BMW Group Manufacturing Thailand CO_2 Reduction Programme

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BMW Group Manufacturing Thailand has an ambitious and challenging goal of reducing its overall CO_2 footprint by 80 per cent until 2030. In an effort to achieve this goal, a variety of conditions and technologies have to be integrated to achieve the generation/consumption balance, the grid condition and TOU tariffs of the energy utility. In a wider sense. At the same time, intelligent management of decentralised loads, storage and generation has to be created, resulting in a virtual power system management solution.

A Virtual Power Systems Management Solution constitutes a new method of balancing power generation and power consumption. For example, with short-term curtailment events, up to 9 gigawatts of conventional power plants could be replaced by such solutions from Germany's industrial and commercial sectors alone.

In an article published in December 2011, the German Federal Minister for the Environment, Nature Conservation and Nuclear Safety defined the five pillars of the Energiewende, Germany's energy revolution – flexible generation, grid expansion, storage solutions, energy efficiency and Demand Response. Compared to the other options, Demand Response is the fastest, cheapest and greenest infrastructure investment.

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In a first attempt, BMW has engaged Bender-IS Co., Ltd. to systematically exploit all flexibility potentials by analysing the potential of automated processes within the BMW plant power grid for designing a new, efficient Virtual Power Management Solution. This can be accomplished through the use of real-time and rule-based software systems and extended data communication from a variety of sources, such as intelligent meters. Such modern forecasting and optimization methodologies provide AI-based, real-time services and are proven solutions in a number of industries. The objective of this approach is to generate pure flexibility and high reliability for the energy system by significantly reducing the overall CO_2 emissions.

Bender-IS has proposed basing the project on four main essential activities during an initial analysis phase that aims to outline the selection process of the most appropriate technologies, solutions and overall Roadmap to enable the implementation to achieve the final goal of an 80 per cent CO_2 reduction at the BMW plant at the Amata Rayong Industrial Estate. These activities include:

- Understanding the actual framework. Analysing the actual energy scenario, the behaviour and requirements of all current and future processes within the plant's operations. This also includes the already planned and agreed expansions;
- Load prediction analysis. Creating in-depth knowledge of operational behaviours and the influencing factors that will enable the forecasting of their future adoption to the implementation of additional renewable energy sources, and an intelligent energy management solution in the short and long term;
- Optimal planning. Creating an optimization model that will provide the most efficient scheduling of the short-term requirements and the optimal planning of the long-term resources, technologies, solutions and investment in additional renewable energy resources. That also includes the analysis of the effectiveness of potential third parties as value added service providers;
- Roadmap. Outlining the timeline and milestones for each step of the implementation process of the various hard and software solutions. Every milestone will be tied to a CO_2 reduction target.

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