Research Center
Finance & Information Management

Fraunhofer FIT
Project Group
Business & Information
Systems Engineering

Generic Data Model for Describing Real-Time Data-Supported Power Flexibility

by

Thomas Weber[1], Daniel Schel[2], Paul Schott, Dennis Bauer[2], Jaroslav Pullmann[3], Eberhard Abele[1], Thomas Bauernhansl[2], Gilbert Fridgen, Matthias Jarke[3]

presented at: SmartER Europe, Essen, Deutschland, February 2018

[1] PTW TU-Darmstadt
[2] Fraunhofer IPA
[3] Fraunhofer FIT

WI-746

University of Augsburg, D-86135 Augsburg
Visitors: Universitätsstr. 12, 86159 Augsburg
Phone: +49 821 598-4801 (Fax: -4899)

University of Bayreuth, D-95440 Bayreuth
Visitors: Wittelsbacherring 10, 95444 Bayreuth
Phone: +49 921 55-4710 (Fax: -844710)

www.fim-rc.de

Generic Data Model For Describing Real-Time Data-Supported Power Flexibility

Thomas Weber, PTW TU-Darmstadt; Daniel Schel, Fraunhofer IPA; Paul Schott, Fraunhofer FIT PGWI; Dennis Bauer, Fraunhofer IPA; Jaroslav Pullman, Fraunhofer FIT; Prof. Dr. –Ing. Eberhard Abele, PTW TU-Darmstadt; Prof. Dr. Thomas Bauernhansl, Fraunhofer IPA; Prof. Dr. Gilbert Fridgen; Fraunhofer FIT PGWI; Prof. Dr. Matthias Jarke, Fraunhofer FIT

Abstract:

In the course of the German Energiewende, the share of controllable power generation is decreasing, while renewable, volatile generation resources (wind turbines and photovoltaics), are being expanded. Therefore, the need for flexibility on the consumer side to compensate for this volatile generation is growing, because the balance of power production and power consumption needs to be guaranteed [1]. The German industrial sector consumes the largest share by 43.7 % of electricity [2] and also holds enormous potential for load flexibility in Germany [3]. However, many potentials cannot be exploited because the necessary information technology connections are missing. The generic data structure presented in this paper offers an approach to describe power flexibility potentials in a standardized way for a prevailing situation. This state-dependent flexibility potential can thus be made available to a higher-level instance for optimizing the operation strategy. As digitization progresses, the degree of automation increases, and so does the flexibility potential of the system. To this end, the basic characteristics of flexibility are first of all worked out and the corresponding degrees of freedom are explained in more detail. The existing approaches for describing flexibility of conventional power plants, such as the transmission code [4], will also be discussed. There are two classes of power flexibility - time-restricted and time-independent flexibility. Separate sets of flexibility indicators are created for both classes, which are then transferred to a data structure. Finally, an information architecture to process the data model is presented.