

A study of municipal power producer and supplier projects and the ideal business style for local city

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Abstract

Many kinds of Domestic Municipal Power Producer and Supplier (MPPS for short) projects were shown in this study to create the ideal PPS plan for the citizens and the local community. Generally, the MPPS projects supply energy from local renewable sources to the local consumers. The profits from MPPS projects will be used for public welfare services for elderly people and children. As these projects progress, MPPS companies will provide a lot of benefits to the local community. In order to promote these projects, it is necessary to raise the citizen's awareness of the importance of the MPPS projects through environmental education.

Keywords: Off shore wind turbine, Power producer and supplier, STADTWERKE, Renewable energy

1. Introduction

"Municipal Power Producer and Supplier (MPPS for short)" is the retailing electrical power producer and supplier business that provides electricity to private houses, private companies, and public facilities by mainly using regional renewable energy; further, the municipal government invests in it⁽¹⁾. MPPS is a small scale PPS covering localized areas, rather than a major electric company such, as TEPCO, and KEPCO etc. but. The Resources and Energy Agency in Japan defines PPSs as "the enterprises that provide electricity to consumers who use over 50 kW of electricity through electric lines provided by a company are considered to be major electric companies." They are considered as "newcomers in the liberalized retail sector". From April 1, 2016, the electricity deregulation policy came into force. After the enactment of this policy, all new PPS companies that were registered nationally as a "retail electrical power supplier" could provide electricity to all consumers, irrespective of the contract demand voltage.

MPPSs that weigh heavily of the public interest are considered to have more important roles, such as introducing REs to a local area with specific natural characteristics. Following this situation, CHIBA Mutsuzawa Energy Co., Ltd. and Narita Katori Energy Co., Ltd. have been established in Chiba prefecture. Especially in Choshi city where the author is living, "Choshi Electrical Company (CEC)" has been established on May 23rd, 2018. The CEC Ltd. used funds from the city

budget to provide half the capital of the new energy company comes from city budget, and the other half was provided by private companies, such as LOOOP Ltd and X Ltd. After this, the city government of Choshi decided to start a cooperative venture with the CEC Ltd.

This paper gives examples of and various approaches to MPPS provided by domestic and foreign companies. The methods of investigation are: internet search and interviews with the employees of MPPS companies after visiting them. Based on these results, readers will understand the ideal styles of MPPS companies.

2. Foreign example: "STADTWERKE" in Germany

As shown in Fig.1, STADTWERKE is the name of the organization that provides many kinds of infrastructure services, such as communications, pools, libraries, and so on, while cooperating with the local government and private companies, to local citizens shown. Now, there are over 900 companies⁽²⁾, which mainly focus on the energy industry in Germany. These companies are focusing particularly on the PPS businesses. In 2013, the electricity, gas, and heat sales of STADTWERKE were \$70 billion, \$30 billion, and \$5 billion, respectively. Electricity retail sales, at \$20 billion, corresponded to 20 % of the total electricity retail sales in Germany⁽³⁾.

STADTWERKEs are managed by private companies which are independent of the influence of local governments; however, STADTWERKEs accept the capital budget from local governments. While this makes them similar to the Japanese third-sector companies, STADTWERKE has a heavy management responsibility that depends on their business results. Because it is considered as a corporation serving public interest, STADTWERKE is required to obey the management decisions of municipal government.

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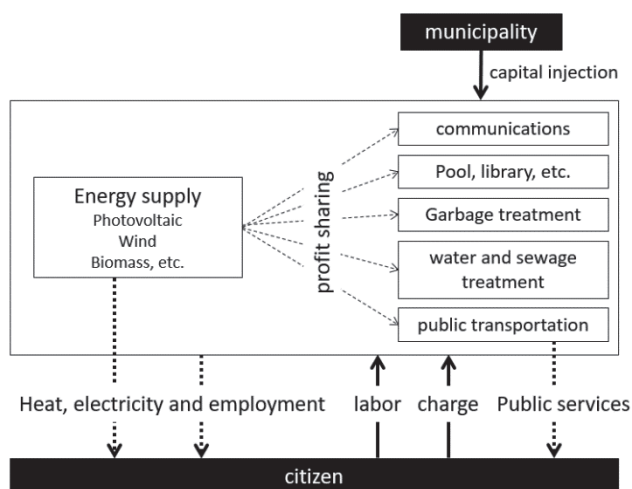


Fig.1 The key map of STADTWERKE.

The four factors essential for the success of STADTWERKE are as follows⁽⁴⁾.

(1) STADTWERKE can get relatively cheaper electric power through the electrical trading market, and the transmission fee is relatively cheaper than that of the other electric companies.

(2) STADTWERKE can provide local heat energy, as well as electric power.

(3) STADTWERKE can provide many kinds of added values such as energy saving plans.

(4) Citizens understand that STADTWERKE is essential for creating regional employment and stimulating the local economy.

Especially regarding the latter, there is a difference between Japan and Germany. Historically, many German cities laid many heat pipes in their central area to save energy after the oil shock of the 1970s. STADTWERKE not only provides cheap electricity, but also in-depth customer services, so it has been supported by local consumers for a long time. Further, STADTWERKE always considers its impact on the environment by switching from an infrastructure based on fossil fuels to one that is based on natural sources of energies, such as solar and wind.

3. Domestic MPPS companies

The domestic MPPS companies are listed in table 1.

The companies' name, home page addresses, low voltage supply (100V household supply), and supply areas are shown in this table. If information is not available, the cell is in "none". A written order of the company was made into the order of a registration date.

At the end of September 2018, when the survey was conducted, the number of domestic registered MPPS Companies was 26. Of these companies, there were two in Chiba prefecture where author live: CHIBA Mutsuzawa energy Co., Ltd. and Narita/Katori energy Co., Ltd.

The characteristics of representative MPPS companies show below.

3.1 The activity of Representative MMPS companies

3.1.1 Kitakyushu power Co., Ltd.

Kitakyushu Power Co., Ltd. was established after Kitakyushu city contributed 24% of its capital; the remaining capital was provided by eight companies, including Yasukawa Electric Co., Ltd. and Fukuoka Bank Co., Ltd. The main source of electric power supply was the garbage incineration station in Kitakyushu city; it was supplied to public facilities and business offices. Further, this company also traded some surplus electricity generated by private power generation plants that were owned by consumer companies in the city. There is a plan to supply, in the near future, the electricity generated from the offshore wind turbines that will be constructed in Hibikinada.

3.1.2 Miyama Smart Energy Co., Ltd.

Miyama city which is located in the southeastern part of Fukuoka prefecture, established the first MPPS company—Miyama Smart Energy Co., Ltd.—in Japan in March 2015. Miyama city has special characteristics, such as the installation of photovoltaic facilities; 8.9% of these are residential facilities. Further, the city also has some "mega solar" facilities. Miyama city has a goal of making it a "the city with local production of energy for local consumption."

Miyama city participated in the "Large-scale HEMS Information Infrastructure Development Project" initiated by METI, and installed smart meters in 2,000 households in the city. Based on this project, Miyama Smart Energy Co., Ltd. is providing monitoring service to the elderly people who have signed a contract with the company. Further, this company provides many other services, such as homemaking, home delivery of goods, hospital reservation, and taxi arrangements to its customers. The services provided by the company are expected to make citizens' life more comfortable, and contribute to the increase in population from other areas.

3.1.3 Hamamatsu PPS Company Co. Ltd.

Hamamatsu PPS Company Co. Ltd. was established on receiving capital from NTT Facility Co. Ltd., NEC Capital Solution Co. Ltd., Enshu Railroad Company Co. Ltd., and five other companies. Hamamatsu city has longer daylight hours than other cities in Japan, and, thus, owns some mega solar facilities, such as the Murakushi Mega Solar Power plant (1,980 kW). Further, Hamamatsu city has an electric power generation station for refuse incineration that provides 2,800 kW of electricity; the company operating it provides electricity to public facilities and households in the city.

Hamamatsu city has plans to: raise the energy self-efficiency rate from 4.3% to 20.3%; increase the power generated from renewable energy from 155,000 MWh to

Table 1 Domestic MPPS companies (As of the end of Sep. 2018)

	Company name	home page address	Low voltage supply*	Supply area
1	Tokyo Eco Service Co., Ltd.	http://www.tokyoecoservice.co.jp/	none	23 Wards of Tokyo (ward's facilities etc.)
2	General Incorporated Foundation Izumi-sano Power	http://izumisano-pps.or.jp/	scheduled	Osaka prefecture
3	Limited Liability Company Kitakami new power	none	none	no specification
4	Kitakyushu Power Co., Ltd.	http://kitaqpw.com/	none	Kyushu area
5	Miyama Smart Energy Co., Ltd.	http://miyama-se.com/	supplied	Kyushu area
6	Tottori civil power Co., Ltd.	http://power-shift.org/home/	supplied	Tottori prefecture
7	Hioki Regional Energy Co., Ltd.	https://www.hiokienergy.jp/	supplied	Mainly Hioki city, Kagoshima prefecture
8	Local Energy Co., Ltd.	http://www.lenec.co.jp/	none	Yonago city, Tottori prefecture
9	Nakanojo Power Co., Ltd.	https://www.nakanojo-power.jp/	supplied	Nakanojo town, Gunma prefecture
10	Hamamatsu New Power Co., Ltd.	https://www.hamamatsu-e.co.jp/	undecided	Hamamatsu city, Shizuoka prefecture
11	Yamagata New Power Co., Ltd.	https://www.ymgt-ps.jp/	none	Yamagata prefecture
12	General Incorporated Association Higashi Matsushima Future City Organization	http://hm-hope.org/	scheduled	Miyagi prefecture
13	Miyako New Power Co., Ltd.	http://www.miyakosumakomi.net/	undecided	Miyako city, Iwate prefecture
14	Ikoma Power Co., Ltd.	http://www.ikoma-denryoku.jp/	undecided	Kansai area
15	Ota Power Co., Ltd.	http://ota-power.co.jp/	none	Ota city, Gunma prefecture
16	Ichiki Kushikino Power Co., Ltd.	http://ik-epco.co.jp/index.html	supplied	Kyushu area
17	Dan Dan Energy Co., Ltd.	https://nanbu.de-power.co.jp/	undecided	Chugoku area
18	Konan Ultra Power Co., Ltd.	http://konan-ultra.de-power.co.jp/	none	Konan city, Shiga prefecture
19	CHIBA Mutsuzawa Energy Co., Ltd.	https://mutusuzawa.de-power.co.jp/	supplied	Chiba Kyushu area
20	Oku Izumo Power Co., Ltd.	https://okuizumo.de-power.co.jp/	none	Chugoku area
21	Narita Katori Energy Co., Ltd.	https://www.city.narita.chiba.jp/environment/index0576.html	none	Narita city, Katori city, Chiba prefecture
22	Nature Energy Oguni Co., Ltd.	http://oguni.de-power.co.jp/	undecided	Kyushu area
23	Ikoma Civil Power Co., Ltd.	http://ikomacivicpower.co.jp/	supplied	Ikoma city, Nara prefecture
24	Coco Terrace Tagawa Co., Ltd.	http://tagawa.de-power.co.jp/	none	no specification
25	Osumi Peninsula Smart Energy Co., Ltd.	http://opse.jp/index.html	undecided	no specification
26	Mtuzaka new power Co., Ltd.	http://www.matsusaka-epower.co.jp/index.htm	undecided	Matuzaka city, Mie prefecture (public facilities)

*: Electrical supply system for households as 100V in Japan.

795,000 MWh; and reduce electricity usage by 10%. These energy plans are driven by the following business goals: 1) enhancement of applicant of Res; 2) local production for local consumption of electric power; 3) effective utilization of city's resources; 4) activation of local economy; and 5) enhancement of energy saving and environmental awareness of citizens.

3.1.4 CHIBA Mutsuzawa Energy Co., Ltd.

CHIBA Mutsuzawa Energy Co., Ltd. was established with investment by Mutsuzawa town (55%), Pacific Power Co., Ltd. (19.5%), and the Chamber of Commerce of Mutsuzawa, GodoShigen Co., Ltd., Kanto Natural Gas Development Co., Ltd., and two other companies that invested 5% each. The Chamber of Commerce of Mutsuzawa is cooperating with CHIBA Mutsuzawa Energy Co., Ltd. to attract new customers by acting as its sales agency. The main sources of electricity are some mega solar facilities in the town; further, this company also receives electricity from JEPX and backup electricity from some other facilities. It supplies to the town's facilities, companies, and households.

CHIBA Mutsuzawa Energy Co., Ltd. desires to establish a complete recycling energy supply system in the town. Further, the basic strategy of this town is "smart wellness town provision project." Under this, energy service businesses are its main target.

3.1.5 Narita & Katori Energy Company Co., Ltd.

Narita & Katori Energy Company Co., Ltd. was established mainly through investment from Narita city and Katori city; it provides electricity to their public facilities. One of the energy sources is the refuse incineration generator in Narita city and the other sources are 5 mega solar facilities from Katori city. Narita and Katori have each contributed 40% of the capital, and the remaining 20% has come from the Shin Energy Co., Ltd.

Because two local governments had invested in Narita & Katori Energy Company Co., Ltd., many arrangements, such as a company name, office location, and the percentage share of profits, were needed. Because of this, there were many confusing procedures about national registration forms for the electricity enterprise; this required the framing of some rules. The company conducted open recruitment based on proposals regarding job performance and the scope of business. The agenda of both cities was to gain maximum benefits and minimize the electricity fees of their facilities; they also tried to create a local energy-producing system for local consumers.

4. Discussion

4.1 The desired role of MPPS in local cities

Miyama Smart Energy Co., Ltd. has tried the following approaches to solve local problems: 1) focus on the regional usage of energy generated in city; 2) expand and create employment that is not only for the youth, but also elderly people; and 3) differentiate itself from companies

in other cities by providing unique services to the residents⁽⁵⁾. Everything that supports the program, which is called "Nandemo support Suttai," is provided to the covenanted people. By providing the services, Miyama Smart Energy Co., Ltd. tries to build a relationship with the local people, and solve local problems by applying the aforementioned approaches.

All MPPS companies collect local renewable energy from solar facilities, waste power generators, biomass power generators, and so on, and supply it to households, public facilities, and factories (Fig.2). This means that it is based on local energy production for local consumption. Further, many MPPS companies provide financial support for unsustainable public services. To perform these public services, there is a need for local residents to understand what an MPPS is and stands for; if possible, many residents should get in touch with those companies. Environmental education for school students, through observational tours and lectures, must be implemented in order to promote the understanding about MPPS business model.

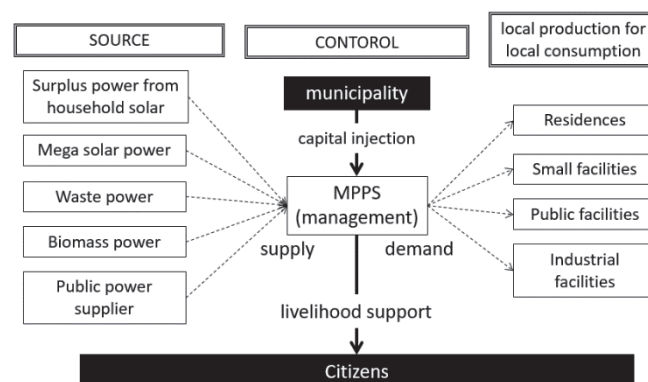


Fig.2 The key map of MPPS.

4.2 Independent and dependent model

When a local government starts making an MPPS business plan, there are two types of business models; the first one is the "independent model" and the other is a "dependent model."

The "independent model" is the business model where the local government tries to do, if possible, almost everything by itself. Miyama Smart Energy Co., Ltd., is an example of this category. This company tries to deal with energy supply-and-demand management and drafting bills to satisfy regional employment needs. Miyama Power Holdings Co., Ltd. is an ideal example of entities following the independent model, and provides a lot of support to other MPPS companies that follow the same model. This company's final goal is to make a "Japanese STADTWERKE," and it works together with "Japan STADTWERKE network" of general Aggregate Corporation. Further, Miyama Power Holdings Co., Ltd., tries to develop strategies, such as renewable energy introduction, "Virtual Power Plant" promotion, providing

a new kind of living support system for local consumers, and management services for independent model MPPS companies. On the other hand, Miyama Power Holdings Co., Ltd., is not required to pay the agent service fee. This is the most advantageous element for local governments that settle on the independent model. On independent model, it is easy to create local employment and provide other regional welfare services, therefore the regional sustainable development is able to expect for a long time. On the other hand, it needs more work experience, time and money than dependent model when it starts.

In the “dependent model” local governments select a joint company from many applicants, and confides the basic practice to the operating company. Many local governments adopt the “dependent model” because they are able to rely on someone else for almost all the basic practices of MPPS. Choshi city where the author is living adopted this model. Further, there are many more advantages for local governments that are able to realize this approach: they get upstream support, confide the operation of supply-demand adjustments, make adjustments in response to a lack of energy, and so on. In many cases, the joint company has a role of general consulting for electricity-providing businesses. This is because the local government can get plenty of advice and suggestions when developing a low-carbon energy plan, energy management plan, and smart community plan.

It is anticipated that many MPPSs’ basic practices, such as the operation of supply-demand, customer management, and billing service will be done automatically through a computer. It is considered that the maintenance cost of offices and local employment will be the obstacles for smaller local governments that adopt the “independent model” in the near future. On the other hand, in the case of the “dependent model,” a part of the local benefits would be paid by the joint company in the form of dividend and the agent service fee. It will be possible to make an innovative local restructuring plan and provide stable management if the local government adopts the “dependent model” and cooperates with the joint company that has a nationwide and scalable management ability. One example of this case is the “smart wellness town provision project” undertaken by CHIBA Mutsuzawa Energy Co., Ltd., whose holding company is a nationwide energy consulting company⁽⁶⁾.

It is difficult to predict which model will be good at this moment; further research is required. For example, it is necessary to investigate the company's situation of 1) profits and losses, 2) business continuity, 3) problem of daily work, etc.

5. Conclusion

This research has provided some information about foreign and domestic approaches to MPPS businesses. The following conclusions were obtained from this research.

1. Based on web research, 26 companies were listed as domestic MPPS companies.

2. The MPPS business are thought to represent the local production for local consumption of energy. The benefits from the MPPS businesses should be used for public services, such as: taking care of the elderly people and young children and subsidizing regional public transportation services. To establish this kind of public businesses, it is important to educate the regional children on the role of MPPS business.

3. Two types of business models are defined in this article-the “independent model” and the “dependent model.” The regional governments can choose one of these business models; each has advantages over the other. The independent model has many more benefits than the dependent model, which can be managed in a more stable way than the independent model. Independent model is easy to create local employment and provide other regional welfare services, therefore the regional sustainable development is able to expect for a long time. It is hard to say at this stage which model is better for each specific regional government. The choice depends on various regional factors, such as the population, the budget, and the regional environmental condition.

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