

# Consumer-Centric Electricity Markets: Six Design Principles

Michaelis, A.<sup>a,b,\*</sup>, Hanny, L.<sup>c</sup>, Körner, M. F.<sup>a,b</sup>, Strüker, J.<sup>a,b</sup>, & Weibelzahl, M.<sup>a,b</sup>

<sup>a</sup> University of Bayreuth, FIM Research Center, Wittelsbacherring 10, 95444 Bayreuth, Germany

E-mail addresses: marc-fabian.k.koerner@uni-bayreuth.de, jens.strueker@fim-rc.de

<sup>b</sup> Fraunhofer FIT, Wittelsbacherring 10, 95444 Bayreuth, Germany

E-mail address: anne.michaelis@fit.fraunhofer.de; martin.weibelzahl@fit.fraunhofer.de

<sup>c</sup> Fraunhofer FIT, Alter Postweg 101, 86159 Augsburg, Germany

E-Mail address: lisa.hanny@fit.fraunhofer.de

\* Corresponding author

E-Mail address: anne.michaelis@fit.fraunhofer.de

**Abstract:** Key to the necessary decarbonization of energy systems is the large-scale expansion of renewable energy sources and their integration into the electricity system. This integration is challenging because the feed-in from renewable energy sources is highly intermittent and largely dependent on uncontrollable factors such as weather patterns. To maintain grid stability, which refers to the required balance between demand and supply in the electricity system, flexibility is key. Large flexibility potentials can be found on the electricity demand side. However, current electricity market design in Europe, while providing major flexibility incentives, often neglects small-scale electricity consumers and distributed energy resources. We contribute to shape future electricity markets with consumers at the heart by developing six design principles for a consumer-centric electricity market design. We proceed by conducting a systematic literature review and confirming the findings by expert interviews. Based on the developed design principles, we define a consumer-centric market design as a set of market rules that align with the rules of other relevant energy markets and allow for the efficient matching of electricity demand and supply, with consumers having nondiscriminatory market access, being exposed to fine-grained price signals, being able to express their preferences, and having sufficient possibilities to protect themselves against unexpected price spikes. By actively incorporating consumers into electricity markets, we contribute to the overarching goal of integrating renewable energy sources while promoting energy justice, i.e., supporting a balanced mix of economic, political, environmental, and social interests.

**Keywords:** Energy transition, electricity, flexibility, energy justice, consumer-centric electricity market, consumer-centric market design, consumer participation, demand side participation