

Decarbonisation - 100 % Renewable Energy and more

Research project

“The municipal efficiency revolution for climate protection in German cities – requirements, transformation paths and effects” (KomRev)

100% renewable energy exemplified by the City of Rheine

SIJ | SOLAR-INSTITUT JÜLICH
FH AACHEN
UNIVERSITY OF APPLIED SCIENCES



Supported by:



based on a decision of the German Bundestag

1 Community - 2 Concepts: Questions & Models

- Level of energy supply from local potentials and from the outside: heat (yearly amount), electricity (effective power levels, yearly amount), fuel (yearly amount)?
 - Effects on electricity residual loads by different options for supply and interconnection?
- ⇒ Spatial modelling of network based solar heat supply via geographical information system (demand, roof area)
- ⇒ Hourly based simulation of heat, traffic and electricity demand and supply

Demand reduction as basic assumption

Private household

- Today's high efficiency appliances
- Slight decrease of energy hungry consumption development

Industry

- Realizing efficiency potentials in cross-sectional and process technologies

Heating & warm water

- Energetic renovation of all existing buildings
- Decrease of warm water demand per person

Demand reduction as basic assumption

Private household

- Today's high efficiency appliances
- Slight decrease of energy hungry consumption

Industry

- Realizing efficiency through cross-sectional and process technologies

Heating and hot water

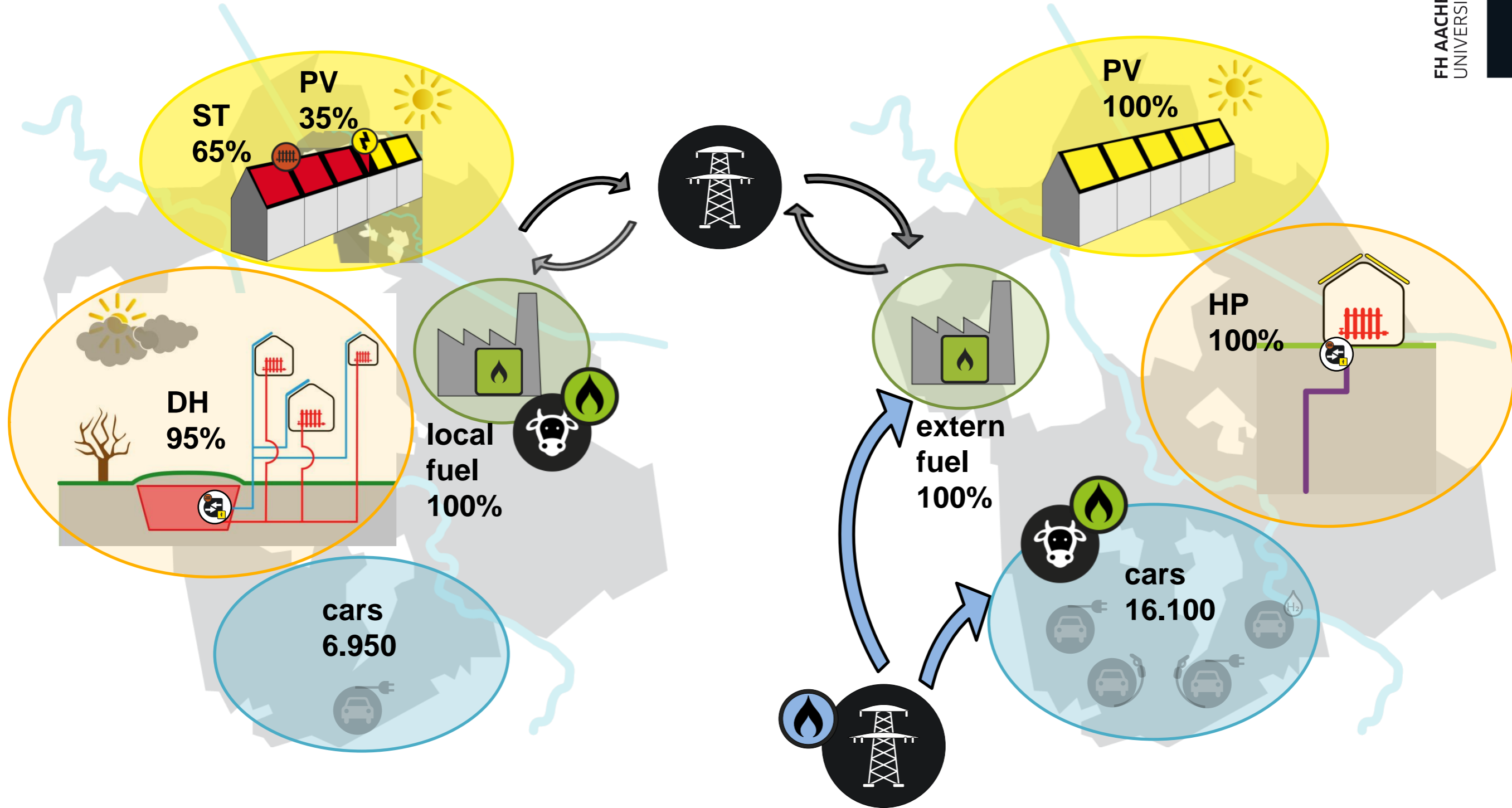
- Energetic renovation of all existing buildings
- Decrease of warm water demand per person

20% to 90% demand reduction

System boundaries and concept guard rails

Maximum Decentralized

Moderate Decentralized



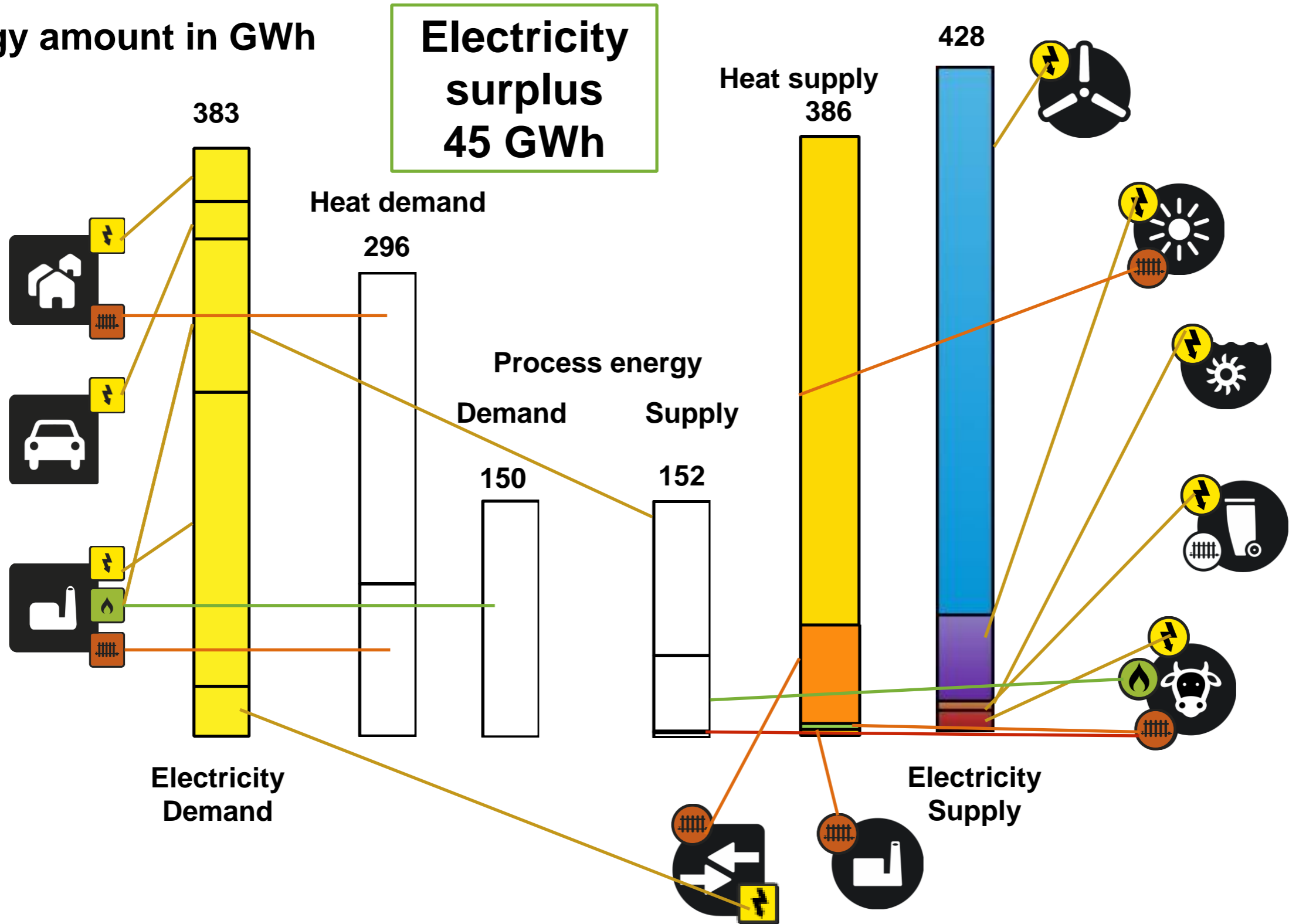
Results Maximum Decentralized

Energy amounts per year

➔ locally met demand and energy export for:

Results MaxDec – Energy Export

Energy amount in GWh



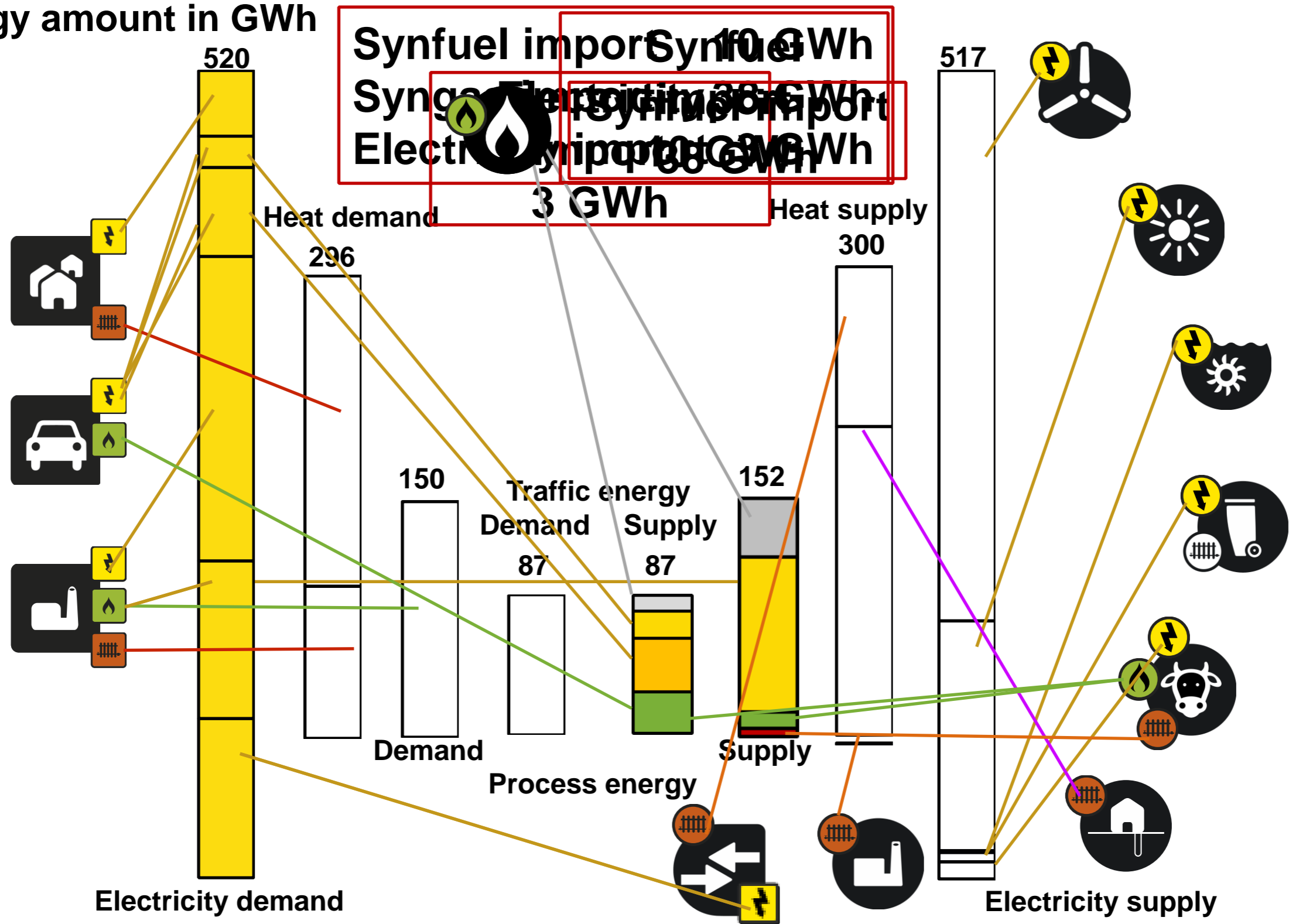
Results Moderate Decentralized

Energy amounts per year

➔ locally met demand and energy import

Results ModDec – Energy Imports

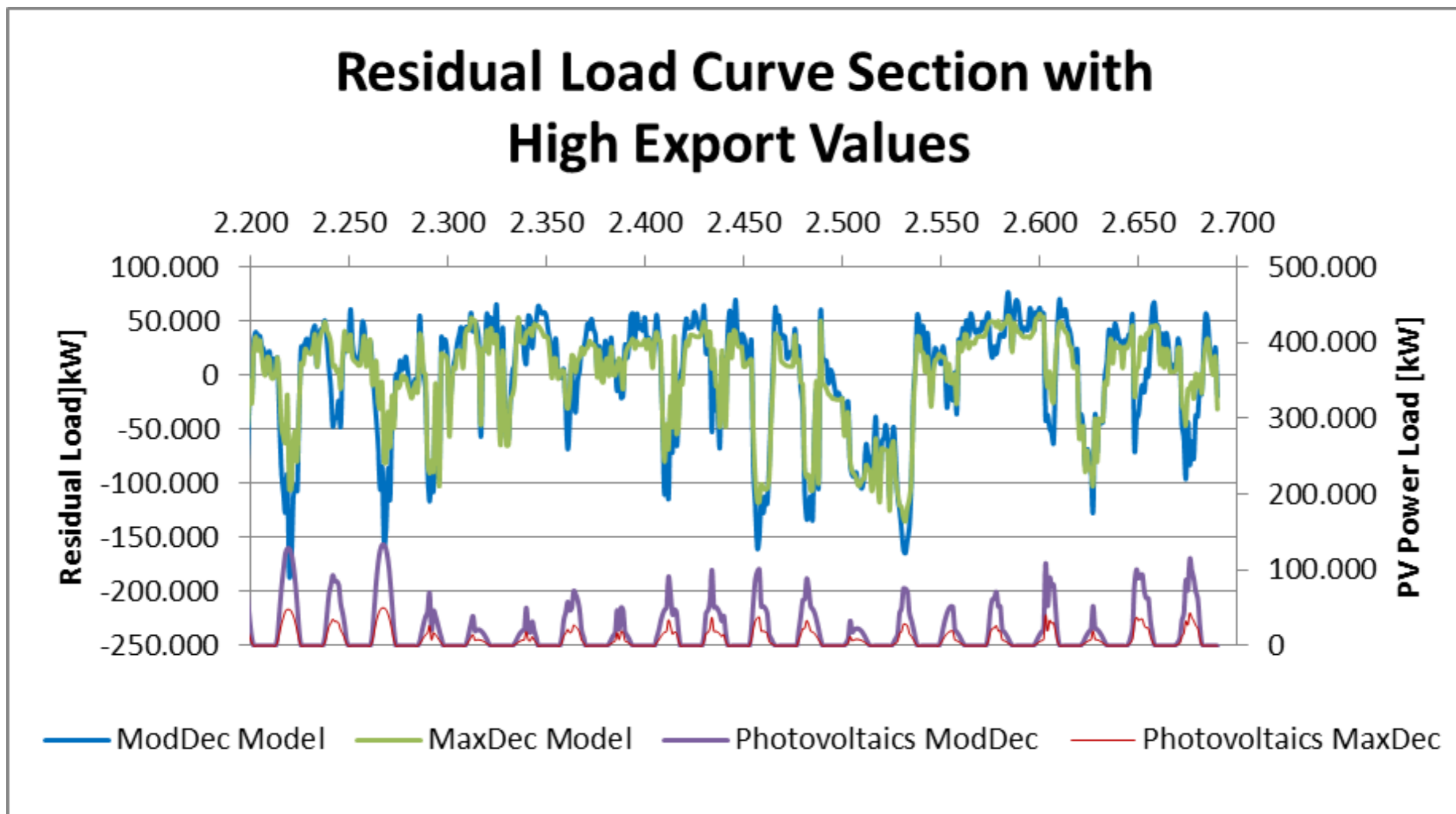
Energy amount in GWh



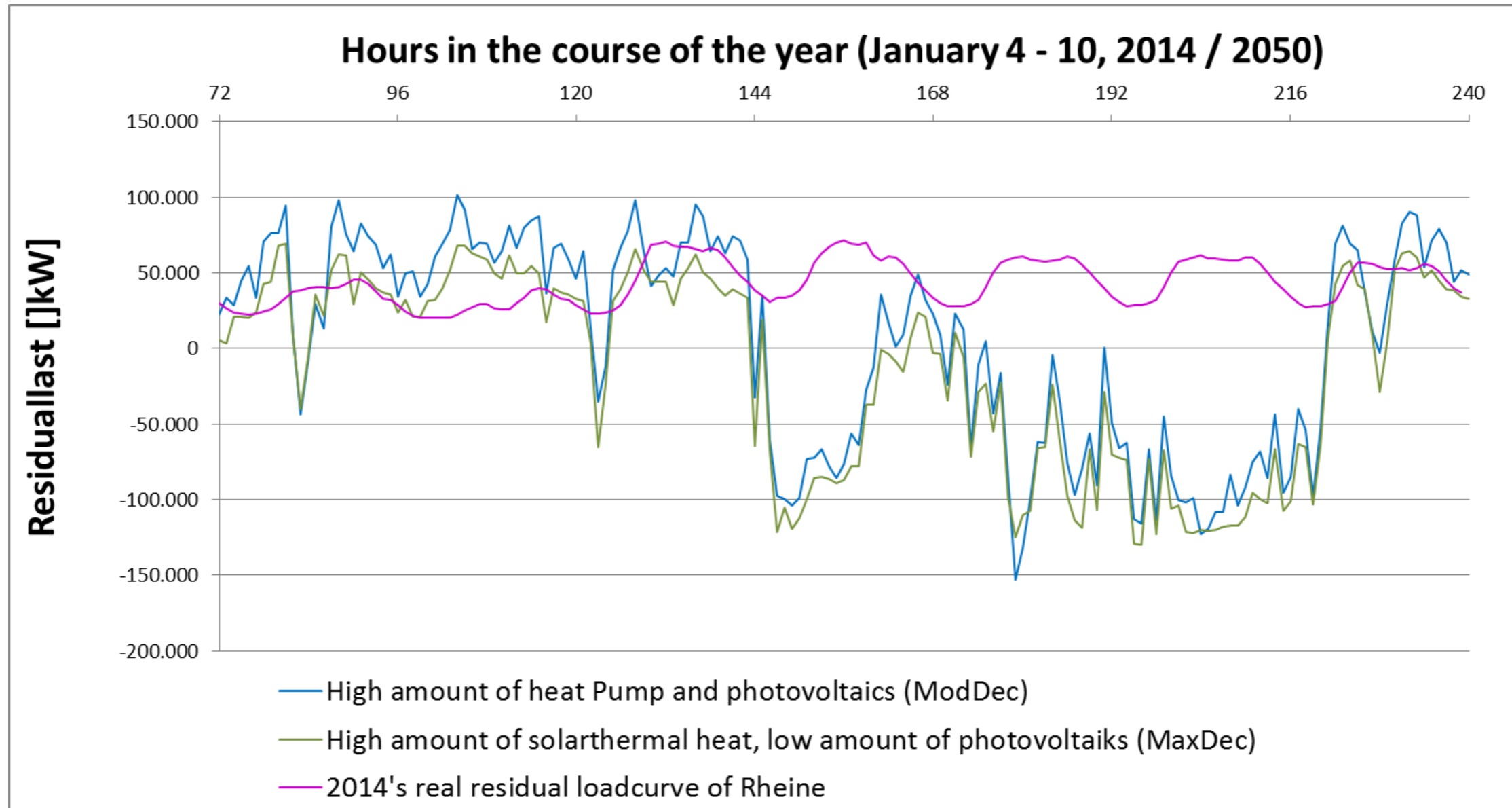
Results on Residual Load Curve

Effects of the heating system choice

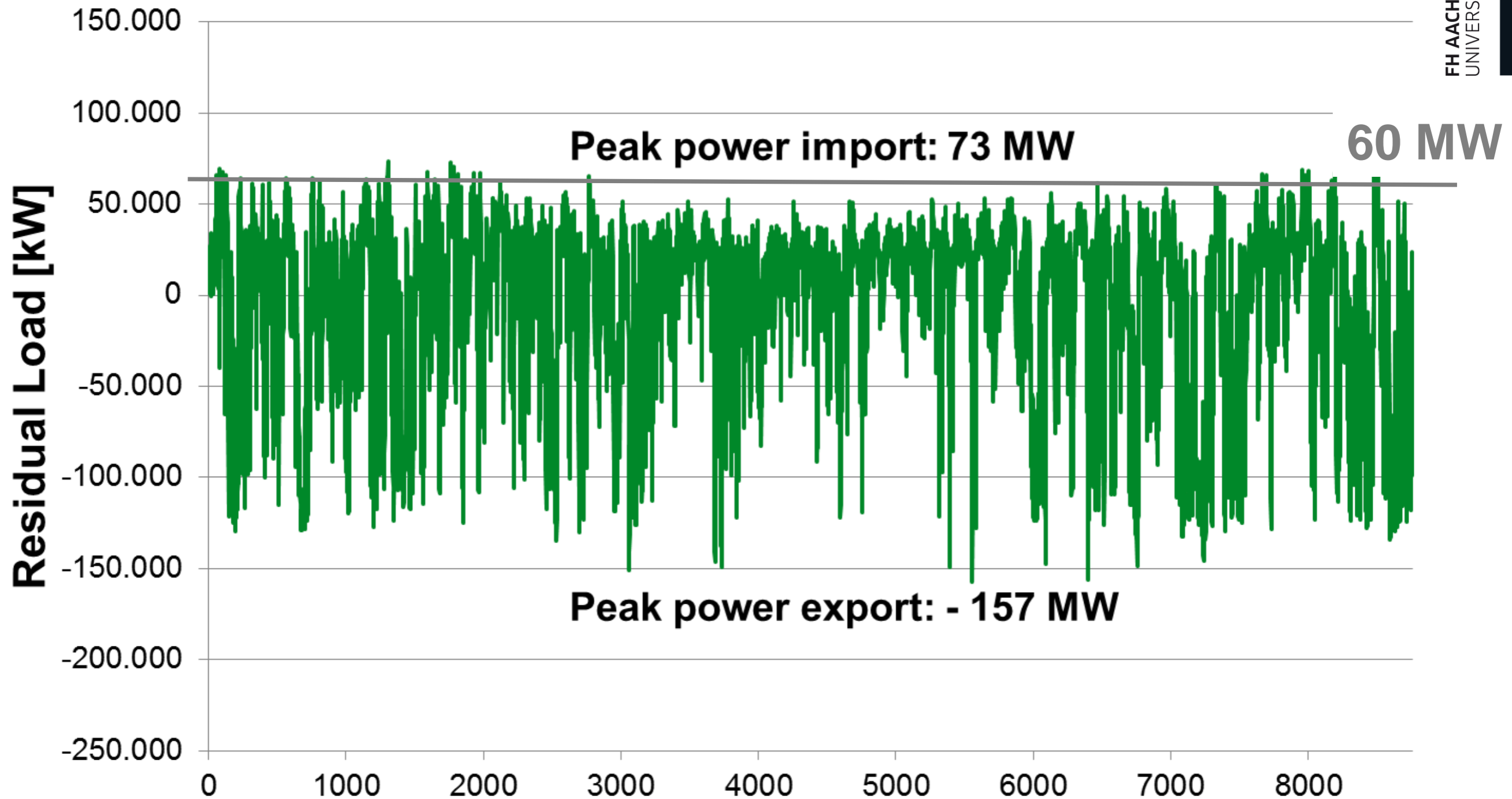
Residual Load Curve - Effects of DH & Seasonal Storage



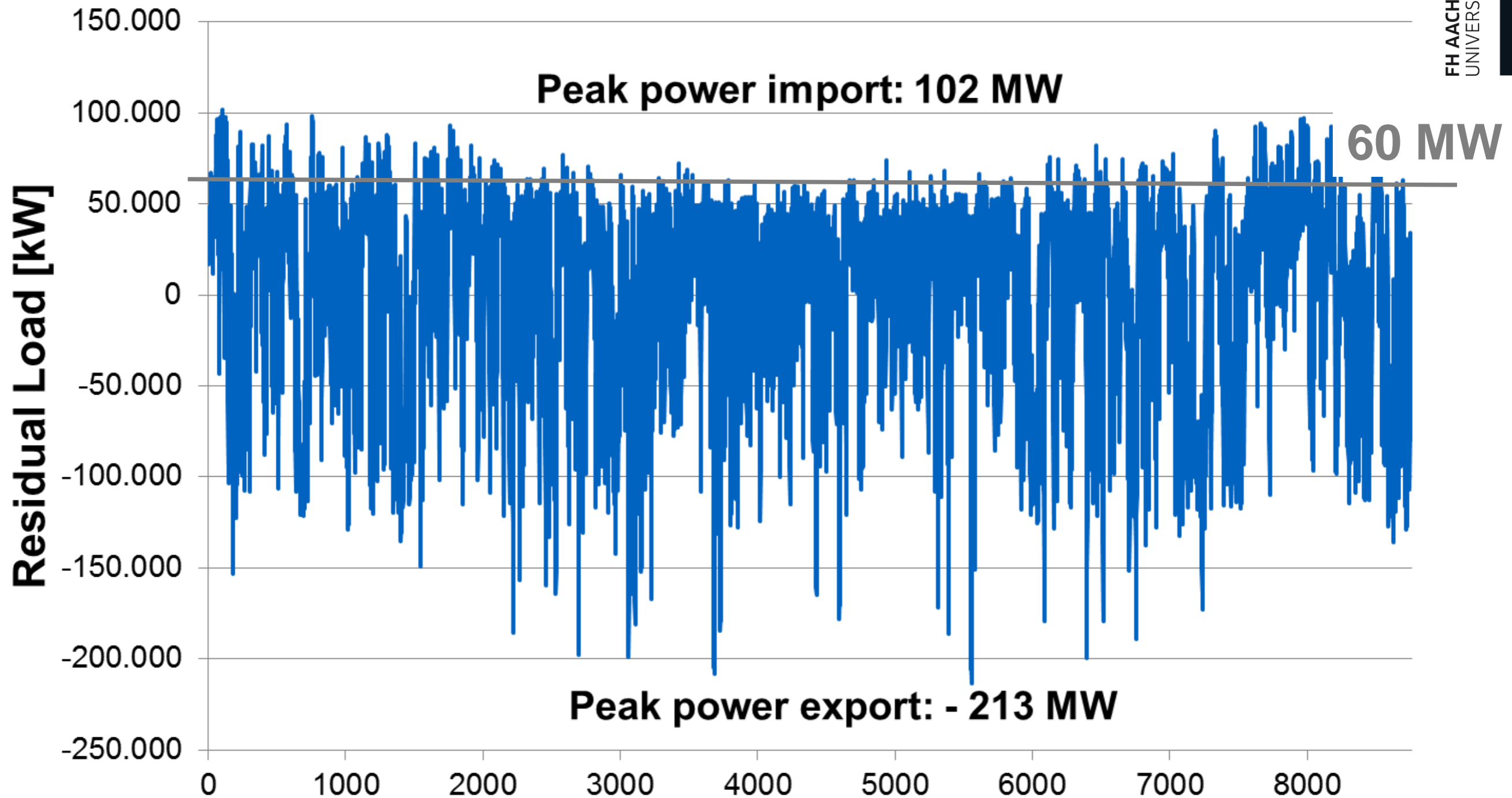
Today's and Future Residual Load Curves



Results MaxDec – Residual Load Curve



Results ModDec – Residual Load Curve



Contact details

Dipl.-Ing. Barbara Fricke, M.Sc.

Solar-Institut Jülich, FH Aachen University of Applied Sciences

Heinrich-Mußmann-Str. 5

52428 Juelich

Germany

0049 (0)241 6009 53519

fricke@sj.fh-aachen.de