Benchmarking the energy situation of Danish municipalities - Rural production and urban efficiency

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Benchmarking the energy situation of Danish municipalities
Rural production and urban efficiency


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This poster is a supplement to the extended abstract, available on the conference homepage, www.aesop2014.org

Background

Energy is a key issue for sustainable urban development, mainly related to the twin challenges of climate change and resource scarcity (Droege 2011). Despite agendas set on national and international level, local authorities are the key actors in this transformation (Lewis et al. 2013). European initiatives as the Covenant of Mayors or Energy Cities are closely following this development and supporting local authorities in their actions. Still, a general benchmarking of states and efforts is still missing which could however increase the use of good practice and enforce discussions in lagging cities.

Against this background, a model was developed in the ongoing European FP7 project PLEEC (see Figure 1) to measure the energy situation in cities, called “Energy-Smart City” (ESC), compiling over 50 energy-related indicators, aggregated into domains and further into key fields (Giffinger & Strohmayer 2014). We adapted the model to the Danish context and benchmarked the energy situation in the 98 municipalities of the country.

The ESC-model is very comprehensive and includes a wide range of different aspects of urban energy. This ‘inclusiveness’ also means a wide variety of data when operationalised. Despite originating from different databases and spatial levels (local, nuts2/3), the data is also related to very different contexts. This could be particular geographical patterns but also particular political decisions and policies.

First results

The data allows detailed profiles of the municipalities’ energy situation and we are currently in discussion with a couple of local stakeholders on the use of it for policy guidance. Besides that, we would like to identify more general patterns related to types of cities/municipalities. In a first step we used a downscaled version of Eurostat’s Urban-rural typology (Fertner 2012) to distinguish between urban, intermediate and rural municipalities (Figure 2).

Figure 3 shows the average, standardized values in each key field for a municipality in each of the three categories. Urban municipalities show a much better performance in *Green buildings and land-use* and *in Mobility and transport*, while the patters seems turned around for *Energy supply*. The other three key fields are not clearly related to the typology.

Figure 4 shows the average performance on the level of domains, showing further relations of energy and urban areas. District heating is clearly more spread in urban areas, while heat pumps (the indicator behind *Electric power grids*) are more spread in rural areas. Also, urban households use less energy per capita than rural ones which might be connected to the pattern we can see in the key field *Mobility and transport*.

Limitations and perspectives

As every model, also the ESC-DK is simplifying reality. A selection of indicators are aggregated to benchmark the performance in particular key fields related to energy – case specific contexts and developments can only be marginally accounted for. The model is therefore mainly a screen tool to base further, deeper analysis on. Further, the current model only illustrates the status at a point in time; development is not mirrored. That might be possible in a follow-up, because most data used is available for several years. A benchmark evaluating on the one hand the status of energy use and on the other hand the progress of getting more efficient, more sustainable would be feasible.

The ESC-DK is the first operationalization of the Energy-Smart city model developed in PLEEC. Key fields, domains and indicators were elaborated with the input and in discussion of many but no validation work has been done yet. Some indicators might be problematic and not helpful, others might be missing. Also, the theoretical conceptualisation behind the choice of indicators needs further work and analysis so results can be interpreted easier. Future working questions include:

- Are the key fields/domains/indicators appropriate to use for benchmarking and monitoring?
- What typologies or other variables could reveal patterns of energy use and efficiency, especially related to urban structure?
- How could the results be used for planning/policy making?

The results of these discussions will also be brought further in PLEEC, were one of the major outcomes should be a general conceptualisation and model of Energy-Smart Cities, related to different contexts.

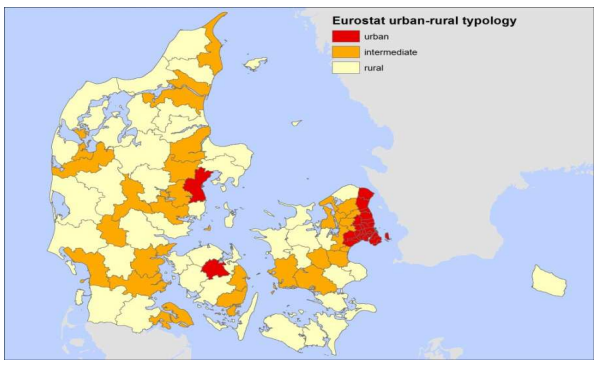

Fig. 2: Urban-rural typology of Danish muncipalities

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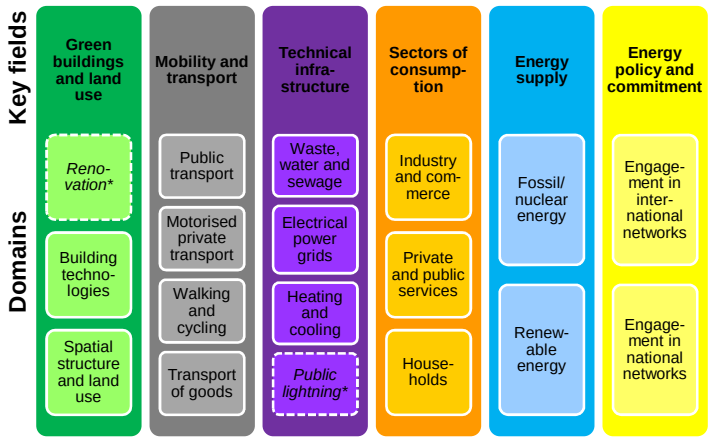

** No Danish data was available for the domains "Renovation" and "Public lightning"*

Fig. 1: Key fields and domains in the Danish ESC model

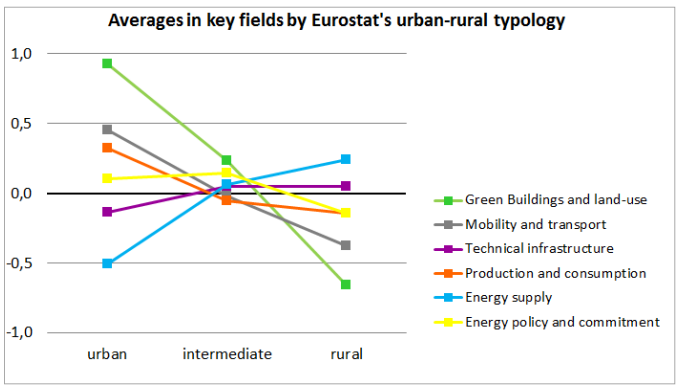

Fig. 3: Avg. performance in key fields, by urban-rural typology

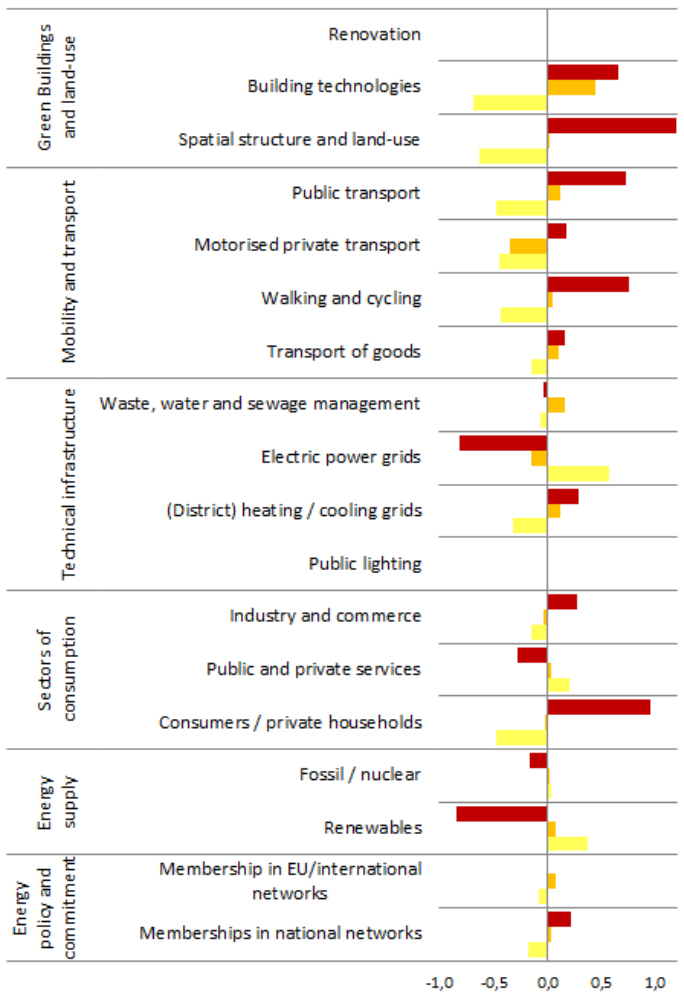

Fig. 4: Average performance on the level of domains, by urban-rural typology (red=urban, orange=intermediate, yellow=rural)

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