

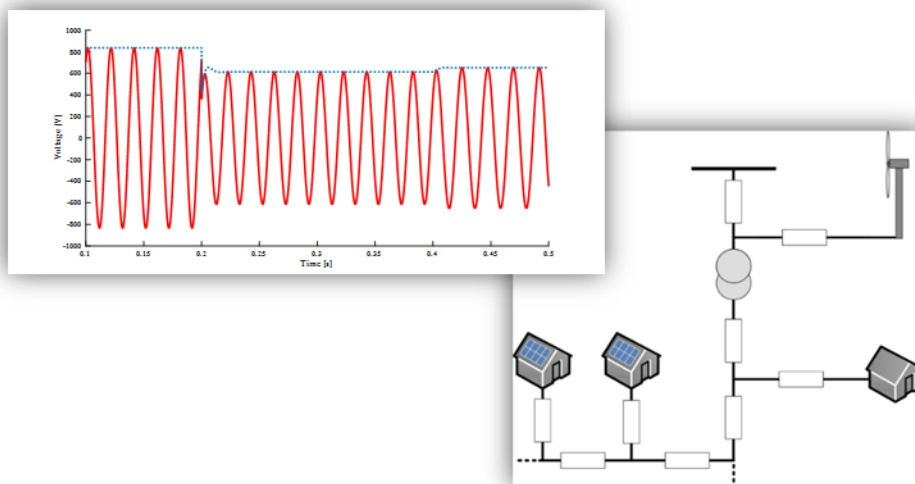
## Bachelor/Master Thesis:

### Modeling and Simulation of Distributed Generation Units using Dynamic Phasors

#### **Context:**

The increasing amount of distributed generation units in power systems brings up new requirements for grid planning and control. In order to consider these requirements in detail, the project *SINERGIEN* will deliver a simulation platform, which allows for the parallel simulation of power system, communication network and energy market. Therefore, several software components are being linked with the purpose of simulating the different aspects.

In this context, the ACS institute develops in particular a simulator for the power system. The simulator is implemented in Modelica, which is an open and object-oriented modelling language and allows for the simulation of complex multi-physic systems. For the modelling of power system components, the simulator follows a multi-level approach, which provides stationary as well as transient models of the components.



#### **Task:**

This thesis involves the modelling of distributed generation units considering both Electromagnetic Transient (EMT) and Dynamic Phasor (DP) models. The models shall represent substantial dynamic characteristics of the generation units while remaining suitable for grid simulations. In the focus of a bachelor thesis will be combined heat and power units including an induction machine. For a master thesis, additionally wind turbines, which are connected to the grid via a full-scale converter, shall be considered. The models are to be

integrated into the existent Modelica library. A subsequent analysis shall compare EMT and DP models considering particularly the accuracy of the simulation results and the required simulation time. During this, appropriate scenarios incorporating events, such as short-circuit faults, shall be investigated.

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