

Caroline Möller

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Vita

Caroline Möller is researcher in the field of Transformation of Energy Systems since 2011. She focuses on the simulation of regional electricity and heat supply scenarios and on the development of relevant modeling frameworks. She is part of the developer and user group of the open source modelling framework oemof (open energy modelling framework). Caroline Möller studied Environmental Engineering/Renewable Energies at the University of Applied Sciences Berlin. Since December 2013 she investigates the integration of storages in so-called energy regions and analyzes self-sufficient supply scenarios on a regional and community level in her Ph.D. project. The Ph.D. project is part of the research project "EOS - Energiespeicherlösungen in der Region Osnabrück-Steinfurt" at the University of Applied Sciences Osnabrück.

Research topic

Storage demand and system costs in the electricity supply from the perspective of energy regions and communities

With the transformation of the energy supply to renewables the concept of energy regions has been established. Those are regions which focus a substantive development of renewables within their region and an independence of the import of fossil fuels. In this context a self-sufficient energy supply plays a major role. Calculations of self-sufficiency base most of the time on pure mathematics by balancing annual generation and consumption and therefore do not consider the fluctuating profile of photovoltaic and wind energy which are seen as the fundament of renewable energy supply. Within the Ph.D. project a bridge between the partly abstract ambitions of energy autarky which base on annual balances and real autarky is built. On the example of the region Osnabrück-Steinfurt and by applying energy system modelling questions concerning real autarky through the development of renewables, system costs and storage demand and synergy effects by changing the system size are addressed. Especially, transferring these questions to the energy community level is focused as the subject of autarky is promoted on the community level by a bunch of pilot projects and business models whereas on the regional level it is often criticized. Advantages of synergies by combining several households are already an argument on the community level, the system size, however, is considerably smaller than the regional one. Target of the Ph.D. project is to analyze both system levels from a techno-economic viewpoint by using model calculations and consequently evaluate their relationship.

Keywords

energy system modelling, scenario analysis, storage demand, energy regions, community storage

Publications

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