**Documentation of Variable trimming add-on**

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**Aim:** to reduce calculation time by trimming the set IAGKN\_Y and IAGK\_HASORPOT, which are used to filter many of the equations and variables in Balmorel. IAGKN\_Y contains the technologies that can be invested in in each area.

The add-on is working for technology types GCND, GHOB, GEXT and GBPR. It could also work well for GETOH technologies. Technologies with bypass-option will be included.

The Add-on uses screening curves methodology to assess which technologies that are not in any case a cost effective investment.

**The addon contains four sections:**

1. Calculation of fixed costs, variable cost associated with heat generation and variable cost associated with electricity generation. It mirrors the objective function (QOBJ).
2. Identification of technologies with either limits that restricts use, such as maximum fuel use, or technologies with limits to minimum use.
3. Calculating annual costs of providing heat or electricity for each technology given what’s found in (1.) and the amount of full load hours of electricity generation (FLHE) , full load hours of heat generation (FLHH) and value of byproduct (BYPR) (e.g. heat for electricity generation). A combination of these three dimensions is a segment in which each technology competes to deliver the lowest cost heat or electricity annually for each year within the optimization horizon. If a technology is identified as the cheapest heat or electricity generating technology, within a segment, in one of the years in the optimization horizon, it is selected.

The value of the byproduct is limited upwards by the cheapest possible GHOB or GCND technology in segment and lowest value is set to zero. Furthermore, if a technology with a limit that restricts use is found to be cheapest in a segment, the second best is also selected. Technologies that are related to minimum use requirements are always selected.

1. Technologies not selected are labelled “nevercheap” and are removed from IAGKN\_Y. IAGKN\_HASORPOT is reassigned.

**What to be careful about:**

FLHE, FLHH and BYPR are given in discrete steps. Increasing the number of steps will increase the number of segments taken into consideration and hence reduce the likelihood of removing a relevant technology.

The method does not take into consideration start-up costs and ramping capabilities.

The addon should be adapted after model updates that alters the cost function for the technologies considered and updates to the assignment of IAGKN\_HASORPOT.

Currently only limits to fuel use, generation and emissions in the main model version are handled. Addon-limits are not yet included.

By-pass option not yet considered.

**Interference with other addons:**

Taxes: Fuel taxes are part of the calculation of variable generation costs. Vt\_sim\_agknytrim.sim should be called after initialization of the relevant taxes.