

Innovation type:
Computer model

TRL: 4

Date: Dec 2019

Contact:
Magnus Korpås
magnus.korpas@ntnu.no

Target group:

Actor/ purpose	x
DSO, TSO	X
Technology provider	X
Member organisation	X
Market operator	X
Research/ Consultancy	X
Teaching	X

Data-driven flexibility model for shiftable atomic loads

Modelling flexibility potential in distribution system is crucial for reasonable estimation of expected potentials as input to network planning, flexibility aggregation and distribution network operational planning activities. Data-driven models are developed for loads that can be shifted, but once they start they can not be interrupted. Such loads are defined as shiftable atomic loads (washing machine, dishwasher etc.).

Challenge

Modelling flexibility can be a difficult task especially when it involves the considerations of user habits. Appliances such as cloth washing machines, dish washing machines and dryers are such sources of flexibility where the frequency of use and the selected program during operation varies a lot. In this scenario, modelling approaches solely applying engineering approaches would fail to capture the required dynamics.

Solution

A data-driven model is developed which utilizes statistical data and other previously available time series measurements to extract the required features in the calculation of the expected flexibility potential as well as rebound effects after activation.

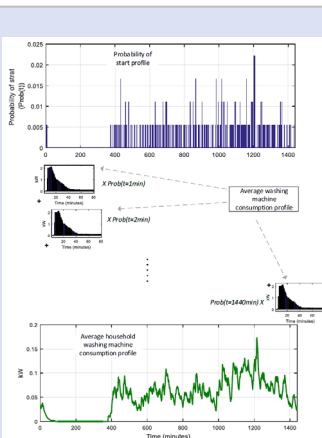
Potential

The model can be updated whenever time series and statistical data is available. It can be used to estimate aggregated flexibility potential from group of households at any specific time of the day. Network operators may use it in their operation and/or long term plans. Aggregators can estimate the flexibility expectations from these appliances prior to participation in a market.

Reference in CINELDI

The models are developed by SINTEF Energi in the in-kind project KPN ModFlex. The model is available on zenodo here:

<https://zenodo.org/record/3859909#.Xvm3EZgzb-h>



Process of reconstructing the single household consumption from probability of start and appliance average single-use profiles