Seminar for Introducing the Latest Environmental Countermeasures Technology at Thermal Power Plants in Myanmar and Achievements Related to Japanese Efforts

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1. Introduction

JCOAL co-sponsored seminars on March 5, 2018 between the governments of Myanmar and Japan in the capital of Nepido. The seminar introduced our technology and experience with environmental countermeasures and protection at Japanese thermal power plants.

2. History Before the Seminar

Securing a stable power supply is critical in order to improve standard of living and economic growth. Confronted with problems of power shortages during economic growth, Myanmar also needs to introduce thermal power generation (coal/gas) to secure a stable power supply. Within this context, in October 2017, Mr. Win Khaing, Minister of Electric Power and Energy, visited Japan, where he visited the Isogo Power Station of J-Power and the Bulk Coal Terminal of Idemitsu. Afterwards, the Minister asked the Japanese Government for an introduction to environmental countermeasures at thermal power generation as well as Japanese technology and experience cultivated up to this point, and further, requested cooperation for human resource development. In response to these requests, this seminar is intended to introduce Myanmar to Japan's experience and technology as put into practice operating high-efficiency thermal power plants while also implementing environmental countermeasures. A total of 16 people from Japan's Ministry of Economy, Trade and Industry, Japanese corporations and JCOAL visited Myanmar for this seminar.

3. Discussion with Permanent Secretary Tin Maung Oo of the Ministry of Electricity and Energy

Prior to the seminar, the Japanese delegation met with Mr. Tin Maung Oo, Permanent Secretary of Electricity and Energy, as well as the officers of the Ministry of Energy. At the meeting, the Japanese team described the purpose of this seminar and the details about cooperation from Japan and Permanent Secretary Tin Maung Oo expressed gratitude for holding this seminar. In addition, the Myanmar team reiterated to the Japanese team the importance of coal-fired power stations and requested cooperation for the power generation sector including thermal power in the future. (Fig. 1)
4. Summary of the Seminar

(1) Participants
The seminar ended successfully with about 80 people consisting of leaders from local government, primarily the Ministry of Electricity and Energy, and electric power companies in Myanmar. In addition to the delegation from Japan, 21 members including to the local JICA staff were participated. With 12 out of 14 ministers responsible for electric power of various states and jurisdictions in Myanmar attending this seminar, participants enthusiastically exchanged views on Japanese power generation technology and environmental technology. With the chairperson of the Electricity Energy Development Committee, made up of member of parliament, and one member of that committee also in attendance, we could see expectations the Myanmar government has for the seminar.

(2) Opening Greetings, Keynote Speech and Photo Session
At the seminar, first, Tin Maung Oo, Permanent Secretary of the Ministry of Electricity and Energy, and then Hiroyuki Tsukada, Director for Coal Policy, Clean Coal Division, Natural Resources and Fuel Department, Agency for Natural Resources and Energy(ANRE), Ministry of Economy, Trade and Energy(METI) each gave opening remarks. After this, Ms.Myint Myint Kyi Swe, Director of Department of Electricity Power Planning from the Myanmar team gave a keynote speech entitled "Current Status and Progress in Power Sector in Myanmar", and then Planning Officer Tsukada from the Japanese team gave a speech entitled "Air Pollution Reduction Technology & Procedure for EIA of coal power plant in Japan". A photo session was held after this. (Fig. 2)
(3) Lecture Contents
The seminar was split into Lecture 1, Lecture 2 and Lecture 3. We introduced Japanese thermal power generation technology for reducing the environmental burden and technologies for environmental protection, which include Japan's air pollution control, environmental assessment system, the social responsibility of power companies, harmony with local residents, environmental countermeasures in thermal power generation, desulfurization/denitrification technology, environmental measurement technology, coal utilization technology in harmony with the environment, and combined cycle of gas thermal power. Finally, Senior Executive Director Hashiguchi Masamichi of JCOAL gave closing remarks to end the seminar.

○ Lecture 1: Experience of Environmental Impact Assessment and CSR Activities
Electric Power Development Co., Ltd. (J-Power) described their efforts on environmental impact assessment (EIA).

○ Lecture 2: Environmental countermeasures at thermal power stations
(1) “Tokyo Electric Powee Co.,Inc.(TEPCO)’s Effort to reduce Air Pollutant Emission ”
TEPCO described their efforts in reducing the environmental impact primarily focusing on the particular problem of air pollution.
(2) “Dry-Desulfurization /Denitrification System”
JGC Corporation described the importance of removing SOx and NOx, and JGC's Dry Desulfurization/Denitrification system.
(3) “Contribution to Environmental Protection through Monitoring Technology”
HORIBA, Ltd. described examples of utilizing measurement equipment and its efforts up to now at environmental countermeasure.
Idemitsu Kosan Co., Ltd. described utilization of coal in harmony with the environment and measures to prevent dust from scattering and spontaneous heat generation which are important as environmental countermeasures.

**Lecture 3: High-efficiency, low-emission coal-fired power generation technology**

(1) “Comparison of Generating Technology: Sub-C, SC, USC”
JCOAL gave a general description of CCT technology and then gave a comparison and economic analysis of technologies such as Sub-C, SC and USC. JCOAL also described Japanese efforts to develop future environmental countermeasures.

(2) “MHPS Gas Turbine Combined Cycle Development and Experience”
Mitsubishi Hitachi Performance Systems, Ltd. (MHPS) described the combustion cycle of a gas turbine, the advantages of combined cycle and main constituent equipment, the world of gas turbines and its equipment installation track record in Myanmar, and a brief summary.

(3) Q&A
After the presentation, many questions were received from the audience, and active discussions ensued. There were many questions about the cooperative relationship between residents, local governments and electric power companies. The Japanese team described the dialogue Japan has held with residents, the environmental preservation agreement, and the efforts of local governments.

(4) Results
Thirty-four people responded to the questionnaire conducted after the seminar. As shown in Fig. 4, all of the responders highly evaluated the seminar highly and we heard many people say they hoped
that a subsequent seminar would be held.

- Very good 53%
- Good 47%
- Overall seminar evaluation

Survey Results

5. In Conclusion

Participants from Myanmar enthusiastically attended the seminar and actively questioned the Japanese team, impressing us with their concern for this matter and their great need for Japanese cooperation.

![Figure 5 Remarks by the Permanent Secretary of Electricity and Energy](image1)

![Figure 6 Remarks by Planning Officer Tsukada of METI](image2)

![Figure 7 Closing Remarks by Senior Executive Director Hashiguchi of JCOAL](image3)