# BANGLADESH CONSIDERS CLEAN COAL TO MEET FUTURE POWER GENERATION GOALS

**Dhaka, Bangladesh** – Senior-level managers, engineers, and plant operators from the Bangladesh Power Development Board (BPDB) and its subsidiaries gathered for a workshop on clean coal technology, power plant performance monitoring, heat rate improvement programs, coal transportation, and coal handling.


## BACKGROUND

The U.S. Energy Association (USEA) and Bangladesh Power Development Board (BPDB) signed a Memorandum of Understanding in 2011 establishing the U.S. – Bangladesh Power Generation Partnership, with support from the U.S. Agency for International Development (USAID). The objective of the partnership was to share best practices with BPDB in power generation employed by the world's best utilities and equipment manufacturers.

The Bangladesh Power Development Board was created in 1972 and started with only 200 MW of installed generation capacity. Today they have increased their installed capacity to over 12 GW (12,000 MW) with four subsidiaries. BPDB is responsible for a large portion of electricity generation and distribution in the urban areas of Bangladesh. The Board has plans to increase generation capacity to 24 GW by 2021 in order to provide reliable electricity to the entire country. Bangladesh's power generation has historically been largely dependent on natural gas, which comprises 62% of the country's electricity fuel mix. Unfortunately, proven gas reserves are depleting in the country so there is a significant need to diversify the fuel mix. As a result, they are looking at coal power generation to meet their electrification goals.

The workshop topic was requested by BPDB to help them begin preparations for coal-based power generation. The objectives of this workshop included the following:

- Best practices in power plant performance monitoring
- Super critical and ultra-super critical technological approaches for coal-based power plants
- Critical issues related to coal import, transportation and handling
- Heat rate improvement planning and implementation

## WORKSHOP OVERVIEW

The workshop began with opening remarks from the BPDB Chairman, Md. Shamsul Hasan Miah. Chairman Miah urged the attendees to share the lessons they learn from the workshop with their colleagues. He stated that coal was the only viable option to meet their future power generation and distribution goals. Miah also encouraged the speakers to share their experiences on a few specific topics that were of concern to Bangladesh as they make a shift in power supply. These include long-term versus short-term contracts, differences in coal varieties and blended coal, coal transportation and coal sourcing.

*Md. Shamsul Hasan Miah (right), BPDB Chairman, as he gives his opening remarks. Abul Baser Khan (left), member of Planning & Development.*


*Mr. Unni (Tata Power) has 34 years of experience and focuses on Operations & Maintenance standards and best practices for performance improvement within the power sector.*

The workshop was led by two executives from Tata Power in India – Mr. Gopalakrishnan Unni, Head of Operations Management and Mr. Sharad Baijal, Chief of Corporate Operations.

Tata Power was created in 1915 and today is the largest integrated power company and renewable energy player in India. Tata Power developed India's first 4000 MW (800 MW x 5 units) Ultra Mega Power Project (UMPP) based on super-critical technology near the city of Mundra. It is considered the most energy-efficient coal-based power plant in the country today.

Mr. Baijal began the training with a case study presentation on India's first 800 MW supercritical unit installations. He presented on coal transport methods, coal handling and best practices at Tata Power. He offered a comparison of the various coal transportation modes, along with real-world examples for each transport option. Mr. Unni discussed heat rate (the heat input required to generate a unit of electricity), its importance, and heat rate improvement activities in power plants. Heat rate is used to determine the efficiency of a plant and is important monitoring performance evaluations and improvements. He also presented on safety awareness, turbine performance and fleet wife monitoring. He described Tata Power's approach to fleet monitoring and the Advanced center for Diagnostics & Reliability Enhancement (ADoRE). ADoRE is the remote monitoring center at Tata Power that uses predictive analytics software that identifies emerging problems in a plant. Once these problems are detected, plant personnel are immediately alerted of the problem. Throughout the presentations, both speakers provided sound case study examples for the BPDB participants.


*Mr. Baijal (Tata Power) has over 35 years of experience in the power sector and specializes in power plant commissioning and Operations & Maintenance practices.*

## RESULTS

Participants had the opportunity to discuss coal power generation procedures and best practices throughout the workshop. The workshop attendees found Mr. Baijal's case study presentations useful and were inquisitive about issues that Tata Power ran into with their own installations. They asked questions about the type of loop system used, the disposal of ash, and how to determine the dimensions of power plant stacks. Participants also found Mr. Unni's heat rate presentations useful and asked many engaging questions throughout the workshop. Many of the questions surrounded the topic of plant losses and how to combat these losses. The participants had a great deal of interest in this topic because they wanted to understand how to minimize losses in their own system.

They collaborated with one another to generate recommendations and next steps for BPDB. The key improvements that participants plan to implement in the near future include:

- Operations & maintenance of power plants and coal handling equipment
- Heat rate improvement methods
- Safety awareness and measures to reduce accidents
- Sustainable coal sourcing
- Coal handling and transportation

*Mr. Gopalakrishnan Unni, Head of Operations Management of Tata Power, addressing a participant's question about heat rate improvement methods.*

The participants designated sustainable coal sourcing, heat rate, and safety awareness as part of the most useful information from the workshop. Coal sourcing is a topic the BPDB Chairman specifically asked to be discussed during the workshop and was among the most useful for participants because it is one of BPDB's biggest issues. Due to the high population density in Bangladesh, coal mining would require relocation and resettlement of many people in an already land-scarce country. The coal reserves in Bangladesh are located under a thick layer of sand and water, which makes underground coal mining and exploration a complex and expensive endeavor. The coal reserves are also located under very fertile soil that is already being used for farming. Outside of the geographical issues mentioned, there is a lack of coal ports and coal import infrastructure. The private sector may not be able to invest the capital needed to develop the ports and infrastructure required for large coal importation. River transportation of coal to certain areas of Bangladesh would also be a challenge. Due to all of these challenges, coal sourcing and transport was among the top priorities for the Chairman and other attendees.

At the conclusion of the workshop, USEA asked the participants to complete a survey to assess their comprehension of the topics covered. From the survey responses submitted by the attendees, the topics that returned the highest increase in knowledge were coal handling systems, coal imports to power plants, heat rate definitions, and the importance of heat rate monitoring.

## NEXT STEPS

As part of the workshop, the participants conducted planning sessions to brainstorm actions that could be implemented to address some of the issues they would face when establishing a coal power plant in Bangladesh. The participants plan to incorporate personal protection equipment and training to improve safety within their divisions. Monitoring, maintenance and coal quality improvements are part of their short-term plans (0 – 3 years). System upgrades, operations and maintenance guidelines are part of their medium-term plans (4-7 years). Proper design, commissioning and planning of coal power plants are part of their long-term plans (more than 7 years). The workshop participants want to continue the knowledge sharing and plan to share the information acquired with their teams upon their return from the workshop.


## LIST OF ATTENDEES

| | Name | Office |
|---|---|---|
| 1 | Mr. Md. Shamsul Hasan Miah | Chairman |
| 2 | Mr. Md. Abul Baser Khan | Member, Planning & Development |
| 3 | Mr. Md. Khaled Mahmood | Member, Generation |
| 4 | Mr. Abdul Majid | Construction of Rampal Coal-based Power Plant, BPDB, Dhaka |
| 5 | Md. Abdullah al Mamun | BPDB |
| 6 | Md. Abdus Sattermiah | BPDB |
| 7 | Mr. Md. Abu Bakar Siddique | 5-6 Unit, Ghorasal Power Station, BPDB, Narsingdi |
| 8 | Mr. Md. Abul Kashem Mahmud | Directorate of Project Planning, BPDB, Dhaka |
| 9 | Mr. Ajoy Kumar Chakraborty | Barapukuria 275 M W Coal Fired Thermal Power Plant (3rd unit) Construction Project, BPDB, Dhaka |
| 10 | Mr. Md. Anowar Hossain | Directorate of System Planning, BPDB, Dhaka |
| 11 | Mr. Md. Ariful Haq | Design and Inspection-1, BPDB, Dhaka |
| 12 | Mr. Arifur Rahman Bhuiyan | Construction of Maheskhali Coal-based Power Plant, Cox's Bazar, BPDB, Dhaka |
| 13 | Ms. Jakia Najnin Panna | BPDB |
| 14 | Mr. Bikash Dewan | Planning & Development, BPDB, Dhaka |
| 15 | Mr. Chowdhury Nuruzzaman | Barapukuria 275 M W Coal Fired Thermal Power Plant(3rd unit) Construction Project, BPDB, Dhaka |
| 16 | Mrs. Daisy Pervin | Directorate of Project Planning, BPDB, Dhaka |

| | Name | Office |
|---|---|---|
| 17 | Mr. Md. Ekhlasur Rahman Chowdhury | Barapukuria Coal Fired Thermal Power Plant, BPDB, Dinazpur |
| 18 | Mr. Ferdousi Begum | BPDB |
| 19 | Mr. Golam Kibria | IPP cell-1, BPDB, Dhaka |
| 20 | Mr. Goutam Kumar Pal | Construction of Rampal Coal-based Power Plant, BPDB, Dhaka |
| 21 | Mr. Md. Hassan Mahamud | Barisal Gas Turbine Power Station, BPDB, Barisal |
| 22 | Mr. Md. Helalur Rahman | Titas 50 MW Peaking Power Plant, BPDB, Comilla |
| 23 | Mr. Ibrahim Ahmad Shafi Al Mohtad | Electricity Generation Company of Bangladesh Limited, Dhaka |
| 24 | Mr. Md. Imrose Islam | Ashuganj Power Station Company Ltd, Ashuganj, Brahmanbaria |
| 25 | Dr. Kazi Humayun Kabir | ECGBL |
| 26 | Mr.Md. Jashim Uddin | Chittagong Power station, Raojan, BPDB, Chittagong |
| 27 | Mrs. Jorifa khatun | Directorate of System Planning, BPDB, Dhaka |
| 28 | Mr. Kausar Amir Ali | Construction of Bibiyana-III, 400 MW Combined Cycle Power Plant, BPDB, Dhaka |
| 29 | Mr. Khandaker Azizur Rahman | BPDB |
| 30 | Mr. Kshirod Mohan Bose | Ghorashal Power Station, BPDB, Narsingdi |
| 31 | Mr. Mahbubur Rahman | Member, Generation, BPDB, Dhaka |
| 32 | Mr. Md. Mizanur Rahman | Faridpur 50 MW Peaking Plant Power Plant, BPDB, Faridpur |
| 33 | Mr. Mohammad Moniruzzaman | Coal Power Generation Company Bangladesh Limited (CPGCBL), Dhaka |
| 34 | Mr. Moniruzzaman | Member Generation, BPDB, Dhaka |
| 35 | Mr. Md. Monower Zahid Khan | Directorate of System Planning, BPDB, Dhaka |
| 36 | Mr. Mustaque Muhamad | Power Station Construction, BPDB, Dhaka |
| 37 | Mrs. Nira Mazumder | Construction of Bibiyana-III, 400 MW Combined Cycle Power Plant, BPDB, Dhaka |
| 38 | Mr. Ovijit Kuri | Bhola 225 MW Combined Cycle Power Station, BPDB, Bhola |
| 39 | Mr. Quazi Md. Ziaul Hoque | Shiddhirganj 210 MW Power Plant, Shiddhirganj, BPDB, Narayanganj |
| 40 | Mr. Md. Rahmat Ullah | Chief Engineer, Generation, BPDB, Dhaka |
| 41 | Mr. Rajesh Mazumder | Design and Inspection-2, BPDB, Dhaka |
| 42 | Mr. Ratan Kumar Paul | Directorate of System Planning, BPDB, Dhaka |
| 43 | Mr. Md. Rezaul Karim | Khulna Power Station, BPDB, Khulna |
| 44 | Mr. Ashutosh Roy | BPDB |
| 45 | Mr. Md. Sahadat Hossain | Barapukuria Coal fired Thermal Power Plant, BPDB, Dinazpur |
| 46 | Mr. Sayeed Ahmed | Private Generation, BPDB, Dhaka |
| 47 | Mr. Sayeed Akram Ullah | Design and Inspection-1, BPDB, Dhaka |
| 48 | Ms. Selima Nargis | Directorate of System Planning, BPDB, Dhaka |
| 49 | Mr. Md. Tanbir Rahman | North-West Power Generation Co. Ltd, Dhaka |

For more information about the Bangladesh Partnership, please contact Ms. Ibironke Ogunye at iogunye@usea.org or Ms. Sarah Blanford at sblanford@usea.org.