

Feasibility Studies with the Aim of Developing a
Joint Crediting Mechanism in FY2017

Feasibility Study on Development and Standardization of a Power Digital Solution for Utilities in the ASEAN Region

New Energy and Industrial Technology Development Organization (NEDO)

Marubeni Corporation

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Conducted by: Marubeni Corporation

Study Outline

Summary

This study was carried out for a project to optimize power plant performance and determine the level of greenhouse gas (GHG) emissions reduction obtained through the introduction of a “power digital solution” at coal-fired power plants in the Mae Moh district operated by the Electricity Generating Authority of Thailand. The power digital solution includes technology utilizing an Internet of Things (IoT) platform which optimizes plant boiler performance and improves its operating efficiency.

Needs of partner country

The power plants at Mae Moh use lignite coal for fuel and require a high level of operational skills. Challenges facing the Mae Moh power plants include optimization of plant operation and fuel consumption. It is believed that a power digital solution will help address these challenges and subsequently contribute to efforts to address global warming.

Technical issues

Issues include the status of sensor installation at existing power plants and methodologies for the collection, processing, and selection of data from sensors.

Prospects for dissemination

Power demand in Thailand and neighboring countries is increasing, so it is therefore essential to improve operational efficiency at existing power plants as well as optimize and balance power supply and demand. Thailand is keen on the development of digitalization, and aims to become a regional hub for supplying electricity in the ASEAN region. The development of a power digital solution for power plants as well as transmission systems, therefore, is important to the entire ASEAN region, including Thailand. To address these opportunities and challenges, Marubeni will work to standardize this technology solution in cooperation with various industry leaders who have expertise in areas such as electric power business operation, artificial intelligence (AI), big data, and IoT platforms.

Technology Outline

Boiler optimization

Boiler optimization refers to improved boiler combustion efficiency and emissions reduction by applying optimum operational settings calculated by model predictive controls, AI, and other means. It is expected that heat absorption and reliability will also be improved by optimizing boiler cleaning operations.

Asset management solution

One feature of an asset management solution known as asset performance management (APM) is predictive analysis enabled by similarity-based modeling (SBM) and physics-based analytics. A SBM analytical model is created by using historical data and defining expected behavioral norms. APM predicts failures by monitoring current conditions and deviations from expected norms. APM also includes features for knowledge management and maintenance strategy optimization.

Invariant analysis technology

Invariant analysis technology is an advanced AI technology which detects “unusual behavior” within a system at an early stage by using data collected by sensors and visualizing invariant relationships among sensors. This technology enables the detection of failure signs and the monitoring of conditions in various settings such as plants, factories, buildings, and computer systems.