Ringkøbing-Skjern Energy Atlas for municipal energy planning

Ringkøbing-Skjern is Denmark's largest municipality, located in the west part of Central Denmark Region. Its medium-term goal is to achieve 100% self-sufficiency in renewable energy supply by 2020. To achieve this ambitious goal, future courses of action have been outlined in the municipality's energy strategy "Energy2020" and divided into five groups: increasing production from wind, bioenergy and other renewable energy sources, reducing heat demand in buildings and converting transportation sector to renewable energy. The analysis of technical, economic and environmental impacts of such a variety of technologies on the municipality's energy system requires highly detailed decision support system. For that purpose, GIS-based energy atlas has been developed for Ringkøbing-Skjern municipality. The data about energy supply and demand, transmission and distribution infrastructure, energy resources, societal and other energy data have been geographically referenced and combined with the tools built in ArcGIS software.

The data have been collected from various sources: freely accessible public databases, the municipality, district heating and electricity companies, Danish transmission system operator, etc. The focus in the energy atlas is put on the geographical level of details, such as locations of district heating pipes and wind turbines, but the objects have been described with technical parameters and historical values as well. The applicability of the energy atlas is elaborated in the present paper and it is concluded that it can be used for analysis of heat saving measures in the building stock, district heating expansion and site-selection analysis for new wind turbines or biogas plants. In addition to that, it has proven to be useful as a data container and pre-analysis tool for energy system models and as a visualization tool. The continuous updating of the atlas while maintaining the sufficient level of data confidentiality is considered crucial for its long-term value; the strategy for continuous updating is presented in a separate section. Finally, since the methods and procedures used to create the atlas are irrespective from administrative boundaries, neither obstacle is observed towards creating the GIS-based energy atlases for other Danish municipalities or for Denmark as a whole.

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