Mobility Schemes between researchers

Coordinated by Elena Dufour – EERA AISBL

The SmILES project (*Smart Integration of Energy Storages in Local Multi Energy Systems for Maximising the Share of Renewables in Europe's Energy Mix*) offered the opportunity to develop their cross-simulation activities within other research organizations. This was an important step towards developing structured ways of exchanging models between project partners.

AIT @ EDF: Preparation for cross-simulation of Collectopia

by Benedikt Leitner (August 2018)

The so-called cross-simulation activities are an important part of the SmILES project. Cross-simulation partners thereby exchange data about their system under study to enable their counterpart to model and simulate this system with their respective toolchain. The main activity during this exchange was focused on the preparation of models and simulations by AIT to enable a cross-simulation of EDF's system "Collectopia". This model was then used as a basis for further investigations of the system "Collectopia" with AIT's toolchain.

KIT @ DTU: Cross simulation

by Alexander Engelmann (April 2018)

I went to DTU to evaluate the possibility to replicate parts of the DTU Nordhavn system configuration in our KIT toolchain. At KIT, we mainly use MATLAB and an optimisation toolbox called CasADi for simulation and optimal control. This environment requires algebraic or differential equations in form of MATLAB functions. By acquiring domain knowledge of district heating and electricity grids, we were able to develop simple linear models of these two domains of Nordhavn and developed a first implementation in the KIT toolchain.

AIT @ DTU: Evaluation of test system cross-simulations

by Benedikt Leitner (June 2018)

A crucial step for our project is to derive methods to describe multi-energy systems in detail to enable others, project partners or third-parties, to assess the system with their respective tools and methods. Several forms and formats to describe relevant parts of the system (configuration, control, data, etc.) have been developed during the project. However, testing them on a specific system under study was not performed until my researcher exchange. During my stay we developed such a test, identified shortcomings of the method and highlighted areas that need improvements in the description forms.

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Six outcomes of SmILES fruitful exchanges are reported in these two pages, in order to underline the benefits of this mobility scheme.

AIT @ Innsbruck University: Use case with seasonal thermal energy storage

by Paolo Leoni (May 2019)

The exchange focused on the development and preliminary validation of a model of an underground seasonal TES. The model, which assembles and adapts tools available in the public Dymola/Modelica libraries, offers the advantage to be in a language widely used in the dynamic simulation of thermal systems, such as district heating and cooling networks. Therefore, it will be helpful in setting up simulations in a variety of scenarios integrating already existing models of other system components. The validation relies on extensive data derived from detailed field measurements over three years.

KIT @ DTU: Meta-Modeling for Prediction of evaluation metrics based on Scenario parameters (MeMoPS)

by Kai Heussen (September 2019)

SmILES has developed simulation models to facilitate storage integration for several scales and purposes. With this project, I aimed to complement the SmILES cross-simulation methodology with a technique to transfer model information across scales, here from the technical congestion management simulated in DTU's Nordhavn case to VITO's TIMES long-term economy model. The hosts connected me with several experts at VITO and Energyville and within only two days of discussions, we managed to create a clear case for further study, also beyond the SmILES project.

AIT @ DTU: Feasibility analysis of up-scaling storage solutions

by Hamid Aghaie (May 2019)

Within this scheme, I aimed to address the main barriers of upscaling the energy storage (especially battery storage) from a rural area, Eberstalzel (ELZ) in Austria, to the country scale. I used an open source dispatch and investment modeling tool called Balmorel. By upscaling the ELZ region and increasing its generation self-sufficiency, the investment in battery storages and system costs increases exponentially. The main reason is limited potential for storage technologies other than batteries in this region and its neighborhood.

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