

LIBRARY CONCEPT AND GENERIC PARAMETRIZATION FOR ENERGY PLANNING OF POLYGENERATION SYSTEMS



Figure 1: Energy Center at Offenburg University

Energy planning tool
for the concept, design and operation phase of small-scale renewable energy systems

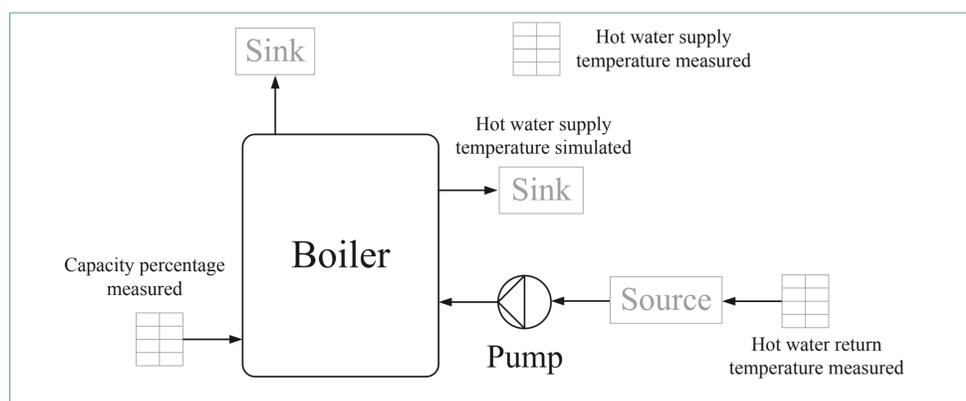


Figure 2: Object diagram of Boiler Model

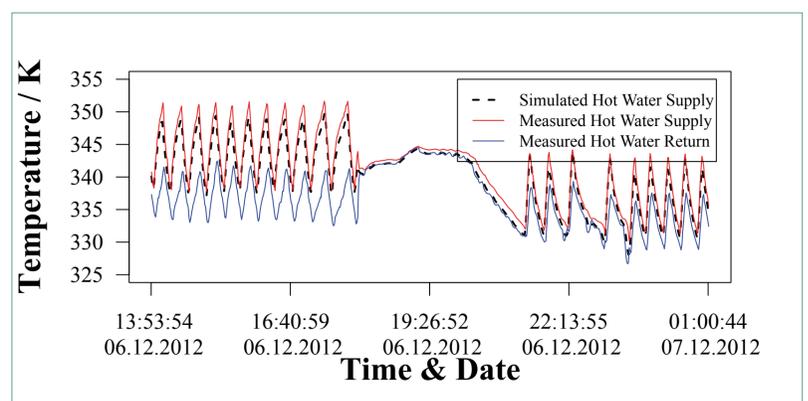


Figure 3: Validation of Boiler Model from Energy Center

There is a requirement for a simpler, reliable and suitable method for planning of complex small-scale decentralized energy systems. Figure 1 shows an example of such a complex trigeneration system. A library using object oriented programming language Modelica/Dymola has been developed. The library contains all necessary components to model energy system like shown in Figure 1. For example,

Figure 2 shows an overview of object diagram of one component, i.e., boiler from energy center. The library can be used as a tool during planning phase to simulate the energy/fuel requirements based on heating, cooling and electrical loads or vice-versa. The major advantage of the library is that there were novel strategies developed and implemented such as easy-to-parametrize approach to

make the modeling of components simpler by still keeping the dynamics intact.

Figure 3 illustrates the validation result of boiler model. The start-up and shut-down behaviour along with the effect of storage can be seen in the simulation result. The boiler model consists of only 6 parameters which can be easily found in the manufacturer's spec sheets.