# Impact of electricity prices on Dutch power grid

**Studies: BSc Electrical Engineering, MSc Sustainable Energy Technology**

The electrification of our energy demand, as a result of the energy transition, has resulted in various problems, including the present day grid congestion, which prevents companies from growing and residential areas from being built. One thing is clear: the way we use electricity will dramatically change in the next years to keep our overall electricity supply reliable and affordable whilst enabling further developments to shift away from polluting energy generation by integrating more renewable energy sources.

One important driver is the introduction of new incentives, e.g., dynamic electricity prices that change every 15 minutes since this year in the Netherlands. But also grid operators, such as Alliander, envision the introduction of time-dependent grid tariffs. The goal of these incentives is to shift electricity use away from peak moments in order to reduce stress on the physical grid.

However, it is unclear what the response of customers, e.g., households and small and medium enterprises (SMEs) is to these incentives. Some research even suggests that these may lead to even more severe synchronization effects as loads automatically react to such incentives using an energy management system. In collaboration with Alliander we wish to research these possible effects and learn from other regions and countries (e.g., Scandinavia, Belgium, Californa) that already have implemented new pricing schemes.

**Assignment**
For this assignment you will conduct a literature study to assess the effects seen in other countries and their effect on electricity distribution grids. Based on this you will select likely scenarios for the Netherlands and based on this develop a small simulation setup to quantify the effects on the power quality in Dutch grids. For this it is possible to use the PowerGridModel tool developed by Alliander, but alternatives exist as well. Moreover, we have close contacts with experts at Alliander, who might also assist you in this journey.

**Research Questions:**
- What are the effects of new electricity usage incentives in other countries?
- To what extent can similar approaches have a positive effect on typical Dutch electricity grids?

**Objectives:**
1. Literature study of effects of new incentive schemes abroad;
2. Discuss and select possible scenarios for the Netherlands;
3. Create a small simulation setup representing a typical Dutch grid;
4. Analyse the results of incentives on the Dutch grid;

**Work Division**
- Literature: 30%
- Modelling: 20%
- Coding: 20%

- Evaluation: 10%
- Writing: 20%

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