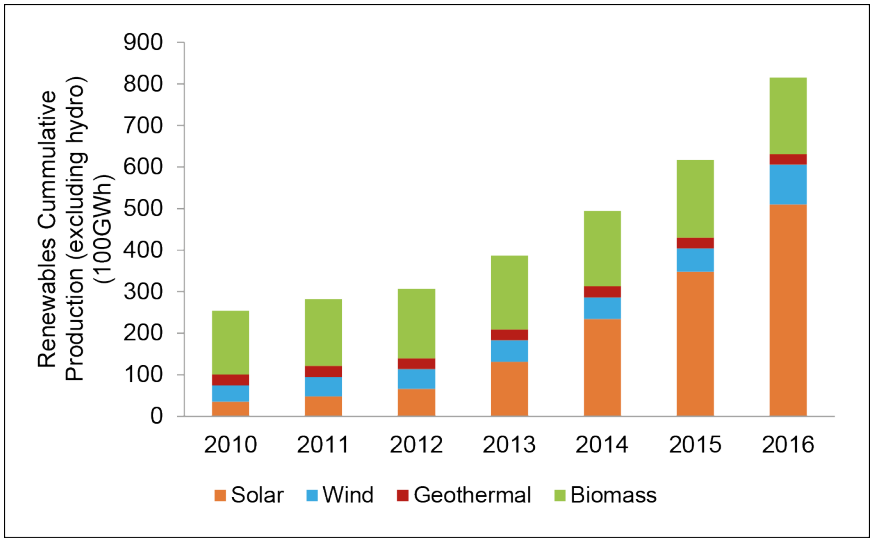
It was only after 1992, when "net-metering" was launched as a voluntary scheme by the electricity utilities, that the rate of deployment of certain renewable electricity from PV and wind gained momentum. Net-metering enables customers to use their own electric generation to offset their consumption over a billing period, where customers receive retail prices for the excess electricity they generate.

In 2003 the Japanese government enacted legislation based on the renewable portfolio standard (RPS) scheme, which requires electricity retailers to supply a certain amount of renewable electricity to grid consumers. The RPS legislation was to ensure market efficiency, as well as to increase renewable capacity. The effect of RPS, however, remained minimal, to the extent that it was overtaken by the nationwide feed-in-tariff (FIT), the new policy programs that have been internationally proven to be effective to bring larger interests into renewable energy production *(ibid.)*.

Official legislation of the Democrat cabinet led by the former Prime Minister Naoto Kan, FIT was put into effect in July 2012, which required electric utility companies to purchase electricity produced from renewable energy sources with a higher price than that of conventional fossil-fuel-based energy. It follows the conventional FIT system seen for example in the EU countries where the extra costs of the purchase were added onto the electricity bill. Tariffs are set for each renewable energy category, and are revised each year based on the degree of circulation and market conditions of each category.

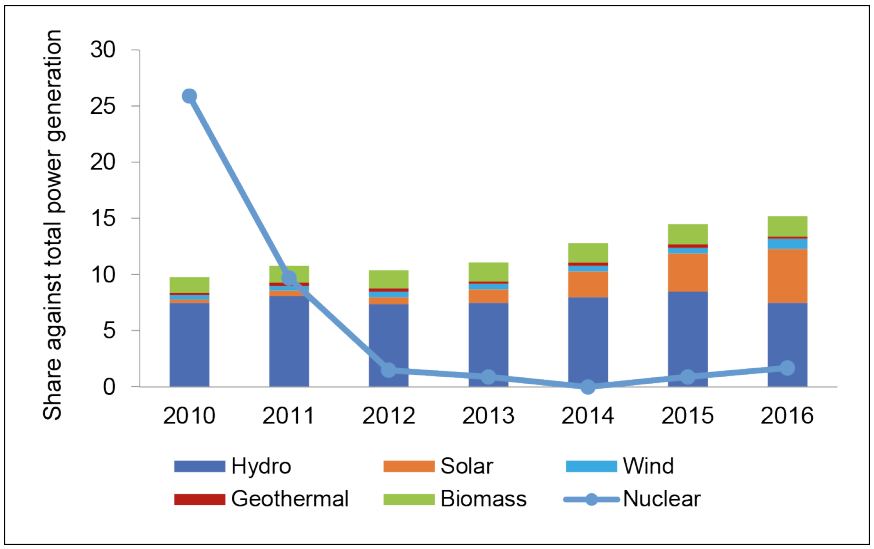
Indeed, the Japanese FIT accelerated renewable deployment in Japan, with PV, wind, SHP, and geothermal electricity, and increased their capacities (Figure 2). The capacity increase is significant for solar and wind, whereas the hydropower increase remains relatively modest (Figure 3). Compared with the last few decades, however, the pace of SHP has steadily increased.

Figure 2: Trends of Renewable Energy Capacity in Japan



Source: Agency for Natural Resources and Energy, Figure created by the authors.

Figure 3: Trends of Renewables and Nuclear Power Generation in Japan
(%)



Source: Agency for Natural Resources and Energy, figure created by the authors.

The increase of the renewable feed-in to the electric grid was enough to provoke discussion over ancillary control. Ancillary services are what maintain the proper flow and direction of electricity, address imbalances between supply and demand, and help the system recover after a power system event. The electric utilities claim that reliable operations of the grid may be disturbed by the intermittent power inputs from renewables. The utilities are keen to control the amount of renewable-generated electricity so as to keep it within their preferred range.

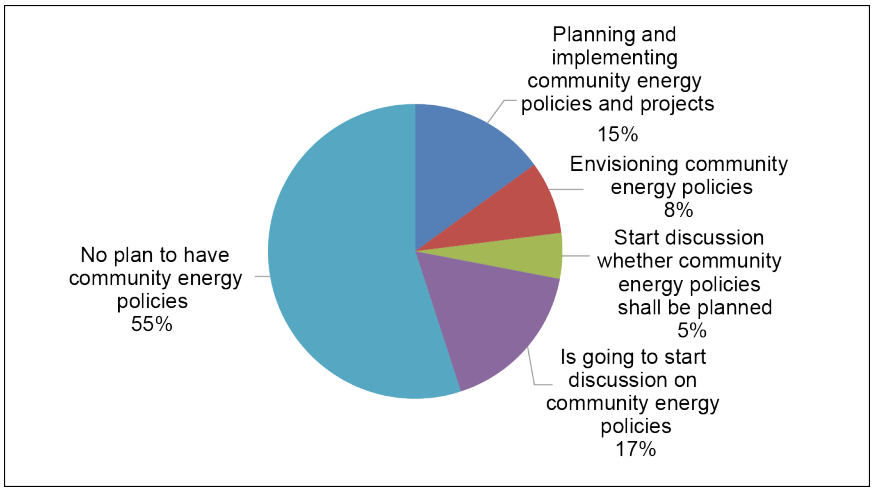
This argument has created uncertainty regarding investments in renewables, with the market cautiously observing whether and how the FIT tariffs will change, especially PV. Nevertheless, FIT, as the main renewable policy mechanism, continues to have a large influence over the renewable development, as it has direct links with their profitability.

2.3 Community Renewables and Barriers

It is only during the past few decades that the interest in energy from renewable sources has gradually paved the way for renewable development. There are a number of “communities” that venture into the development of those locally accessible energy sources, given the nature of renewable energy, of being relatively small and available near the sites of energy demand.

In fact, nearly half the Japanese local authorities who represent their communities are planning/implementing or envisioning community energy policies, as seen in Figure 4. This movement, which was absent for decades, has been triggered by multiple factors, such as the Fukushima nuclear meltdown accidents, the introduction of the feed-in-tariff and the electricity market liberalization (Ministry of Environment Japan 2015).

Figure 4: Local Authorities Planning Community Renewable Policies



Source: Ministry of Environment Japan (2015). Graph reproduced by authors.

Community energy development could suggest the kind of projects that incorporate community-led, -controlled and -owned renewable energy installation development (Walker et al. 2007). Although they have significant implications both from local economy and carbon reduction contexts, community energy projects face various barriers, ranging from technical and economic to legal for the early and operational phases of their development.

As mentioned, during the post WWII industrialization period, the electricity sector in Japan was centralized and heavily focused on large-scale power generation. This brought the decline of renewable power and of the associated sectoral knowledge and industrial expertise for both large and small renewable power development.

Above all, these technical and legal complications, social and political disputes are increasingly observed in the scene of renewable development as potential barriers for the renewables. Currently this means that the people who have installed or will install PVs are assuming a high level of risk, and there are increasing stakeholder interests among property developers as to how much solar access should be given around their construction projects.

The feed-in-tariff, by its design, however, made a clear connection between renewable development and income. In other words, wind, sunlight, or other renewable resources are no longer just a source for warmth and amenity, but also a source for property and economic return: Renewables now can generate financial benefits, as a form of energy and electricity, which are materialized through a financial rebate system, such as FIT, or other forms of supporting policies.

On the other hand, the energy-related benefits thus are increasingly connected to economic systems, where equity on the production, distribution, benefit sharing, and equal opportunity for investment are fundamentally required. Armstrong and Bulkeley (2014) argue for a focus on the socio-materiality of renewables, calling for a different viewpoint over renewable resources to understand the shifting discourses, coalitions, and interests at stake.

As the number of renewables increases in Japan, however, poor public consultation process by the developers, selection of the most economically viable location, and the lack of direct paybacks to local community became appealing issues for opposition to renewable development. The production of energy, especially electricity, often

produces conflicts with these existing rights and ownership, where the right to produce electricity tends to not be established within the existing legal and political framework for renewable resource management.

The classic divisions between community and big capital have been often observed by advocates of "community energy development" and seen in wind development cases (Pasqualetti 2011; Aitken 2010). Devine-Wright (2009) addressed the ethos of local contestations, which have roots in place-protective action and arise when new developments disrupt pre-existing emotional attachments and threaten place-related identity processes. Place-protective behaviors are generally shaped by a variety of psychological and contextual factors, where the politics of energy production strongly correlates with behavioral resistance. This can be decreased when communities are convinced with a clear financial balance sheet.

Electricity liberalization now plays significant role here, as it creates new stakeholders, e.g., local communities, can enter into the market as energy "producers." This is revolutionary in the sense that they can potentially have a share in the electricity (and other energy) market. Currently, the electricity market itself has JPY 60 trillion in sales volumes in Japan as a whole. If local communities successfully establish energy companies with sufficient customers, they can take over part of the profits that may have been otherwise accrued to the existing utilities.

In the next section, this paper classifies recently developed local renewable projects into different categories in order to identify how they demonstrate the socio-material dimensions of water-energy resource, which allow for more interaction with the wider community and stakeholder engagement.

2.4 Measuring Community Economic Benefits

In undertaking classification with key categories involved in the renewables, it has become clear that there are multiple factors that contribute to the typology of benefit sharing among the different cases. These factors are mostly represented by the government, utility, and community initiatives, purposes for power generation (power sales or power consumption, and whether the financial benefit is obtained through power sales through FIT, or onsite electricity consumption).

Measuring community economic benefits would be one potential way to convince stakeholders and let them be interested in infrastructural projects. It is highly important to recognize and increase the investment incentives by identifying the *spillover effects* and consider the strategies to share the benefits among the concerned parties, to ensure their interests in energy financing (Yoshino and Taghizadeh-Hesary 2017).

Convincing evidence can be drawn through measurement of regional economic value added, including the spillover effects, through renewable development. Value added is a well-established concept in economic theory, referring to the transformation of materials, goods, or services with higher monetary value. It usually compares differences between the values of before and after the external factor functions (Heinbach et al. 2014; Raupach-Sumiya 2014).

The value-added analysis originally has its root in industrial organization theory to identify transforming inputs to higher value outputs. It has recently been applied to the renewable energy industrial chain (Coon et al. 2012; Allan et al. 2011). Analysis has been carried out to interpret the value-creating process of the renewable industry, from the generation, transmission, and distribution of the renewables, throughout the chronological stages of their installation, maintenance, through to decommissioning. The existing analysis identifies four key stages of financial stages for understanding

cost structure of renewable development: 1) direct investment, 2) investment-related support, 3) plant operation, 4) commercial management (Raupach-Sumiya 2014).

The renewable cost structure analysis, however, often does not necessarily limit its scope into "regional" value added, as they normally cover overall value chain of renewable energy development. Thus, there is a need to distinguish added value from the degree of their regional contribution. There are several analyses conducted by German institutions on measuring regional value added as the total sum of a) net personal incomes for employees, b) after-tax profits for the plant owners (and their partners), and c) regional tax income (Raupach-Sumiya 2014). Though there are variations of analyzing practices so far in the literature, these three elements would provide a powerful benchmark for understanding added value to locality through renewable development.

There are several case studies in Japan that estimate how much of these local profits are generated and "stay" in a municipality. Academic effort, for example, on environmental economics domain, demonstrated a value-added and employment potential through a renewable energy development in Japan (Raupach-Sumiya and Nakayama 2015). It reveals that profit and its associated value added would not remain in the locality unless the plant owners and their business partners are local external players, as the tax income will be incurred elsewhere.

2.5 Local Government and Community Nongovernment-organization Cooperation Model

The regional value-added models described above are useful tools for understanding the values brought in to a locality. The quantitative and transparent analysis enables policy makers and stakeholders to objectively judge the degree of contribution that renewables could provide. The following case study of Ikoma city, Nara Prefecture Japan, illustrates, through the value-added analysis, how a new type of community energy business can generate local benefits. The case could highlight the implication of green finance or local energy business by identification of monetary return to localities.

Ikoma city is located in the northwestern end of Nara Prefecture, Japan. There are about 120,000 residents, with 50,000 households, and a land size of 53km². It is a typical sub-urban city in the Nara Prefecture, adjacent to the Osaka Metropolitan area, the second largest city in Japan. As a sub-urban city, the Ikoma City Government has promoted rooftop PV for a decade. In addition to PV, the city is geographically located in the mountains that divide Nara and Osaka, and it is endowed with sufficient kinetic potential for hydropower.

The city has relied on its income from residential related tax, which accounts for 85% of the total city revenue. Upon facing the forecasted decreasing population, the city is eager to stimulate forms of income other than residential tax in order to maintain its services. The city was also selected in 2014 as one of the Eco-model cities in Japan, the Ministry of Environment Japan's initiative to activate environmental and sustainability policies at the local governmental stages. With this background, the Ikoma City Government has taken an initiative to establish a new community electricity company to explore local sustainability though community energy development and the shared benefits out of that development.

The initiative first encountered barriers in terms of gaining recognition and endorsement from the financial sector. The governor and the officers of the Ikoma local government negotiated with a local bank (the Bank of Nanto). For the negotiation, the commitment of the local government, together with the support from a large-scale gas

utility (Osaka Gas Co., Ltd.), were the keys for the successful negotiation that created the stakeholder coalition. Also, the fact that the local government itself would be the major shareholder of the newly created power company became the practical financial guarantee for the project.

As a new power producing supplier (PPS), Ikoma Citizens Power (ICP) was officially formed in July 2017, in collaboration with a local nongovernment organization (NGO), called Citizen Energy Ikoma. The new company receives investments from CEI, Osaka Gas Co., Ltd., as well as the Ikoma City Government, which owns 51% of its shares. It is the first case in Japan where a local NGO invested in a community energy company (Table 1).

Table 1: ICP Investment from Stakeholders

	Millions JPY	Share of Total Stocks
Ikoma City Government	7.65	51%
Osaka Gas Co., Ltd.	5.10	34%
Ikoma Commercial Union	0.9	6%
Bank of Nanto	0.75	5%
Citizens Energy Ikoma (NGO)	0.6	4%
Total	15	100%

Source: Amano (2018).

Currently, the corporate capital of the new company (ICP) is rather minimal, and they have launched their business to a limited market (e.g. the city government buildings and facilities, and municipal schools), but it is planned to generate and deliver electricity to 5,000 households, accounting for 10% of the total within the city boundary, from 2019. ICP recognizes that there is a challenge to secure sufficient renewable electricity, as well as acquire operational costs to obtain the generated electricity.

The Ikoma City Government provides electricity generated at its water purification facility (Ikoma-Yamazaki Purification Facility) that has a height difference of 63m between the water intake and the mechanical location where there is 40kW electricity production capacity available (Amano 2018). The new company will also secure renewable electricity from a local NGO, which has been actively developing local renewable electricity, mainly through rooftop PVs, since 2013, as one form of the Hometown Investment Trust (HIT). HIT is a new source of financing created to support renewable energy available at the community level, with the objective of linking local investors with the financial benefits to their locality (Yoshino and Taghizadeh-Hesary 2017). The renewables currently account for about 6% of the total company portfolio (about 550kW), with the rest of the electricity to be covered by the Osaka Gas Co., Ltd., a big private gas utility that entered into the electricity market in 2016.

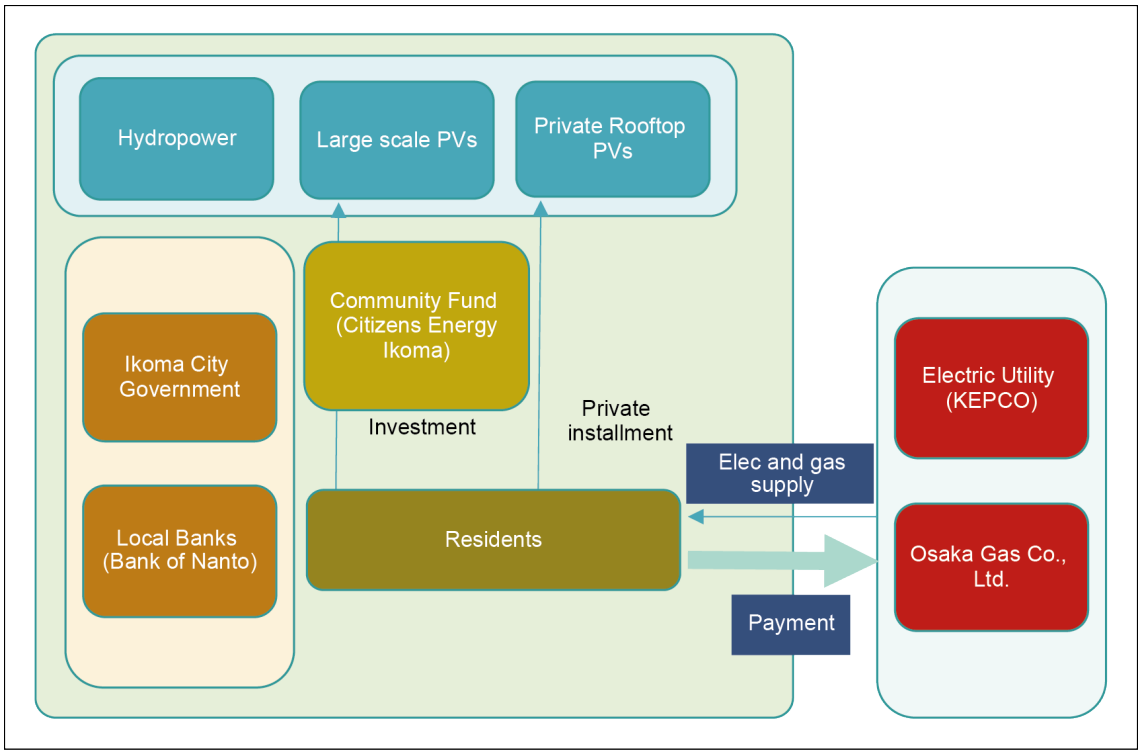
The challenge for the new company is to ensure further renewable supply. The company is anticipating that it will procure electricity from more rooftop PVs within the city, with the observation that the rooftop PV has shown a steady increase over recent years. The city government believes that the local government subsidies for PVs, in addition to the national FIT, are at least in part attributed to its increase, implicitly claiming the PVs are a community asset, seeded and grown by the local taxpayers' contributions.

The ICP case demonstrates an interesting departure from the existing community energy development models, as it works as a community business that secures financial benefits that remain in the municipality. As briefly mentioned, there have been cases where renewable business entities have started community energy development, especially after the electricity market reform in Japan. Financial gain through these renewable businesses, however, usually exits of the community, as it is often the case that the business developers are registered in big cities, such as Tokyo and Osaka, where corporate and income taxes are incurred.

Ikoma city is therefore mindful of ensuring that the ICP is located and registered within the city. Thus, the new company is to pay these taxes to the city government. The second unique feature of ICP is that it will not provide dividends to stockholders. The accrued financial benefits shall be returned to the city residents by increasing local governments' tax allocation into much needed purposes, such as education and child care.

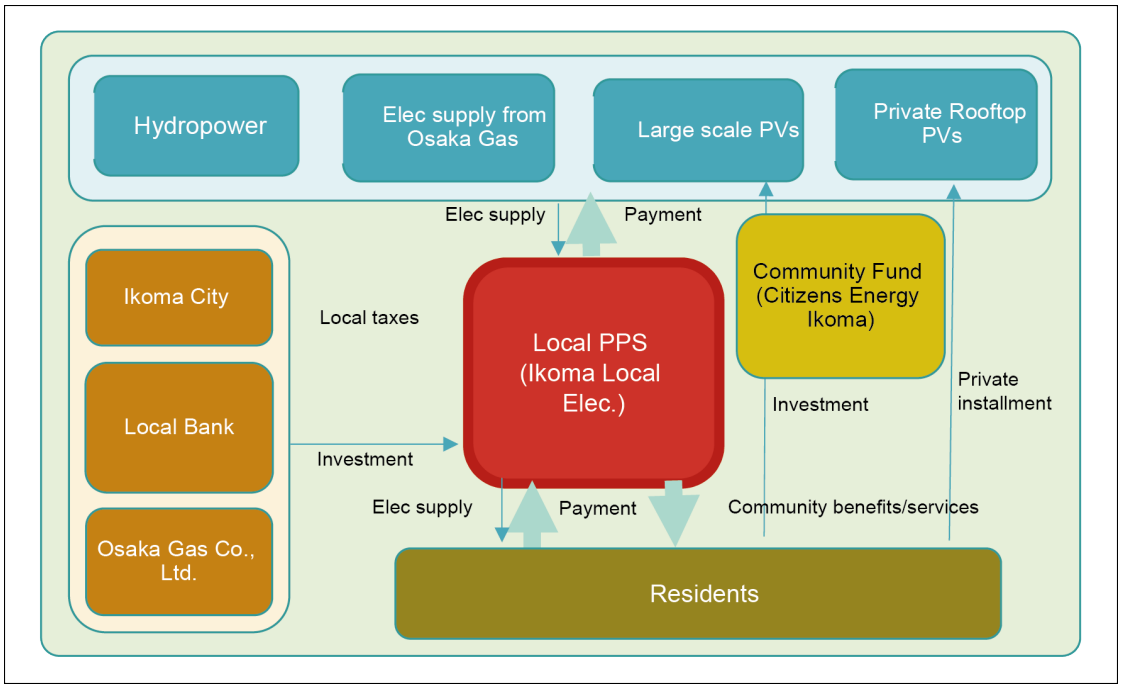
After being established in July 2017, ICP began its business operation in November 2017. Further detailed financial information shall be accumulated in the future. Nevertheless, Figures 5 and 6 show the generated financial gain expected through the ICP project. It compares before and after the establishment of ICP and how the monetary flow has changed.

Figure 5: Value added and Municipal Territory (Before ICP was established)



Source: Authors.

Figure 6: Value Added and Municipal Territory (After ICP was established)



Source: Authors.

There are increasing numbers of community funds that raise financial contributions from wider investors to develop renewable energies. Through these funds, institutions and individuals are able to participate in renewable energies. The fund organizers are often local NGOs that are keen to contribute to the locality through establishing networks between projects and actors within or outside of the concerned areas. The Ikoma case can be seen as an example of the collaboration between local government and NGOs/funds.

3. FRENCH ELECTRICITY REFORM

3.1 Origin of the Electricity Reform

When the first energy grids developed at the beginning of the 20th century, the French energy market was mostly decentralized and based on small gas networks that were owned and operated by local governments. Yet after World War II, several laws were adopted to nationalize the gas and electricity markets and make them a national public service (that is, an activity dedicated to the public good, and as such, ruled by public law). From then on, the whole electricity chain (production above 8 MVA, transmission, distribution and supply) was outsourced to the national public company Electricité de France (EDF). Today the French state is still the major shareholder of the company (84.5%). At the time of nationalization, municipalities kept the ownership of the networks, but they were bound by law to outsource the supply activity to EDF. Only 5% of local governments remained electricity suppliers (Allemand et al. 2016).

The electricity market stayed as such for about half a century and proved to be efficient for supporting French economic development, as it managed to satisfy a growing demand while applying regulated tariffs. Yet in the 2000's, the European Union adopted the first directives providing for the liberalization of energy markets (electricity

and gas). Those directives aim at creating a common electricity market ensuring security of supply at an affordable price for users. They have three specific objectives: let consumers freely choose their supplier; open the access to the production activity; allow access to transmission and distribution networks according to transparent and non-discriminatory rules. In order to do so, the production and retail segments of the market have been opened up to competition. Yet transmission and distribution remain regulated.

Consequently, France started, reluctantly, to open its network, under the monitoring of the Competition Directorate-General of the European Commission. Following a first European Directive in 1996, from 1999, the biggest consumers (more 100 GWh) could choose their provider. Subsequently, since 1 July 2004, consumers, other than households, could change their supplier. Finally, since 1 July 2007, all consumers have this option, as is shown in Table 2. Since then, other directives have been adopted. The current Directive in force is Directive 2009/72/EC of the European parliament and of the council of 13 July 2009 concerning common rules for the internal market in electricity. These measures are now completed by the environmental requirements set by the Climate-Energy Package in terms of greenhouse gases reduction, renewable energy share, and energy efficiency.

Table 2: Chronology and Impact of the Electricity Market Liberalization in France, Source Adapted by the author from Energie-info (2017)

	Feb 1999	Feb 2000	Feb 2003	July 2004	July 2007
Targeted consumers	Companies using more than 100 GWh	Companies using more than 16 GWh	Companies using more than 7 GWh	Local gvmts and business sites	Households
Market opening	20%	30%	34%	70%	100%

Source: Authors.

3.2 Current Status and Impact of the Reform: Both Demand and Supply Sides

It has been now about 10 years that the French electricity market is open to competition. Historic incumbents remain the main operators on the markets and prices for consumers have hardly decreased. Yet, although the number of new providers keeps increasing, and in spite of a totally free switching process, only a handful of consumers have changed their supplier. About 15.1% (that is, 4.88 million sites on a total of 32.1 million) of households and business consumers have switched from EDF, the incumbent operator, to a new provider (the main competitor to EDF, being Direct Energie, which has about 2.2 million consumers). This is very different from neighboring countries such as Belgium, also bound by European law, where the historical main incumbent has now only about 50% of the market share (Palot 2017).

Among the reasons for this slow move are the affordable cost of electricity in France and the high security of supply. Moreover, the high share of nuclear power in electricity production impedes flexibility. There is also a lack of information on switching opportunities, which may be related to vested interests between the public authorities and the historical incumbent. The cheapest offers from the alternative suppliers are, on average, 6% under the regulated tariffs. In addition to lower prices, new providers try to innovate to attract new consumers: for instance, by promoting energy saving measures for savings on energy bills by offering remote electric appliance devices and systems or rewarding sponsorships, etc. (Bourbon 2017).

Digital services or combined offers (telephone and electricity; home insurance and electricity) are other types of incentives. On the side of consumers, they are also some initiatives to get better offers. For instance, consumer associations are organizing collective purchasing tenders, which they submit to electricity suppliers in order to get the best tariffs. However, the phasing out from regulated tariffs (which currently applies only to the historical operator EDF) provided for by European directives might be a key step to boost competition and foster the changing of suppliers by consumers.

As for electricity production, here also liberalization has had little impact. In France, electricity production (total of 568 TWh in 2015) relies mostly on nuclear power (77%). Hydroelectric power is second and the first renewable (11%), then are thermal power (coal, natural gas and oil) (7%), and solar and wind, which represent about 5%. Since 1970 the electricity consumption has tripled, but it has stabilized since the 2008 economic crisis (SOeS 2017).

The Ministry of Energy delivers electricity production authorizations. Yet, since EDF is by law the only nuclear electricity producer (it also owns the power plants), it is consequently the main electricity producer in France. In addition, EDF also owns about 80% of the hydroelectricity installations. The second main electricity producer is the Compagnie nationale du Rhône (CNR), which produces hydroelectricity (about 16 TWh) thanks to the 19 dams that it owns. The shareholders of the CNR are: Electrabel, the former main operator of Belgium that is now part of the holding Enegie (which produces electricity from gas in France), the French Deposits and Consignments Fund public agency and local governments. The third main producer is SNET (about 8 TWh), which uses thermal power. In addition, some of the local governments that did not outsource production to EDF are also producing energy. Finally, there is an increasing share of citizens' energy production, which is now being promoted by public authorities, especially to foster renewable energy. Between 2009 and 2015, about 300 renewable energy projects have been financed at least partly by citizens (Poize and Rüdinger 2014).

3.3 Has there been any Positive Effect on Local Renewable Development?

Given the structure of the electricity market in France, there is, to date, no noticeable progress on the development of local renewable energy. Yet, several legislative initiatives are triggering progress. First, they set very ambitious targets. Among others, art. 1 of the 2015 Energy Transition for Green Growth Law provides that by 2030 the following goals should be reached:

- Reducing GHG emissions by 40% (and divide them by four by 2050);
- Reducing final energy consumption by 20% (and by 50% in 2050);
- Reducing primary consumption of fossil energies by 30% in respect to 2012 and 32% of final energy consumption;
- Increasing the share of renewable energies to 40% of electricity production;
- Setting a carbon price of 100 euros/ton;
- Reducing nuclear share in electricity production to 50% by 2025 (with an overall limit of production of 63.2 GW maximum);
- Delivering five times more heating and cooling from renewable and waste sources in district heating and cooling systems.

These goals complete and go further than the European goals, although the second European Climate and Energy Package, adopted in October 2014, also relies heavily on the contribution of local authorities, which, through their jurisdiction over issues such as land use, transports, buildings, waste management, etc., affect the energy intensity of their territories. These EU targets aim to increase the renewable energy share to 27%, increase energy efficiency by 27%, and reduce greenhouse gas emissions (GHG) by 40% by 2030.

But progress toward more local energy renewable production is actually not the result of liberalization as such, but of two other institutional reforms: on the one hand, the European and national commitments on the share of renewable energy consumption, and on the other hand, the national general administrative reforms enhancing decentralization in France, a traditionally centralized unitary state.

Against this background, the central government has adopted several measures, which increase the jurisdiction of local governments in the energy sector. This is meant to push and ease their intervention. The first measures were the mandatory adoption of local climate-energy plans, setting targets, and action plans. In addition, municipalities and municipal associations are responsible for creating and operating district heating or cooling systems, which often use biomass. Then, following the adoption of a new law, the 2015 Energy Transition for Green Growth Law, partnerships with private actors and citizens through new forms of corporate bodies became possible, as long as the aim is to produce renewable energy (local public-private partnerships, cooperative societies of collective interest with citizens, etc.).

These new legal corporate bodies expand the opportunities of local governments to enter economic activities when related to energy transition. New financing mechanisms were also created, which allow local governments and citizens to participate in energy companies, in debt or capital. For instance, corporations and cooperative societies that form to promote a renewable energy project can, when they are constituted or when they raise capital, sell shares to individuals, including people residing near the project location, as well as local governments and municipal groupings on whose territory it is located. This may increase the legitimacy and the acceptance of renewable energy development projects by the local inhabitants. From a legal point-of-view, consequently, for the first time in French law, local governments can hold a share in for-profit corporations, with no limit in ownership percentage (Dreyfus and Allemand 2018).

In addition, in order to compensate for the slow withdrawal from the purchasing obligation system under the pressure of European law, the Energy Transition Law establishes a new support scheme for facilities that will allow producers to sell renewable electricity directly on the markets and with additional remuneration in order to guarantee a minimum price to the operator. This is actually to phase out the purchasing obligations system set up in the 2000s to foster the renewable energy production.

Another incentive for renewable energy is the 2017 law on auto-consumption. It is meant to support auto-production by reducing its costs in a context where it is still more attractive to sell the energy produced locally than to consume it. But on a big scale, auto-consumption development might actually affect the development of alternative average providers, which, today, financially survive on the basis of electricity volumes they sell. So, the restructuration of the market will need to be observed carefully to see whether renewables will actually benefit from it.

Therefore, the centralized, sectoral, and productivity approach is slowly evolving toward a more holistic, territorialized, and participatory approach. Legal measures are

there, however, results are not yet visible in the national data. Moreover, some local social-benefits are worth considering for territories, such as tax revenues or jobs creation. But this is also too early to measure yet.

Finally, the main challenge remains to meet national targets, such as the reduction of the nuclear share in electricity production. In fact, if its share does not decrease, will there be room for renewable energy? Evolution therefore still very much depends on the central government's keenness to implement the reforms formerly adopted. Yet in a recent political statement, the Minister of Ecological and Solidarity Transition acknowledged the difficulty that France will have to meet its nuclear electricity share reduction unless an increase in GHG emissions is accepted. As a consequence, the completion date for the reduction of the nuclear share in electricity is to be postponed.

To summarize, in France, community financing has started recently. Legal tools, such as new forms of corporate bodies, have been created by the 2015 Energy Transition for Green Growth Law, but it is too early to assess their potential scope and achievement of any results. Therefore, today's policy to achieve renewable energy targets in France remains based on two dimensions: first the promotion of research and technological development, and second the support to industrial and commercial expansion of renewable energies, mostly through fiscal instruments and financial tools, which differ from one sector to another. Moreover, in the electric and gas sectors, renewable energy financial incentives have to comply with European competition law. As a result, and in compliance with the European legal framework, financial incentives can consist of feed-in tariffs, top-up payments, and technology neutral auctions. The choice of one of these mechanisms depends on the energy generation capacity of the renewable energy targeted. France's energy policy mostly relies on the two first mechanisms. Feed-in tariffs are mostly dedicated to support smaller renewable energy generation plants (ex. under 500 KW). A decree provides which installations are entitled to benefit from this mechanism. In addition, in the sector of renewable heating and cooling, several tax instruments are set up for individual inhabitants, such as for individuals, tax credits or 0% interest loans for retrofitting, or for the business and services customers, public subsidies schemes based on call for grants.

4. CONCLUSION AND POLICY RECOMMENDATION

The energy-related benefits are strongly connected to social and economic systems, where equity on the production, distribution, and benefit sharing are fundamentally required. In both countries, a general decentralization reform providing a stronger financial autonomy to local governments and opening ways of participation to citizens would allow developing real autonomous energy local policies that are adapted to their territories. France has had several reforms of that kind, but has recently cut its financial support, limiting the scope of the reforms. In Japan, the late decentralization reform dates back to 2006. There is therefore more reflection needed on what energy governance should consist of and how to coordinate action at various levels as encouraged by multi-level and polycentric governance studies to tackle climate change and develop sustainable energy systems (Ostrom 2014; Eyre 2013; Corfee-Morlot et al. 2009; Schreurs 2008; Bulkeley and Betsill 2003).

There is also a question regarding how much positive financial benefit these local PPS could have to localities through renewable development. If locally available renewable energy can be developed by big businesses, the financial benefits may be only experienced by those with large capital. Can the argument about local resource ownership be eased by financial benefits brought by the recent PPS development?

The identification of value added, e.g. local tax income and financial flow to community supply chain clarified the role and economic implication of local PPS. The Japanese case demonstrates the local energy projects that have been carried out at localities. This suggests to us that the implications of community-based energy development should be recognized, along with the models, whose benefits could be shared among the developers and the community. There is naturally investment risk on these community-based projects, which functions as a major financial barrier. Creating entities that could generate electricity income would be the most potent solution for convincing the financial sectors and getting them interested in the projects.

On the other hand, the example of France shows that liberalization of the market is not enough to remove the barriers for local governments and communities to take action. As shown, in 2017, France celebrates 10 years of full liberalization of its electricity market. Yet the outcomes have not met the expectations (lower prices for consumers, diversification of energy sources with a bigger part of renewable, greater number of providers including at the local level). The main historic incumbents remain the dominant actors of the energy sector, leaving little room in the network for alternative producers. They have also kept their close relationships to the central government. Now the question is whether Japan will manage to do better, although in terms of administrative organization, the two countries are comparable, with both being very centralized.

People in France strongly and satisfactorily relied on the State as the main operator. It is only very recently that some legal barriers were lifted through liberalization, and new legal tools were created triggered by the necessity to meet ambitious renewable energy targets. New forms of corporations in the 2015 Energy Transition Law and the 2017 auto-consumption law are significant steps forward, but it is too early to assess their concrete outcomes. Yet the multiplication of local initiatives promoting citizens' involvement in energy projects and the creation of web platforms dedicated to renewable energy financing projects suggest that a cultural change on these issues is slowly happening.

Through the experiences of both countries, there are four major preconditions for the sustainable electricity income for such local entities. These could be, in turn, interpreted as the policy recommendations to foster local initiatives:

1. First there must be a circumstance where there is a "freedom" to form PPS, as the market liberalization allowed.
2. Second, the electricity sales must be profitable, and the profitability would be generally ensured by the existence of FIT. Also, the profitability depends on the volume of customers: If local customers are not switching their suppliers (largely from the existing big utilities), the success of the scheme would remain marginal.
3. Third, credibility of the PPS is a key for gaining confidence from stakeholders. Commitment from the local government, e.g. as a main shareholder, would enhance the stakeholder interests in the PPS.
4. The most important issue is that the accrued profit would circulate back to the community; otherwise the local politicians would not endorse legitimacy of the local government investment and interest into the PPS.

It seems that the interventions by the actors contributed practical backgrounds to the local community energy development. Mobilization and engagement of local actors (as in the Ikoma case) often drives the sharing process. It is only indicative to illustrate the recent successful examples among other initiatives. Nevertheless, the local

governments' direct and indirect intervention seem to be the key for these initiatives, where their commitment may give credibility and authority to these projects, to the concerned localities where the nexus of community human factors is intricate and often involve cohesive personal relationships and contestation. Therefore, the policy recommendations to the Asian-wide context could be summarized as below:

- The identification and clear demonstration of the community financial flow would be highly important to gain support and participation from community leaders, stakeholders, and residents in other Asian countries, too. However, in the Asian context, there are often problems of governance, both at the national and local levels.
- Sharing the implications of community finance and the associated benefits, and creating the relevant schemes with participatory manner, may bring significance to the governance improvement.

Overall, it is of particular significance that policy makers and stakeholders recognize the impact and implication of the market liberalization, and harness the potential financial added value to communities through carefully designed institutions (e.g., PPS) that can help improve access to finance and investment in green and renewable energy projects. Energy market liberalization should be seen as a window of opportunity to unlock the local green finance.

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