

## The role of electricity-“prosumers” in the transition towards a low carbon energy system

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Research field “Innovation and sustainability research: Sustainable transition and innovation research in the context of climate change”

Research question 1 | Cluster 3

Links to showcases Steininger 1, Baumgartner 2, Schulev-Steindl 1, Meyer 1, Meyer 2, Bednar-Friedl 1

**Background:** Electricity production is the largest single sector emitting fossil fuel CO<sub>2</sub> and thus plays a major role in mitigation scenarios (Bruckner et al. 2014). Main technologies for electricity generation from renewable sources, especially photovoltaics, allow cost-efficient small-scale applications; in the extreme case by prosumers where the same economic unit produces and consumes electricity without any need for transmission and distribution. However, there is still a need to provide a more realistic portrait of microeconomic decision-making frameworks for such technology-choices (Kolstad et al. 2014), especially when considering that the efficiency of these technologies strongly depends on regional topographic, climatic, etc. conditions and varies over time.

**Goal:** The main research objective is to gain better understanding of technology decisions by electricity prosumers, both private households and companies. For governing the transition towards a low carbon energy system, it is of interest, what factors foster or hinder the fast diffusion of distributed electricity generation by prosumers, and what are appropriate business models, product-service-systems, and policy interventions to come up with transformational change of the energy system.

**Methods and disciplinary background:** Based on literature and secondary data analysis, we will conduct quantitative and qualitative empirical social research. Results will be statistically analyzed and used for simulations and the development of scenarios. Main economic and environmental indicators will be calculated, and potential policy interventions simulated.

### References:

- Bruckner T., I. A. Bashmakov, Y. Mulugetta, H. Chum, A. de la Vega Navarro, J. Edmonds, A. Faaij, B. Functammasan, A. Garg, E. Hertwich, D. Honnery, D. Infield, M. Kainuma, S. Khennas, S. Kim, H. B. Nimir, K. Riahi, N. Strachan, R. Wiser, and X. Zhang, 2014: Energy Systems. In: Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Edenhofer, O., R. Pichs-Madruga, Y. Sokona, E. Farahani, S. Kadner, K. Seyboth, A. Adler, I. Baum, S. Brunner, P. Eickemeier, B. Kriemann, J. Savolainen, S. Schlömer, C. von Stechow, T. Zwickel and J.C. Minx (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.
- Kolstad C., K. Urama, J. Broome, A. Bruvoll, M. Cariño Olvera, D. Fullerton, C. Gollier, W. M. Hanemann, R. Hassan, F. Jotzo, M. R. Khan, L. Meyer, and L. Mundaca, 2014: Social, Economic and Ethical Concepts and Methods. In: Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Edenhofer, O., R. Pichs-Madruga, Y. Sokona, E. Farahani, S. Kadner, K. Seyboth, A. Adler, I. Baum, S. Brunner, P. Eickemeier, B. Kriemann, J. Savolainen, S. Schlömer, C. von Stechow, T. Zwickel and J.C. Minx (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.