

Energy concepts for self-supplying communities based on local and renewable energy sources - DTU Orbit (09/11/2017)

Energy concepts for self-supplying communities based on local and renewable energy sources: A case study from northern Germany

The reduction of GHG emissions in buildings is a focus area of national energy policies, because buildings are responsible for a major share of energy consumption. Policies to increase the share of renewable energies and energy efficiency measures are implemented at local scale. Municipalities, as responsible entities for physical planning, can hold a key role in transforming energy systems towards carbon-neutrality, based on renewable energies. The implementation should be approached at community scale, which has advantages compared to only focusing on buildings or cities. But community energy planning can be a complex and time-consuming process. Many municipalities hesitate to initiate such a process, because of missing guidelines and uncertainty about possible energy potentials. Case studies help to understand applied methodologies and could show available energy potentials in different local settings. The current case study presents a community energy concept for the inner-city of Elmshorn. By estimating the energy demand, consideration of local energy saving potentials, and available energy potentials within the community, it was possible to develop several energy system variants that virtually allow a heating energy and electricity supply fully based on local, renewable energy resources. The most feasible and cost-efficient variant is the use of local food production waste in a CHP plant feeding a district heating grid. The overall aim is to show that a self-sufficient heat- and electricity supply of typical urban communities is possible and can be implemented in a cost-efficient way, if the energy planning is done systematically and in coherence with urban planning.

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