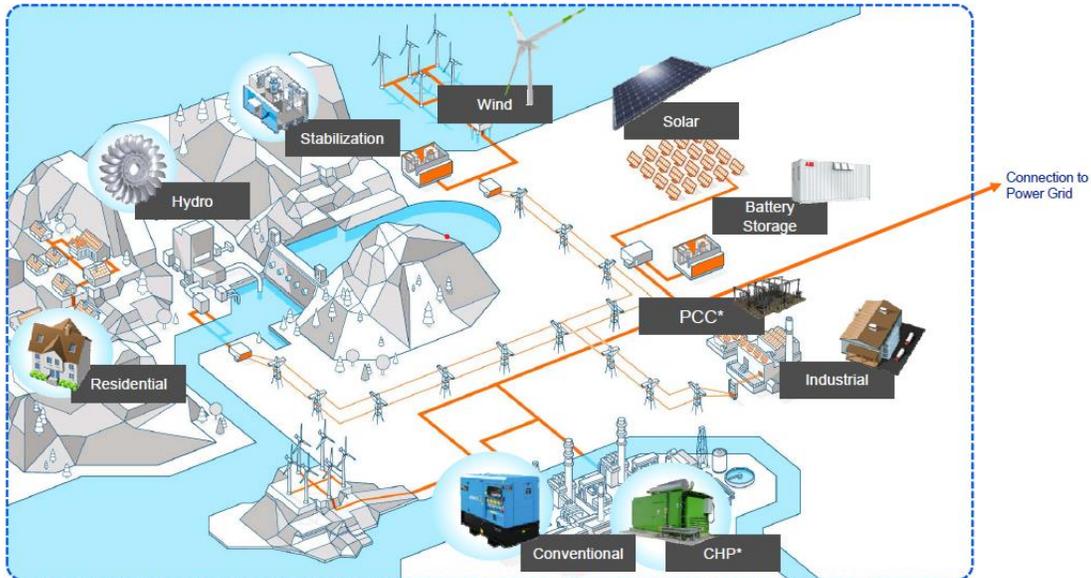


Demand flexibility from residential buildings in Sweden

Bakgrund



Lack of power grid capacity is one of the main barriers for integrating renewable energy sources and EV into the existing power system. It is also a barrier for hosting large data centers and battery factories in Sweden. It takes about 10 years to build a new high voltage power line, but the grid integration process of renewables and EVs is much faster. In order not to impede such an integration process, demand flexibility is considered as one of the key solutions to provide short-term relief on the need of the grid capacity.

The project is nominated to "Elkraftrådets kandidatarbetspris".

ELKRAFTRÅDET
vid Chalmers Tekniska Högskola

Problembeskrivning

In order to understand the demand flexibility potential from residential buildings, this project aims to evaluate how much and for how long the space and hot-water heating and EV charging from detached houses could contribute to the flexibility services for mitigating grid capacity congestion. The tasks include:

1. State-of-the-art review on demand flexibility services for mitigating grid capacity congestion
 - a. Technologies and incentives needed for the customers to provide demand flexibility services
 - b. Barriers to provide demand flexibility services
 - c. Existing flexibility service markets evaluated in Sweden
2. Review on flexibility potential from residential houses.
 - a. Statistics of different heat pump technologies installed in Sweden
 - b. Statistics of EV charging at home
 - c. Measures of flexibility from heat pumps and EV charging
3. Install and collect measurement in selected residential buildings to analyze consumption behavior of heat pumps and EVs.
4. Evaluate the aggregated demand flexibility from residential houses in a selected region of Sweden based on the statistics and measured data.

Målgrupp: TKAUT, TKMAS, TKELT, TKDAT, TKTFY,

Gruppstorlek: 4-6 studenter.

Antal grupper: 1

Förkunskapskrav: Basic courses in electric circuits and electric power engineering.

Kontaktperson: Peiyuan Chen, peiyuan@chalmers.se

The thesis report should be written in English. You will be part of the research team on Operation and Control of Active Grids at Chalmers.

Handledare: Peiyuan Chen, peiyuan@chalmers.se
Kristoffer Fürst, kristoffer.furst@chalmers.se

Examinator: Jimmy Ehnberg, jimmy.ehnberg@chalmers.se