

COMPARING ENERGY EFFICIENCY ANALYSES IN TWO MODELLING TRADITIONS

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Extended Abstract

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Abstract Summary

When considering energy and climate policies, numerical model analyses are useful sources of knowledge. We align and compare the outcome of the same energy policy in two widely used types of models: a bottom-up energy system model and a top-down general equilibrium model. The case is an energy saving target for the Norwegian residential sector. We identify some important differences in the scope, model mechanisms and assumptions in the two model types that lead to diverging results.

Some general conclusions can be drawn from our case study. The two model types have complementary contributions to energy policy planning and should therefore be used together to illustrate the different aspects of a policy intervention. Bottom-up energy system models give more detailed results about technology choices. One type of response to energy policy only present in traditional bottom-up models is households' use of non-purchased energy, for instance self-collected wood or ambient energy for heat pumps. On the other hand, top-down models feature a wider range of substitution possibilities in demand, by allowing for changes in demand for energy as well as for other goods, both in households and in all sectors of the economy. Thus, top-down models are more appropriate when the focus is on economy-wide interactions and implications.

Presenting Author Biography

Orvika Rosnes is economist (PhD) with extensive experience in energy and climate policy analyses, both as a researcher and as a consultant. She has worked on issues related to climate policies, market design, regulation, and investments in power markets. Orvika is an expert in model-based scenario analyses, having extensive experience both in partial equilibrium models and in general equilibrium (CGE) models. She has also experience with other methods, e.g. cost-benefit analyses and willingness to pay studies. A recent study

estimated Norwegian households' willingness to pay to avoid a large power outage that hits several critical infrastructure services simultaneously.