2020 Edition

Japan Coal Phase-Out:

The Path to Phase-Out by *2030*

KIKO NETWORK 気候ネットワーク

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Contents

Executive Summary

- Coal-fired power plants have proliferated in Japan since the 1970s, and today coal accounts for about 30% of electricity generated in the country. As of the time this report was written (November 2020), there were 162 operational electricity generation units at coal-fired power plants throughout Japan, with a total capacity of 49,289 megawatts (MW).
- National legislation relating to coal-fired power generation -- such as the Act Concerning the Rational Use of Energy, and the Act on the Promotion of Use of Non-fossil Energy Sources and Effective Use of Fossil Energy Materials by Energy Suppliers -- has had no limiting effect on the 50 coal-fired power plant projects proposed since 2012, many of which are still relentlessly moving ahead with construction and starting operation.
- If the world is to achieve the 1.5 to 2.0 degrees Celsius goal of the Paris Agreement, developed countries must phase out coal power by 2030.
- The national goal of carbon neutrality by 2050 announced by Prime Minister Yoshihide Suga in October 2020 is consistent with the Paris Agreement; accordingly, Japan needs to phase out coal power by 2030.
- The policy for a coal phase-out by 2030 must be articulated, and the government and power suppliers need to develop plans. The plans must ensure transparency and be implemented faithfully.
- In this coal phase-out report, the sequenced retirement of coal-fired power plants is proposed, starting first with old and inefficient facilities.
- Considering many factors, it is entirely possible to gradually phase out coal-fired power generation without affecting the nation's power supply, and to meet demand without relying on nuclear or coal power. Electricity demand is below projections; there is spare capacity with LNG gas-fired power generation facilities and capacity utilization ratios; more renewable energy is being installed and the government is considering raising its targets; and demand can be shifted by demand side management.

Preface for this Edition

On October 26, 2020, Prime Minister Yoshihide Suga made his inaugural policy statement to parliament, announcing that Japan would aim to achieve net zero greenhouse gas (GHG) emissions by 2050. Now Japan must quickly determine the path to achieve this.

For the world to achieve the 1.5 degree Celsius goal of the Paris Agreement, emissions must not only be reduced to net zero by 2050, but significant reductions must also be achieved by 2030. For that, the reduction of coal-fired power generation is the most important and urgent action to take. Whether the aim is to achieve the Paris Agreement goal of limiting warming to 1.5 or 2.0 degrees Celsius, coal-fired power generation must be phased out by 2040 globally, and by 2030 in developed countries.[1] Therefore, as a core component of its climate actions, Japan must move forward with the phase-out of coal power by 2030. Based on these premises, this report provides an update to our November 2018 report "Japan Coal Phase-Out: The Path to Phase-Out by 2030" based on the latest government policies and status of existing and new coal-fired power plants in Japan, and restates our recommendations for the path forward.

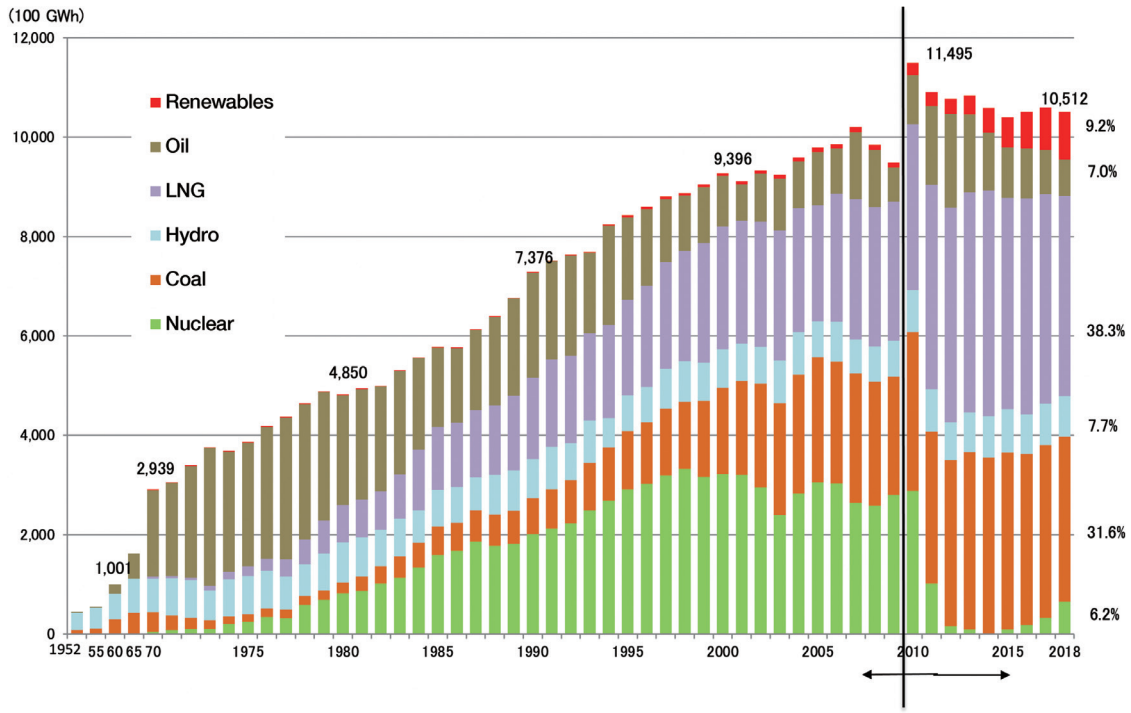
1 Climate Analytics (2019), "Global and regional coal phase-out requirements of the Paris Agreement: Insights from the IPCC Special Report on 1.5°C"

1 Status of Coal Power Generation in Japan

(1) Coal-fired power generation still rising

As Japan's reliance on nuclear power grew after the oil shocks in the 1970s, so too did the amount of electricity generated by burning coal. Nuclear power generation peaked in the latter half of the 1990s, but since then the use of coal and liquefied natural gas (LNG) has grown steadily (Figure 1). Coal accounted for 31.6% of the electricity generated in Japan in FY2018.

Figure 1. Electricity Production in Japan



Source: Agency for Natural Resources and Energy, "2020 Annual Report on Energy" (2020)

After the accident at Tokyo Electric Power Company's (TEPCO) Fukushima Daiichi nuclear power plant in March 2011, the government and utilities made a major shift to expand the use of coal. The government decided to expedite assessments for projects that would improve environmental performance by upgrading (removing and replacing) coal-fired power generation facilities,[2] and it also introduced a bidding process for thermal power generation in order to bring down electricity costs after the nuclear accident.[3] These actions added momentum to the construction of new coal-fired power plants, and since 2012, the rush of new-build proposals has amounted to 50 units, with a total added capacity of 23,230 MW.

2 Ministry of the Environment (2012) "Guidelines on rationalizing environmental impact assessment methodologies relating to thermal power plant replacement" (in Japanese).

3 Agency for Natural Resources and Energy (2012) "Guidance relating to operation of bidding for new thermal power generation" (in Japanese).

At the time of this report, there were 162 generating units in operation at coal-fired power plants in Japan, with a total capacity of 49,289.4 MW (as of November 2020) (Table 1). This number includes 14 units (1,872 MW) of in-house power generation (power plants not defined as owned by power suppliers) by companies for their own electricity consumption.[4]

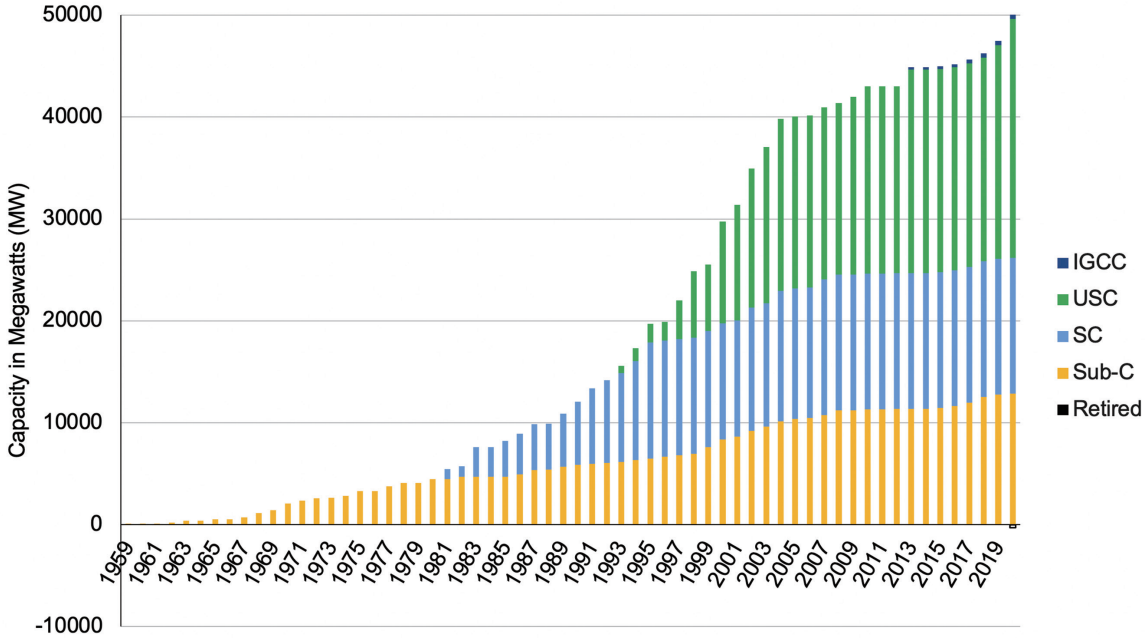
Table 1. Current Status of Coal-Fired Power Plants in Japan

Status	Units	Capacity (MW)
Operating	162	49,289
Planned or under construction	17	9,930
Total	179	59,219

Source: Prepared from Japan Beyond Coal database (as of Nov. 2020)

With the exception of coal power plants being replaced on the same site, it has been rare to witness any actually being retired in Japan, so the capacity of coal power facilities has moved steadily upwards for decades (Figure 2). Low generating costs have also helped maintain high capacity utilization of these facilities. As a result, CO_2 emissions from coal-fired power generation now account for about 20% of Japan's total GHG emissions, earning it the rank of Japan's largest emissions source.

Figure 2. Coal Power Capacity in Japan



4 In July 2020, for the first time in Japan, a list of power plants owned by power producers and plans for new construction became publicly available when the Agency for Natural Resources and Energy began considering the fade out of inefficient coal power generation. However, it may not cover all of the relevant information, as some companies do not disclose information about their own generating facilities

(2) Two-thirds of new units planned since 2012 advancing to construction and start-up

While still at the planning stage, companies have announced the cancellation of 13 of the 50 new coal-fired generation units planned since 2012, with cancellations being due to local community opposition or management decisions based on changes in the business environment (Table 2). Nevertheless, more than 30 units have proceeded to construction, among which 17 units (4,257 MW) have already started operating (included in the 162 units listed in Table 1 as currently operating). Currently, an additional 17 units (9,930 MW) are planned or under construction (14 large- and 3 small-scale) and proceeding with plans to begin operation between 2020 and 2026.[5]

Thus, by continuing to build new coal-fired power plants, Japan is still going in the completely opposite direction as the international community's efforts to decarbonize. Among developed countries, only Japan is continuing to build new coal-fired power plants at such a pace.

Table 2. Coal-fired Power Plants Planned Since 2012 but Later Canceled

Region	Plant name	Company	Capacity (MW)	Cancellation announced
Fukushima	Soma Core Industrial Area	Soma Kyodo Jikahatsu Kaihatsu Godo Kaisha	112	Not known
Fukushima	Fukushima Iwaki Yoshima	ABL Energy Godo Corp.	112	Not known
Akita	Akita Biomass (Nippon Paper Industries)	Nippon Paper Industries	112	28-Feb-2017
Iwate	Ofunato Biomass (tentative)	Maeda Corporation	112	15-Jun-2017
Miyagi	Sendai Takamatsu (tentative)	Sumitomo	112	1-Jun-2018
Hyogo	Ako No. 1	Kansai Electric Power	600	31-Jan-2017
Hyogo	Ako No. 2		600	
Chiba	Ichihara	Ichihara Thermal Power Generation Godo Kaisha	1,000	23-Mar-2017
Hyogo	Takasago New No. 1	J-POWER	600	27-Apr-2018
Hyogo	Takasago New No. 2		600	
Chiba	Soga (tentative)	Chiba Power (Chugoku Electric Power, JFE Steel)	1,070	27-Dec-2018
Chiba	Sodegaura No. 1	Chiba Sodegaura Energy (Kyushu Electric Power, Idemitsu Kosan, Tokyo Gas)	1,000	31-Jan-2019
Chiba	Sodegaura No. 2		1,000	

Source: Japan Beyond Coal (as of November 2020)

5 Among the 50 new units planned, no progress has been made on power plants in three sites, so it is assumed that the plans have been abandoned.

(3) Policy trends

The Japanese government's Fourth Strategic Energy Plan (2014) identifies nuclear power and coal as "important base load electricity sources," and set the 2030 target for coal at 26% of the nation's energy mix. The Fifth Strategic Energy Plan (2018),[6] which is still in effect, effectively continues to support coal with the government's endorsement.

To address the expected CO_2 emissions from coal power generation, an agreement was reached at the bureau director level within the Ministry of Economy, Trade and Industry (METI) and Ministry of the Environment to require power utilities to establish targets consistent with national plans and programs and to clarify institutional responsibility[7], but this agreement has had no real impact in terms of constraining new plant construction. In procedures for environmental impact assessments, the Ministry of the Environment declared its position that it "cannot approve" large-scale coal-fired power plant projects, but so far, no projects have been stopped based on this position.

In response to the planned construction of many new coal-fired power plants, METI established separate electricity generation standards for new and existing power plants under the Act Concerning the Rational Use of Energy in order to be consistent with the 2030 target for coal as 26% of the energy mix. It also amended regulations to call for a ratio of 44% non-fossil energy at the retail level in 2030 under the Act on the Promotion of Use of Non-fossil Energy Sources and Effective Use of Fossil Energy Materials by Energy Suppliers. However, these actions had absolutely no real effect regarding limiting new construction.

In the interest of moving toward a decarbonized society, in July 2020 METI issued guidance to introduce a new practical mechanism to "fade out" inefficient coal power use and make renewable energy "a major power source," as stated in the Strategic Energy Plan, and detailed discussions on this are now under way. There are 133 units with inefficient technology referred to as sub-critical (Sub-C) and supercritical (SC), and this number includes 3 units now at the planning stage. The mothballing or shutting down of these inefficient power plants would be expected to reduce coal-fired electricity generation to a certain extent. However, because new coal plants have continued to be built in recent years, even after all 133 inefficient coal power generation units have been mothballed or shut down, installed capacity of coal in 2030 would still be only about 20% below today's level. This means that, unless something changes, coal's share of electricity generation will remain high, and there will be no significant change in Japan's coal dependency.[8]

Meanwhile, coal is included in the capacity market that was introduced with electricity market liberalization in Japan, and a bidding system was launched in 2020 for power supply contracts four years in advance. After the first main auction, the total contracted capacity ended up being 167,690 MW (167.69

6 Agency for Natural Resources and Energy (2018) "Fifth Strategic Energy Plan" (in Japanese).
7 Ministry of the Environment (2013) "Summary of Bureau Directors' meeting on thermal power generation bidding for Tokyo Electric Power Company" (in Japanese).
8 Kiko Network (2020), Consideration of Japanese government policy to retire 100 inefficient coal power generation units (in Japanese).

million kW) at a contract price of 14,137 yen/kW.[9] Of this amount, coal accounted for 41,260 MW of winning bids, and if calculated with plant utilization assumed at 70% to 80%, it is clear that nearly all coal-fired power generation in Japan was covered by the auction outcomes. Based on this, even allowing for possible discounting from interim measures that may affect prices (the yen values of power capacity contracts) paid to power suppliers that submitted bids based on power plants constructed by the end of FY2020 (i.e., March 31, 2021), the amount paid in 2024 will be about 660 million yen/MW. This can only be interpreted to mean that Japan's version of the capacity market continues to support coal.

2 Japan Coal Phase-Out Plan

(1) Approach to Coal Phase-Out by 2030

In the months since November 2018 when Kiko Network first released its proposal for a Japan 2030 Coal Phase-Out Plan, coal use has continued to be promoted in Japan, with continued construction and start-ups of new coal-fired power plants. As a result, coal-fired generation capacity in Japan reached an all-time high of 49,284 MW in 2019. However, while Japan has been expanding coal power, there has been no change in necessity for the government to take action as a developed country in order to be consistent with the objectives of the Paris Agreement. For the objectives of the Paris Agreement to be achieved, Japan must phase out all of its coal-fired power generation by 2030, including all plants currently planned or under construction. Construction work has already begun on many newly-planned power plants, and even if construction of these plants gets to the point of completion and they start operating, there is no escaping the fact that they must all be phased out by 2030. It is absolutely crucial to retire all new plants by 2030, with no exceptions.

Based on this, for a coal phase-out by 2030, Kiko Network has proposed an approach that sequences plant retirement starting with the generating units that use the most inefficient technology (Table 3). The phase-out schedule has been prepared with two scenarios, one with the cancellation of all plants planned and under construction, and the other with plants proceeding to start-up but later being retired (Figure 3). However, it must be noted that if new plants are allowed to be built and start operating, it will also be necessary to accelerate the pace of plant retirement. This would add to the difficulty of achieving a coal phase-out, so cancelling all new construction is the optimal path. There is a very high likelihood that new coal power plants will end up as stranded assets due to failed profitability, so it is crucial to review their economic viability and make decisions to cancel those that are being planned.

Our scenario has power plants with inefficient sub-critical (Sub-C) technology being retired by the end of 2023, but some of these have just recently begun operating or have started construction, as their smaller scale puts them outside application of the Environmental Impact Assessment Act. If a grace period is granted for these new power plants despite their low efficiency, it will be crucial to secure a plan that reduces Japan's

9 Organization for Cross-regional Coordination of Transmission Operators (OCCTO) (2020), Statement on publication of contracting outcomes of capacity market auction (target actual demand supply year - FY2024) (in Japanese).

total emissions, for example by advancing the retirement schedules for power plants using supercritical (SC) technology.

Table 3 . Coal-Fired Power Plant Phase-Out Schedule

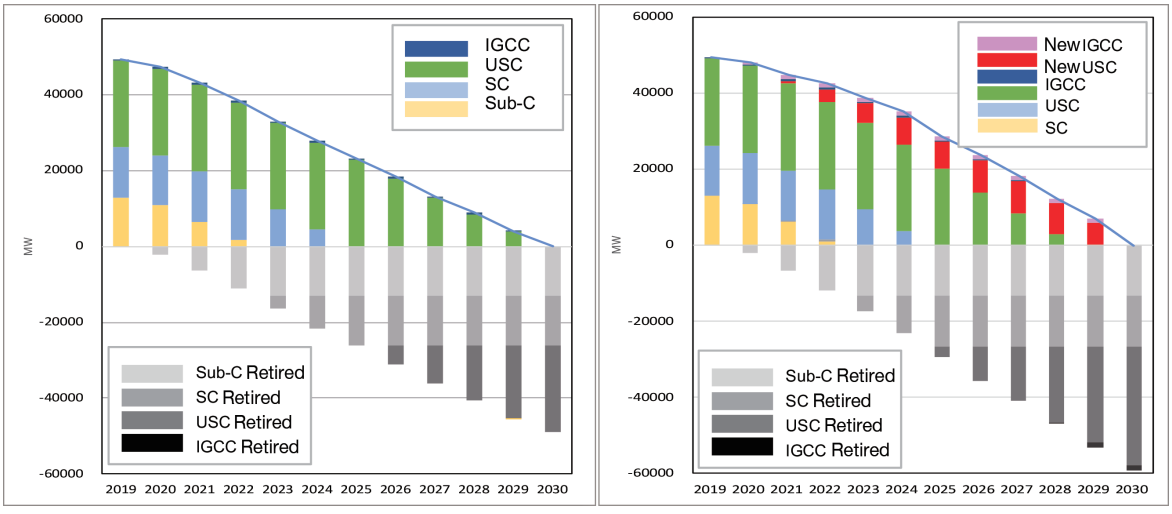
Technology	Phase-out (end of)	Plants (units) covered	Capacity (MW)	Average generation efficiency (%)	Average CO_2 emissions (g-CO_2/kWh)
Sub-critical (Sub-C)	FY2023	114 (includes 2 new)	13,270 (includes 412 new)	39.1	865
Supercritical (SC)	FY2025	20	13,322	41.3	817
Ultra supercritical (USC/ IGCC)	FY2030	45 (includes 14 new)	32,621 (includes 9,400 new)	42.6	785
Total	—	179	59,213	—	—

Prepared by Kiko Network

(2) 2030 Coal Phase-Out Plan

In the 2030 phase-out plan, if all coal power plants currently planned or under construction (16 units, 9,812 MW) are cancelled as described above, 50,000 MW of currently-operating generating facilities would be retired sequentially by 2030 (Figure 3, left). However, if all plants currently under construction start operating, they would add 9,821 MW of capacity, which would require a more rapid phase-out of a total of about 60,000 MW of generating facilities (Figure 3, right).

Figure 3. Japan Coal Phase-Out Plan:
All new plants cancelled (left), All new plants begin operation (right)



Prepared by Kiko Network

(3) Feasibility: Impacts on power supply

The nearly 50,000 MW of coal-fired power generation that the government has been prioritizing as "base load electricity sources" currently accounts for about 30% of Japan's power generation capacity. Japan's Fifth Strategic Energy Plan (2018) has a policy of coal power having a 26% share (281 TWh) of the power mix in 2030, but the phase-out plan we propose has a step-by-step reduction of source capacity of 2,000 MW per year, to as much as 4,000 to 5,000 MW. Regarding the idea of reducing coal power to zero in the less than ten remaining years to 2030, there will naturally be some concerns about the impacts on the stability of the electrical power supply. However, as outlined below, this plan is entirely feasible.

First, electricity demand is expected to be lower than in the past. Electricity demand is considerably lower than in 2015 when the target electricity mix for 2030 was set. A supply plan issued by the Organization for Cross-regional Coordination of Transmission Operators (OCCTO) in FY2020 projects electricity demand in 2029 to be 872 TWh, more than 10% lower than the government's 980 TWh projection for 2030.

Second, during the transition period, LNG could be used as an alternative source of electricity. The OCCTO report explains that the construction of LNG-fired power plants has progressed, with their capacity increasing by 9,100 MW (from 74,550 MW to 83,650 MW) over the five years from FY2014 to FY2019, and forecasts the level of capacity to be maintained until the end of FY2029.

During the same period, coal-fired power generation was also added, so capacity utilization at LNG facilities is expected to drop steadily year-by-year from 58.6% in FY2016 to 33.1% in 2029.[10] Therefore, it would be possible to compensate for the loss of nuclear power and coal by utilizing LNG facilities with around 60% utilisation rate, and in addition, improving energy efficiency and introducing renewable energy as well as the use of pumped storage power generation, regular hydro, geothermal, biomass, and waste-to-energy facilities.

Third, the generating capacity of renewable energy is expected to increase. The Fifth Strategic Energy Plan includes a policy for renewable energy to account for 22% to 24% of generation capacity in 2030; however, it is already at nearly 20% today, so this target is likely to be met and exceeded by a wide margin. Progressive business groups and NGOs have called for renewable energy's share of the energy mix to be raised to 40% or more than 50%, and the government is moving ahead to bolster its policies to increase renewables further. Electricity generation from renewable energy is expected to increase significantly.

Fourth, it is possible to utilize demand side management systems. Besides reducing overall demand, another tool to ensure stable supply and demand is peak shifting through demand response.

Based on the points above, it is fully possible for Japan to meet electricity demand in 2030 without relying on nuclear power and coal.

10 Organization for Cross-regional Coordination of Transmission Operators (OCCTO), Supply Plan Summary for FY2020.

3 Implementing the Coal Phase-Out Plan

(1) Promptly review current policy directions

With the target of net zero GHG emissions by 2050 now declared as government policy, Japan needs to quickly develop a plan for a coal phase-out by 2030 and establish policy measures to make the phase-out a reality.

- **Set more ambition in GHG targets, with emission reductions of at least 50% by 2030**

  Japan should clearly stipulate in legislation its commitment to net zero GHG emissions by 2050, already announced as government policy, and the government should revise its 2030 GHG emission target to a reduction of at least 50% (relative to 1990) in order to be consistent with the goal of net zero by 2050 and the 1.5 degrees Celsius target of the Paris Agreement.

- **Revise the 2030 energy mix without nuclear and coal**

  For the Sixth Strategic Energy Plan, the Fifth Plan's stance of coal and nuclear power as "important base load electricity sources" should be fundamentally revised to a policy of achieving a coal and nuclear phase-out by 2030. The electricity power mix for 2030 should be at least 50% renewable energy and less than 50% LNG.

- **Articulate clear policies for the coal phase-out, formulate the plan, and implement it**

(a) Clarify the policies for 2030 in relevant plans (Strategic Energy Plan and Plan for Global Warming Countermeasures)

The decision to phase out coal power by 2030 should be made in order to be consistent with the objectives of the Paris Agreement, and this should be reflected in Japan's Strategic Energy Plan and Plan for Global Warming Countermeasures.

(b) Develop 2030 Coal Phase-Out Plans

The national government and each power supplier should formulate a 2030 coal phase-out plan, and all of the information in these plans should be made public in order to ensure transparency. This will facilitate objective assessment of the progress and effectiveness of coal phase-out efforts and ensure steady implementation without leaving discretion to the Ministry of Economy, Trade and Industry. It bears restating that the coal phase-out should not be limited to inefficient coal power generation; all coal-fired power generation needs to be phased out. Plans should be implemented in a systematic way, year by year, for the retirement of all coal-fired power plants.

To date, measures targeting power plants have functioned based on efficiency standards for power generation, using a system of benchmarks under the Act Concerning the Rational Use of Energy.

However, as the purpose of the Act is to improve energy efficiency, it is not well-suited to deal with actually re-examining coal-fired power generation from the perspective of climate change. Even if the Act is able to promote improvements in energy efficiency of coal power, that in no way guarantees a reduction in Japan's total CO_2 emissions. Thus, the coal phase-out should not be handled under the Act, but rather be incorporated as 2030 coal phase-out policy stated explicitly in Japan's next Strategic Energy Plan and Plan for Global Warming Countermeasures; the national government should formulate the phase-out plan, and power suppliers should be required to establish plans. In addition, to ensure steady implementation, new legislation should be enacted that specifies a year-by-year plant retirement schedule.

(c) Comprehensively review the capacity market system

As described above, Japan's capacity market system is a mechanism that prolongs the life of coal-fired power plants. It is a framework with problems not seen in other countries, and results in an extremely high risk of retaining high-emission power sources that should be completely shut down. This system should therefore be comprehensively reviewed. Even if a certain amount of installed capacity is secured during the coming transitional period, it should be limited to highly flexible power sources. It is important to significantly reduce thermal power generation as we move toward zero emissions in 2050 and 100% renewable energy for electricity; an important role for power plants is their ability to adjust output, being reduced during the day to utilize solar power generation and increased moving into the evening. Gas-fired thermal power generation has low CO_2 emissions per unit of electricity generated and output can be quickly adjusted. Nuclear and coal power generation are slow to adjust output and inferior in flexibility, and should be removed from the capacity market because they make it difficult to adjust the system as a whole. Considering the fact that total residual demand in FY2019 was about 130 GW (the remainder after subtracting renewable energy power from demand, covered by thermal power and pumped storage, etc.) and that demand will further decrease due to future energy efficiency and renewable energy measures, it is not necessary to secure the enormous capacity of 170 GW, which is currently being sought, through large-scale and inflexible coal-fired power plants.

(d) Introduce carbon pricing

In order to incentivize rapid reductions in the use of coal power on both the supply and demand side, Japan should move ahead to introduce carbon pricing. Based on the schedule of a phase-out plan, carbon pricing would promote the selection of more efficient decarbonized electricity generation technologies. The implementation of this coal phase-out plan will temporarily involve increased facility utilization rates for LNG power generation, but even then, it will encourage plant operation with more efficient power plants prioritized to operate first. It is also expected to have the effect of broadly promoting demand-side energy efficiency and conservation.

(e) Ensure information and data gathering and disclosure

To secure a steady reduction of emissions from power plants as the largest emissions sector, it is crucial to disclose essential information.

In particular, utilization rates (capacity utilization) at each generation facility should be disclosed on an hourly basis, as well as emissions (CO_2 and other air pollutants) and the amount of electricity generated. Detailed information regarding phase-out plans, including data on those parameters, should also be publicly disclosed.

- **Initiate a mass deployment of renewable energy**

To achieve the coal phase-out, institutional and financial tools must both be strengthened in order to significantly boost the introduction of renewable energy. With renewable energy at the center, the power system must be designed to include variable electricity sources to aim for the flexible adjustment of supply and demand and ensure a stable supply of electricity. Through policy reform to promote the deployment of renewable energy and reductions in energy consumption, Japan needs to develop renewable energy as the main pillar of its power system.

In short, Japan needs to accelerate the mass deployment of renewable energy, and this can be done by ensuring priority dispatch of renewable energy in grid systems, introducing merit orders, having a flexible electricity interchange, and improving grid systems. It is also necessary to immediately review and revise the rules and regulations governing capacity markets and power transmission, which currently result in unfair cost burdens and impede the promotion of renewable energy.

Based on the above proposals, we call upon the government to promptly set targets and overhaul its many policies and measures accordingly.

Appendix 1. Japan Phase-Out Plan, Scenario 1: All New Construction Canceled
(Total installed capacity 49,289 MW)

		Prefecture	Capacity (MW)	Technology	Start	Retire
1	Naie 1	Hokkaido	1,750	Sub-C	1968	2020
2	Naie 2	Hokkaido	1,750	Sub-C	1970	2020
3	Sumitomo Joint Electric Power, Niihama Nishi 1	Ehime	750	Sub-C	1959	2020
4	Daio Paper, Mishima Mill 8	Ehime	300	Sub-C	1960	2020
5	Sumitomo Joint Electric Power, Niihama Nishi 2	Ehime	750	Sub-C	1962	2020
6	Mizushima 2	Okayama	1,560	Sub-C	1963	2020
7	Saijo 1	Ehime	1,560	Sub-C	1965	2020
8	Oji Materia Nayoro 1	Hokkaido	90	Sub-C	1966	2020
9	Shimonoseki 1	Yamaguchi	1,750	Sub-C	1967	2020
10	Takasago 1	Hyogo	2,500	Sub-C	1968	2020
11	Takasago 2	Hyogo	2,500	Sub-C	1969	2020
12	Sumitomo Joint Electric Power, Niihama Higashi 1	Ehime	270	Sub-C	1969	2020
13	Saijo 2	Ehime	2,500	Sub-C	1970	2020
14	Nakoso 7	Fukushima	2,500	Sub-C	1970	2020
15	Toyama Shinkou 1	Toyama	2,500	Sub-C	1971	2021
16	Toyama Shinkou 2	Toyama	2,500	Sub-C	1972	2021
17	Daio Paper, Mishima Mill 6	Ehime	730	Sub-C	1973	2021
18	Daio Paper, Mishima Mill 7	Ehime	730	Sub-C	1974	2021
19	Tosoh Nanyo Complex, 3-2 (in-house plant)	Yamaguchi	1,160	Sub-C	1974	2021
20	Sumitomo Joint Electric Power, Nyugawa 1	Ehime	2,500	Sub-C	1975	2021
21	Miike Power	Fukuoka	1,750	Sub-C	1975	2021
22	Sunagawa 3	Hokkaido	1,250	Sub-C	1977	2021
23	Sakata Kyodo 1	Yamagata	3,500	Sub-C	1977	2021
24	Sakata Kyodo 2	Yamagata	3,500	Sub-C	1978	2021
25	Tomato-atsuma 1	Hokkaido	3,500	Sub-C	1980	2021
26	Sunagawa 4	Hokkaido	1,250	Sub-C	1982	2021
27	Ube Industries 5-5	Yamaguchi	1,450	Sub-C	1982	2021
28	Ishikawa 1	Okinawa	1,560	Sub-C	1986	2021
29	Nippon Paper Kushiro Mill 8-8	Hokkaido	570	Sub-C	1986	2021
30	Ishikawa 2	Okinawa	1,560	Sub-C	1987	2021
31	Nippon Paper Ishinomaki Mill 8-6	Miyagi	980	Sub-C	1987	2021
32	Tokuyama Central 9 (in-house plant)	Yamaguchi	1,490	Sub-C	1987	2021
33	Oji Materia Nayoro 2	Hokkaido	40	Sub-C	1987	2021
34	MCM HQ Energy Center 1	Hiroshima	430	Sub-C	1987	2021
35	Marusumi Paper Ohe Mill 5-3	Ehime	440	Sub-C	1988	2021
36	Nippon Steel Stainless Steel Yamaguchi Works Hikari Area 1	Yamaguchi	530	Sub-C	1989	2021
37	Tosoh Nanyo Complex, 4-4 (in-house plant)	Yamaguchi	1,450	Sub-C	1989	2021
38	Tokai Kyodo (in-house plant)	Aichi	1,490	Sub-C	1990	2021

		Prefecture	Capacity (MW)	Technology	Start	Retire
39	Nippon Paper Iwanuma Mill 4-3	Miyagi	660	Sub-C	1991	2021
40	Mitsubishi Materials Kyushu 2-2	Fukuoka	400	Sub-C	1991	2021
41	Daio Paper, Mishima Mill 12	Ehime	890	Sub-C	1992	2021
42	Daio Paper, Mishima Mill 13	Ehime	910	Sub-C	1992	2021
43	Taiheiyo Cement Kamiiso Plant (in-house plant)	Hokkaido	480	Sub-C	1993	2021
44	Nippon Paper Yashiro Mill 9-5	Kumamoto	750	Sub-C	1993	2021
45	Gushikawa 1	Okinawa	1,560	Sub-C	1994	2021
46	Gushikawa 2	Okinawa	1,560	Sub-C	1995	2022
47	Nippon Steel (NSC) Hirohata Works 6 (in-house plant)	Hyogo	1,490	Sub-C	1996	2022
48	Taiheiyo Cement Saitama Plant	Saitama	500	Sub-C	1996	2022
49	Sumitomo Osaka Cement, Ako Factory	Hyogo	1,030	Sub-C	1997	2022
50	Marusumi Paper Ohe Mill 7-4	Ehime	130	Sub-C	1997	2022
51	Ube Industries Isa Cement Factory	Yamaguchi	570	Sub-C	1998	2022
52	Nippon Steel Stainless Steel Yamaguchi Works Hikari Area 2	Yamaguchi	530	Sub-C	1998	2022
53	Mitsubishi Paper Hachinohe Mill 5-6	Aomori	580	Sub-C	1998	2022
54	Tokuyama Central 2 (in-house plant)	Yamaguchi	1,450	Sub-C	1999	2022
55	Nippon Steel Hirohata Works 7	Hyogo	1,490	Sub-C	1999	2022
56	Tobata 6	Fukuoka	1,490	Sub-C	1999	2022
57	Tosoh Nanyo Complex 5 (in-house plant)	Yamaguchi	1,490	Sub-C	1999	2022
58	Sumitomo Osaka Cement, Kochi Factory 2	Kochi	610	Sub-C	1999	2022
59	Nakayama Nagoya 1	Aichi	1,490	Sub-C	2000	2022
60	Toyohashi	Aichi	1,470	Sub-C	2000	2022
61	Oji Materia Oita 3	Oita	180	Sub-C	2000	2022
62	Osaki	Hiroshima	2,590	Sub-C	2000	2022
63	Nippon Steel Kamaishi Works	Iwate	1,490	Sub-C	2000	2022
64	Itoigawa	Niigata	1,490	Sub-C	2001	2022
65	Nippon Steel Muroran Works 5	Hokkaido	1,450	Sub-C	2001	2022
66	Kin 1	Okinawa	2,200	Sub-C	2002	2022
67	Nippon Steel Oita Works	Oita	3,300	Sub-C	2002	2022
68	Mitsubishi Chemical Hiroshima Factory	Hiroshima	730	Sub-C	2003	2022
69	Kin 2	Okinawa	2,200	Sub-C	2003	2022
70	Tokuyama Central 8 (in-house plant)	Yamaguchi	1,450	Sub-C	2003	2022
71	Nippon Paper Kushiro Mill N1	Hokkaido	880	Sub-C	2004	2022
72	Oji Materia Oita 1	Oita	250	Sub-C	2004	2022
73	Tobata 2	Fukuoka	1,560	Sub-C	2004	2022
74	UBE Power Center 6-6	Yamaguchi	2,160	Sub-C	2004	2022
75	Summit Onahama S Power 1T	Fukushima	500	Sub-C	2004	2022
76	Tosa	Kochi	1,670	Sub-C	2005	2022
77	Sumitomo Osaka Cement Kochi Factory 3	Kochi	610	Sub-C	2005	2022
78	Kureha Iwaki Factory (in-house plant)	Fukushima	450	Sub-C	2006	2022
79	Asahi Kasei NS Energy Nobeoka 1 (biomass)	Miyazaki	500	Sub-C	2006	2022

		Prefecture	Capacity (MW)	Technology	Start	Retire
80	Sumitomo Joint Electric Power, Niihama Higashi 2	Ehime	30	Sub-C	2006	2022
81	Mitsubishi Materials Kyushu 3-3	Fukuoka	750	Sub-C	2007	2022
82	Daicel Otake 6-3	Hiroshimai	500	Sub-C	2007	2022
83	Suzukawa Energy Center	Shizuoka	1,120	Sub-C	2016	2022
84	Tokuyama Central 7 (in-house plant)	Yamaguchi	780	Sub-C	2007	2022
85	Nippon Paper Iwanuma Mill 6-6	Miyagi	450	Sub-C	2007	2022
86	Nippon Paper Iwakuni Mill 9-9	Yamaguchi	350	Sub-C	2007	2022
87	Sumitomo Joint Electric Power, Niihama Nishi 3	Ehime	1,500	Sub-C	2008	2022
88	Tosoh Nanyo Complex 6 (in-house plant)	Yamaguchi	2,200	Sub-C	2008	2023
89	MCM HQ Energy Center 3	Hiroshima	250	Sub-C	2008	2023
90	Hofu Energy Service 8	Yamaguchi	160	Sub-C	2008	2023
91	MC Shiohama Energy Service (in-house plant)	Mie	340	Sub-C	2008	2023
92	Tobata 5	Fukuoka	1,100	Sub-C	2010	2023
93	Hofu Energy Service 9	Yamaguchi	270	Sub-C	2012	2023
94	MCM Energy Service Hofu Nishiura	Yamaguchi	250	Sub-C	2013	2023
95	Hofu Power Station 2	Yamaguchi	360	Sub-C	2015	2023
96	Rengo Kanazu Mill 2	Fukui	30	Sub-C	2015	2023
97	Rengo Kanazu Mill 2-4	Fukui	380	Sub-C	2015	2023
98	Summit Onahama S Power 2T	Fukushima	60	Sub-C	2016	2023
99	Daicel Otake 7-4	Hiroshima	390	Sub-C	2016	2023
100	Marusumi Paper Ohe Mill 9-6	Ehime	300	Sub-C	2016	2023
101	Mizushima MZ	Okayama	1,120	Sub-C	2017	2023
102	Nakayama Nagoya 2	Aichi	1,100	Sub-C	2017	2023
103	Sendai Power Station	Miyagi	1,120	Sub-C	2017	2023
104	Meinan Kyodo Energy	Aichi	310	Sub-C	2018	2023
105	Ishinomaki Hibarino 1	Miyagi	1,490	Sub-C	2018	2023
106	Soma Coal-Biomass	Fukushima	1,120	Sub-C	2018	2023
107	Kamisu	Ibaraki	1,120	Sub-C	2018	2023
108	Asahi Kasei NS Energy Nobeoka 2	Miyazaki	600	Sub-C	2018	2023
109	Hibikinada Biomass Power	Fukuoka	1,120	Sub-C	2018	2023
110	Hibikinada Thermal Power	Fukuoka	1,120	Sub-C	2019	2023
111	Hofu Biomass-Coal Mixed Power Plant	Yamaguchi	1,120	Sub-C	2019	2023
112	Matsushima 1	Nagasaki	5,000	SC	1981	2023
113	Matsushima 2	Nagasaki	5,000	SC	1981	2023
114	Takehara 3	Hiroshima	7,000	SC	1983	2023
115	Nakoso 8	Fukushima	6,000	SC	1983	2023
116	Nakoso 9	Fukushima	6,000	SC	1983	2023
117	Tomato-atsuma 2	Hokkaido	6,000	SC	1985	2023
118	Shin Onoda 1	Yamaguchi	5,000	SC	1986	2024
119	Shin Onoda 2	Yamaguchi	5,000	SC	1987	2024
120	Matsuura 1	Nagasaki	7,000	SC	1989	2024
121	Matsuura (J-POWER) 1	Nagasaki	10,000	SC	1990	2024

		Prefecture	Capacity (MW)	Technology	Start	Retire
122	Tsuruga 1	Fukui	5,000	SC	1991	2024
123	Hekinan 1	Aichi	7,000	SC	1991	2024
124	Hekinan 2	Aichi	7,000	SC	1992	2024
125	Noshiro 1	Akita	600	SC	1993	2024
126	Shinchi 1	Fukushima	10,000	SC	1994	2025
127	Shinchi 2	Fukushima	10,000	SC	1995	2025
128	Reihoku 1	Kumamoto	7,000	SC	1995	2025
129	Kobe 1	Hyogo	7,000	SC	2002	2025
130	Kobe 2	Hyogo	7,000	SC	2004	2025
131	Nippon Steel Kashima Works	Ibaraki	5,220	SC	2007	2025
132	Hekinan 3	Aichi	7,000	USC	1993	2026
133	Noshiro 2	Akita	6,000	USC	1994	2026
134	Nanao Ota 1	Ishikawa	5,000	USC	1995	2026
135	Haramachi 1	Fukushima	10,000	USC	1997	2026
136	Matsuura (J-POWER) 2	Nagasaki	10,000	USC	1997	2026
137	Misumi 1	Shimane	10,000	USC	1998	2026
138	Haramachi 2	Fukushima	10,000	USC	1998	2027
139	Nanao Ota 2	Ishikawa	7,000	USC	1998	2027
140	Tachibana-wan 1	Tokushima	7,000	USC	2000	2027
141	Tachibana-wan (J-POWER) 1	Tokushima	10,500	USC	2000	2027
142	Tsuruga 2	Fukui	7,000	USC	2000	2027
143	Tachibana-wan (J-POWER) 2	Tokushima	10,500	USC	2000	2027
144	Karita New 1	Fukuoka	3600	USC	2001	2028
145	Hekinan 4	Aichi	10,000	USC	2001	2028
146	Isogo New 1	Kanagawa	6,000	USC	2002	2028
147	Tomato-atsuma 4	Hokkaido	7,000	USC	2002	2028
148	Hekinan 5	Aichi	10,000	USC	2002	2028
149	Reihoku 2	Kumamoto	7,000	USC	2003	2028
150	Hitachinaka 1	Ibaraki	10,000	USC	2003	2029
151	Hirono 5	Fukushima	6,000	USC	2004	2029
152	Maizuru 1	Kyoto	9,000	USC	2004	2029
153	Isogo New 2	Kanagawa	6,000	USC	2009	2029
154	Maizuru 2	Kyoto	9,000	USC	2010	2029
155	Nakoso 10	Fukushima	2,500	IGCC	2013	2029
156	Hirono 6	Fukushima	6,000	USC	2013	2029
157	Hitachinaka 2	Ibaraki	10,000	USC	2013	2030
158	Osaki Cool Gen	Hiroshima	1,660	IGCC	2017	2030
159	Matsuura 2	Nagasaki	10,000	USC	2019	2030
160	Noshiro 3	Akita	6,000	USC	2020	2030
161	Takehara New 1	Hiroshima	6,000	USC	2020	2030
162	Kashima	Ibaraki	6,450	USC	2020	2030

Appendix 2. Japan Coal Phase-Out Plan, Scenario 2: All New Plants Begin Operation
(RED FONT indicates new units) (Total capacity 59,219 MW)

		Prefecture	Capacity (MW)	Technology	Start	Retire
1	Naie 1	Hokkaido	1,750	Sub-C	1968	2020
2	Naie 2	Hokkaido	1,750	Sub-C	1970	2020
3	Sumitomo Joint Electric Power,Niihama Nishi 1	Ehime	750	Sub-C	1959	2020
4	Daio Paper, Mishima Mill 8	Ehime	300	Sub-C	1960	2020
5	Sumitomo Joint Electric Power, Niihama Nishi 2	Ehime	750	Sub-C	1962	2020
6	Mizushima 2	Okayama	1,560	Sub-C	1963	2020
7	Saijo 1	Ehime	1,560	Sub-C	1965	2020
8	Oji Materia Nayoro 1	Hokkaido	90	Sub-C	1966	2020
9	Shimonoseki 1	Yamaguchi	1,750	Sub-C	1967	2020
10	Takasago 1	Hyogo	2,500	Sub-C	1968	2020
11	Takasago 2	Hyogo	2,500	Sub-C	1969	2020
12	Sumitomo Joint Electric Power, Niihama Higashi 1	Ehime	270	Sub-C	1969	2020
13	Saijo 2	Ehime	2,500	Sub-C	1970	2020
14	Nakoso 7	Fukushima	2,500	Sub-C	1970	2020
15	Toyama Shinkou 1	Toyama	2,500	Sub-C	1971	2021
16	Toyama Shinkou 2	Toyama	2,500	Sub-C	1972	2021
17	Daio Paper, Mishima Mill 6	Ehime	730	Sub-C	1973	2021
18	Daio Paper, Mishima Mill 7	Ehime	730	Sub-C	1974	2021
19	Tosoh Nanyo Complex, 3-2 (in-house plant)	Yamaguchi	1,160	Sub-C	1974	2021
20	Sumitomo Joint Electric Power, Nyugawa 1	Ehime	2,500	Sub-C	1975	2021
21	Miike Power	Fukuoka	1,750	Sub-C	1975	2021
22	Sunagawa 3	Hokkaido	1,250	Sub-C	1977	2021
23	Sakata Kyodo 1	Yamagata	3,500	Sub-C	1977	2021
24	Sakata Kyodo 2	Yamagata	3,500	Sub-C	1978	2021
25	Tomato-atsuma 1	Hokkaido	3,500	Sub-C	1980	2021
26	Sunagawa 4	Hokkaido	1,250	Sub-C	1982	2021
27	Ube Industries 5-5	Yamaguchi	1,450	Sub-C	1982	2021
28	Ishikawa 1	Okinawa	1,560	Sub-C	1986	2021
29	Nippon Paper Kushiro Mill 8-8	Hokkaido	570	Sub-C	1986	2021
30	Ishikawa 2	Okinawa	1,560	Sub-C	1987	2021
31	Nippon Paper Ishinomaki Mill 8-6	Miyagi	980	Sub-C	1987	2021
32	Tokuyama Central 9 (in-house plant)	Yamaguchi	1,490	Sub-C	1987	2021
33	Oji Materia Nayoro 2	Hokkaido	40	Sub-C	1987	2021
34	MCM HQ Energy Center 1	Hiroshima	430	Sub-C	1987	2021
35	Marusumi Paper Ohe Mill 5-3	Ehime	440	Sub-C	1988	2021
36	Nippon Steel Stainless Steel Yamaguchi works Hikari Area 1	Yamaguchi	530	Sub-C	1989	2021
37	Tosoh Nanyo Complex, 4-4 (in-house plant)	Yamaguchi	1,450	Sub-C	1989	2021
38	Tokai Kyodo (in-house plant)	Aichi	1,490	Sub-C	1990	2021
39	Nippon Paper Iwanuma Mill 4-3	Miyagi	660	Sub-C	1991	2021

		Prefecture	Capacity (MW)	Technology	Start	Retire
40	Mitsubishi Materials Kyushu 2-2	Fukuoka	400	Sub-C	1991	2021
41	Daio Paper, Mishima Mill 12	Ehime	890	Sub-C	1992	2021
42	Daio Paper, Mishima Mill 13	Ehime	910	Sub-C	1992	2021
43	Taiheiyo Cement Kamiiso Plant (in-house plant)	Hokkaido	480	Sub-C	1993	2021
44	Nippon Paper Yatsushiro Mill 9-5	Kumamoto	750	Sub-C	1993	2021
45	Gushikawa 1	Okinawa	1,560	Sub-C	1994	2021
46	Gushikawa 2	Okinawa	1,560	Sub-C	1995	2021
47	Nippon Steel (NSC) Hirohata Works 6 (in-house plant)	Hyogo	1,490	Sub-C	1996	2021
48	Taiheiyo Cement Saitama Plant	Saitama	500	Sub-C	1996	2021
49	Sumitomo Osaka Cement, Ako Factory	Hyogo	1,030	Sub-C	1997	2021
50	Marusumi Paper Ohe Mill 7-4	Ehime	130	Sub-C	1997	2021
51	Ube Industries Isa Cement Factory	Yamaguchi	570	Sub-C	1998	2022
52	Nippon Steel Stainless Steel Yamaguchi Works Hikari Area 2	Yamaguchi	530	Sub-C	1998	2022
53	Mitsubishi Paper Hachinohe Mill 5-6	Aomori	580	Sub-C	1998	2022
54	Tokuyama Central 2 (in-house plant)	Yamaguchi	1,450	Sub-C	1999	2022
55	Nippon Steel Hirohata Works 7	Hyogo	1,490	Sub-C	1999	2022
56	Tobata 6	Fukuoka	1,490	Sub-C	1999	2022
57	Tosoh Nanyo Complex 5 (in-house plant)	Yamaguchi	1,490	Sub-C	1999	2022
58	Sumitomo Osaka Cement, Kochi Factory 2	Kochi	610	Sub-C	1999	2022
59	Nakayama Nagoya 1	Aichi	1,490	Sub-C	2000	2022
60	Toyohashi	Aichi	1,470	Sub-C	2000	2022
61	Oji Materia Oita 3	Oita	180	Sub-C	2000	2022
62	Osaki	Hiroshima	2,590	Sub-C	2000	2022
63	Nippon Steel Kamaishi Works	Iwate	1,490	Sub-C	2000	2022
64	Itoigawa	Niigata	1,490	Sub-C	2001	2022
65	Nippon Steel Muroran Works 5	Hokkaido	1,450	Sub-C	2001	2022
66	Kin 1	Okinawa	2,200	Sub-C	2002	2022
67	Nippon Steel Oita Works	Oita	3,300	Sub-C	2002	2022
68	Mitsubishi Chemical Hiroshima Factory	Hiroshima	730	Sub-C	2003	2022
69	Kin 2	Okinawa	2,200	Sub-C	2003	2022
70	Tokuyama Central 8 (in-house plant)	Yamaguchi	1,450	Sub-C	2003	2022
71	Nippon Paper Kushiro Mill N1	Hokkaido	880	Sub-C	2004	2022
72	Oji Materia Oita 1	Oita	250	Sub-C	2004	2022
73	Tobata 2	Fukuoka	1,560	Sub-C	2004	2022
74	UBE Power Center 6-6	Yamaguchi	2,160	Sub-C	2004	2022
75	Summit Onahama S Power 1T	Fukushima	500	Sub-C	2004	2022
76	Tosa	Kochi	1,670	Sub-C	2005	2022
77	Sumitomo Osaka Cement Kochi Factory 3	Kochi	610	Sub-C	2005	2022
78	Kureha Iwaki Factory (in-house plant)	Fukushima	450	Sub-C	2006	2022
79	Asahi Kasei NS Energy Nobeoka 1 (biomass)	Miyazaki	500	Sub-C	2006	2022

		Prefecture	Capacity (MW)	Technology	Start	Retire
80	Sumitomo Joint Electric Power, Niihama Higashi 2	Ehime	30	Sub-C	2006	2022
81	Mitsubishi Materials Kyushu 3-3	Fukuoka	750	Sub-C	2007	2022
82	Daicel Otake 6-3	Hiroshima	500	Sub-C	2007	2022
83	Tokuyama Central 7 (in-house plant)	Yamaguchi	780	Sub-C	2007	2022
84	Nippon Paper Iwanuma Mill 6-6	Miyagi	450	Sub-C	2007	2022
85	Nippon Paper Iwakuni Mill 9-9	Yamaguchi	350	Sub-C	2007	2022
86	Sumitomo Joint Electric Power, Niihama Nishi 3	Ehime	1,500	Sub-C	2008	2022
87	Tosoh Nanyo Complex 6 (in-house plant)	Yamaguchi	2,200	Sub-C	2008	2022
88	MCM HQ Energy Center #3	Hiroshima	250	Sub-C	2008	2022
89	Hofu Energy Service 8	Yamaguchi	160	Sub-C	2008	2022
90	MC Shiohama Energy Service (in-house plant)	Mie	340	Sub-C	2008	2022
91	Tobata 5	Fukuoka	1,100	Sub-C	2010	2022
92	Hofu Energy Service 9	Yamaguchi	270	Sub-C	2012	2022
93	MCM Energy Service Hofu Nishiura	Yamaguchi	250	Sub-C	2013	2022
94	Hofu Power Station 2	Yamaguchi	360	Sub-C	2015	2022
95	Rengo Kanazu Mill 2	Fukui	30	Sub-C	2015	2022
96	Rengo Kanazu Mill 2-4	Fukui	380	Sub-C	2015	2022
97	Summit Onahama S Power 2T	Fukushima	60	Sub-C	2016	2022
98	Daicel Otake 7-4	Hiroshima	390	Sub-C	2016	2022
99	Suzukawa Energy Center	Shizuoka	1,120	Sub-C	2016	2022
100	Marusumi Paper Ohe Mill 9-6	Ehime	300	Sub-C	2016	2022
101	Mizushima MZ	Okayama	1,120	Sub-C	2017	2022
102	Nakayama Nagoya 2	Aichi	1,100	Sub-C	2017	2022
103	Sendai Power Station	Miyagi	1,120	Sub-C	2017	2022
104	Meinan Kyodo Energy	Aichi	310	Sub-C	2018	2022
105	Ishinomaki Hibarino 1	Miyagi	1,490	Sub-C	2018	2023
106	Soma Coal-Biomass	Fukushima	1,120	Sub-C	2018	2023
107	Kamisu	Ibaraki	1,120	Sub-C	2018	2023
108	Asahi Kasei NS Energy 2	Miyazaki	600	Sub-C	2018	2023
109	Hibikinada Biomass Power	Fukuoka	1,120	Sub-C	2018	2023
110	Hibikinada Thermal Power	Fukuoka	1,120	Sub-C	2019	2023
111	Hofu Biomass-Coal Mixed Power Plant	Yamaguchi	1,120	Sub-C	2019	2023
112	Kushiro Power Station	Hokkaido	1,120	Sub-C	2020	2023
113	Kaita Biomass-Coal Mixed Power Plant	Hiroshima	1,120	Sub-C	2021	2023
114	Tokuyama East 3	Yamaguchi	3,000	Sub-C	2022	2023
115	Matsushima 1	Nagasaki	5,000	SC	1981	2023

116	Matsushima 2	Nagasaki	5,000	SC	1981	2023
117	Takehara 3	Hiroshima	7,000	SC	1983	2023
118	Nakoso 8	Fukushima	6,000	SC	1983	2023
119	Nakoso 9	Fukushima	6,000	SC	1983	2023
120	Tomato-atsuma 2	Hokkaido	6,000	SC	1985	2023
121	Shin Onoda 1	Yamaguchi	5,000	SC	1986	2023
122	Shin Onoda 2	Yamaguchi	5,000	SC	1987	2024
123	Matsuura 1	Nagasaki	7,000	SC	1989	2024
124	Matsuura (J-POWER) 1	Nagasaki	10,000	SC	1990	2024
125	Tsuruga 1	Fukui	5,000	SC	1991	2024
126	Hekinan 1	Aichi	7,000	SC	1991	2024
127	Hekinan 2	Aichi	7,000	SC	1992	2024
128	Noshiro 1	Akita	6,000	SC	1993	2024
129	Shinchi 1	Fukushima	10,000	SC	1994	2024
130	Shinchi 2	Fukushima	10,000	SC	1995	2025
131	Reihoku 1	Kumamoto	7,000	SC	1995	2025
132	Kobe 1	Hyogo	7,000	SC	2002	2025
133	Kobe 2	Hyogo	7,000	SC	2004	2025
134	Nippon Steel Kashima Works	Ibaraki	5,220	SC	2007	2025
135	Hekinan 3	Aichi	7,000	USC	1993	2025
136	Noshiro 2	Akita	6,000	USC	1994	2025
137	Nanao Ota 1	Ishikawa	5,000	USC	1995	2025
138	Haramachi 1	Fukushima	10,000	USC	1997	2025
139	Matsuura (J-POWER) 2	Nagasaki	10,000	USC	1997	2026
140	Misumi 1	Shimane	10,000	USC	1998	2026
141	Haramachi 2	Fukushima	10,000	USC	1998	2026
142	Nanao Ota 2	Ishikawa	7,000	USC	1998	2026
143	Tachibana-wan 1	Tokushima	7,000	USC	2000	2026
144	Tachibana-wan (J-POWER) 1	Tokushima	10,500	USC	2000	2026
145	Tsuruga 2	Fukui	7,000	USC	2000	2026
146	Tachibana-wan (J-POWER) 2	Tokushima	10,500	USC	2000	2027
147	Karita New 1	Fukuoka	3,600	USC	2001	2027
148	Hekinan 4	Aichi	10,000	USC	2001	2027
149	Isogo New 1	Kanagawa	6,000	USC	2002	2027
150	Tomato-atsuma 4	Hokkaido	7,000	USC	2002	2027
151	Hekinan 5	Aichi	10,000	USC	2002	2027
152	Reihoku 2	Kumamoto	7,000	USC	2003	2027
153	Hitachinaka 1	Ibaraki	10,000	USC	2003	2028
154	Hirono 5	Fukushima	6,000	USC	2004	2028
155	Maizuru 1	Kyoto	9,000	USC	2004	2028
156	Isogo New 2	Kanagawa	6,000	USC	2009	2028
157	Maizuru 2	Kyoto	9,000	USC	2010	2028
158	Nakoso 10	Fukushima	2,500	IGCC	2013	2028
159	Hirono 6	Fukushima	6,000	USC	2013	2028
160	Hitachinaka 2	Ibaraki	10,000	USC	2013	2028

		Prefecture	Capacity (MW)	Technology	Start	Retire
161	Osaki Cool Gen	Hiroshima	1,660	IGCC	2017	2028
162	Matsuura 2	Nagasaki	10,000	USC	2019	2029
163	Noshiro 3	Akita	6,000	USC	2020	2029
164	Takehara New 1	Hiroshima	6,000	USC	2020	2029
165	Kashima	Ibaraki	6,450	USC	2020	2029
166	Nakoso IGCC	Fukushima	5,430	IGCC	2020	2029
167	Hitachinaka Joint Thermal Power Station	Ibaraki	6,500	USC	2021	2029
168	Hirono IGCC	Fukushima	5,430	IGCC	2021	2029
169	Kobe New 1	Hyogo	6,500	USC	2022	2029
170	Taketoyo 5	Aichi	10,700	USC	2022	2029
171	Misumi 2	Shimane	10,000	USC	2022	2030
172	Kobe New 2	Hyogo	6,500	USC	2023	2030
173	Saijo New 1	Ehime	5,000	USC	2023	2030
174	Yokosuka New 1	Kanagawa	6,500	USC	2023	2030
175	Yokosuka New 2	Kanagawa	6,500	USC	2024	2030
176	Akita Port 1	Akita	6,500	USC	2024	2030
177	Akita Port 2	Akita	6,500	USC	2024	2030
178	Nishiokinoyama 1	Yamaguchi	6,000	USC	2026	2030
179	Nishiokinoyama 2	Yamaguchi	6,000	USC	2026	2030

Published by: Kiko Network https://www.kikonet.org
November 2020
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