ROSVS Research Project (**R**obuste **O**ptimierung der **S**trom**V**ersorgungs**S**ysteme [Robust Optimization of Energy-Supply Systems])

Gefördert durch:

Bundesministerium
für Wirtschaft
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aufgrund eines Beschlusses
des Deutschen Bundestages

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Partners:

1. ProCom GmbH (Aachen), Coordinator
2. Department of Mathematics II, RWTH Aachen University (Aachen)

Title: Development of innovative processes for the operational management of smart grids with a high proportion of distributed, and particular renewable, generating plants

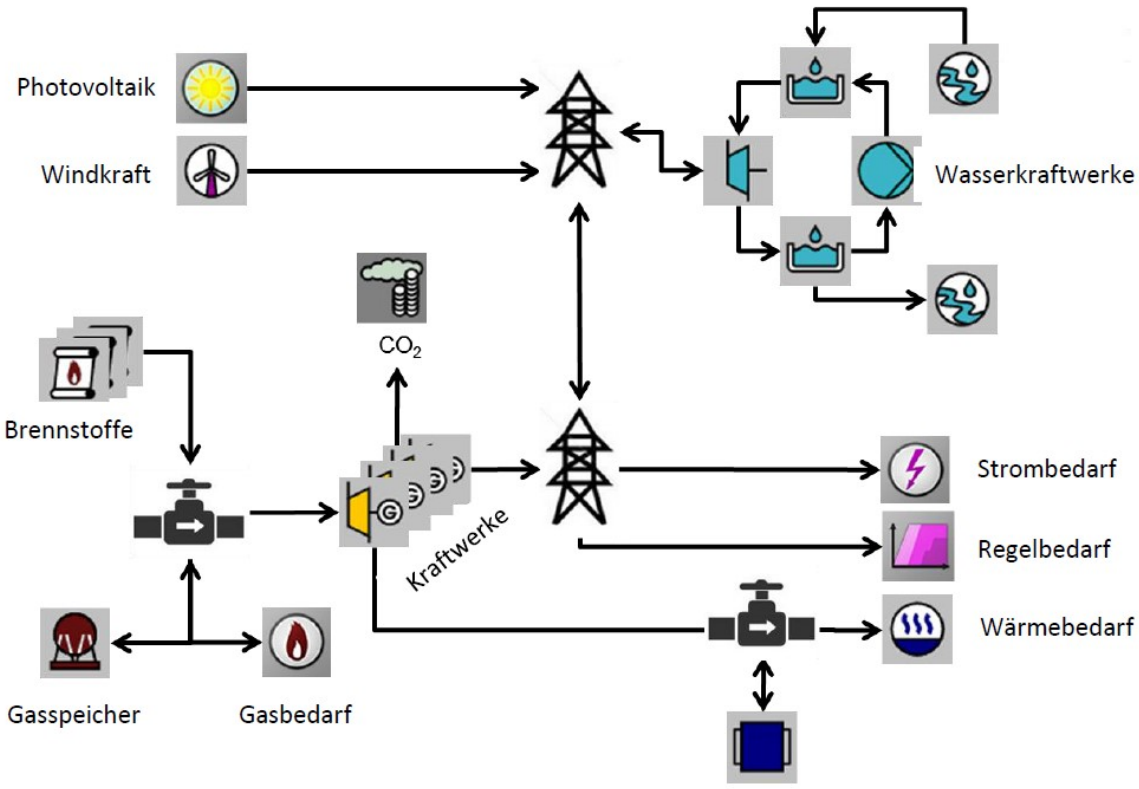

Figure: Uncertain quantities in a portfolio to be managed using robust optimization methods (example)

Project objectives:

At present, the most common planning method for the operation of energy systems is deterministic optimization. This is coordinated planning for a small number of large plants with correspondingly large outputs. Since smaller installations are also gaining significance, the planning needs to be adapted and at the same time automated in order to remain economical. At the same time, planning is based on more and more data that has to be considered uncertain, such as prices, heat demand and availability.

The focus of the planning task is therefore shifting from the operators of larger generating units to the Distribution Network Operators, who are not only having to accommodate a growing number of small generators in their networks, but are simultaneously responsible for the stable operation of the networks. Demands for operating reserves in particular are to be considered a significant additional source of uncertainty in planning.

The objective of the R&D project presented here is therefore to develop innovative methods and concepts to extend the exploitation of the potential of decentralized load management with robust grid management, including the provision of system services. To this end, RWTH Aachen University aims to develop novel and robust optimization models, algorithms and prototype implementations to ensure a planned behavior of local generators provided the uncertainties fluctuate within a “normal” framework. These are defined by “uncertainty sets” for uncertain quantities, and the deterministic optimization problem is extended accordingly.

Objectives of ProCom GmbH

ProCom GmbH aims to develop prototypes of robust optimization methods for selected plant inventories and for load management. The plant inventories should predominantly take into consideration generating plants influenced by uncertain factors. These include combined heat- and power-generating plants as well as wind and solar farms, among others. For validation, the processes developed are test run with selected customers of the existing production systems. The results of a planned detailed study with existing customer models will contribute to a qualified deployment of the robust optimization methods, thereby providing the basis for future utilization.