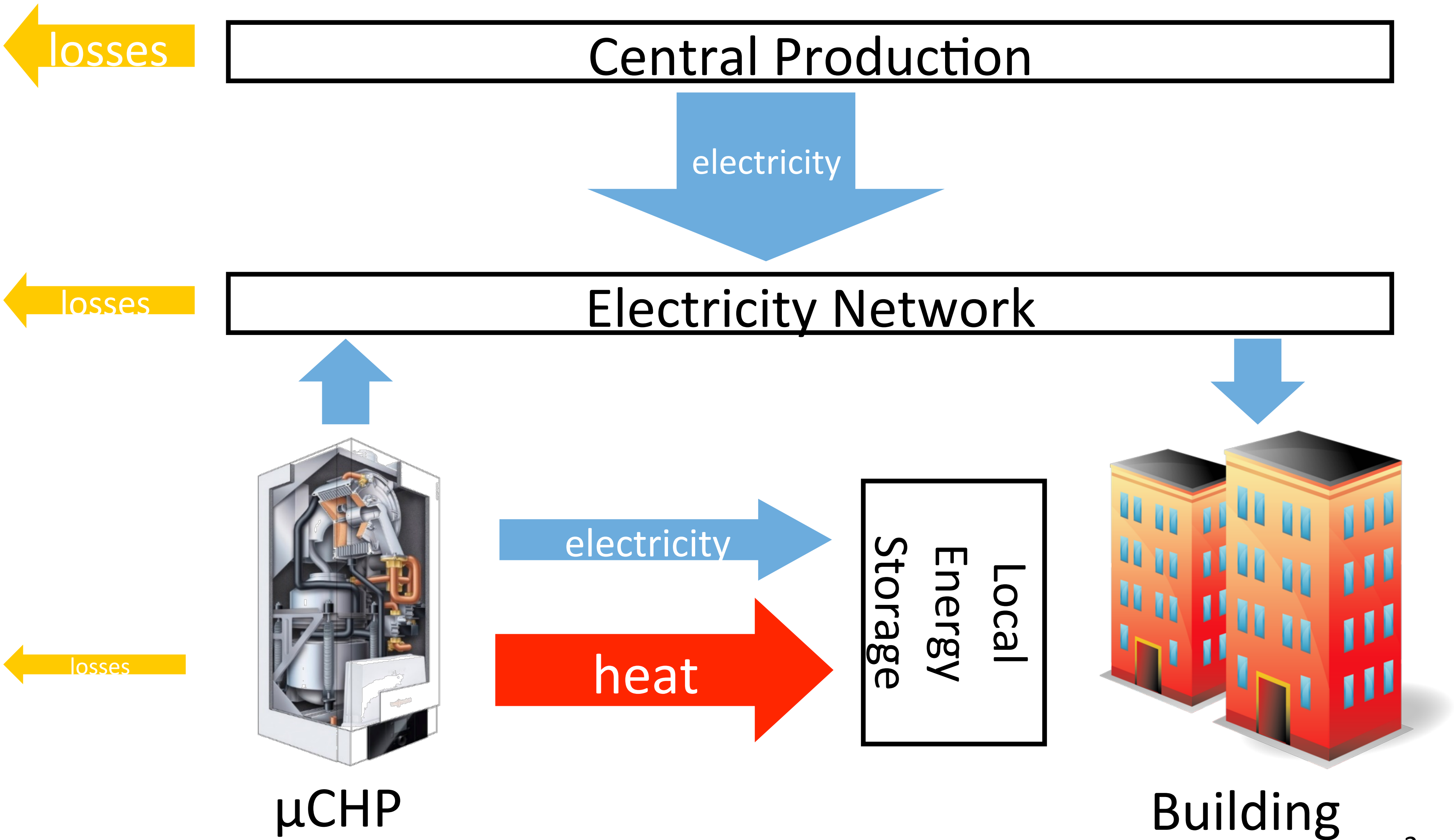
SIMUREX
Porticcio, Corse
26 – 30 October 2015

Optimal Integration of Micro-Cogeneration Systems in Buildings

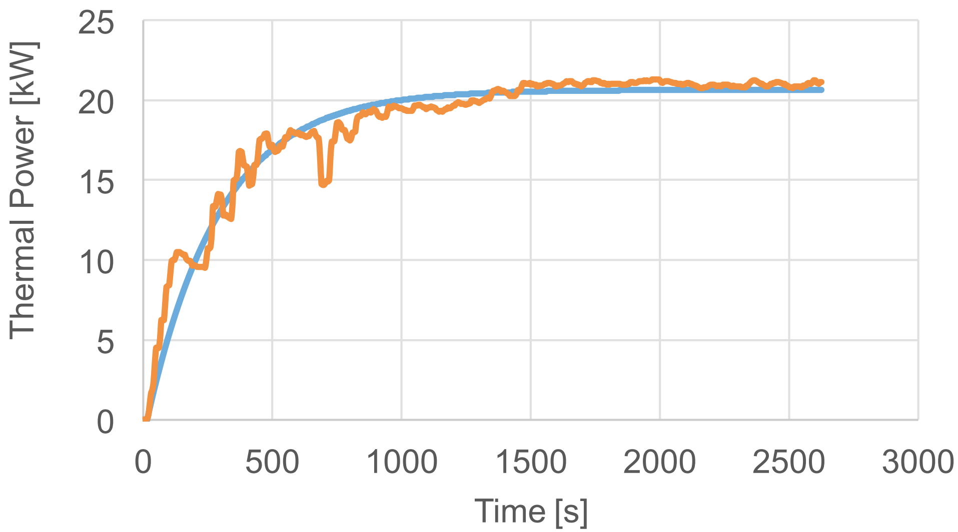
Context

- A µCHP System in a building



Approach

- Experiments and modeling
  - Modeling is based on experimental data of 3 real µCHP systems:



  - A grey-box µCHP model adapted to Building Energy Simulation is used:

$$P_{fuel} = P_{fuel}^{nom} + a\,(T_{cw,i} - T_{cw,i}^{nom}) + b\,(\dot{m}_{cw} - \dot{m}_{cw}^{nom})$$

$$\dot{Q}_{HX} = \dot{Q}_{HX}^{nom} + c\,(T_{cw,i} - T_{cw,i}^{nom}) + d\,(\dot{m}_{cw} - \dot{m}_{cw}^{nom})$$

$$P_{gross} = P_{gross}^{nom} + e\,(T_{cw,i} - T_{cw,i}^{nom}) + f\,(\dot{m}_{cw} - \dot{m}_{cw}^{nom})$$

P_{fuel} : Fuel power – $\dot{Q}_{HX}$: Thermal production – P_{gross} : Gross electricity production – $T_{cw,i}$: Inlet cooling water temperature – $\dot{m}_{cw}$:

Approach

- ## Modeling
  - Modelica libraries to get dynamic HVAC systems models.
  - Different representations of thermal needs : static, simplified dynamic, detailed dynamic.
  - Stochastic electrical consumption and occupancy profiles with 10 minutes timestep.
- ## Evaluation
  - Primary Energy Consumption
  - Electricity Selfconsumption
  - Global Cost
  - ON/OFF cycles