Conviviality in Energy: Designing a Renewable Energy System in a Degrowth Society

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To reach the climate protection goals of the EU, renewable energies must play a major role in the future European energy supply system. According to a report of the Intergovernmental Panel on Climate Change they can contribute to a sustainable development as well as to climate change mitigation [IPCC, 2011]. Next to the transition from conventional energy sources to renewables, politics puts further emphasize on increasing energy efficiency. Both – the reconstruction of the energy system and the increase of energy efficiency based on technological advances – is in-line with the overarching goal of economic growth and the goal of increasing national competitiveness. But so-called rebound effects more and more counteract the 'gain' from increased energy efficiency [von Weizsäcker et al., 2009]. Hence, a sustainable reconstruction of the energy system needs to include the aspect of energy sufficiency [Hanke and Best, 2013].

The work described in this abstract mainly picks up on the ideas of Hanke and Best [2013]. In their work, Hanke and Best describe how forwarding convivial technologies may facilitate sufficient life styles and the implementation of the *Energiewende* in a degrowth society. Accordingly technologies such as 'power-heat cogeneration facilities at home' and 'photovoltaic modules on shed roofs' are considered to be more convivial than larger power plants such as offshore wind parks for instance. Subsidizing these 'low-tech' technologies might help to provoke an attitude shift towards more sufficient and sustainable life styles.

Our work aims to examine this idea from a more technical point-of-view: The ongoing transition of the energy system strongly alters the grid requirements. On the one hand, an increased share of renewable energies from highly fluctuating energy sources, such as solar and wind, makes new distribution grids as well as storage capacities necessary. On the other hand, a highly decentralised energy production in combination with a well extended distribution grid may help to decrease energy fluctuations and to balance production-demand discrepancies between regions. Thus, fostering a decentralisation of the energy supply system might counteract some of the disadvantages, which come with increased shares of renewable energy sources. Following the thoughts of Hanke and Best [2013] decentralisation can be achieved by implementing an energy system with a high share of relatively small power plants in public ownership in contrast to an energy system based on only relatively few large power plants in the ownership of a few big companies. This at the same time would increase the conviviality of the system and hence facilitate sufficiency.

One possible way to run power plants in public ownership are community initiatives like energy cooperatives. Oteman et al. [2014] defined (renewable) energy cooperatives as 'decentralized, non-governmental initiatives of local communities and citizens to promote the production and consumption of renewable energy'. Following this definition, members of energy cooperatives are involved in the construction of power plants as well as in their maintenance. They monitor the energy production and consumption themselves. The effect of increasing efficiency and sufficiency can hence be measured directly, which – as a feedback – leads to an additional minimisation of the members' individual consumption (see for example Wirth [2014]). The question about the role, which energy cooperatives might play in realising the energy transition in Europe, is recently addressed in various projects, e.g. EnGeno (`www.engeno.net`) and Rescoop 20-20-20 (`www.rescoop.eu`).

Our work intends to investigate the relationship between decentralisation and (renewable) energy production in an interconnected European energy supply system. Different scenarios, which map the system's degree of decentralisation and conviviality, shall be considered. We plan to compute time series of the energy production in Europe by using wind speed and solar irradiance data. Computations shall base on simulated spatial distributions of installed wind power and solar power capacities. The distributions will be simulated in a way, so that they mirror the scenarios mentioned above. The effect of an increased decentralisation on the fluctuations of the energy production will be investigated by comparing these time series. By doing so, this work will also contribute to the debate about the role of energy cooperatives in a redesigned European energy supply system.

References

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