Models of Energy Communities in Japan (Enekomi): Regulatory Solutions From the European Union (Rescoms and Citencoms)*

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Energy communities are already part of the current Japanese energy sector. The* enerugīkomyuniti *(or* enekomi*, as I propose to call this type of entities) powered by renewables with an important role played by photovoltaics (PVs), reflect a growing wave of prosumer movements in Japan. This derives from the decrease in the cost of renewable installations, as well as the opportunities for multiple deployments in places previously unable to access renewable energy (such as farms – when 'farming photovoltaics' or 'agrivoltaic systems' are applied). The establishment of municipal power producers and suppliers (small-scale entities covering local areas), leading to broader popularization and use of distributed energy in Japan has also helped to promote this movement. However, any further development of* enekomis *requires the appropriate regulatory framework. Japan, which wants to promote the concept of a sustainable regional community internationally, must focus on a more preferential approach to* enekomi*. Based on the experience of the Member States, the European Union has managed to establish a model that could be implemented in Japan after a suitable adaptation. This applies in particular to the solutions offered to energy communities in Europe with respect to membership, non-discriminatory treatment, barriers, support schemes as well as grid connection and management.

Keywords: community energy, Japanese energy sector, enekomi, citizen energy communities, renewable energy communities, energy prosumers

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I. Introduction

Technological development and growing accessibility of energy installations stimulate a global increase in dispersed, mainly renewable energy sources (RES). This stems mostly from the continuous lowering of costs, where solar panels (photovoltaics, PVs) lead in terms of price affordability.[1] It also results in an increased interest of individuals in renewables. The said individuals are eager to commence their activity in the energy industry and become energy prosumers.[2] Additionally, the prosumer movement has its group dimension represented by different forms of energy communities.[3] This also reflects a social transition of adopting already-known forms of group cooperation for the energy needs. Another element of this move concerns environmental and climate issues.

Apart from the global trends related to technologies or prices of renewable installations, a lot depends on the regulatory environment, which could be positive, negative, or neutral to this development (or transition). In this context, the aim of this study is to analyse the current regulatory framework on energy communities in the European Union to establish, on this basis, the benchmark solutions for Japan. For this purpose, the paper assesses the regulatory framework for energy communities provided by the European law, including the Renewable Energy Directive II (RED II)[4] and the Fourth Electricity Directive (FED).[5]

In the EU, the current regulatory framework has its roots in a long European tradition of local cooperation for the energy needs including the of use RES.[6] Japan, with its experience in development programmes for energy efficiency and renewables, along with the tradition of

[1] *See* Hao Ding, Dequn Zhou, Guoquan Liu & Peng Zhou, *Cost Reduction or Electricity Penetration: Government R&D-Induced PV Development and Future Policy Schemes*, 124 Renew. Sust. Energy Rev. 109752 (2020).

[2] Nowadays many consumers are playing a more active role in the energy markets, representing a combination of production (pro-) and consumption (-sumers) of energy; however, a 'prosumer' is a broader term because modern energy consumers do more than just produce electricity – they also provide crucial grid services, such as storage and demand response, Sharon B. Jacobs, *The Energy Prosumer*, 43(3) Ecology L.Q. 519, 524 (2016).

[3] *See* Stefano Moroni, Valentina Alberti, Valentina Antoniucci & Adriano Bisello, *Energy Communities in the Transition to a Low-Carbon Future: A Taxonomical Approach and Some Policy Dilemmas*, 236 J. Envtl. Mgmt. 45 (2019).

[4] Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 Dec. 2018 on the promotion of the use of energy from renewable sources, OJ L 328, 21 Dec. 2018.

[5] Directive (EU) 2019/944 of the European Parliament and of the Council of 5 June 2019 on common rules for the internal market for electricity and amending Directive 2012/27/EU, OJ L 158, 14 June 2019.

[6] *See* Maciej M. Sokołowski, *European Law on the Energy Communities: A Long Way to a Direct Legal Framework*, 27(2) Eur. Energy Envtl. L. Rev. 60, 60–70 (2018); Maciej M. Sokołowski, *Local Public Energy Utilities: A Road to Improving Local Energy Security*, 17(4) Network Indus. Q. 15 (2015).

Models of Energy Communities in Japan (Enekomi)

utilizing cooperatives,[7] could be a fertile ground for further development of Japanese energy communities which have been growing since the early 2000s.[8] Against this backdrop, the paper discusses and analyses European regulatory solutions for citizen energy communities and renewable energy communities in order to elaborate on the Japanese regulatory approach to energy communities. On this basis, the paper shows possible models of regulating energy communities in Japan by juxtaposing the European solutions for membership, non-discriminatory treatment, barriers, support schemes, and grid issues. At the same time, the paper discusses the framework for developing RES in Japan, presenting energy communities from the viewpoint of 2050 carbon neutrality.

II. Framework for Developing Renewables in Japan

Japan has a long tradition of the state carrying out actions stimulating the energy sector. Since the 1970s the country has been initiating various initiatives relating to the energy industry. This includes the Sunshine Project, the Moonlight Project, and the New Sunshine Project. The first one – the Sunshine Project – was initiated in 1974 by the Agency of Industrial Science and Technology, a part of the Ministry of International Trade and Industry, which offer research and development activities in different energy activities, including solar.[9] This was the time of the energy crisis,[10] when attention was given to solar installations seen as an alternative to conventional fossil fuels.[11] With the total annual budget ranging from about 2,400 million JPY (1974) to 44,000 million JPY in the fiscal year 1985, the solar cell production in Japan reached 12,500 kW in 1986.[12] The Moonlight Project, started in 1978, was created to develop energy conservation technologies combining research and development works of government and industry.[13] Moreover, in response to the 1990s stagnation trends and to take advantage of the potential of renewable energy in Japan, the Sunshine Project along with the Moonlight Project and the Global Environmental Technology Program evolved into the New Sunshine Program launched in 1993.[14] These incentives – supplemented by other actions on PVs such as the Residential PV System Dissemination Program, as well as its predecessor Residential PV System Monitoring Program resulted in many demonstration projects and establishing basic research and development work which create the necessary demand for solar cells.[15] Also in the 1990s, the first Japanese solar power plant, owned and financed collectively by local citizens, was launched (1994).[16]

On the one hand, the 1980s and 1990s experiences with the successful New Sunshine Program as its flagship product have made Japan a long-term global forerunner with respect to solar energy. On the other hand, with first reduction and then discontinuation of solar subsidies, the PV market in Japan has stagnated or even declined.[17] In 2003, the Renewable Portfolio Standard (RSP) legislation imposed an obligation on utilities to supply fixed percentages of electricity generated each year from solar, wind, biomass, geothermal or small hydropower.[18] However, when compared to, e.g., European countries, the Japanese targets were very low. The annual target started at 7.32 TWh in 2003 then increased to 12.43 TWh and by 2010 was equivalent to only 1.35% of Japan's total electricity supply,[19] in contrast to e.g., about 22% indicative share of

[7] Consumer cooperatives in Japan trace their roots to the late nineteenth century, when, only twelve years after the Meiji Restoration, the first cooperative stores were established in Tokyo, Osaka, and Kobe in 1879, Akira Kurimoto, *Consumer Cooperatives' Model in Japan*, in *Waking the Asian Pacific Co-Operative Potential* 235, 236 (Morris Altman, Anthony Jensen, Akira Kurimoto, Robby Tulus, Yashavantha Dongre & Seungkwon Jang eds, Academic Press 2020). Formed in Mar. 1951 as a national federation of consumer co-ops in Japan, the Japanese Consumers' Co-operative Union (JCCU) brings together approximately 320 consumer co-ops and consumer co-op unions with about 29.6 million members, Japanese Consumers' Co-operative Union, *Who We Are*, https://jccu.coop/eng/jccu/who-we-are.html (accessed 6 Feb. 2021).

[8] In the last two decades, public interest in community wind power in Japan has increased, with projects set up in 2001 in Hokkaido and in 2003 in Aomori and Akita prefectures, Yasushi Maruyama, Makoto Nishikido & Tetsunari Iida, *The Rise of Community Wind Power in Japan: Enhanced Acceptance Through Social Innovation*, 35(5) Energy Pol'y 2761, 2763 (2007).

[9] Kiyoshi Takahashi, *Sunshine Project in Japan – Solar Photovoltaic Program*, 26(1–2) Sol. Cells 87 (1989).

[10] Maciej M. Sokołowski, *Energy as a Conflict Trigger. Comparative Analysis of International Disputes in the Middle East with Energy Relations in the Background*', in *International Disputes – A Challenge for the Contemporary World* 107, 111–115 (Anita Garnuszek, Aleksandra Surma & Laura Mazur eds, WPiA UW 2012).

[11] Yoshihiro Hamakawa, *Present Status of Solar Photovoltaic R&D Projects in Japan*, 86 Surf. Sci. 444 (1979).

[12] Takahashi, *supra* n. 9, at 87, 96.

[13] Mineo Tatsuta, *New Sunshine Project and New Trend of PV R&D Program in Japan*, 8(1–4) Renew. Energy 40 (1996); Yukiko Fukasaku, *Energy and Environment Policy Integration: The Case of Energy Conservation Policies and Technologies in Japan*, 23(12) Energy Pol'y 1063, 1067 (1995).

[14] Chihiro Watanabe, *Identification of the Role of Renewable Energy: A View from Japan's Challenge: The New Sunshine Program*, 6(3) Renew. Energy 237, 238 (1995).

[15] Sanjeeda Chowdhury, Ushio Sumita, Ashraful Islam & Idriss Bedja, *Importance of Policy for Energy System Transformation: Diffusion of PV Technology in Japan and Germany*, 68 Energy Pol'y 285, 286, 289 (2014).

[16] Jörg Raupach-Sumiya, *Consumer (Co-)Ownership in Renewables in Japan*, in *Energy Transition: Financing Consumer Co-Ownership in Renewables* 637, 641 (Jens Lowitzsch ed., Palgrave Macmillan 2019).

[17] *See* Chowdhury et al., *supra* n. 15, at 289.

[18] Timothy Fraser & Daniel P. Aldrich, *The Fukushima Effect at Home: The Changing Role of Domestic Actors in Japanese Energy Policy*, 11(5) Wiley Interdiscip. Rev. Clim. Change e655, 3 (2020).

[19] Yanli Dong & Koji Shimada, *Evolution from the Renewable Portfolio Standards to Feed-in Tariff for the Deployment of*

Models of Energy Communities in Japan (Enekomi)

electricity set to be produced from RES in the total EU-15 electricity consumption by 2010.[20] Furthermore, in 2005, the Residential PV System Dissemination Program was abandoned, and the Japanese PV market decreased from 260 MW in 2005 to just 180 MW in 2007.[21]

To improve this situation, in 2009, the government of Japan announced national goals of increasing PV capacity to – by referring to 2005 levels – twenty times by 2020, and forty times by 2040 – accordingly. This would amount to a deployment of 28 GW in 2020, and 56 GW in 2040.[22] In the same year (2009), a net metering scheme for PV was launched to require electricity companies to purchase any surplus electricity generated by the PV installations of their customers.[23] Furthermore, achieving these national goals was supported by the introduction of a new feed-in tariff (FIT) for electricity production in PV installations.[24] This happened in August 2011, when the Act on Special Measures concerning the Procurement of Renewable Energy by Operators of Electric Utilities (Act on Special Measures) was passed. The aim of the Act, as stated in its Article 1, is to encourage the use of RES by taking price measures. The FIT mechanism (effective from July 2012), which is at the heart of the Act on Special Measures,[25] evolved from (and incorporated) the PV net metering scheme.[26] Like the previous scheme, FIT obliges regional electricity utilities to purchase electricity from RES[27] (so not only PVs as in the metering scheme),[28] provides long-term contracts for renewable producers, and guarantees a fixed purchase price.[29]

It should be noted that the FIT legislation was adopted only three months after an event which had a significant impact on Japan's energy sector, i.e., – the Fukushima 2011 nuclear accident.[30] One should also observe that Japan has been developing nuclear power generation research since the mid-1950s, with the first commercial reactor launched in 1966 (166 MW). As a result, Japan had fifty-four commercial nuclear reactors of almost 49 GW installed capacity just before the Fukushima Daiichi Nuclear Power Station accident caused by the Great East Japan Earthquake in March 2011.[31] At the beginning of 2011, nuclear energy accounted for about 27% of electricity generation and was one of Japan's cheapest sources of energy.[32] The accident prompted the Japanese government's initial reaction in the matter of nuclear power plants (all were initially shut down in May 2012)[33] which were then required to perform a 'stress test' to examine whether the country's power plants would be prepared for comparable natural disasters.[34] This significant loss of electricity coming from nuclear sources was counteracted by the use of imported natural gas, low-sulphur crude oil, fuel oil, and coal. However, this resulted in higher electricity prices for consumers, higher government debt levels, and loss of revenue for electricity utilities, as fossil fuel electricity generation was more expensive in nuclear installations.[35]

Apart from expanding the use of conventional fuels, Japan changed its energy mix after the Fukushima accident in 2011, not only by increasing the share of natural gas and oil, but also – as previously mentioned – by trying to improve the use of RES.[36] One should note the activity in the Fukushima Prefecture, which plans to fully meet the energy demand (100%) generated in RES by 2040.[37] On the other hand, the FIT rate for PVs has recorded cyclical reductions: at the time of the system

Renewable Energy in Japan, 107 Renew. Energy 590, 591 (2017).

[20] Article 3(4) of Directive 2001/77/EC of the European Parliament and of the Council of 27 Sept. 2001 on the promotion of electricity produced from renewable energy sources in the internal electricity market, OJ L 283, 27 Oct. 2001, at 33–40. *See* Maciej M. Sokołowski, *Renewable Energy Communities in the Law of the EU, Australia, and New Zealand*, 28(2) Eur. Energy Envtl. L. Rev. 34, 35 (2019).

[21] Satoshi Myojo & Hiroshi Ohashi, *Effects of Consumer Subsidies for Renewable Energy on Industry Growth and Social Welfare: The Case of Solar Photovoltaic Systems in Japan*, 48 J. Jpn. Int'l Econ. 55 (2018).

[22] Chowdhury et al., *supra* n. 15, at 289.

[23] Kanako Morita & Ken'ichi Matsumoto, *Renewable Energy-Related Policies and Institutions in Japan: Before and After the Fukushima Nuclear Accident and the Feed-In Tariff Introduction*, in *Legal Issues of Renewable Energy in the Asia Region: Recent Developments in a Post-Fukushima and Post-Kyoto Protocol Era* 6 (Anton Ming-Zhi Gao & Chien Te Fan eds, Wolters Kluwer 2014).

[24] *See* Chowdhury et al., *supra* n. 15, at 289.

[25] Dong & Shimada, *supra* n. 19, at 591.

[26] Morita & Matsumoto, *supra* n. 23, at 8.

[27] *See* Art. 17(1) of the Act on Special Measures under which an electricity utility must supply or use electricity from RES.

[28] Morita & Matsumoto, *supra* n. 23, at 10.

[29] Dong & Shimada, *supra* n. 19, at 591.

[30] Nevertheless, it should be emphasized that the FIT mechanism had been under consideration since 2009 and that the Japanese government had already planned the FIT scheme prior to the Fukushima 2011 nuclear accident, which, however, accelerated the implementation of the scheme, *see* Morita & Matsumoto, *supra* n. 23, at 11.

[31] Federation of Electric Power Companies of Japan, *Nuclear Power Plants in Japan*, https://www.fepc.or.jp/english/nuclear/power_generation/plants/index.html (accessed 6 Feb. 2021).

[32] Maciej M. Sokołowski, *Priorities of Energy Policy of Japan Under Abenomics*, in *Opportunities for Cooperation Between Europe and Asia* 232 (Magdalena Sitek & Michał Łęski eds, WSGE 2015).

[33] *See* Federation of Electric Power, *supra* n. 31.

[34] Benjamin C. McLellan, Qi Zhang, N. Agya Utama, Hooman Farzaneh & Keiichi N. Ishihara, *Analysis of Japan's Post-Fukushima Energy Strategy*, 2(2) Energy Strategy Rev. 190, 191 (2013).

[35] Sokołowski, *supra* n. 32, at 232.

[36] *Ibid.*

[37] Fukushima Prefectural Government, *Renewable Energy Promotion Project*, http://www4.pref.fukushima.jp/investment/eng/challenge/001/ (accessed 6 Feb. 2021); *see* Yoshio Ohira, *Renewable-Energy Policies and Economic Revitalization in Fukushima: Issues and Prospects*, in *Rebuilding Fukushima* 148 (Mitsuo Yamakawa & Daisaku Yamamoto eds, Routledge 2017).

launch it accounted for 42 JPY/kWh in 2012, while in 2019 it went down to 24 JPY/kWh (for residential installations below 10 kW).[38] As a result, the demand for PV modules has decreased and the number of inactive PV projects has increased in Japan.[39]

III. Energy Communities in Japan 2050 Carbon Neutrality Agenda

In 2016, there were around 1,000 community-owned energy installations in Japan (with a total capacity of 89 MW),[40] most of which were solar power (984 projects/42 MW), with thirty wind power plants (46 MW) and ten small-scale hydropower plants (1 MW).[41] The first citizen funded wind power project in Japan, launched by Hokkaido Green Fund, started operating in September 2001 in Hamatombetsu, in the north of Hokkaido.[42] Community wind projects have been developed in the north of Honsiu, in Amori and Akita prefectures, under the framework of Green Energy Aomori and Japan Green Fund.[43] Community PV projects (located on rooftops of public buildings such as elementary schools and day-care centres for children) have been underway in Nagano prefecture since 2004 (Ohisama Shinpô Energy Fund in Iida city).[44] Renewable citizen investments have been mobilized both in smaller communities like Bizen city in Okayama prefecture (Bizen Green Energy Fund),[45] and in bigger municipalities like Kawasaki city (Citizen-Initiated Power Station Project),[46] as well as in other parts of Japan.[47]

While the energy policies in Japan are strongly dominated by the central government,[48] let us take a look at some local and civic energy elements still present in those policies. In 2019, Japan announced its 'Long-Term Strategy Under the Paris Agreement'[49] (Long-Term Strategy) which offers a vision of decarbonized society reducing the greenhouse gas (GHG) emissions by 80% to reach this target before 2050.[50] In October 2020, the new Japanese Prime Minister Yoshihide Suga made a move toward carbon neutrality in Japan,[51] pledging to cut GHG gas emissions in Japan to net zero by 2050,[52] and presenting it as a chance for the Japanese economy and society where 'proactively taking measures against global warming will … lead to major growth'.[53] These steps are a clear signal of the current pro-climate direction of Japanese politics, although it has not always been the case in the past.[54]

To reach these goals Japan adopts the use of innovations for decarbonization[55] realized at different levels by different stakeholders, both consumers and local governments.[56] What should be highlighted in the context

[38] *See* Yasuhiro Sakuma, *VPP/EV Aggregation Project in Japan*, Tokyo, 13 (8 Oct. 2019), https://www.nedo.go.jp/content/100898203.pdf (accessed 6 Feb. 2021).
[39] Kenji Takeuchi & Mai Miyamoto, *Renewable Energy Development in Japan*, in *Risks and Regulation of New Technologies* 219–221 (Tsuyoshi Matsuda, Jonathan Wolff & Takashi Yanagawa eds, Springer 2021).
[40] As of 2020, thirty local power producers and suppliers have been established or invested in by local authorities, Aki Suwa, *Renewable Energy and Regional Value: Identifying Value Added of Public Power Producer and Suppliers in Japan*, 37(5) Fin. Res. Lett. 101365 (2020).
[41] Raupach-Sumiya, *supra* n. 16, at 641.
[42] Shota Furuya, *The Pioneer of Community Wind in Japan*, https://www.energy-democracy.jp/264 (accessed 6 Feb. 2021).
[43] Maruyama, Nishikido & Iida, *supra* n. 8, at 2765.
[44] Raupach-Sumiya, *supra* n. 16, at 650.
[45] Kohei Izutsu, Masao Takano, Shota Furuya & Tetsunari Iida, *Driving Actors to Promote Sustainable Energy Policies and Businesses in Local Communities: A Case Study in Bizen City, Japan*, 39(1) Renew. Energy 107, 111 (2012).
[46] Kawasaki International Association (KIAN), *Overview of the Citizen-Initiated Ohisama ('Mister Sun') Solar Power Station*, https://www.kian.or.jp/len/topics/solar-power-gen.shtml (accessed 6 Feb. 2021).
[47] *See* Carol Hager & Nicole Hamagami. *Local Renewable Energy Initiatives in Germany and Japan in a Changing National Policy Environment*, 37(3) Rev. Pol'y Res. 386 (2020); Timothy Fraser, *Japan's Resilient, Renewable Cities: How Socioeconomics and Local Policy Drive Japan's Renewable Energy Transition*, 29(3) Envtl. Pol. 500 (2019).
[48] Izutsu et al., *supra* n. 45, at 107.
[49] Government of Japan, *Long-Term Strategy Under the Paris Agreement* (11 June 2019), https://unfccc.int/sites/default/files/resource/The%20Long-term%20Strategy%20under%20the%20Paris%20Agreement.pdf (accessed 6 Feb. 2021).
[50] *See ibid.*, at 15.
[51] Although the PM Suga's statement was the first occurrence when the Japanese prime minister presented a specific timeline for the development of a carbon-free society, it was not the first long-term emission target declared by Japan's top politician. One should note, e.g., the 'Fukuda Vision' presented by PM Yasuo Fukuda in 2009 which included a long-term GHG emissions reduction target of 60–80% by 2050, *see* Kae Takase & Tatsujiro Suzuki, *The Japanese Energy Sector: Current Situation, and Future Paths*, 39(11) Energy Pol'y 6731, 6735 (2011).
[52] Kyodo News, *Japan PM Suga Vows Goal of Net Zero Emissions by 2050* (26 Oct. 2020), https://english.kyodonews.net/news/2020/10/7a5539cd0324-japan-pm-suga-vows-goal-of-net-zero-emissions-by-2050.html (accessed 6 Feb. 2021).
[53] *Ibid.*
[54] Japan's position on climate has been hindered by a series of conflict resolution processes between different ministries and energy-intensive industries (which have consistently opposed the implementation of almost any type of emission-reduction policy); this has been accompanied by the lack of citizens' pressure on Japanese politicians to make more ambitious climate decisions, *see* Yasuko Kameyama, *Climate Change Policy: Can New Actors Affect Japan's Policy-Making in the Paris Agreement Era?*, jyaa051 Soc. Sci. Jpn. J. 2–3 (2021).
[55] *See* Nicola Labanca, Ângela Guimarães Pereira, Matt Watson, Kristian Krieger, Dario Padovan, Laura Watts, Mithra Moezzi, Grégoire Wallenborn, Rebecca Wright, Erik Laes, Brian D. Fath, Franco Ruzzenenti, Tine De Moor, Thomas Bauwens & Lyla Mehta, *Transforming Innovation for Decarbonisation? Insights from Combining Complex Systems and Social Practice Perspectives*, 65 Energy Res. Soc. Sci. 101452 (2020).
[56] *See* Long-Term Strategy, *supra* n. 49, at 17.

Models of Energy Communities in Japan (Enekomi)

of Japanese energy communities is that, apart from business, Japan plans to involve citizens at all levels to tackle climate change, promoting cooperation between public and private actors.[57] Aside from general actions, such as utilizing Sustainable Development Goals and already-established agenda like 'Society 5.0',[58] Japan proposes to create 'Circulating and Ecological Economy'. This approach is based on cooperation of regional communities utilizing their resources in a sustainable way to become self-reliant (as much as possible), and being connected in a network of communities[59] aimed at reaching decarbonization and sustainable development.[60]

Moreover, one should link two other fields with the postulate of 'Circulating and Ecological Economy'. One is 'co-creation' – repeated interactions between different types of knowledge (as cooperation is an element of sustainable regional communities),[61] combined with sharing best practices – as in the network of sustainable regional communities.[62] This falls into the scope of 'carbon neutral communities'[63] – agricultural (farming, fishing, forestry) and urban communities based on renewable generation and smart grids.[64] To encourage this transition and the smooth installation of renewables Japan plans to apply, inter alia, blockchain technology.[65]

Finally, one more important postulate needs further remarks. This is the heralded creation of a community-based initiative consisting of local authorities, entrepreneurs and residents.[66] Under this policy, the Japanese government plans, inter alia, to transform abandoned farms into large-scale PV installations[67] and improve the development of wind power by facilitating investment timeframes.[68] Furthermore, this type of energy communities can improve disaster prevention – enhancing self-sufficiency[69] by utilizing smart grids, energy storage (batteries), fuel cells, as well as cogeneration, combined with applying the demand response and virtual power plants (VPPs).[70]

Japanese energy communities have two dimensions, urban[71] and rural.[72] The urban-type involves increasing the energy efficiency of the use of electricity and heat in facilities and buildings as a way to achieve a major reduction in CO_2 emissions; it also encourages the use of public transport and promotes cycling and walking.[73] The rural-type could be linked to the Japanese idea of 'the Village Energy Management System' (VEMS) aimed at optimizing the use of local energy resources as well as 'farming photovoltaics'[74] or 'agrivoltaic

[57] *See ibid.*, at 16.
[58] Society 5.0 is a super smart society aiming for a prosperous humanocentrism built upon Society 4.0, *see* Mayumi Fukuyama, *Society 5.0: Aiming for a New Human-Centered Society*, 27 Jpn Spotlight 47, 47–48 (2018).
[59] cf. Diego Silva Herran & Akihisa Kuriyama, *Challenges for Realising Japan Long-Term Strategy for Decarbonisation Under the Paris Agreement, and the Role of Scenarios*, IGES Working Paper, 6 (Dec 2020), https://www.iges.or.jp/en/publication_documents/pub/discussionpaper/en/11101/MCS2020rev.pdf (accessed 6 Feb. 2021).
[60] Long-Term Strategy, *supra* n. 49, at 18.
[61] *See* Makoto Nishikido, Satoru Kuroda & Zenki Hirakawa, *Reconstruction from the Great East Japan Earthquake and the Development of Resilience in Regional Communities: Reconstruction of Residences and Livelihoods and Reorganization of Regional Communities in Kitakami-cho, Ishinomaki City, Miyagi Prefecture*, Soc. Post-Disas. Societ. 50, 56–58 (2014).
[62] Strategy, 2019, at 18–19.
[63] *See* Vanessa Rauland & Peter Newman, *Decarbonising Cities: Mainstreaming Low Carbon Urban Development* 13–55 (Springer 2015).
[64] Strategy, 2019, at 54.
[65] Strategy, 2019, at 55–56; *see* Amanda Ahl, Masaru Yarime, M. Goto, Shauhrat S. Chopra, Nallapaneni Manoj Kumar, Kenji Tanaka & Daishi Sagawa, *Exploring Blockchain for the Energy Transition: Opportunities and Challenges Based on a Case Study in Japan*, 117 Renew. Sust. Energy Rev. 109488 (2020).
[66] Strategy, 2019, at 55.
[67] Such projects have been carried out in Taiwan under the subsidisation of central and local governments, where abandoned farms have been rented and PV installations built, *see* Wen-Tien Tsai, *Innovative Promotion of Renewable Energy Development for Challenging Sustainable Low-Carbon Society: Case Study of Pingtung County, Taiwan*, 5(1) Challenges 26, 29 (2014).
[68] Strategy, 2019, at 55. For example, in the EU the procedures for the authorization, certification and licensing of renewable projects, including spatial planning, must be clearly coordinated and defined, with transparent timetables for the determination of planning and building applications, *see* Maciej M. Sokołowski, *Discovering the New Renewable Legal Order in Poland: With or Without Wind?*, 106 Energy Pol'y 68, 72 (2017).
[69] Energy self-sufficiency, along with the economic disaster recovery, are among the main reasons for the involvement of Japanese communities in local renewable projects, *see* Hager & Hamagami, *supra* n. 47, at 386, 400.
[70] Strategy, 2019, at 55.
[71] *See* Ioannis Poursanidis, Giuliano Rancilio, Evangelos Kotsakis, Gianluca Fulli, Marcelo Masera & Marco Merlo, *A Design Framework for Citizen Energy Communities in Cities: Exploring PV-Storage Synergies*, in *2019 IEEE PES Asia-Pacific Power and Energy Engineering Conference (APPEEC)*, Macao, 1–6.
[72] *See* Nasir El Bassam, Preben Maegaard & Marcia Lawton Schlichting, *Distributed Renewable Energies for Off-Grid Communities: Strategies and Technologies Toward Achieving Sustainability in Energy Generation and Supply* 215–283 (Elsevier 2013).
[73] Strategy, 2019, at 55. *See* Kimihiro Hino, Ayako Taniguchi, Masamichi Hanazato & Daisuke Takagi, *Modal Shift From Cars and Promotion of Walking by Providing Pedometers in Yokohama City, Japan*, 16(12) Int'l J. Envtl. Res. Pub. Health 2144 (2019). In a conducted survey research Japanese individuals (aged ≥ 65 years of age) most frequently selected ≤ 1 km as an acceptable walking distance, *see* Kenji Tsunoda, Yuki Soma, Naruki Kitano, Takashi Jindo, Keisuke Fujii & Tomohiro Okura, *Acceptable Walking and Cycling Distances and Their Correlates Among Older Japanese Adults*, J. Popul. Ageing 1 (2020).
[74] The alternative name used is 'solar sharing' (in Japanese: ソーラーシェアリング, *sōrāshearingu*), *see* Tomoya Kamata, 我が国における営農型太陽光発電の現状 [*Current Status of*

Models of Energy Communities in Japan (Enekomi)

systems'.[75] This means PV installations over arable fields,[76] including abandoned ones, enabling the land to be cultivated[77] and mitigating land-use conflicts caused by the growth of PV use.[78] Lastly, one should also note the idea of using a mixture of innovating technologies including AI applied by these communities for the climate needs,[79] inter alia, monitoring GHG emissions.[80]

Bearing in mind the steps and concepts addressed in the Long-Term Strategy it is justifiable to examine how the Japanese energy communities could be regulated. This concerns their recognition in law, including the definition, criteria for membership, rights and duties – covering such issues as promotion, also via support schemes, connection to the grid, and grid management. The recently adopted European solutions could be a good benchmark – as energy communities are deeply rooted in the European energy sectors of selected Member States.

IV. EU Framework on Energy Communities and Regulatory Models for Japan

Apart from defining energy communities in law, the main element brought by the European legislation concerns enabling the framework,[81] to promote and facilitate the development of energy communities.[82] As in the case of definitions, this regulatory regime could be a benchmark for Japan, if the country decides to create a direct legal environment for energy communities.[83] Let us discuss this by addressing five different issues: membership, non-discriminatory treatment, barriers, support schemes, and grid management.

4.1 Criteria of membership

Defining energy communities in law makes it necessary to provide the basic criteria for their membership. If Japan decides to establish energy communities in law in a direct way, the following issues should be addressed: voluntary membership, open membership, effective control; community character, aims of operation.

First, a voluntary membership should ensure that no one would be forced to join an energy community – the same applies to leaving them; nobody can be stopped from staying, forced to stay in or leave an energy community.[84] This approach does not exclude public policies encouraging some entities to join energy communities – e.g., local authorities and entities under their influence. Japan has a long-standing tradition of this kind of cooperation. In Japan, local authorities usually own and operate the entities responsible for providing services of general interest like water supply, sewage, and waste management.[85] Sometimes, several municipalities jointly establish a special association to operate these services ('partial-affairs association').[86] Such an association is a specific type of a local public organization established to jointly manage the duties of several local public bodies in waste management, sewage disposal, fire-fighting or ambulance operation.[87] It has a corporate legal status and the Local Autonomy Law stipulates it as a

Farming Photovoltaics in Japan], 29(2) J. Arid Land Stud. 75 (2019).

[75] *See* Harshavardhan Dinesh & Joshua M. Pearce, *The Potential of Agrivoltaic Systems*, 54 Renew. Sust. Energy Rev. 299 (2016).

[76] Apart from the stilt-mounted PV modules above the crops, one can also find other examples of agrovoltaics, such as a PV greenhouse, in which a part of its transparent cover is replaced by PV modules or the sites where the space between PV rows is used for crops, *see* Takashi Sekiyama & Akira Nagashima, *Solar Sharing for Both Food and Clean Energy Production: Performance of Agrivoltaic Systems for Corn, a Typical Shade-Intolerant Crop*, 6(6) Env'ts 65, 2 (2019).

[77] Strategy, 2019, at 51, 58.

[78] *See* William Lytle, Theresa K. Meyer, Nagendra G. Tanikella, Laurie Burnham, Julie Engel, Chelsea Schelly & Joshua M. Pearce, *Conceptual Design and Rationale for a New Agrivoltaics Concept: Pasture-Raised Rabbits and Solar Farming*, 282 J. Clean. Prod. 124476 (2021).

[79] *See* Maciej M. Sokołowski, *AI and Climate-Energy Policies of the EU and Japan*, in *Regulating Artificial Intelligence in Industry* (Damian Bielicki ed., Routledge 2021).

[80] *See* Strategy, 2019, at 58. *See also* Georgios Chalkiadakis, Charilaos Akasiadis, Nikolaos Savvakis, Theocharis Tsoutsos, Thomas Hoppe & Frans Coenen, *Providing a Scientific Arm to Renewable Energy Cooperatives*, in *The Role of Exergy in Energy and the Environment* 717 (Sandro Nižetić & Agis Papadopoulos eds, Springer 2018).

[81] Theodoros G. Iliopoulos, *The Promotion of Renewable Energy Communities in the European Union*, in *Energy Services Fundamentals and Financing* 37, 43 (David Borge-Diez & Enrique Rosales-Asensio eds, Academic Press 2011).

[82] Accordingly, under Art. 22(4) of RED II the Member States are obliged to provide an enabling framework for the rescoms; *see* Art. 16 of FED with respect to citencoms.

[83] In Japan, there is no legal concept of consumer co-ownership, and the term 'community power' is widely used for projects funded and owned jointly by consumers and local residents, Raupach-Sumiya, *supra* n. 16, at 641–642.

[84] *See* Maciej M. Sokołowski, *Renewable and Citizen Energy Communities in the European Union: How (Not) To Regulate Community Energy in National Laws and Policies*, 38(3) J. Energy Nat'l Res. L. 289 (2020).

[85] Usually these are Waterworks Bureau (in Japanese: *suidō-kyoku*, 水道局), Sewerage Bureau (*gesuidō-kyoku*, 下水道局), Cleaning Office (*seisō jimusho*, 清掃事務所), etc.; *see* Chiba Prefectural Government, *Waterworks Bureau*, https://www.pref.chiba.lg.jp/english/regidents/waterworks.html (accessed 18 Feb. 2021); Kitami City, *Waterworks and Sewerage Bureau*, http://www.city.kitami.lg.jp.e.fu.hp.transer.com/soshiki/jogesuido/ (accessed 18 Feb. 2021); Bureau of Sewerage Tokyo Metropolitan Government, *About Us*, https://www.gesui.metro.tokyo.lg.jp/english/aboutus/index.html (accessed 18 Feb. 2021).

[86] In Japanese: *ichi buji mukumi ai*, 一部事務組合.

[87] Kiyotaka Yokomichi, *New Policies in Wide-Area Administration in Japan*, 6 Utd. Docs. Loc. Auton. Jpn. 1, 7 (2010).

Models of Energy Communities in Japan (Enekomi)

type of a union.[88] This type of framework could constitute an interesting benchmark for the future growth of Japan's energy community movement. In this light, various ways for encouraging different entities to join energy communities should be allowed. To do so, the government of Japan could elaborate on the 'Energy Community Strategy' offering a description of the tools which could be offered to energy communities in Japan.

Second, energy communities should be as open as possible. However, providing the right conditions for joining energy communities would not only be in line with the above-mentioned openness – it would also be highly recommended. This may concern, e.g., the communities' local character – distinguished by the cooperation of local actors, benefits for local areas, or the proximity of renewable installations. Some additional criteria could also be established, including those of a financial nature (e.g., own contribution in shares) – however, this cannot be excessive.[89] In the case of Japan this could be limited to local governments, as under the 'Eco-town' programme mandating their cooperation with the private sector.[90]

Third, what is important in creating the regulatory framework for energy communities is maintaining their community character. This involves keeping the decision-making in the hands of smaller members of energy communities, especially individuals.[91] Similarly, energy communities should not become platforms for business entities willing, e.g., to optimize their corporate tax if energy communities are granted tax deductions. This is linked with another issue – a matter of activities undertaken by energy communities. In general, energy communities should have a possibility to act in the energy sector, i.e., generate, consume, store, or distribute and supply energy. Here, a prosumer model[92] may be used (in which many possibilities regarding energy activities are provided for energy communities)[93]; however, the scope of this activity could have limitations. Therefore, when considering the introduction of energy communities in law, Japan should consider the widest possible approach to energy activities, while limiting their size. This should be done in order to maintain their local character and community nature.[94] In this way, energy communities should be allowed to, e.g., offer a charging service for electric vehicles of non-members of energy communities, where the profits from this service would be used for the aims of community's operation or providing heat supplies.[95] In the latter case, if generation of electricity was combined with the production of electricity[96] they could be recognized as cogeneration cooperatives/cogeneration communities (cogenatives/cogenmunities).[97] Such organizational solution of energy communities using cogeneration could also be applied in the growing Japanese CHP sector,[98] especially at micro scale.[99]

Finally, the EU law stipulates specific goals for energy communities' activities. These are 'environmental, economic or social community benefits to its members or shareholders' along with the benefits to local areas set as the key purposes of citencoms' operation.[100] By referring these goals to the previously discussed community nature and energy activities provided by energy communities under the prosumer model – the Japanese framework for this type of structures should balance their general profits (from simply doing business) with the benefits for their members, shareholders, and local areas.[101] The aim of the proposed solutions should be to promote those activities which address environmental, economic, social, or local community benefits. At the same time they should allow the generation of profits but only as an auxiliary activity – any given energy community should not exist solely for profit.[102] Energy communities should therefore differ from energy companies offering energy products (electricity or heat) to their customers. In this light, energy communities could supply surplus electricity generated to the

[88] Michikazu Kojima, *Regional Waste Management – Inter-Municipal Cooperation and Public and Private Partnership*, in *Inter-Municipal Cooperation and Regional Waste Management in Japan* 10, 29 (Shunsuke Kimura ed., ERIA 2020).
[89] *See* Sokołowski, *supra* n. 84, at 293.
[90] *See* Yasuhiko Hotta, *Recycling Policy: The Sound Material Cycle Society and 3R Concepts from Japan to Developing Asia*, in *Waste as a Resource* 162, 170 (Ronald E. Hester & Roy M. Harrison eds, RSC 2013).
[91] *See* Recital 44 of FED.
[92] *See* Clément Alaton, Jesus Contreras-Ocaña, Philippine de Radiguès, Thomas Döring & Frédéric Tounquet, *Energy Communities: From European Law to Numerical Modeling*, in *2020 17th International Conference on the European Energy Market (EEM)*, Stockholm, 4.
[93] Like supply, aggregation or other commercial energy services, Sokołowski, *supra* n. 84, at 294.
[94] *Ibid.*, at 300.
[95] *See* Stian Backe, Magnus Korpås & Asgeir Tomasgard, *Heat and Electric Vehicle Flexibility in the European Power System: A Case Study of Norwegian Energy Communities*, 125 Int'l J. Electr. Power Energy Syst. 106479 (2021).
[96] Cogeneration or Combined Heat and Power (CHP).
[97] Maciej M. Sokołowski, *European Law on Combined Heat and Power* 232 (Routledge 2020).
[98] As of Mar. 2020, there are 20,813 CHP units in Japan accounting for 12,975: 15,019 installed in commercial sectors (2,669 MW) and 5,794 in industry (10,306 MW), Advanced Cogeneration and Energy Utilization Center JAPAN, *Total Number of Units and Total Capacity*, https://www.ace.or.jp/web/en/currentstate/currentstate_0010.html (accessed 6 Feb. 2021).
[99] *See* Yasushi Santo, *Micro Cogeneration in Japan*, in *Micro Cogeneration: Towards Decentralized Energy Systems* 265, 270–273 (Martin Pehnt, Barbara Praetorius, Katja Schumacher, Corinna Fischer, Lambert Schneider, Martin Cames & Jan-Peter Voß eds, Springer 2006).

Models of Energy Communities in Japan (Enekomi)

grid,[103] but generally, electricity produced should be consumed or stored by the energy community itself[104]; though other approaches are also available.[105] In Japan, grid delivery has become popular as a result of FIT. However, the Act for Establishing Energy Supply Resilience[106] adopted in June 2020 introduced the local grid isolation scheme and authorized the aggregator business (VPPs). Therefore, the more the retail price of electricity increases, the better self-consumption will be in Japan. Assuming, therefore, that the retail price of electricity would increase, self-consumption could be the preferred option in Japan.

4.2 Non-discriminatory treatment

One of the basic elements of the framework for an energy community is the role of its members – they keep the status of energy consumers or prosumers (final, household customers, or active customers)[107] – as it does not negatively affect their membership in the energy community.[108] In this way, the members do not lose their rights and obligations deriving from the energy consumer or prosumers status.[109]

Despite some advances in their market position (Japanese energy consumers were granted the right to change electricity supplier in April 2016),[110] there is still room for further improvement.[111] In the EU, there is an important element of the framework which concerns the non-discriminatory treatment of energy communities.[112] This covers fair, proportionate, and transparent procedures and charges, including those regarding the registration and licensing of energy installations by energy communities – these are the facilitations which should be applied to energy communities.[113] However, the previously mentioned discrimination has two dimensions – accordingly, both have to be covered by regulatory approach.

The first concerns external relations – the interactions of energy communities with other participants of the energy market. Here, specific problems may occur in the course of energy communities operation, especially those concerning the relationship with distribution system operators (DSOs). Issues which may arise here include, among others, access to the market or connection to the grid, i.e., cost – too high, time – too long, application for connection – too complicated.[114] In this context, one should note the obligation to cooperate with energy communities imposed by EU law on DSOs.[115] Moreover, the non-discriminatory approach (external) covers the procedures and grid charges which, besides being non-discriminatory, should also be transparent.[116] In addition, the grid charges – as highlighted in the European legislation – have to be cost-reflective[117]; They must also meet the conditions for other relevant charges, levies, and taxes which are to be adequate, fair, and represent a balanced contribution to the overall cost sharing of the system.[118] This approach, where the cost matters, would be in line with the Japanese move towards making RES more market-oriented. The second dimension reflects the internal matter of non-discriminatory treatment of the members

[100] Article 2(11)(b) of FED.

[101] Cf. Nobuko Kawashima, *The Emerging Nonprofit Sector in Japan: Recent Changes and Prospects*, 1(1) Nonprof. Rev. 5 (2001).

[102] Sokołowski, *supra* n. 84, at 299–300.

[103] *See* Verena Heinisch, Mikael Odenberger, Lisa Göransson & Filip Johnsson, *Organizing Prosumers Into Electricity Trading Communities: Costs to Attain Electricity Transfer Limitations and Self-Sufficiency Goals*, 43(13) Int'l J. Energy Res. 7021, 7025, 7031 (2019).

[104] *See* Andrea Bartolini, Francesco Carducci, Carlos Boigues Muñoz & Gabriele Comodi, *Energy Storage and Multi Energy Systems in Local Energy Communities With High Renewable Energy Penetration*, 159 Renew. Energy 595 (2020).

[105] There are three major trends regarding how the surplus generation is treated: first, energy exports are not remunerated or compensated at wholesale market prices ('pure self-consumption'); second, the surplus generation is awarded a subsidised market premium or FIT ('self-consumption with feed-in tariffs'); and third, the surplus generation is converted into energy credits which offset any future grid consumption ('self-consumption with net metering'), Ricardo Moura & Miguel Centeno Brito, *Prosumer Aggregation Policies, Country Experience and Business Models*, 132 Energy Pol'y 820 (2019).

[106] In Japanese: エネルギー資源エネルギー安全保障, *enerugī kyōkyū kyōjin-ka-hō.*

[107] According to Art. 2(8) of FED, an active customer is 'a final customer, or a group of jointly acting final customers, who consumes or stores electricity generated within its premises located within confined boundaries or, where permitted by a Member State, within other premises, or who sells self-generated electricity or participates in flexibility or energy efficiency schemes, provided that those activities do not constitute its primary commercial or professional activity'; *see also* K. J. Cseres, *The Active Energy Consumer in EU Law*, 9(2) Eur. J. Risk Regul. 227 (2018); Maria Ioannidou, *Effective Paths for Consumer Empowerment and Protection in Retail Energy Markets*, 41(2) J. Consum. Pol'y 135 (2018).

[108] *See* Ksenia Poplavskaya & Laurens de Vries, *Aggregators Today and Tomorrow: From Intermediaries to Local Orchestrators?*, in *Behind and Beyond the Meter* 105, 118–120 (Fereidoon Sioshansi ed., Academic Press 2020).

[109] Sokołowski, *supra* n. 84, at 300.

[110] Kong Joo Shin & Shunsuke Managi, *Liberalization of a Retail Electricity Market: Consumer Satisfaction and Household Switching Behavior in Japan*, 110 Energy Pol'y 675, 676 (2017).

[111] *See* Andrew Chapman & Kenshi Itaoka, *Curiosity, Economic and Environmental Reasoning: Public Perceptions of Liberalization and Renewable Energy Transition in Japan*, 37 Energy Res. Soc. Sci. 102 (2018).

[112] Whenever it comes to non-discrimination, it is not only a matter of system user similarity, but also of whether system users are in an analogous situation with respect to the services they use, Hannah Kruimer, *Non-Discriminatory Energy System Operation: What Does It Mean*, 12(3) Comp. & Reg. Network Indus. 260 (2011).

[113] *See* Sokołowski, *supra* n. 84, at 300.

Models of Energy Communities in Japan (Enekomi)

of an energy community – this concerns in particular the consumers, especially the poorer ones.[119]

4.3 Barriers

The European regulatory framework[120] is aimed at eliminating the barriers hindering development and operation of energy communities.[121] As highlighted in the RED II the barriers have no justification – simply: 'unjustified regulatory and administrative barriers to [rescoms] are removed'.[122] Despite the wording ('unjustified'), all regulatory and administrative barriers to development of rescoms should be eliminated.[123]

In practice, energy communities also face certain obstacles connected with the setting up and running.[124] These include: unnecessary requirements of establishing the communities, such as the number of members (especially if it is much higher than in other comparable structures),[125] or financial requirements.[126] Other issues may include legal specifications related to specific documentation needed for the formation of an energy community (the amount and types of documents required) and the complexity of the documentation itself.[127] In addition to barrier-qualification, these examples also reflect the concerns related to procedures, such as registration and licensing which should be reasonable, adequate and clear.[128]

How can we recognize that some provisions of regulatory approaches are barriers while others are justified or adequate? This problem could be ascertained in a few ways. For instance, it can be defined in the national legislation in a general way, driven by the following wording: 'any regulatory and administrative barriers to energy communities are prohibited'. This general solution, seemingly good, can, however, cause practical problems – as its actual enforcement may be complicated; besides, in Japan, the actual barrier is the grid capacity. Moreover, it does not solve the issue raised above (how to recognize a barrier).

Therefore, some provisions, especially those at an executive level (e.g., when some regulatory duties are performed by energy operators or when local authorities have power to decide about specific issues related to operation of energy communities) could be formally made into named barriers ('black list').[129] This could be done in a register[130] listing them either *ex post* or *ex ante*.[131] In Japan, the guidelines provided by the Japan Fair Trade Commission which acts to promote fair and free competition by prohibiting, inter alia, unfair trade practices or eliminating unreasonable restraints on production, sale, price, technology, etc.[132] could serve as a reference for such a register.[133] Another way to qualify specific provisions (e.g., of local authorities) or a particular conduct of, for example, grid operators as an obstacle to energy communities, is to leave it to the court (or to the regulator, if the administrative way of resolving it is allowed by law). This would, however, require ensuring efficiency[134] (the time that goes from bringing the case to obtaining the judgment, including the appeal).[135]

4.4 Support schemes

In the EU, the support schemes for electricity from RES have to be established to maximize their integration in the electricity market.[136] Apart from this, the systems have to comprise maximizing revenues, on a market basis, i.e., by responding to price signals.[137] This could be accomplished on the basis of direct price support schemes which give a sliding fixed market premium, delivered in

[114] *Ibid.*, at 294. This was the case in India where wind developers faced multiple problems related to, e.g., obtaining various approvals from different authorities, land acquisition, grid access, and complicated procedures often leading to high costs, *see* Suyash Jolly & R. P. J. M. Raven, *Collective Institutional Entrepreneurship and Contestations in Wind Energy in India*, 42 Renew. Sust. Energy Rev. 999, 1005 (2015); *see also* Maciej M. Sokołowski, *When Black Meets Green: A Review of the Four Pillars of India's Energy Policy*, 130 Energy Pol'y 60 (2019).

[115] It concerns the facilitation of electricity transfers within energy communities with fair compensation, as assessed by the regulatory authority, as provided for in Art. 16(1) of FED.

[116] *See* Maciej M. Sokołowski, *Regulation in the European Electricity Sector*, 202–203 (Routledge 2016).

[117] *See* Robert Passey, Navid Haghdadi, Anna Bruce & Iain MacGill, *Designing More Cost Reflective Electricity Network Tariffs with Demand Charges*, 109 Energy Pol'y 642 (2017).

[118] *See* Recital 71 of preamble of RED II.

[119] *See* Shinichiro Okushima, *Understanding Regional Energy Poverty in Japan: A Direct Measurement Approach*, 193 Energy Build. 174 (2019). *See also* Jakub Sokołowski, Piotr Lewandowski, Aneta Kiełczewska & Stefan Bouzarovski, *A Multidimensional Index to Measure Energy Poverty: The Polish Case*, 15(2) Energy Sources B. Econ. Plan. Pol. 92 (2020).

[120] FED and RED II.

[121] *See* Vasco Brummer, *Community Energy – Benefits and Barriers: A Comparative Literature Review of Community Energy in the UK, Germany and the USA, the Benefits It Provides for Society and the Barriers It Faces*, 94 Renew. Sust. Energy Rev. 187 (2018); Dagmara Dragan, *Legal Barriers to the Development of Energy Clusters in Poland*, 29(1) Eur. Energy Envtl. L. Rev. 14 (2020).

[122] Article 22(4)(a).

[123] Otherwise, the '*justified* regulatory and administrative barriers' could be retained, which is not the intention of RED II, Sokołowski, *supra* n. 84, at 291.

[124] *See* Gordon Walker, *What Are the Barriers and Incentives for Community-Owned Means of Energy Production and Use?*, 36(12) Energy Pol'y 4401, 4402–4403 (2008).

[125] Sokołowski, *supra* n. 84, at 293.

[126] For example, the need to provide bank or insurance guarantees, where comparable legal entities are not needed to provide them, *ibid.*, at 293.

[127] *Ibid.*

[128] *Ibid.*

[129] '[A]n indication of the categories of … practices which cannot be exempted under any circumstances', John Ratliff, Stephen Tupper & Jan Curschmann, *Competition Law and*

Models of Energy Communities in Japan (Enekomi)

an open, transparent, competitive, non-discriminatory, and cost-effective way.[138] Auction is the one that meets all of these criteria.[139] Additionally, small-scale installations and demonstration projects, because of their capacities, are given exemptions.[140]

In Japan, the community energy projects face the problem of non-adjustment to the scale. The FIT scheme initially applied only to two tariff classes (<10 kW and >10 kW, with installations of 250 kW moved to auctions in 2020)[141], which means that medium-scale projects, like those over –250 kW, are considered large when it comes to meeting similar terms of project management, financing and economic feasibility. This, however, works to the detriment of citizens and community-based projects as investment costs are higher for medium-scale projects than for the large-scale ones.[142]

By developing a support scheme for small renewable installations, including those operated by rescoms, the Japanese non-adjustment problem could be solved. This could be, e.g., a separate scheme offered for rescoms – such as a tariff supporting small rescoms (those under 500 kW).[143] Alternatively, rescoms could be included in a separate bidding process limited to energy communities, or specific technologies. This could take shape of an auction for a long-term contract for energy sales from rescoms of a given capacity (e.g., between 1–2 MW of power installed) using a specific technology (e.g., wind or solar).[144] Due to the shape of the current support system, this regulatory solution may also be interesting for Japan.

4.5 Grid connection and management

While the EU law offers a possibility of applying a simple notification procedure for grid connections of installations or aggregated production units,[145] the connection of renewable installations is under a tighter regime[146] including the energy utilities' right to deny access to the grid.[147] These provisions on grid access and connection costs (as well as power curtailment)[148] have further strengthened the Japanese energy utilities. Unfortunately, it has also increased the costs and risks buried by renewable developers, in particular for the projects run by individuals and in co-ownership, turning these provisions into formidable barriers.[149]

Furthermore, with respect to grid management, under the EU law energy communities can be entitled to own, establish, purchase or lease distribution grid and autonomously manage it.[150] If citencoms are given the right to manage the distribution grid in their area of operation (this goes together with the right to establish relevant procedures), their regulatory framework has to be adjusted. The adjustment covers three types of issues. First, contracts on grid operation between a given citencom and the relevant operators: DSO or TSO (transmission system operator) to which the citencom's grid is connected. Second, appropriate grid charges have to be applied so that the electricity fed into the distribution grid and the electricity consumed by the citencom is accounted for separately. Third, the customers who remain

Insurance: Recent Developments in the European Community, 18 Int'l Bus. L. 352, 354 (1990).

[130] Sokołowski, *supra* n. 84, at 292.

[131] *See* Maciej M. Sokołowski, *Regulatory Dilemma: Between Deregulation and Overregulation*, in *Prawo administracyjne wobec współczesnych wyzwań. Księga jubileuszowa dedykowana profesorowi Markowi Wierzbowskiemu* [*Administrative Law Facing Contemporary Challenges: Jubilee Anniversary Publication Dedicated to Professor Marek Wierzbowski*] 591 (Jacek Jagielski, Dariusz Kijowski & Marek Grzywacz eds, CH Beck 2018).

[132] *See* Art. 1 of the Act on Prohibition of Private Monopolization and Maintenance of Fair Trade (Act No. 54 of 14 Apr. 1947).

[133] Japan Fair Trade Commission, *Guidelines*, https://www.jftc.go.jp/en/legislation_gls/imonopoly_guidelines.html (accessed 6 Feb. 2021).

[134] *See* Marek Wierzbowski, Roberto Galán-Vioque, Eduardo Gamero Casado, Marek Grzywacz & Maciej M. Sokołowski, *Challenges and Prospects of E-Governance in Poland and Spain*, 17(1) Electron Govern 1 (2021).

[135] Sokołowski, *supra* n. 84, at 292.

[136] Article 4(3) of RED II.

[137] 'Electricity from renewable sources should be deployed at the lowest possible cost to consumers and taxpayers' as stated in Recital 19 of preamble to RED II.

[138] Sokołowski, *supra* n. 84, at 295; *see* Art. 4(4) of RED II.

[139] 'Market-based mechanisms, such as tendering procedures, have been demonstrated to reduce support cost effectively in competitive markets in many circumstances', as underlined in Recital 19 of preamble to RED II.

[140] According to the EU Guidelines on State aid for environmental protection and energy 2014–2020 (renewables of capacity lower than 500 kW/1 MW or demonstration projects (with the exception of some wind sources) are generally exempted from the operational aid requirements and the competitive bidding process does not apply to them, Communication from the Commission – Guidelines on State aid for environmental protection and energy 2014–2020, OJ C 200, 28 June 2014; *see* Sokołowski, *supra* n. 84, at 296.

[141] International Renewable Energy Agency (IRENA), *Renewable Energy Auctions in Japan: Context, Design and Results* 10 (IRENA: 2021), https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2021/Jan./IRENA_Auctions_Japan_2021.pdf (accessed 6 Fe. 2021).

[142] Raupach-Sumiya, *supra* n. 16, at 642.

[143] Sokołowski, *supra* n. 84, at 296.

[144] *Ibid.*

[145] Those having 10.8–50 kW of power installed as provided for in Art. 17 of RED II.

[146] 'In Japan, the grid connection code has not yet matured compared to the requirement for generators in the network codes developed by the European Network of Transmission System Operators', Kazuhiko Ogimoto & Hiroshi Wani, *Making Renewables Work: Operational Practices and Future Challenges for Renewable Energy as a Major Power Source in Japan*, 18(6) IEEE Power Energy Mag. 47, 61 (2020).

[147] Raupach-Sumiya, *supra* n. 16, at 643. For example, in the past, no explanation of the refusal of access to the grid was given to wind developers, Emi Mizuno, *Overview of Wind*

Models of Energy Communities in Japan (Enekomi)

connected to the distribution system are not discriminated against or harmed.[151]

Moreover, citencoms can be granted the status of closed DSO[152]; this option, though, should only be considered as an alternative to the general status of DSO which may be granted to a given energy community.[153] Other elements of the citencoms' position in the energy system concerns their balance responsibilities,[154] consumption of self-generated electricity, as well as sharing electricity produced within citencom.[155] Under the EU law, all market participants shall be responsible for the imbalances they cause in the system[156] (this implies the financial responsibility for the created imbalances),[157] with some exemptions which could also be applied to citencoms. This concerns demonstration projects for innovative technologies and smaller RES with the maximum power of 400 kW.[158]

V. Conclusion

Energy communities are already part of the current Japanese energy sector. As of 2017, more than 200 organizations were set up in anonymous partnerships and other types of entities realizing joint prosumer projects of renewable character.[159] These entities represent *enerugīkomyuniti*[160] – or *enekomi* – reflect a growing wave of prosumer movements powered by RES, which are increasingly competitive and adjustable (when it comes to scale). In this trend PV plays an important role, providing an opportunity for multiple deployments in places previously unable to access renewable energy (such as farms) and for broader popularization and use of distributed energy in Japan.

Moreover, the process of decentralization currently taking place in the Japanese energy sector cannot be ignored. This is reflected in the establishment of municipal power producers and suppliers (small-scale entities covering local areas) considered 'newcomers in the liberalised retail sector', and emerging as a result of the electricity deregulation policy which entered into force in April 2016.[161] Among the said entities one may find those based on the local governments' investments in renewable capacity. An example of such is Miyama Smart Energy (the forerunner of this movement), which not only sells power to the inhabitants of Miyama City but also promotes a home energy management system that monitors power consumption and considers investing in its own local grid.[162]

Recent amendments (May 2021) to the Act on Promotion of Global Warming Countermeasures[163] aimed at reaching carbon neutrality in Japan by 2050, with a legal framework for the regional decarbonization promotion projects, may encourage the development of the community energy in Japan. However, further development of *enekomi* requires the appropriate regulatory framework. On the basis of the experience of the Member States, the European Union has managed to establish a model that could be implemented in Japan after an appropriate adaptation. This applies in particular to solutions offered to energy communities in Europe with respect to the previously discussed membership, non-discriminatory treatment, barriers, support schemes as well as grid connection and management. Japan, which wants to promote the concept of a sustainable regional community internationally, must focus on a more preferential approach to *enekomi.*

[151] Sokołowski, *supra* n. 84, at 301.
[152] According to Art. 38(1) of FED it is an electricity distribution system operating within a geographically confined industrial, commercial or shared services site generally not supplying household customers except a small number of households linked with the owner of distribution system by employment or similar relation who use this system incidentally; *see also* recital 47 to preamble of FED.
[153] Sokołowski, *supra* n. 84, at 302.
[154] Regarding the balance responsibilities, Third Electricity Regulation (TER) applies, i.e., Regulation (EU) 2019/943 of the European Parliament and of the Council of 5 June 2019 on the internal market for electricity, OJ L 158, 14 July 2019.
[155] Sokołowski, *supra* n. 84, at 301.
[156] *See* Juan José Alba, Carolina Vereda, Julián Barquín & Eduardo Moreda, *Market Design and Regulation to Encourage Demand Aggregation and Participation in European Energy Markets*, in *Variable Generation, Flexible Demand* 393, 396 (Fereidoon Sioshansi ed., Academic Press 2021).
[157] Article 5(1) of TER.
[158] From 1 Jan. 2026 this level will be twice as low, i.e., only 200 kW RES would be exempted from balancing duties, *see* Art. 5(4) of TER.
[159] Raupach-Sumiya, *supra* n. 16, at 649.
[160] In Japanese: エネルギーコミュニティ (*enerugīkomyuniti*) or エネコミ (*enekomi*).
[161] Takao Ando, *A Study of Municipal Power Producer and Supplier Projects and the Ideal Business Style for Local City*, 45(4) J. Jpn. Sol. Energy Soc. 61 (2019).
[162] Jörg Raupach-Sumiya, *Marketing Renewable Energy in Japan*, in *Marketing Renewable Energy: Concepts, Business Models and Cases* 375, 391 (Carsten Herbes & Christian Friege eds, Springer 2017).
[163] In Japanese: 地球温暖化対策推進法, *chikyūondankataisaku suishin-hō*.

Energy Policy and Development in Japan, 40 Renewable Sust. Energy Rev. 999, 1009 (2014).