Managing energy vulnerability and resilience for rural communities in Northern Denmark by means of energy atlases

Bernd Möller

Dept. of Development and Planning

Aalborg University, Denmark

berndm@plan.aau.dk

Abstract

Denmark has targets of developing a 100% renewable energy supply within the next 4 decades, while the country is facing polarization between urban areas and the rural countryside. Energy vulnerability develops as low income groups move to areas with poor building stock and no access to collective heat supply. With little room for extending mortgage, investments in added insulation or efficient heating technology become less affordable. About a quarter of the Danish population lives in rural areas where energy efficient heat supply and low-energy buildings are outside reach. Typical current problems are high energy costs, which contribute to the unattractiveness of rural areas, driven by centralization and the dismantling of public infrastructure.

On the other hand, most renewable energy sources like wind and biomass are located in rural areas, where they could create resilience: income, jobs and better infrastructure. The imperative is to include energy in regional planning, on the supply side as well as the demand side.

This paper presents an energy atlas to describe the occurrence, spatial distribution and severity of energy vulnerability as well as potential energy resilience. By modeling heat demand, better building shells and heating installation including costs, the energy atlas illustrates vulnerabilities. By plotting supply of wind energy and biomass, prospective local income is mapped relative to the disamenities of heating countryside homes. A socio-economic link to national energy policy is established by showing the marginal impact of rural poor housing on national energy balances, and its meaning for the ambitious government targets.