

Procedure Model for Data-Driven Decision Support Regarding the Integration of Renewable Energies into Industrial Energy Management

Authors : M. Graus, K. Westhoff, X. Xu

Abstract : The climate change causes a change in all aspects of society. While the expansion of renewable energies proceeds, industry could not be convinced based on general studies about the potential of demand side management to reinforce smart grid considerations in their operational business. In this article, a procedure model for a case-specific data-driven decision support for industrial energy management based on a holistic data analytics approach is presented. The model is executed on the example of the strategic decision problem, to integrate the aspect of renewable energies into industrial energy management. This question is induced due to considerations of changing the electricity contract model from a standard rate to volatile energy prices corresponding to the energy spot market which is increasingly more affected by renewable energies. The procedure model corresponds to a data analytics process consisting on a data model, analysis, simulation and optimization step. This procedure will help to quantify the potentials of sustainable production concepts based on the data from a factory. The model is validated with data from a printer in analogy to a simple production machine. The overall goal is to establish smart grid principles for industry via the transformation from knowledge-driven to data-driven decisions within manufacturing companies.

Keywords : data analytics, green production, industrial energy management, optimization, renewable energies, simulation

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