

“Green Building” – Modelling renewable building energy systems and electric mobility concepts using Modelica

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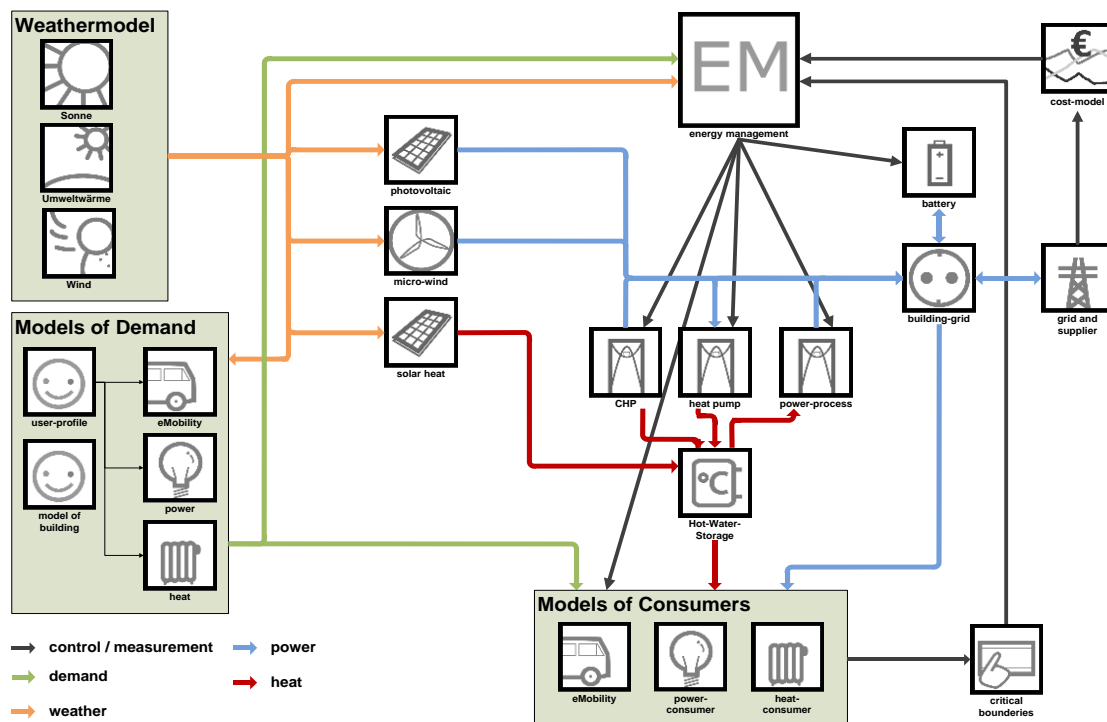
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For most people, a comfortable living and mobility are basic needs. With the rising individual demand for energy as well as the diminishing fossil energy resources, new optimized concepts for energy supply and usage are required. To address these challenges, renewable energy sources, decentralized storage, and electric mobility concepts are matters of rapidly growing importance.

Future building energy systems have to successfully integrate user demands, local renewable energy, storage systems and charging infrastructure, a task requiring extensive scrutineering.

Typical questions to the engineer are to compare different system layouts with respect to sustainability, cost, and robustness, or to identify the right levers in an energy system to optimize components and control algorithms. To solve this task within an acceptable time frame, EA EnergieArchitektur GmbH and IAD TU Dresden together with ITI GmbH have developed the Modelica-based “Green-Building” library. The library offers compatible models of similar granularity in the renewable, thermal, electric, eMobility, cost and user behavior domains.



This paper describes the approaches and philosophy of the library by using a CHP powered building with stationary battery. One of the shown examples is the search for an optimal solution between stationary battery cost and renewable coverage of the vehicle mileage in a typical commuter driving cycle.