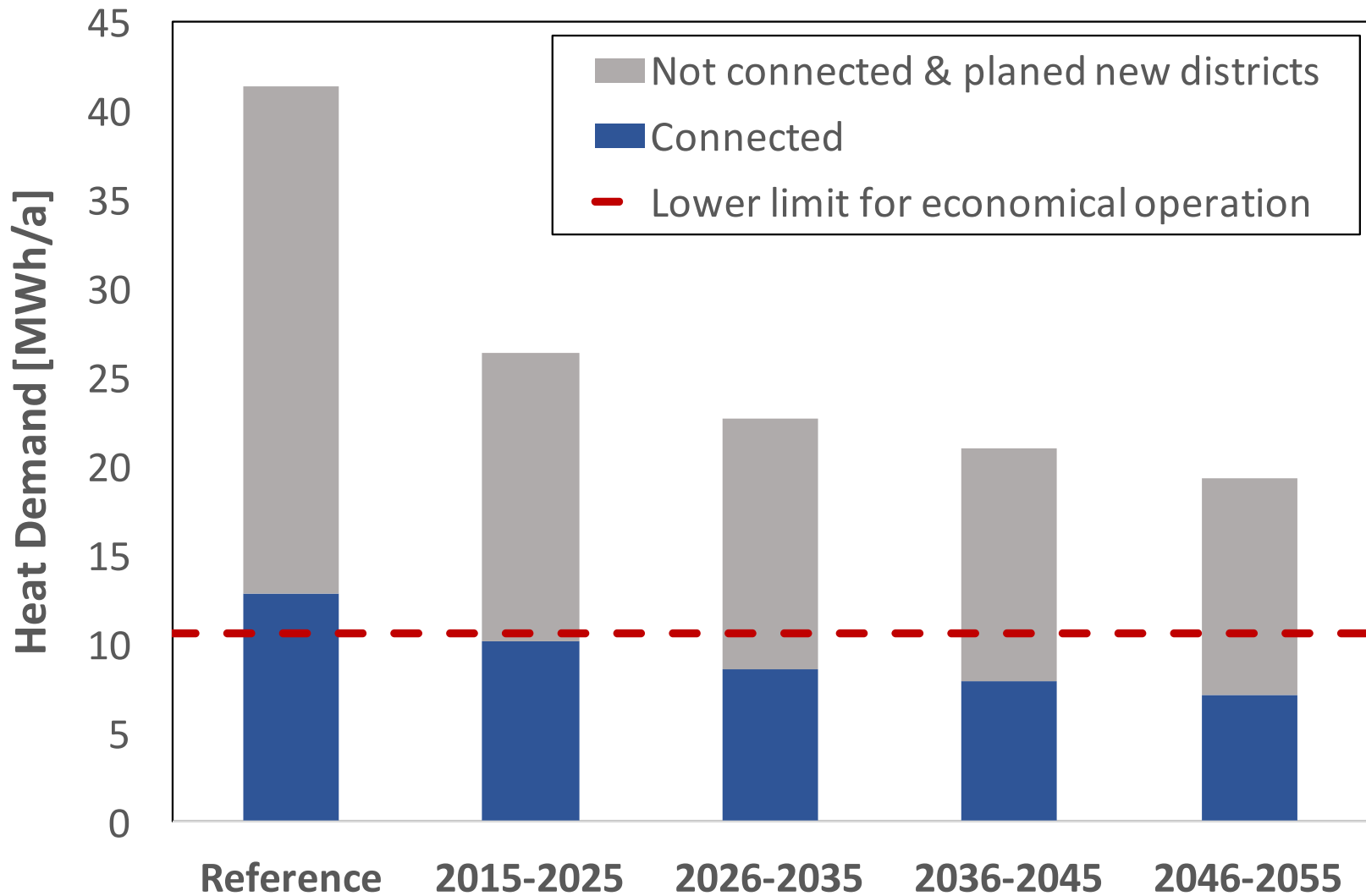


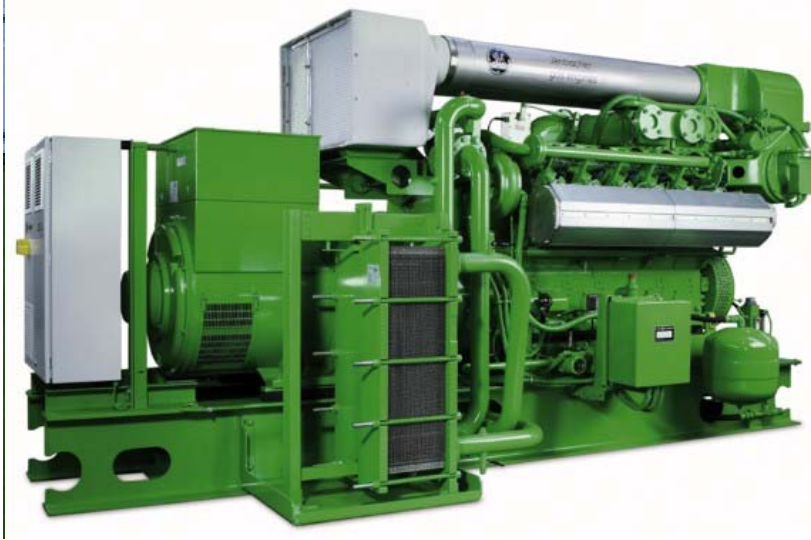
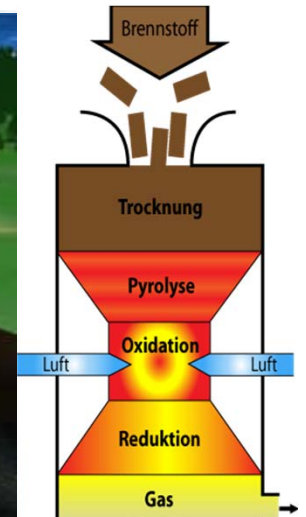
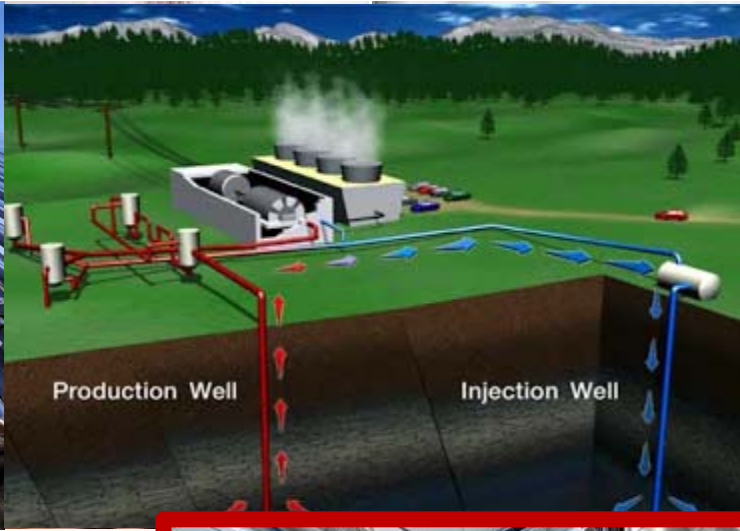
Dynamic Simulations supporting the Design Process of a real Combined Heat and Power Application in Switzerland

ORC 2017 Milano

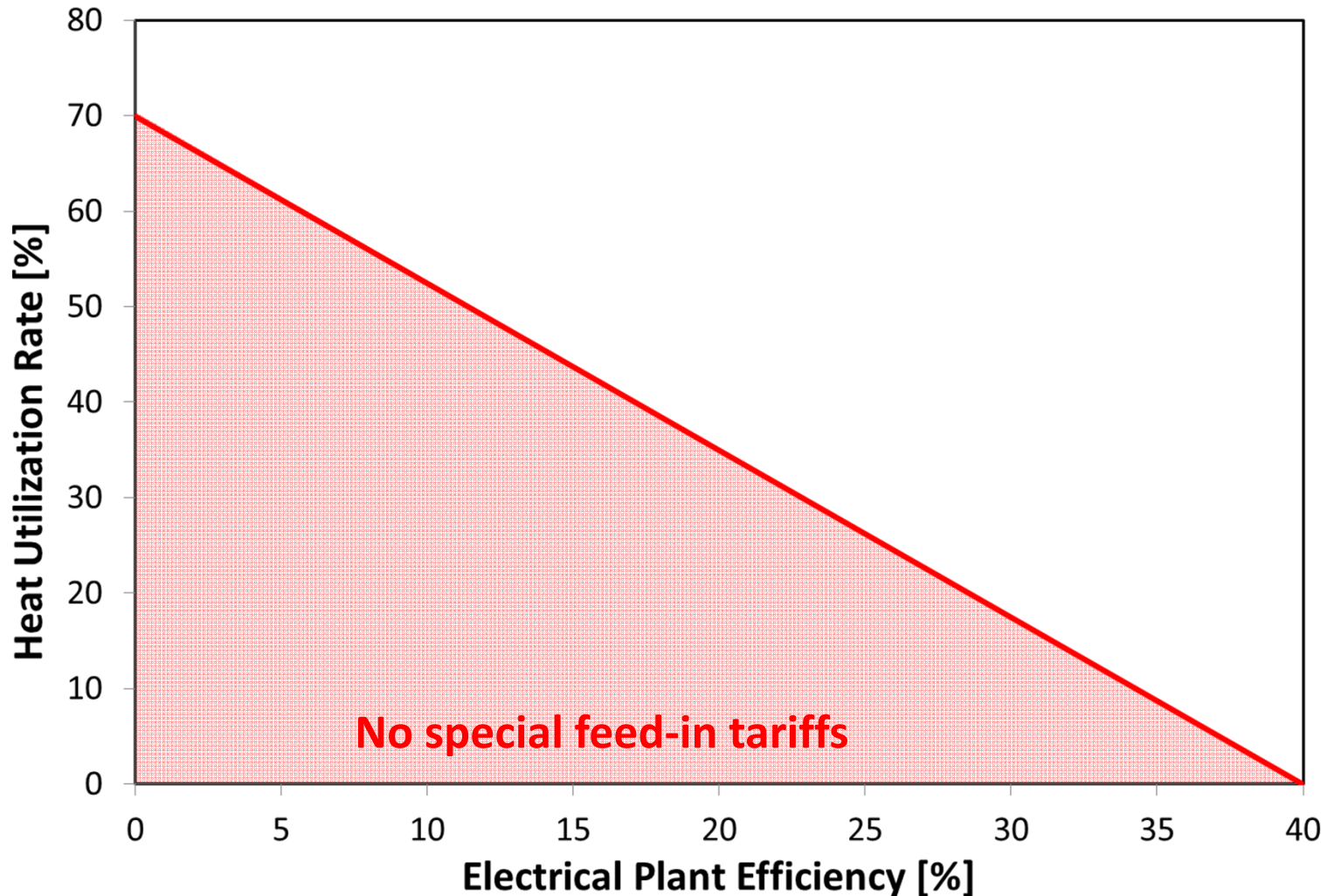
Adrian Rettig, Ulf Christian Müller, Lukas Gasser, Jonas Hurter

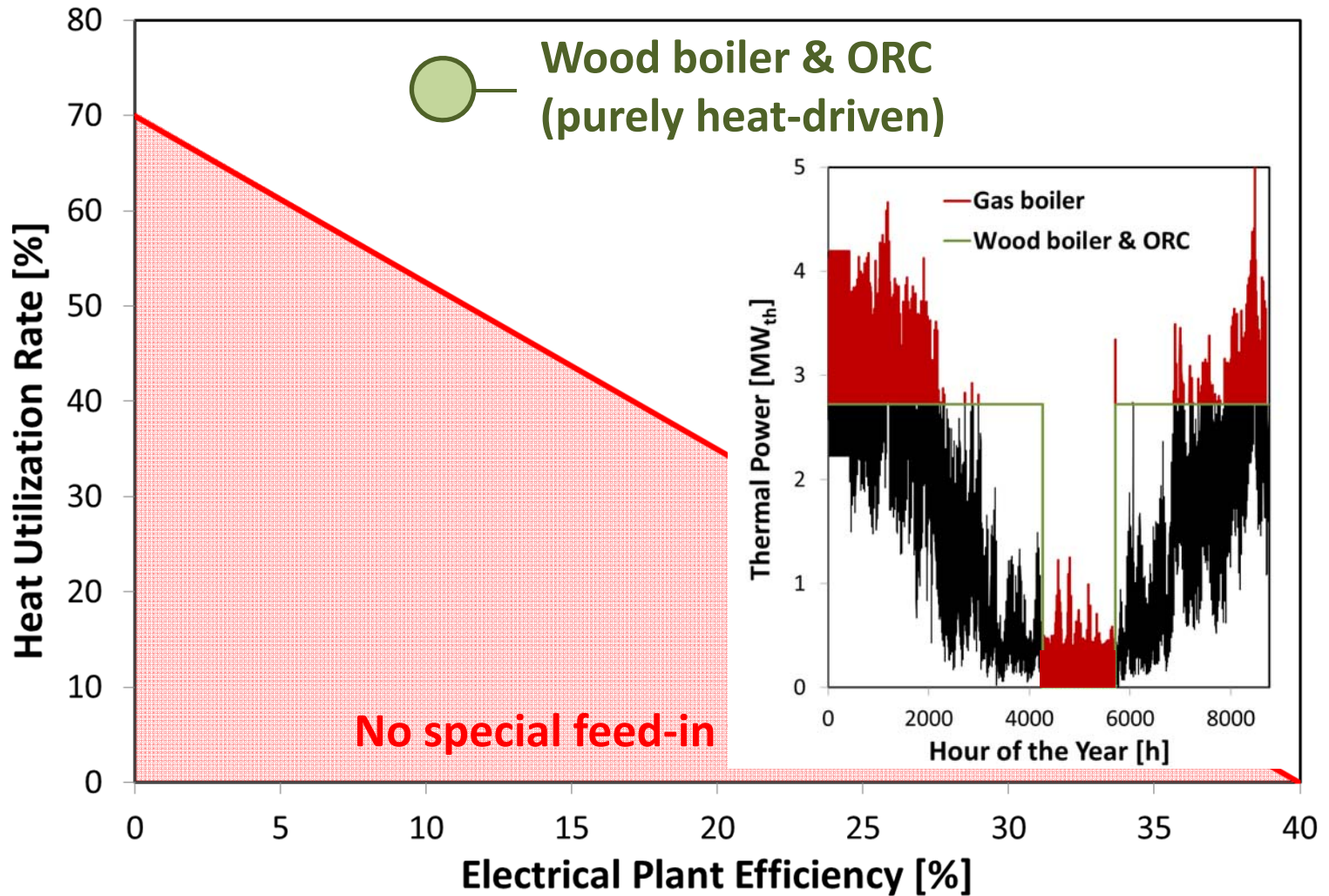


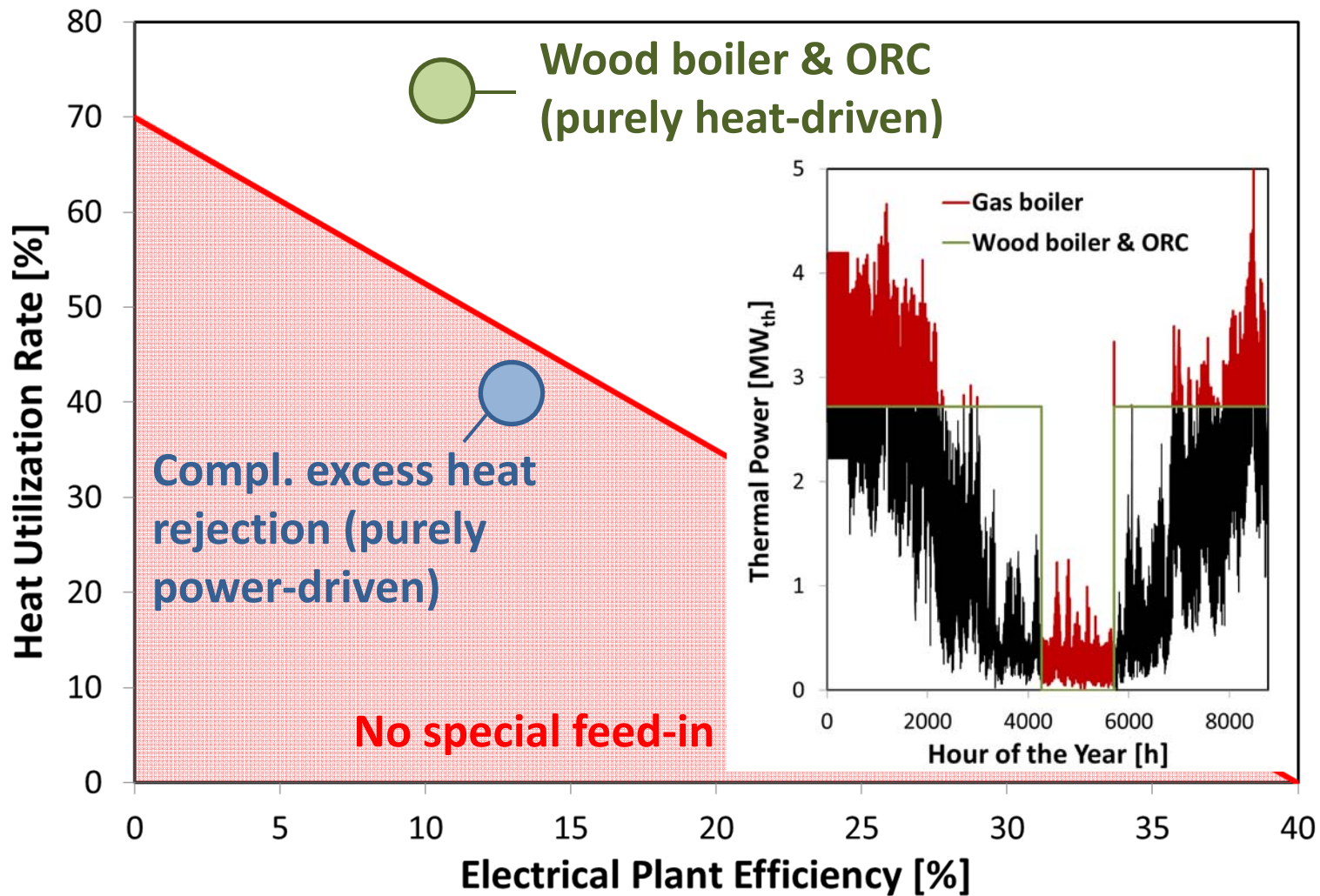


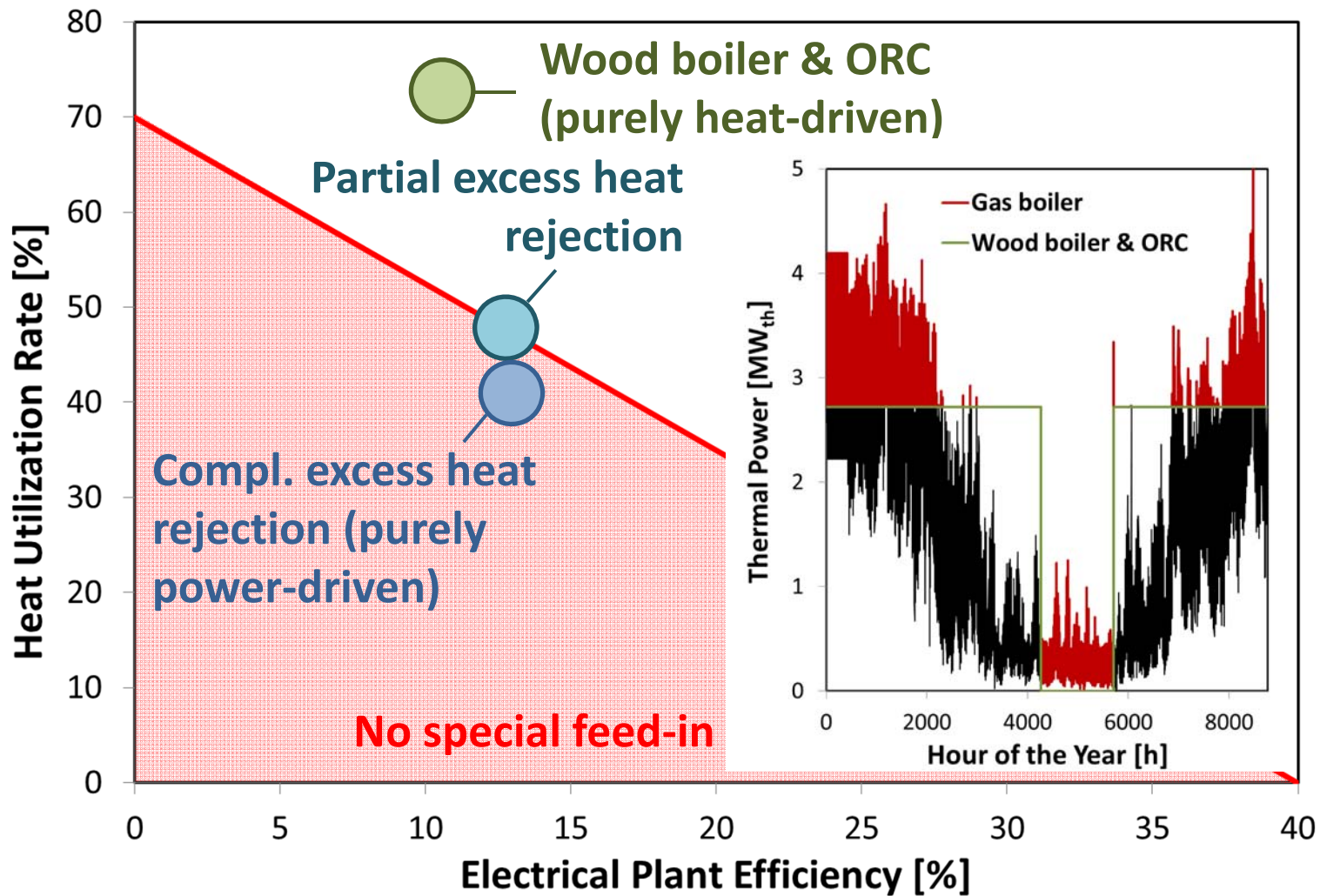


Requirement to get granted special feed-in tariffs

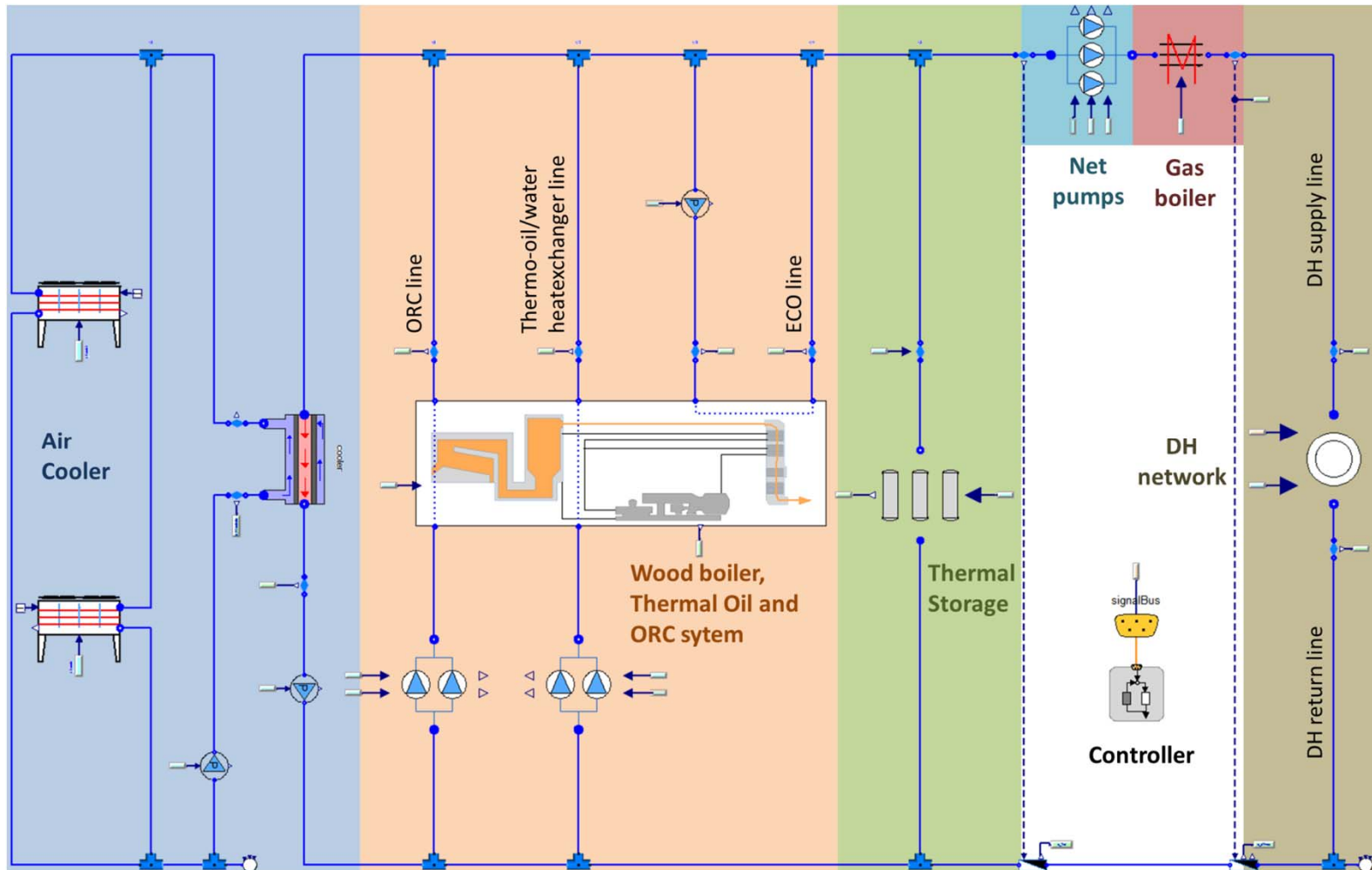




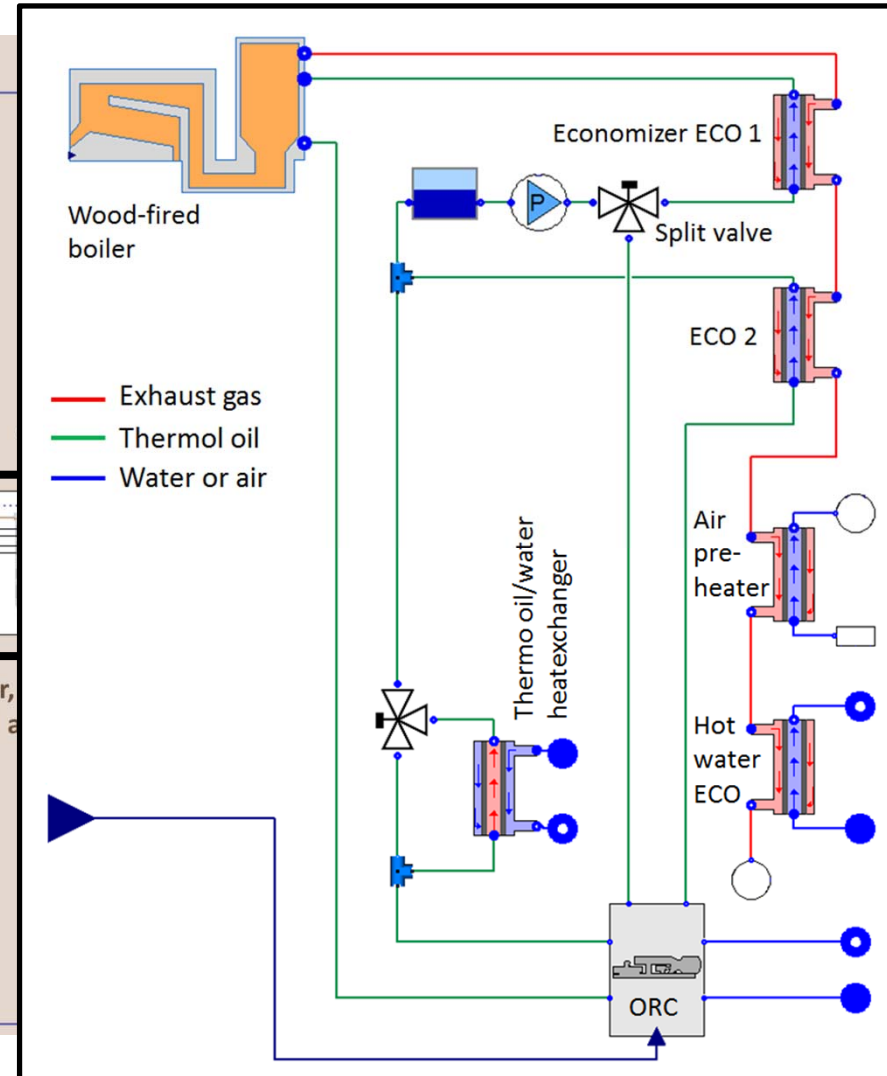
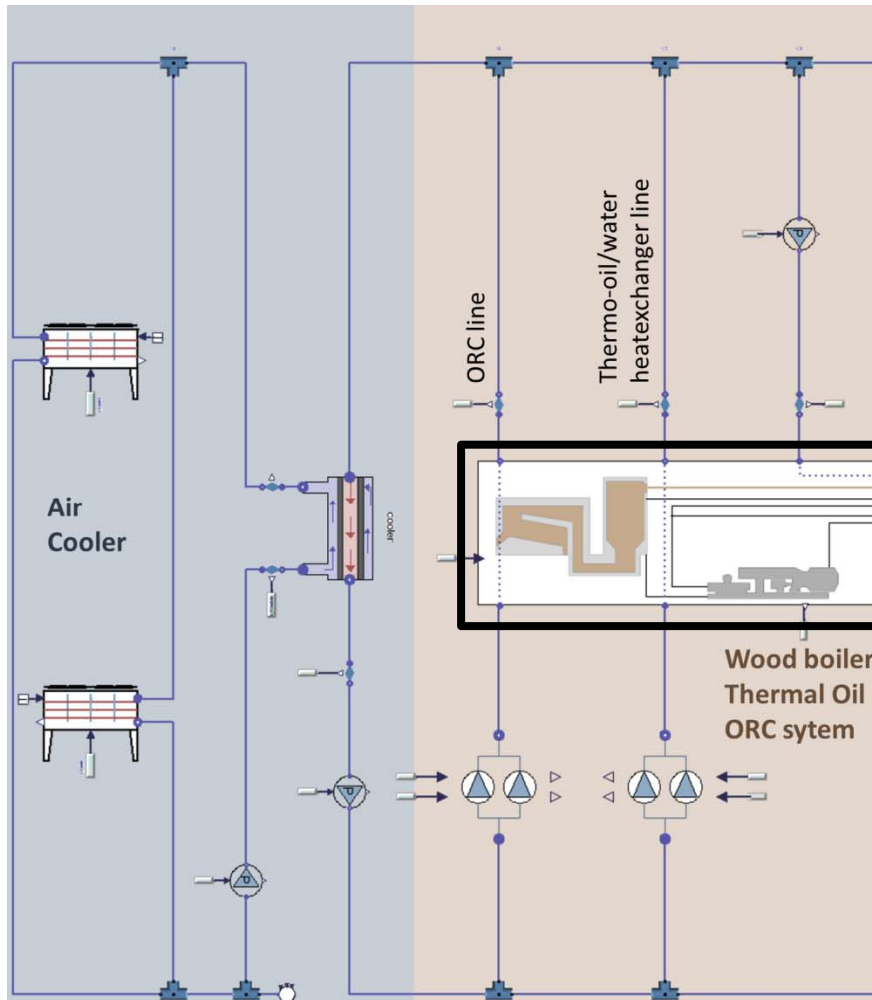




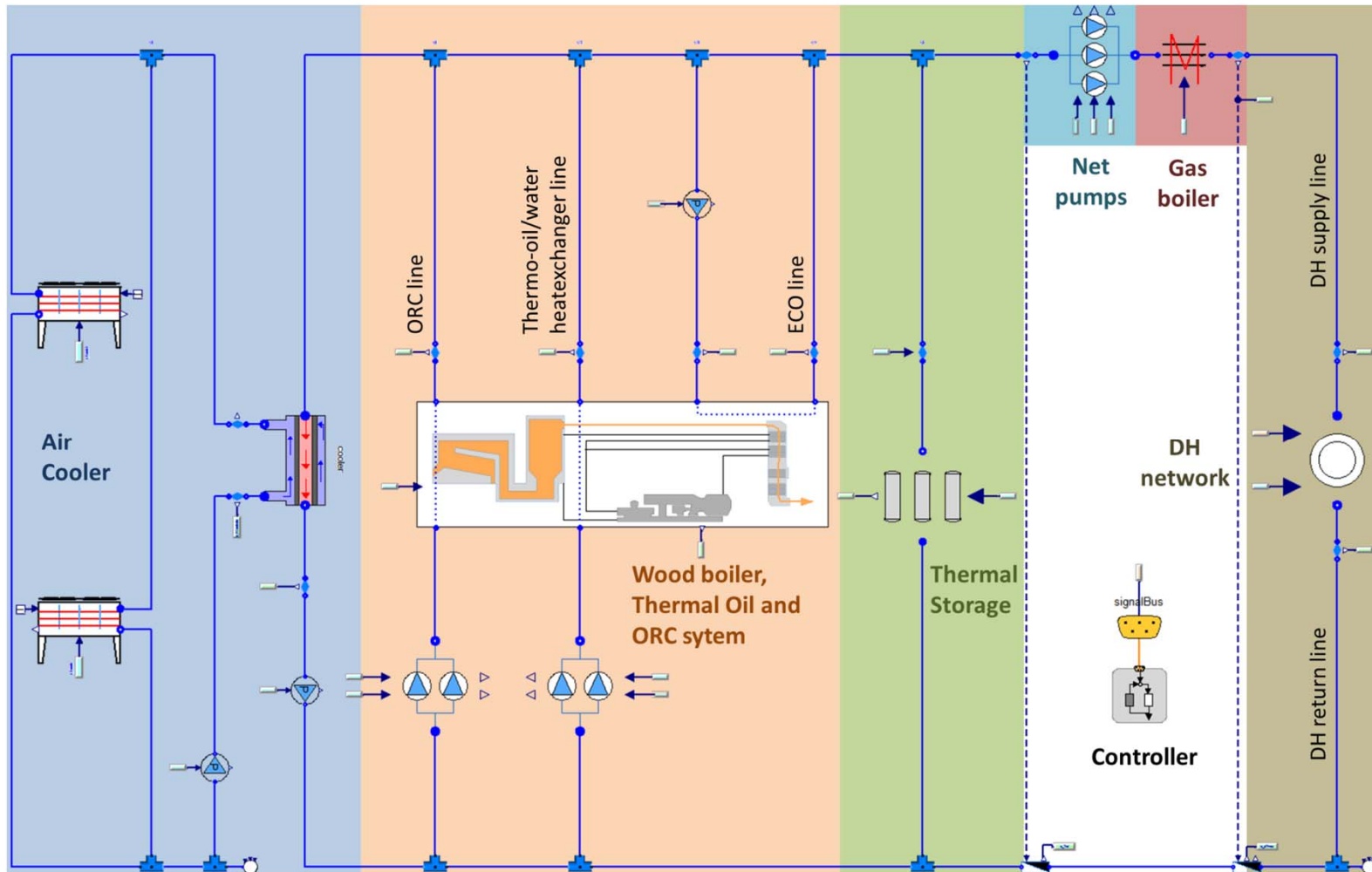
Simulation – Overall Plant Model (Modelica)



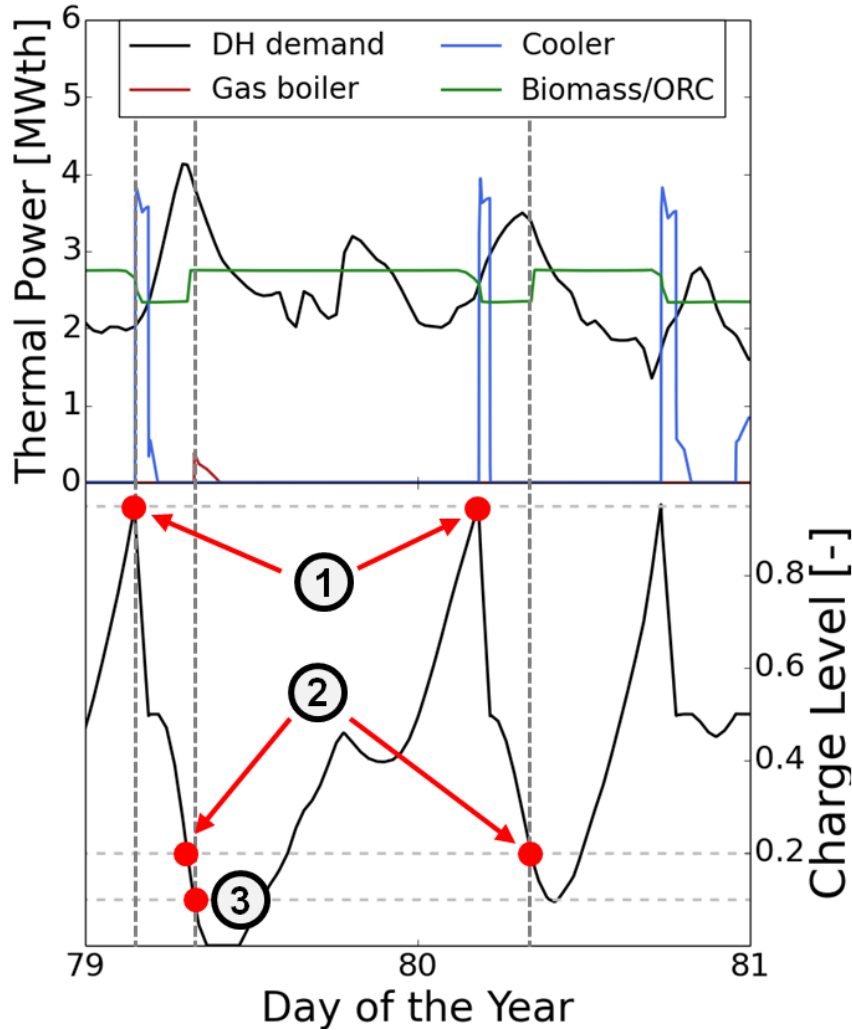
Simulation – Wood boiler, Thermal oil, ORC models



Simulation – Overall Plant Model (Modelica)

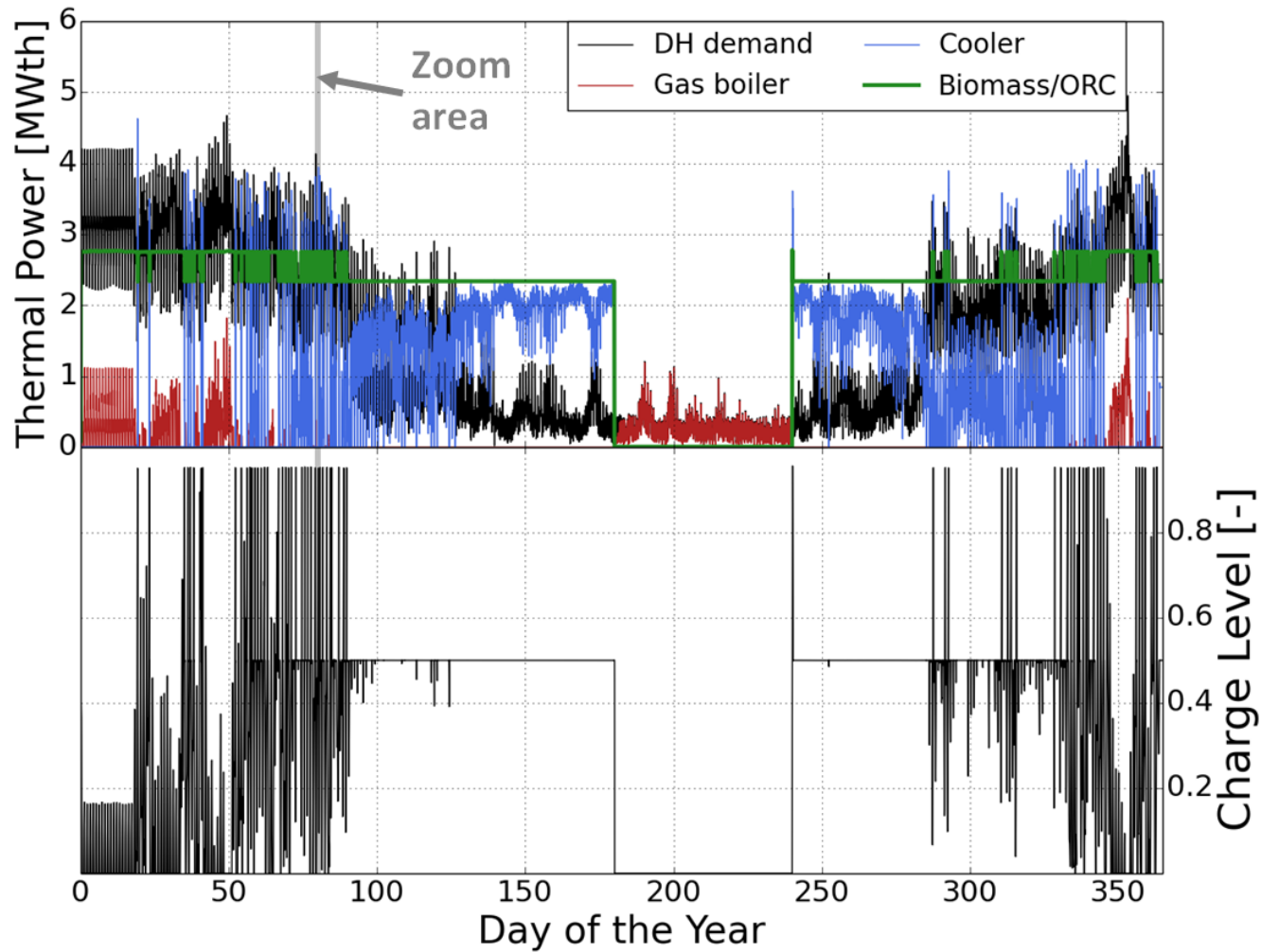


Control Concept & Verification

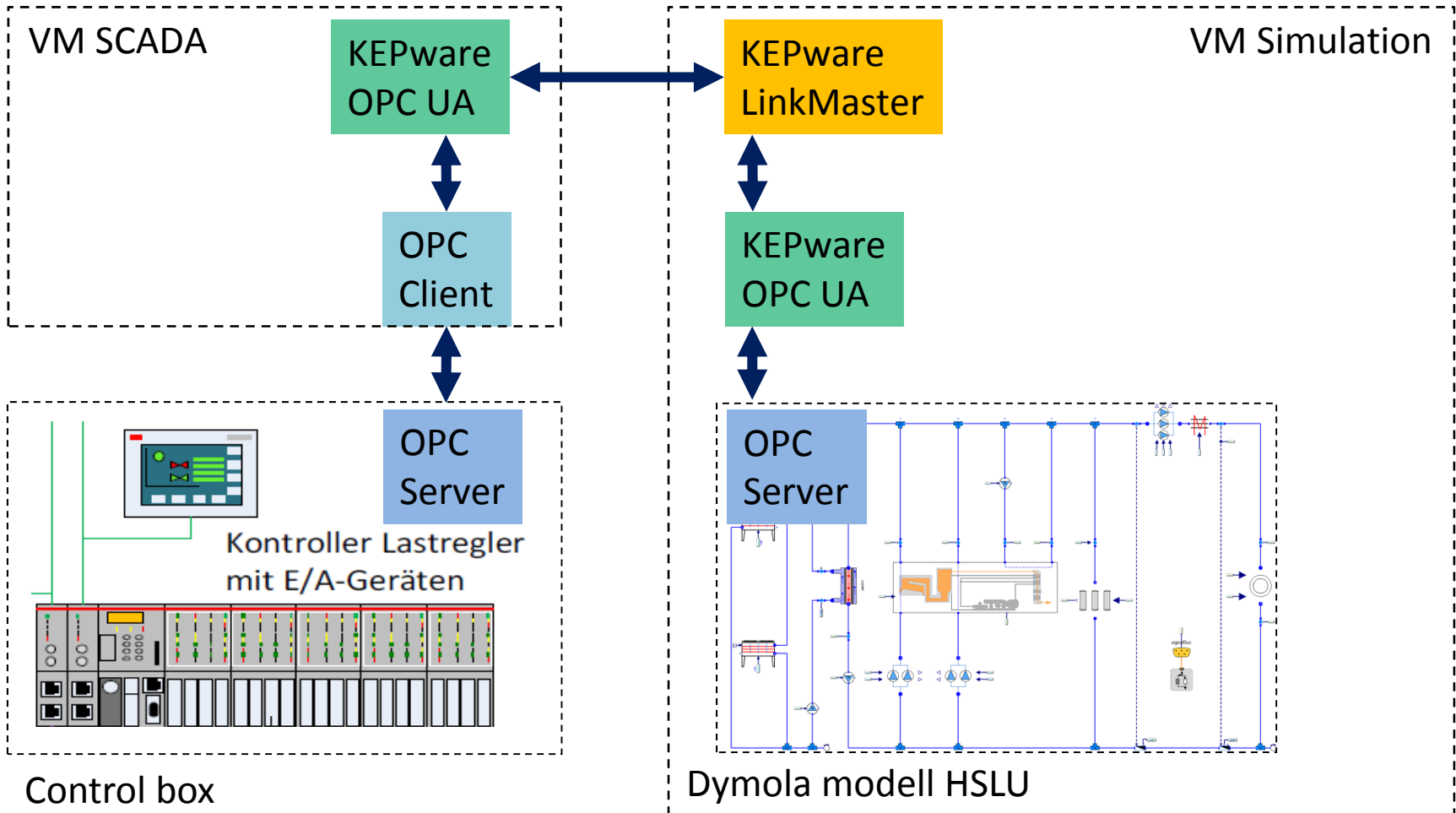


1. Storage fully charged
 - ORC power reduced
 - Cooler on
2. Low charge
 - ORC full power
3. Storage discharged
 - Gas boiler activated
 - Controls supply temp.

Simulation of the Year 2009



Coupling SCADA/Sim. – Communication



Conclusions

- For economical operation
 - Incentive exploitation necessary and
 - Possible to a large extend

- Dynamic simulations
 - Find suitable control concept
 - Deeper insight on interaction of subsystems
 - Support of commissioning

Outlook

- Model calibration
- (Performance) Monitoring of plant operation
- Evaluation of potential plant extensions
- Virtual commissioning on the next application

**Very Important:
Clever control of your ORC
plant, otherwise...**

**... the ORC works
against you!!**

