

Commentary on Japan's Policy Plan for "Phasing out Inefficient Coal-fired Power Plants": The Plan is not consistent with the Paris Agreement

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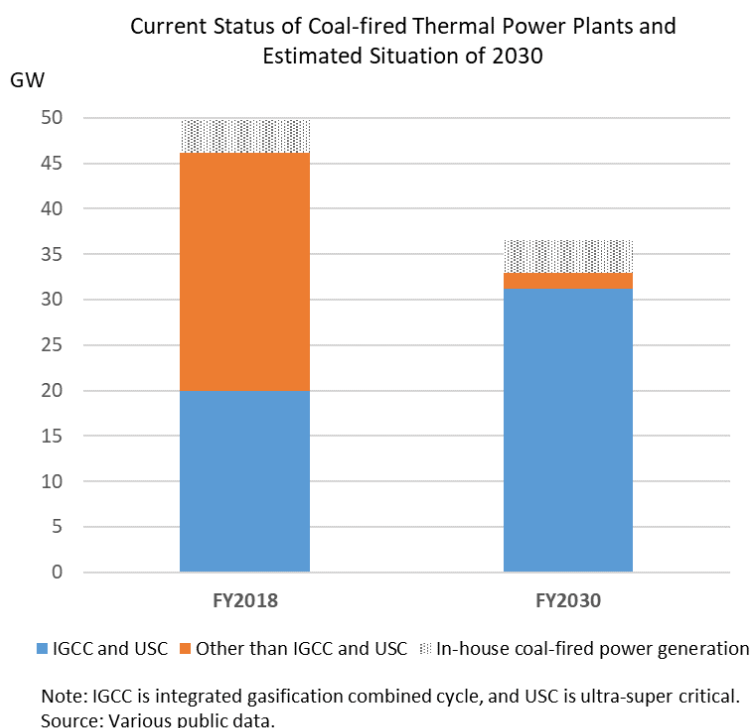
Keypoints

- The Ministry of Economic, Industry and Trade made a welcome announcement on a new policy plan to phase out inefficient coal-fired thermal power plants by 2030 in Japan.
- However, this policy plan does not mean a substantial shift from the conventional energy policy of replacing small-scale, inefficient coal-fired power plants with large-scale, high-efficiency ones. The policy plan is also insufficient as Japan's effort to contribute to the long-term temperature goals of the Paris Agreement.
- Most of the units which are expected to be phased-out under this policy plan are small-scale ones. It is estimated that if coal-fired power plants currently planned and under construction come into operation, there will still be 50 units with a total capacity of 33 GW in 2030.
- A capacity of 33 GW from highly efficient coal-fired power plants would reduce coal-fired power generation by 44TWh to 102TWh, and would result in a fall in CO₂ emissions by 37 million to 62 million tons from what Japan's nationally determined contribution (NDC) assumes. However, these are inconsistent with most of the figures in the integrated assessment models/energy models of Japan's reduction targets that are consistent with the Paris Agreement.
- Out of the 50 units, 21 units (14.5 GW) are expected to have been in operation for 20 years or less as of 2030, and likely to operate up to 2050. Of these, there are only four plants (1.5 GW) using integrated gasification combined cycle (IGCC) which is said to be compatible with carbon capture technology. The rest are using ultra-super critical (USC) technologies that do not plan to be equipped with carbon capture technology, which in turn causes a long-term lock-in of CO₂ emissions.

On 3 July, 2020, the Minister of Economy, Trade and Industry, Hiroshi Kajiyama, announced the launch of a process to come up with concrete measures to phase out low efficient coal-fired power plants by fiscal 2030.¹ While maintaining and expanding highly efficient coal-fired power plants (integrated gasification combined cycle (IGCC) and ultra-supercritical pressure (USC)), inefficient ones (supercritical pressure (SC) and subcritical pressure (SUB-C)) will be phased out. However, exceptions to this phase-out will be Hokkaido and Okinawa areas where inefficient coal-fired power plants will continue to operate. Considering all plants currently planned and under construction together, it is estimated that 50 coal-fired power units will be in operation in 2030 with an installed capacity of approximately 33 GW.² The estimated breakdown is as follows:

- (1) Highly efficient coal-fired power plants (IGCC and USC) already operating as of 2018 (26 units, 20 GW)
- (2) Highly efficient coal-fired power plants (17 units, 12 GW) that will be operational after 2019
- (3) Low efficient coal-fired power plants that have been in operation for less than 40 years as of 2030 in the areas of Hokkaido and Okinawa considered as exceptions (7 units, 1.7 GW)


Currently, there are about 140 coal-fired power units in operation in Japan. According to this new policy plan, about 100 inefficient coal-fired power plants will be shut down by fiscal 2030. However, the installed generation capacity of coal-fired power plants is about 46 GW in Japan (excluding in-house generation). If capacity is about 33 GW in 2030, the reduction set out in this policy plan will be about 30%. In other words, most of the facilities that will be shut down due to this policy plan are small-scale. Since maintaining and expanding large-scale and highly efficient coal-fired power plants is a basic stance of current Japan's energy policy, the new policy does not mean a substantial shift in policy direction.



Coal-fired power plants with a capacity of 33 GW would generate 175 TWh and 233 TWh, respectively, assuming a capacity factor of 60% or 80%. These figures would be 44TWh to 102TWh less than the amount assumed by Japan's nationally

¹ NHK Online News "Aging Coal-fired Power Plants to be Phased Out" 3 July 2020. <https://www3.nhk.or.jp/news/html/20200703/k10012493961000.html>

² On the Kikko Network's list of newly planned coal-fired power plants (https://sekitan.jp/plant-map/ja/v/table_ja), two plans (2 GW in total) without official announcement are not included here. Since the announced policy plan is not clear about how to deal with in-house coal-fired power generation, those are also no included here.



determined contribution (NDC) (277TWh). Assuming a CO₂ emission coefficient of 0.85tCO₂/MWh at the power generation end, CO₂ emissions will also be reduced by about 37 million tons less than assumed in the NDC to 62 million tons. However, these amounts are inconsistent with most of the figures in the scenario studies of Japan's reduction targets that are consistent with the long-term temperature goal of the Paris Agreement.³

In addition, out of the 50 coal-fired power units that will be in operation in 2030, 21 units of 14.5 GW are expected to have been in operation for 20 years or less as of 2030. Thus, there is a possibility that they will continue to operate up to 2050. Of these, there are only four IGCCs (about 1.5 GW) for which carbon capture technology is relatively easy to install. The rest are USC that is not likely to be equipped with carbon capture, storage and utilization (CCS/CCU) technology, which causes a long-term lock-in of CO₂ emissions. To be consistent with the Paris Agreement, coal-fired power must be equipped with carbon capture and storage (CCS/CCU). For the deployment of CCS/CCU, however, it is also necessary to solve many problems such as securing a safe storage site and establishing a method of utilizing captured carbon so that it will not be released into the atmosphere again. In addition to urging the abolition of inefficient coal-fired power plants, it is necessary to take measures aiming at zero net emissions across the entire power sector.

Furthermore, although not fully mentioned in this policy plan, 31 small-scale, inefficient coal-fired power plants for in-house power generation (3.6 GW) are currently operating. Eleven of these will be in operation for 40 years or less as of 2030. Many in-house power generation facilities continue to be used even after 40 years of operation, and therefore it will be necessary to take measures to phase these facilities out in the future.

"Phasing-out of inefficient coal-fired power" is specified in the "Fifth Strategic Energy Plan" (2018). In addition, the "Long-term Strategy under the Paris Agreement" (2019) stipulates that CO₂ emissions from thermal power plants will be reduced and inefficient coal-fired power generation will be phased out to be consistent with the long-term goals of the Paris Agreement. However, as discussed above, this policy is insufficient as an approach consistent with those long-term goals.

³ These figures are not consistent with five out of seven 2°C-goal compatible integrated assessment models/energy models and not consistent with five out of six 1.5°C-goal compatible models. Refer to CD-LINKS Scenario Explorer (<https://data.ene.iiasa.ac.at/cd-links>), Joint Research Centre's POLES and International Energy Agency's World Energy Model.



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