



PhD: Demand side flexibility as an alternative to investments in the transmission grid

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Challenge and objectives

The correct socio-economic choice between grid investment and the use of demand flexibility is dependent on good knowledge about how end users will react to price signals in the future.

The objective is to provide estimates for the price elasticity of end users in urban areas, how this will affect the peak load, and how it can be included in long term demand forecasts.

Research tasks

The research focuses on the price elasticity of households, commercial and public buildings. It will also analyse variable grid tariffs, as proposed by NVE for the distribution grid, as an instrument to utilize demand flexibility and if it could also to a reduced peak demand in the transmission grid.

Approach

The research is based on the statistical analysis of empirical data from end users and how they react to price signals. A main source for the data is Statnett's research project iFleks, which this PhD is closely connected to. In iFleks, end users are exposed to different price signals in randomized controlled trials. In addition, surveys are performed to collect information about the characteristics of these end users.

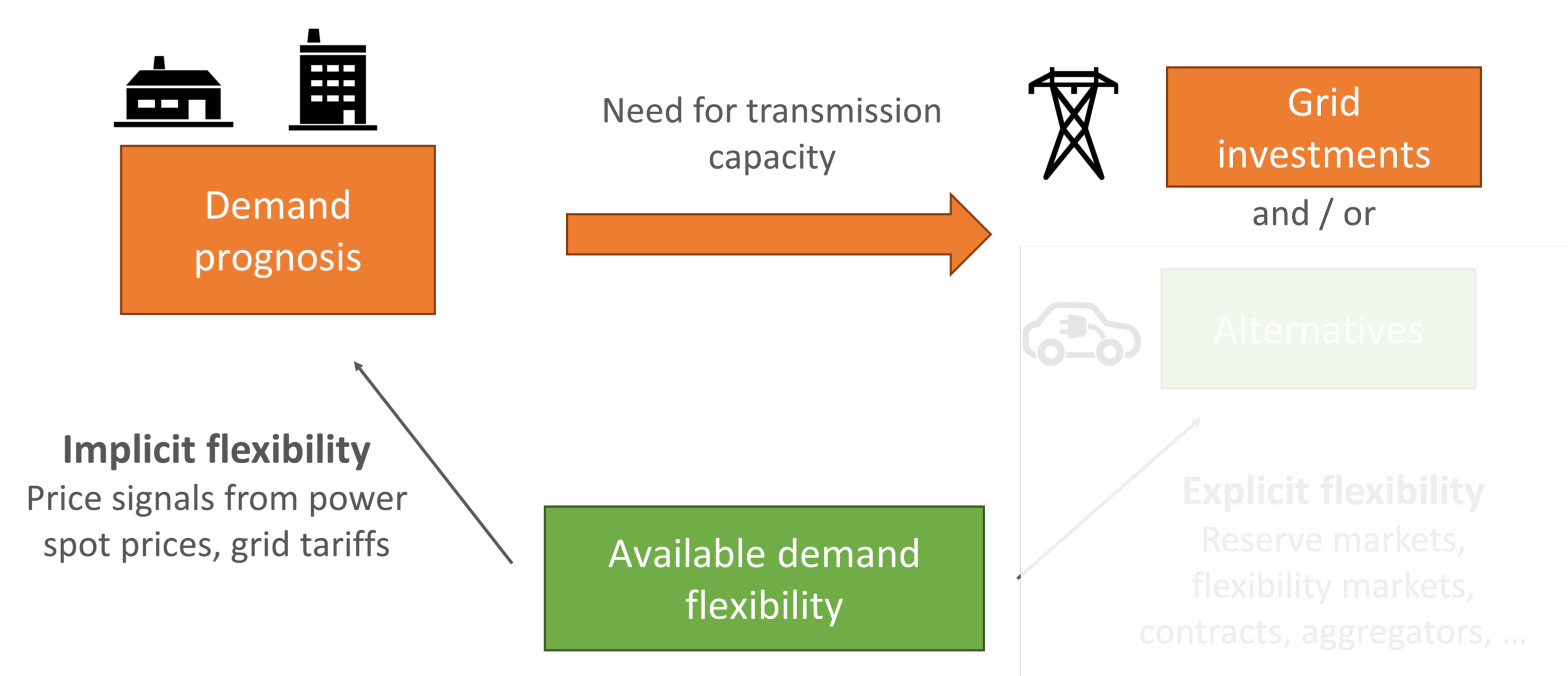
Significant results

A review of international pricing studies shows that households are price elastic. However the magnitude of response to price signals differs largely between these studies.

First results from a price experiment with households in Oslo, Bergen and Stavanger indicate a significant reduction of demand in peak price hours between 6 and 11 %.

A statistical analysis of historical electricity consumption data from Oslo revealed that end users are price elastic in winter times in average. However, they are not price elastic on the coldest days, and therewith days with highest peak demand for electricity.

Illustration



Implicit flexibility affects mostly demand prognoses and is focus of this research

Publication

M. Hofmann and K. B. Lindberg, 'Price elasticity of electricity demand in metropolitan areas – Case of Oslo', in *2019 16th International Conference on the European Energy Market (EEM)*, Sep. 2019, pp. 1–6, doi: [10.1109/EEM.2019.8916561](https://doi.org/10.1109/EEM.2019.8916561).