

Current status and challenges of environment impact assessment for coal-fired power plants

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Abstract

The Paris Agreement triggered the global movement towards low carbon or de-carbonized society and economy. One clear example is that governments in many countries have undertaken policies and measures to reduce or stop coal-fired power plants. In Japan, however, there are still many plans to construct coal-fired power plants, which threaten the achievement of Japan's emission reduction target in 2030 under the Paris Agreement as well as further large-scale CO₂ emission reduction in the longer term. This presentation introduces two recent cases of Japan's Environment Minister's opinions on Environmental Impact Assessment (EIA) of coal-fired power plants to consider how the EIA of each project can contribute to the national climate change policies.

[keyword: Climate Change Policy, Thermal Power Plant, Environmental Impact Assessment (EIA)]

1. Trends around the Global Warming Countermeasures

The Paris Agreement was adopted at the 21st Conference of the Parties to the United Nations Framework Convention on Climate Change (COP21) held in Paris, France in November-December, 2015 and took effect in November 2016 with unprecedented speed.

The Japanese Government accepted the Paris Agreement and signed onto it in November 2016. In July 2015, before adoption of the agreement, Japan submitted its Intended Nationally Determined Contribution (INDC), including its FY 2030 mid-term reduction target to the United Nations Framework Convention on Climate Change (UNFCCC) Secretariat. Japan's FY 2030 mid-term reduction target was at the level of 26.0% by FY 2030 compared to FY 2013 (25.4% reduction when compared to FY 2005) and the reduction target was accepted formally under the Paris Agreement. In May 2016, the Cabinet approved the Plan for Global Warming Countermeasures (Ministry of the Environment (MOE), 2016) including the actions necessary to achieve the mid-term target (26% reduction by FY 2030), strategic actions towards the long-term goal (80% reduction by FY 2050), and actions toward global greenhouse gas (GHG) reduction.

US President Donald Trump announced his decision to withdraw from the Paris deal in June 2017, but many states, cities and industries in US expressed opposing views on this decision and vowed to stay the course. Also, the major countries, including Japan, strengthened the parties bond to compliment the Paris Agreement. The temporary setback will not change the promotion of the global climate change countermeasures in accordance with the Paris Agreement. .

The trend aiming for low-carbon and further de-carbonizing society/economy based on the Paris Agreement is appearing in many countries and in various industry areas. One example in the power generation sector is the reduction of coal-fired power generation which has especially high carbon dioxide emissions. In France, England and Canada, the respective governments announced their policy to stop coal-fired power generation by 2020 to 2030. Germany will stop coal-fired thermal power using lignite and the countermeasure is to reduce the dependency on coal powered thermal power. In China, the highest CO₂ emitting country in the world, similar policy and measures will be implemented, which reduce the plans for, and rescind the permission of, building of coal-fired power plants. Even in the US, where the

President has turned backward for the global warming countermeasures, there is a viewpoint that coal-fired thermal power has no advantage from an economic viewpoint. The Government of India has announced that the addition of coal-based capacity already under construction is likely to yield benefits during 2017-22 but no coal-based capacity will be added from 2022-27 (Draft National Electricity Plan by Central Electricity Authority of the Ministry of Power). Further, in July 2017, Korea's President Moon said that the Government will reiterate his earlier pledge to permanently shut down at least 10 aged, coal-fired power plants, that have operated for more than 30 years, before his five-year term ends, a move aimed at reducing GHG and fine dust emissions.

2. The trend for thermal power generation in Japan

Going against the apparent world trend, Japan's plan to build coal-fired power stations has increased since the accident at Fukushima Daiichi Nuclear Power Station in May 2011, because of the relatively low cost and stable supply. The number of the projects on thermal power plants which the Minister of the Environment expressed an opinion based on the Act on Environment Impact Assessment and the Electricity Business Act was 1 to 5 up to FY 2013 but increased to about 10 annually, and the plan of coal-fired power plants has occupied over the half of the total thermal power generation, during FY 2014 to FY2016 (Table 1).

	Coal	LNG	City gas	By-product gas	Total
2013	1	4			5
2014	6	3	1	1	11
2015	5	2	1	1	9
2016	7	3			11
Total	19	12	2	3	36

Table 1 Number of thermal power plants with an opinion by the Minister of the Environment

The predicted amount of the total power generation by coal-fired power plants which are planned to be built as at April 2017, including smaller coal-fired power plants with sizes below the standard of the EIA Act and thus receive no assessment, is estimated to reach over 18.4 million kW. The CO₂ emission amount from the existing coal-fired power plants is already over the GHG emission amount in FY 2030 predicted in Japan's emission reduction plan. If these plans for the construction of coal-fired power plants are implemented, the CO₂ emission amount in FY2030 will greatly exceed Japan's reduction target.

3. The history of the opinions of Minister of MOE in EIA for coal-fired power plant

(1) The Agreement of the relevant directors in April 2013

In order to achieve the reduction target determined in the Plan for Global Warming Countermeasures, it is essential that the whole electric utility industry attack reducing the CO₂ emissions under the effective framework, complying with the requirements expressed in "the Agreement of the relevant directors on the bidding of thermal electric power in Tokyo Electric Power Co. Ltd (Ministry of Economy, Trade and Industry (METI) and MOE)" accepted by "the meeting of the relevant cabinet ministers on the cost reduction of fuel supply (Meeting of 4 Ministers)" held in April 2013.

After the Agreement of the relevant directors, in the EIA document on primary environmental impact consideration of Hitachinaka Cooperative Coal-fired Thermal Power Station Unit 1 plant, in June 2014, the Minister of Environment expressed the opinion that the effective framework should be induced based on the April 2013 Agreement of the relevant directors.

Japan's INDC (stipulating the reduction target in FY 2030) was accepted by the Government and the consistent plan for energy mix was revealed in July 2015. In June 2015, the Minister of Environment sent to the Minister of METI his opinion

on the document on primary environmental impact consideration for the new project of Nishiokinoyama Coal-fired Thermal Power Station (tentative name). The opinion stated as follows; “in the present time, the framework is not induced (snip) for this project, so considering the above situation there is a concern about hindering the performance the INDC based on the energy mix, and it could not be decided that the content of this project is consistent with the national reduction target and the plan of CO₂ emission, and therefore this project is hard to be approved at the present stage”.

After this opinion, companies of the Federation of Electric Power Companies of Japan announced the outline of a voluntary framework for reduction of CO₂ in the electric utility industry. The outline showed that they could set in force a GHG emission factor of 0.37 kg-CO₂/kWh and follow up to check the complementary situation of the countermeasures every year and reflect the result in the following year’s action plan. However, the problem remained in securing widespread enforceability of the achievement of the target goal.

Thus, against the documents on primary environmental impact consideration for 4 thermal power generation stations of Taketoyo and Chiba-Sodegaura in August 2015 and Ichihara and Akita Port in December 2015, therefore, the Minister of Environment submitted opinion documents stating that “the project plan is hard to be approved at the present stage and it is essential that the actual framework and rules should be induced immediately”.

(2) The Consensus between both Ministers of MOE and METI in February 2016

Considering the opinions of the Minister of Environment, the Electric Power Council for a Low Carbon Society was settled for securing enforceability of the achievement of the voluntary approach in the electric utility industry in February 2016. Between MOE and METI, a viable political approach was discussed and in the same month both Ministers agreed with the following approaches:

- 1) To secure the certain implementation of the voluntary framework in the electric utility industry;
- 2) To secure the enforceability of the approach and achieve the target goal in the whole electric utility industry by the policy measures based on the Act on the Rational Use of Energy (the Energy Conservation Law) and the Act on the Promotion for Utilization of Non-fossil Energy Sources and Effective Utilization of Fossil Energy Materials by Energy Suppliers (the Act on Sophisticated Methods of Energy Supply Structures); and
- 3) To evaluate the progress on the effort to achieve the target goal and improve the enforceability every year and to strengthen the approach as needed.

During the period from this agreement by both Ministers until the effectuation and Japan entering the Paris Agreement, 6 coal-fired thermal power plants (2 documents on primary environmental impact consideration and 4 drafts of the assessment method), a LNG fired thermal power plant (a draft of the assessment method) and a by-product gas fired thermal power plant (a draft of the assessment method) were proposed, and the EIAs were performed mainly with attention to the following subjects and Minister of Environment had sent his opinion;

- # Best Available Technology (BAT): the examination for the process of adaptation by the project proponent who should try to use the power generation technology better than (A: the technology already operating in commercial plants) after the evaluation of (B: the technology being constructed as commercial plants or under the process of EIA) based on the BAT Table of the new technology evaluated and jointly issued by MOE and METI and the reduction of GHG emission through the proper maintenance of the technology.
- # The Energy Conservation Law: reliable compliance with the benchmark index road to FY 2030, continuous publication of the implementation of measures, annual voluntary reporting of the results of measures, and consideration of the restructure of the business when it is decided that the achievement of the target is impossible.
- # Voluntary framework, the Act on Sophisticated Methods of Energy Supply Structures: the supply of electric power to the companies joining the voluntary framework.
- # Long-term target and carbon dioxide capture and storage (CCS): implementation of the considerations of introduction of the CCS plant based on the results of examination by government and the development of this technology.

4. Recent Opinions of the Minister of MOE in EIA on coal-fired power plants

(1) Soga Thermal Power Plant (the document on primary environmental impact consideration)

Soga Thermal Power Plant in Chiba City was the first case of an EIA on coal-fired power plant after the effectuation and Japan's entry to the Paris Agreement and the opinion of the Minister of Environment was sent for the coal-fired power plant (the document on primary environmental impact consideration) in March 2017.

In this opinion the following problems were pointed out in addition to the opinions for the achievement of the target by FY2030. Japan is required to tackle the more severe emission target and needs to make an effort towards 80% reduction of GHG emissions by FY2050. In other countries, there is the trend of suppression of coal-fired power generation, while in Japan there are many plans of new and additional coal-fired power plants even though the present CO₂ emissions are over the emission target in FY2030 and, therefore, there is a concern that Japan will not be able to achieve even the target in FY2030. Further the opinion indicated that coal-fired power generation contains a high business risk from the viewpoint of environmental conservation.

The opinion stated that “it is very important that the project proponent should recognize the high business risk again and consider every alternative of the project including the reconsideration of the business when the way to reduce CO₂ emissions in the business could not be described up to and beyond FY2030”.

(2) Taketoyo Thermal Power Generation Plant (draft of the assessment method)

In August 2017, the Minister of Environment sent the opinion on Taketoyo Coal-fired Thermal Power Generation Plant in Taketoyo town in Aichi prefecture. This project was the first draft of the assessment method since the effectuation of the Paris Agreement and the case which had been pointed out as a “not approved” project in the opinion of the Minister of Environment on the document on primary environmental impact consideration in August 2015. Therefore, the opinion of the Minister of Environment for this project attracted considerable attention.

In this case, the opinion of the Minister of Environment contained more detailed content than the opinion on Soga thermal power plant, continuing the severe attitude expressed for the Soga Plant. Because this project was in the stage of the draft assessment method and closer to the start of construction compared with the Soga thermal power plant, only in the stage of the document on primary environmental impact consideration.

Specifically, the following actions were pointed out:

(As for Soga thermal power plant) It was very important that the project proponent should recognize the high business risk again and consider every alternative of the project including the reconsideration of the business when the path for reduction of CO₂ emissions in the business could not be described up to and beyond FY2030.

And further, the proponent was required to correspond to the following matters:

When the project is complimented after the introduction of adaptation method watching the domestic and foreign situation, the proponent should achieve clearly the target of benchmark indexes and introduce a plan of further reduction of CO₂ emissions into the whole business group, for example by suspension, abolition or suppression of operation of low-efficiency power generation plants which are owned.

Also, about the plan using mixed firing of forest biomass, the effect is partially recognized on the viewpoint of the reduction of CO₂ emissions but there are some concerns like the environmental impact by the supply of woody biomass and the following actions were required: 1) the avoidance of illegal deforestation by the supply of the material accepted with international forest authentication; 2) the maximum suppression of CO₂ emission through the integral evaluation of CO₂ emission amounts in the stage of supply of fuel; 3) the maintenance of the ratio of mix indicated (17%); 4) the maximum use of domestic woody biomass confirming the situation of supply; and 5) the regular publication for the situation of above actions.

5. Summary and the future problems

The two recent opinions of the Minister of Environment, especially for Taketoyo Thermal Power Generation Plant, had the following noticeable features:

1) The relationship between the reduction of emission in the total industry and the individual project.

There is a question that what and how much could be required in the opinion of EIA for the individual project under the situation that the whole electric utility industry is trying to achieve the target settled for reduction of CO₂ emission. In the opinion for Taketoyo Thermal Power Generation Plant additional action was required that “when the project is complimented, suspension, abolition or suppression of operation of the low-efficiency power generation stations in the whole business group” This opinion is an interesting example that the proponent is required the reform of the other existing power generation plants accompanied with the complement of the new project under EIA.

2) The proponent as target of opinion

In recent power generation projects, the proponent which performs the assessment is not always same as the company which starts the business in the future and this situation may make it slightly difficult to make the Minister’s opinion. In the case of Taketoyo Thermal Power Generation Plant, the proponent which performed the assessment was Chubu Electric Power Co. Ltd. but it was announced that the division of thermal power generation of Chubu Electric Power Co., Inc. would be consolidated with TEPCO Fuel & Power, Inc. to integrate their existing thermal power generation businesses into JERA Co., Inc. and the companies have been engaged in detailed study and discussion. It is necessary that the opinion is directed not only toward to Chubu Electric Power which is the proponent of the project but also to JERA as the company enforcing this business after construction. Therefore, the description as “based on the integration of this project into JERA” was added in the opinion. It may be a subject that needs to be contained in the EIA system on how to achieve the enforcement of assessment and to make various improvements in the opinion when the proponent performing the assessment is different with the company enforcing the business.

3) The evaluation for the mixed firing of biomass

Under the Feed in Tariff (FIT) system promoting the spread of renewable energy, plans for biomass mixed firing power plant are increasing and there is a possibility that the plan for the power generation plant using coal as the main fuel with the mixed firing of biomass will increase. As mentioned in the opinion for Taketoyo Thermal Power Generation Plant, it is difficult to accept fully the reduction effect of biomass when the net amount of CO₂ emission increases even though the reduction effect of biomass appears. In addition, there are some problems as avoidance of environment impact caused by supply of biomass and the maintenance of the ideal mix ratio of biomass in mixed firing and so on. It is necessary to evaluate exactly these subjects in each individual case. The biomass mixed firing must not be used as expedient means for the increase of coal-fired power generation.

Now many coal-fired thermal power plants are under planning and EIAs for these projects are in progress. It is necessary to perform EIA for individual projects in order to achieve the CO₂ emission target in FY 2030 and further since 2030, with considering the issues outlined above, following the achievement of the target settled for reduction of CO₂ emission in the whole electric utility industry and in each individual company, and monitoring the situation of these actions.

6. References

[The Plan for Global Warming Countermeasures, Cabinet decision on May 13, 2016, Ministry of the Environment, Japan. \(2016\) \(https://www.env.go.jp/en/headline/2238.html\)](https://www.env.go.jp/en/headline/2238.html)