



Modelling Energy Storage Demand

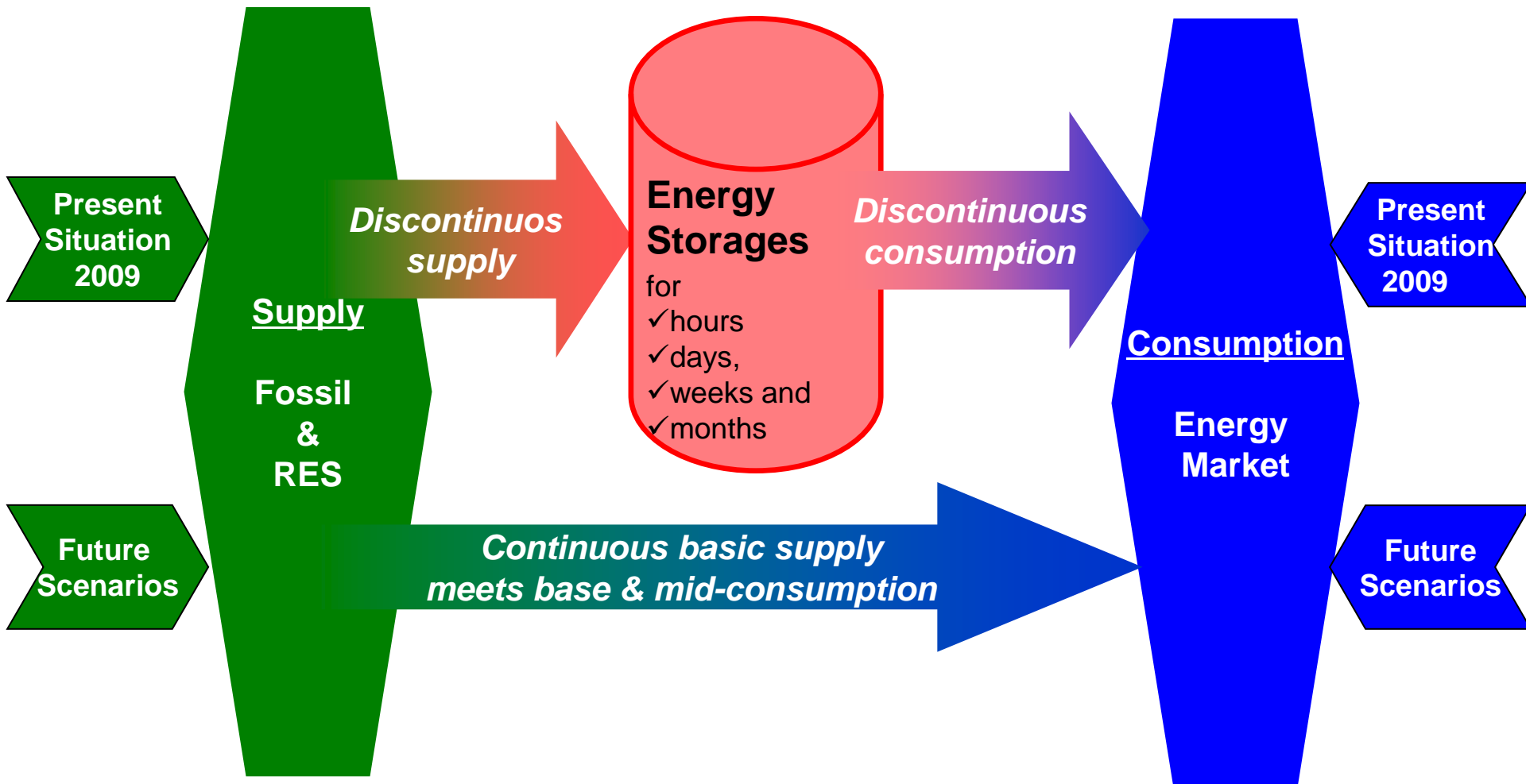
**„Energy Storages for Renewable Energy as Key Technology for
Future Energy Systems“**

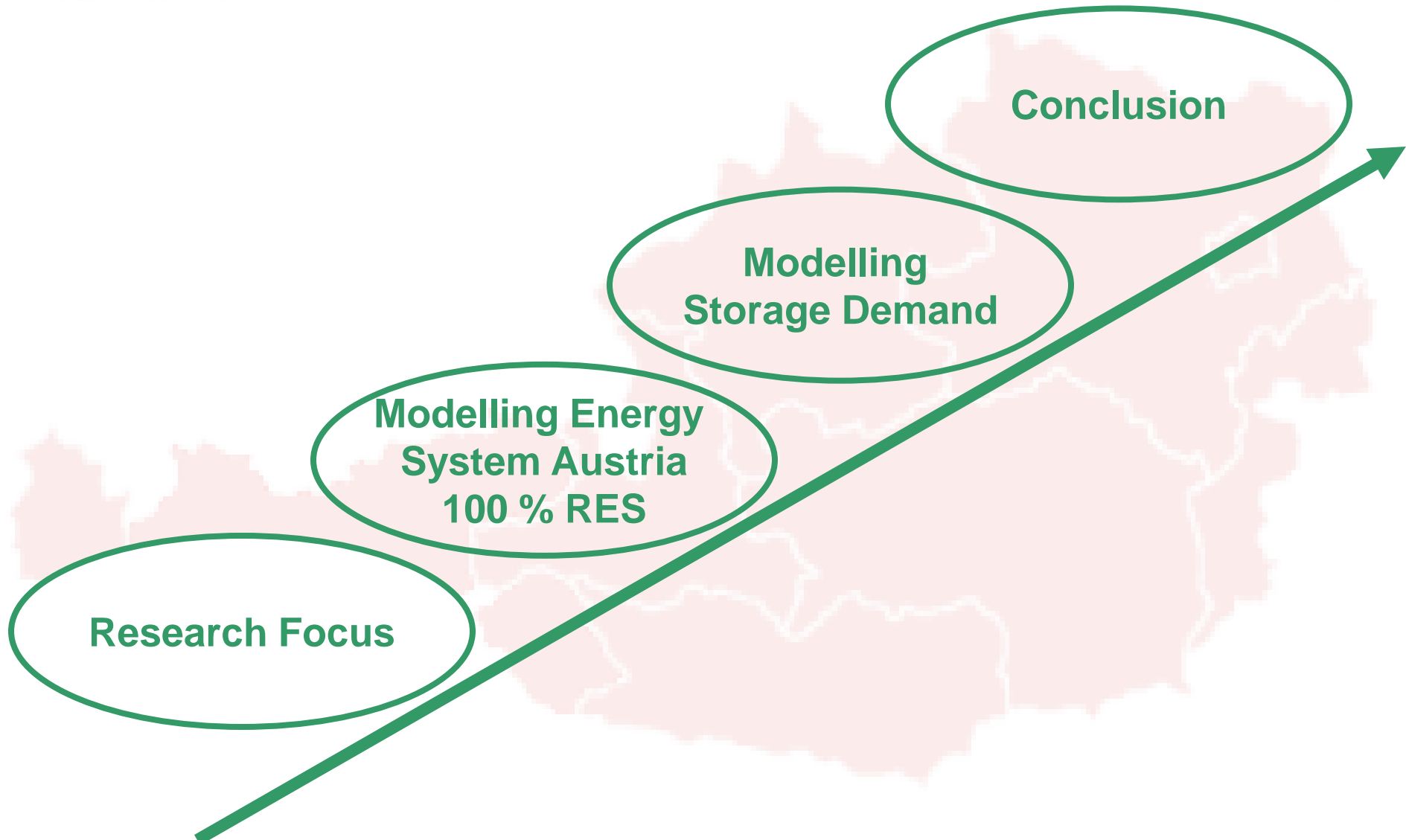
Karl-Peter Felberbauer

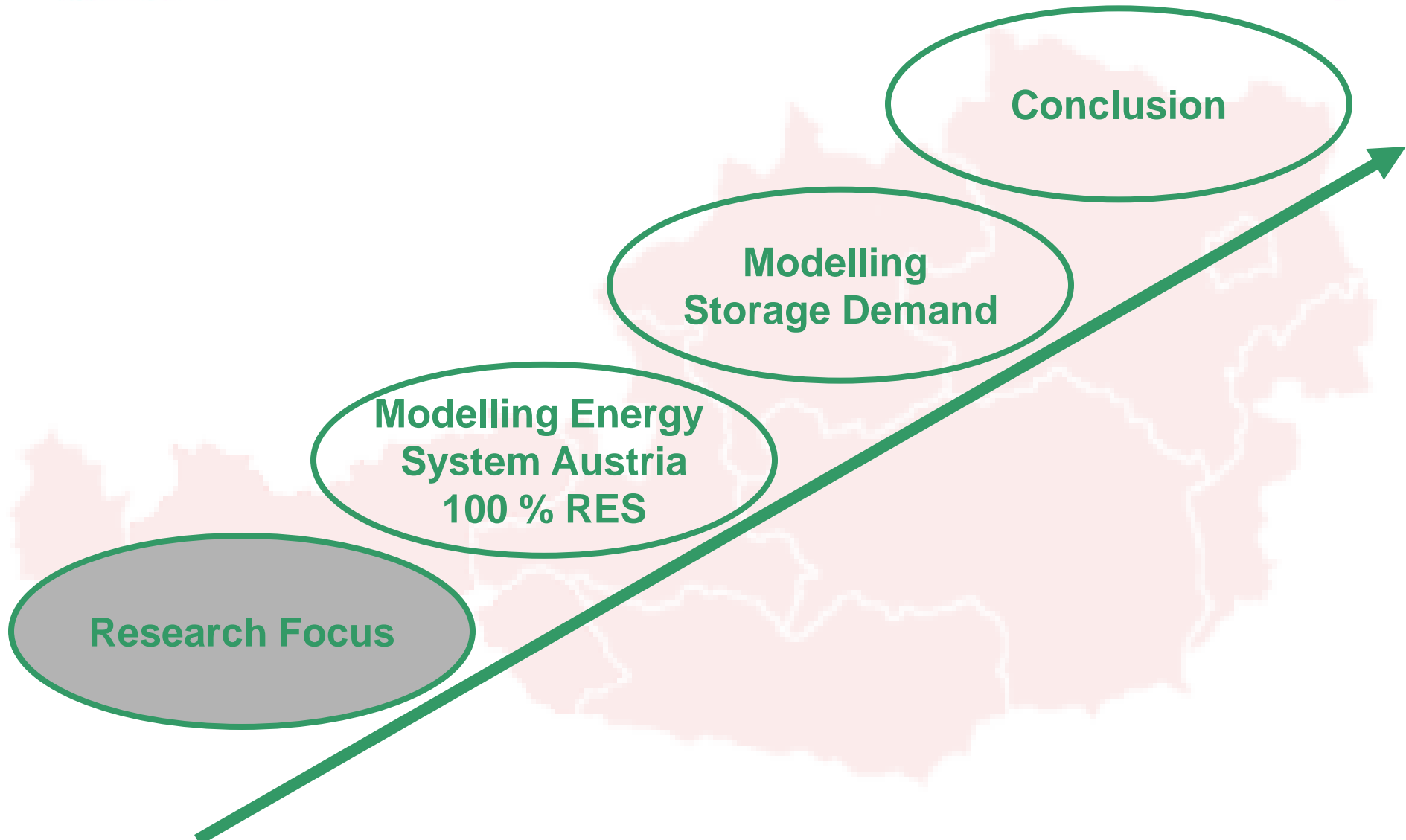
IEA-CERT Workshop
Energy Storage Issues and Opportunities

15th February 2011, Paris

Modelling Energy System Austria







Research Focus

Energy Storages Technologies & Systems

State of the art & characteristics

Application systems & integration

Assessment

Technical

Economical

Environmental

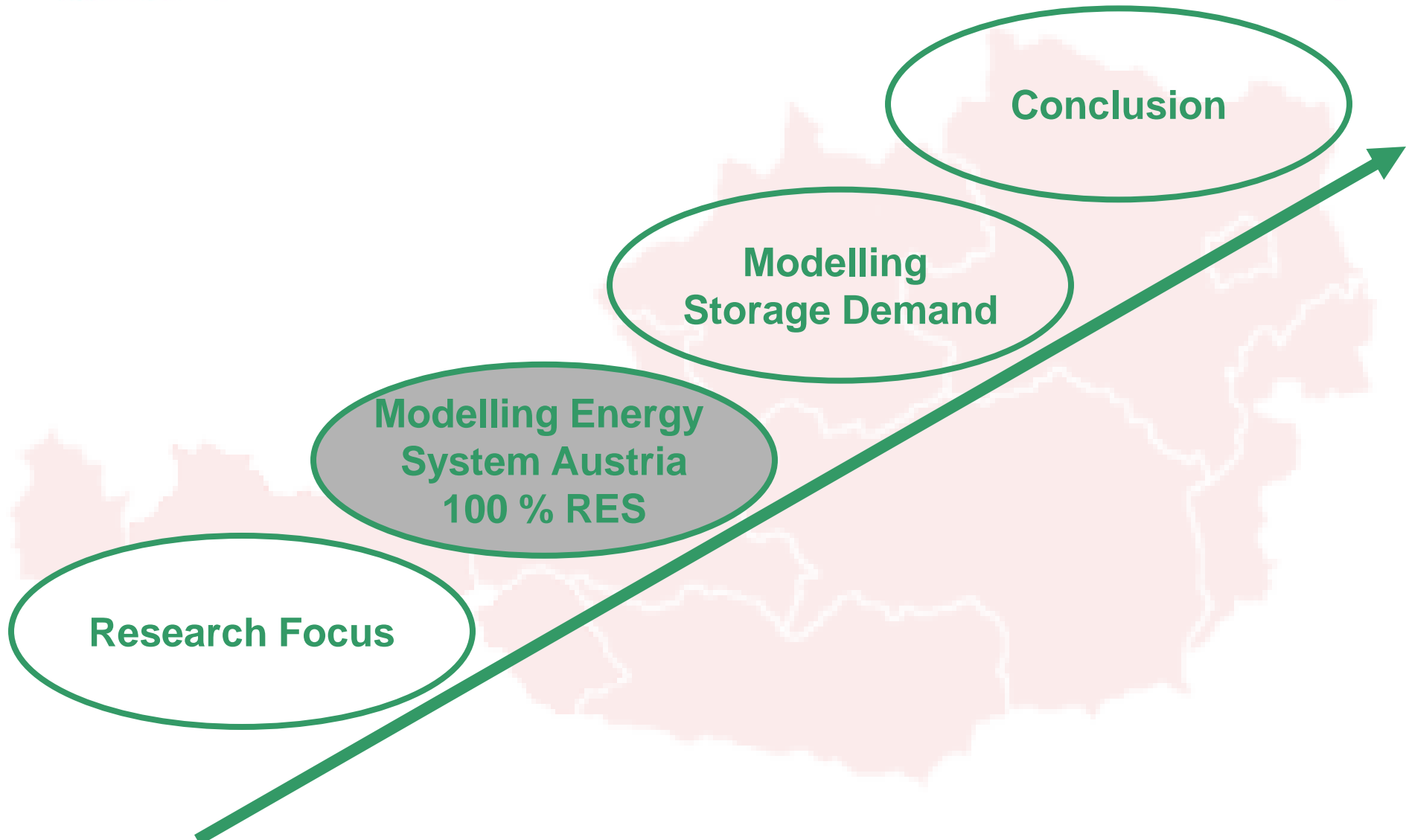
Modelling Storage Demand in Austria

Electricity, Heat, Fuels
(solid, liquid, gaseous)

Present & Future situation

Identification of the most interesting energy storages options for Austria

Recommendations for stakeholders (industry, government & research) in Austria



Modelling Energy System Austria I

Periods

- Present: 2009
- Future: 2025/2050

Possible scenarios

- More RES (e.g. „Scenario 100% RES“)
- More energy efficiency
- Consumer behaviour change
- Smart Grids
(Demand Side Management,
Supply Side Management,..)

Results

- Identify most interesting energy storages options for 2025/2050

Modelling Energy System Austria II

Useful energy demand
e.g. vehicle, heat

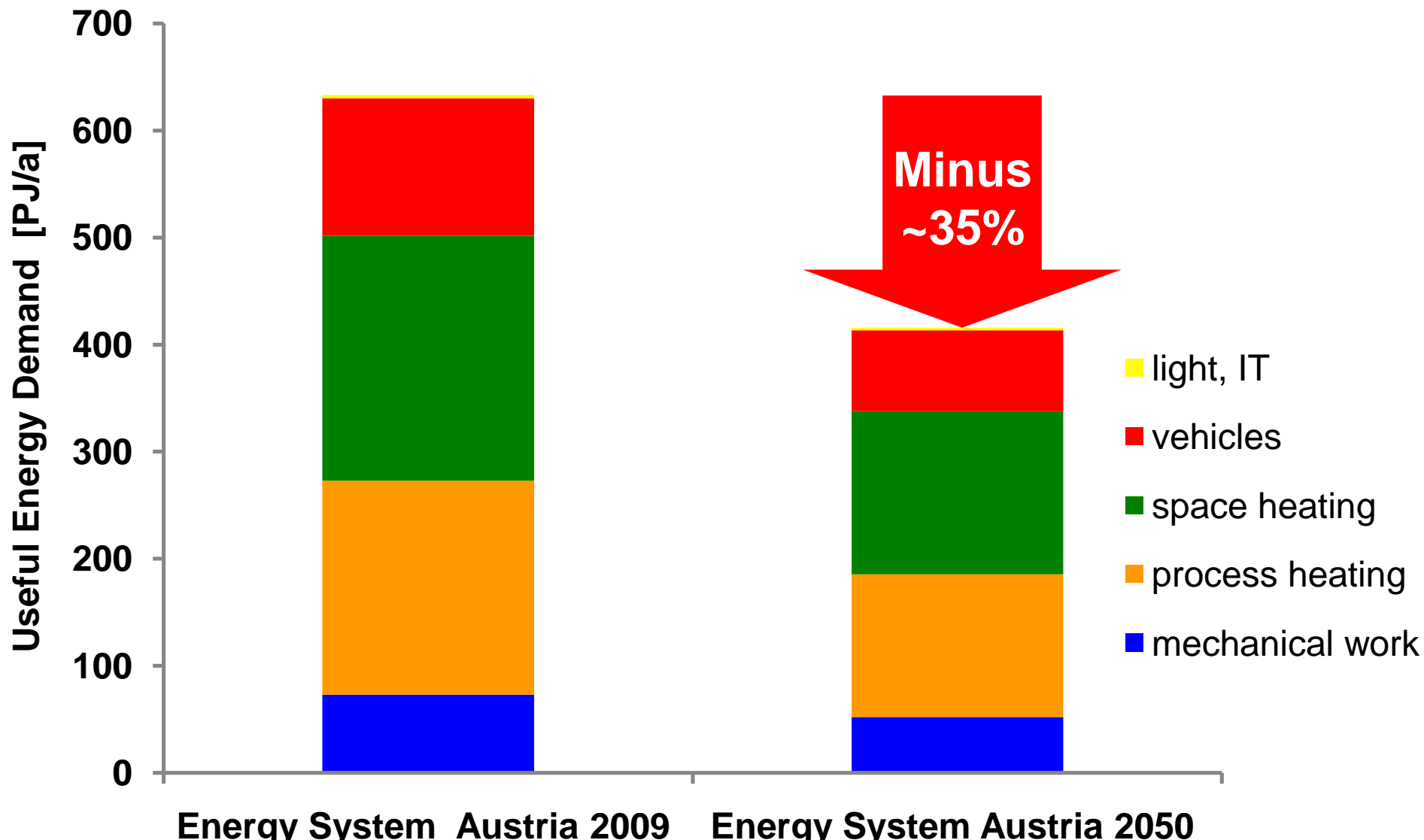
Demand of energy services
Austria 2009 = 2050

Final energy:
demand = supply
e.g. heating oil, electricity

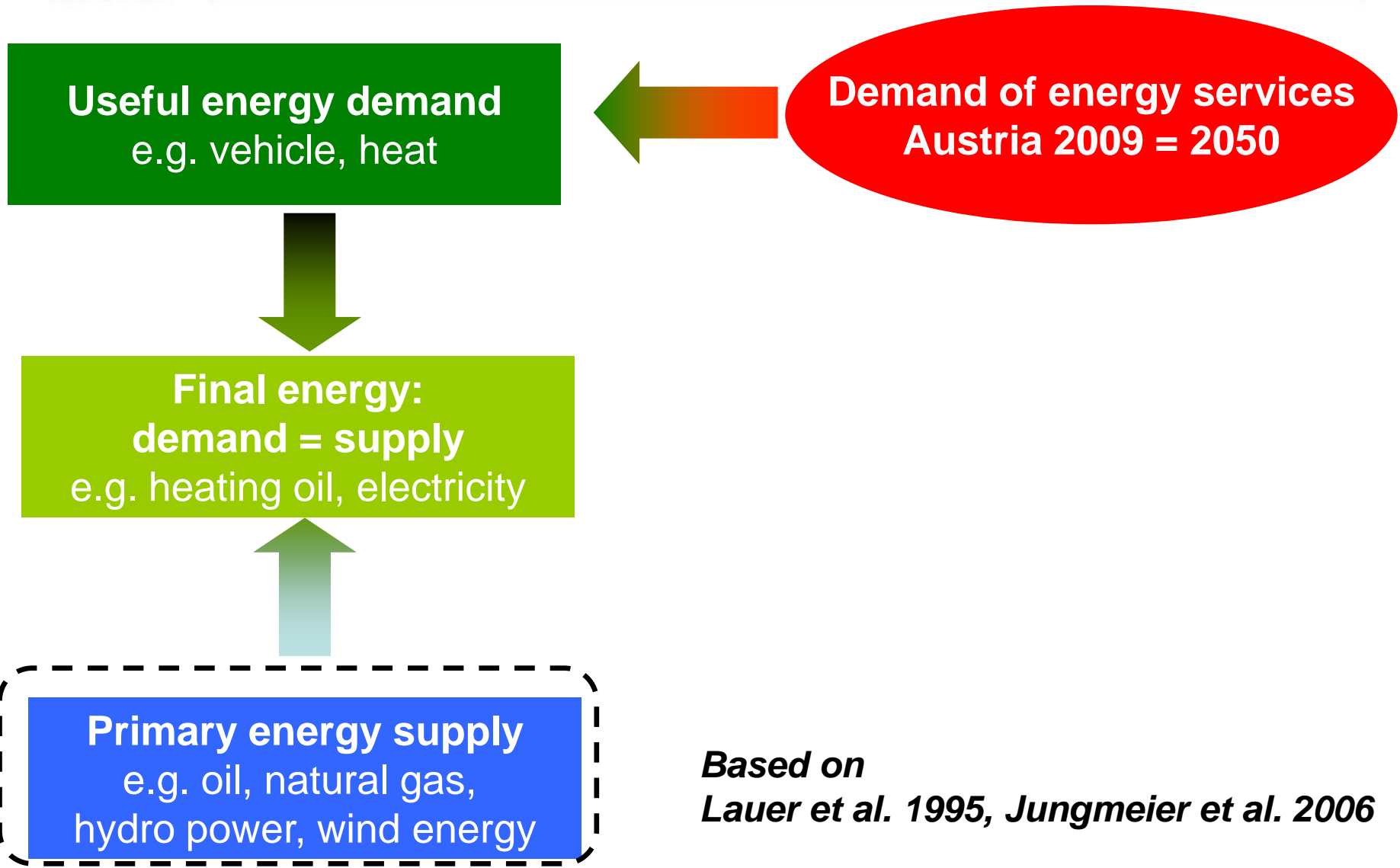
Primary energy supply
e.g. oil, natural gas,
hydro power, wind energy

Based on
Lauer et al. 1995, Jungmeier et al. 2006

Useful Energy Demand in „Scenario 2050: 100 % RES“

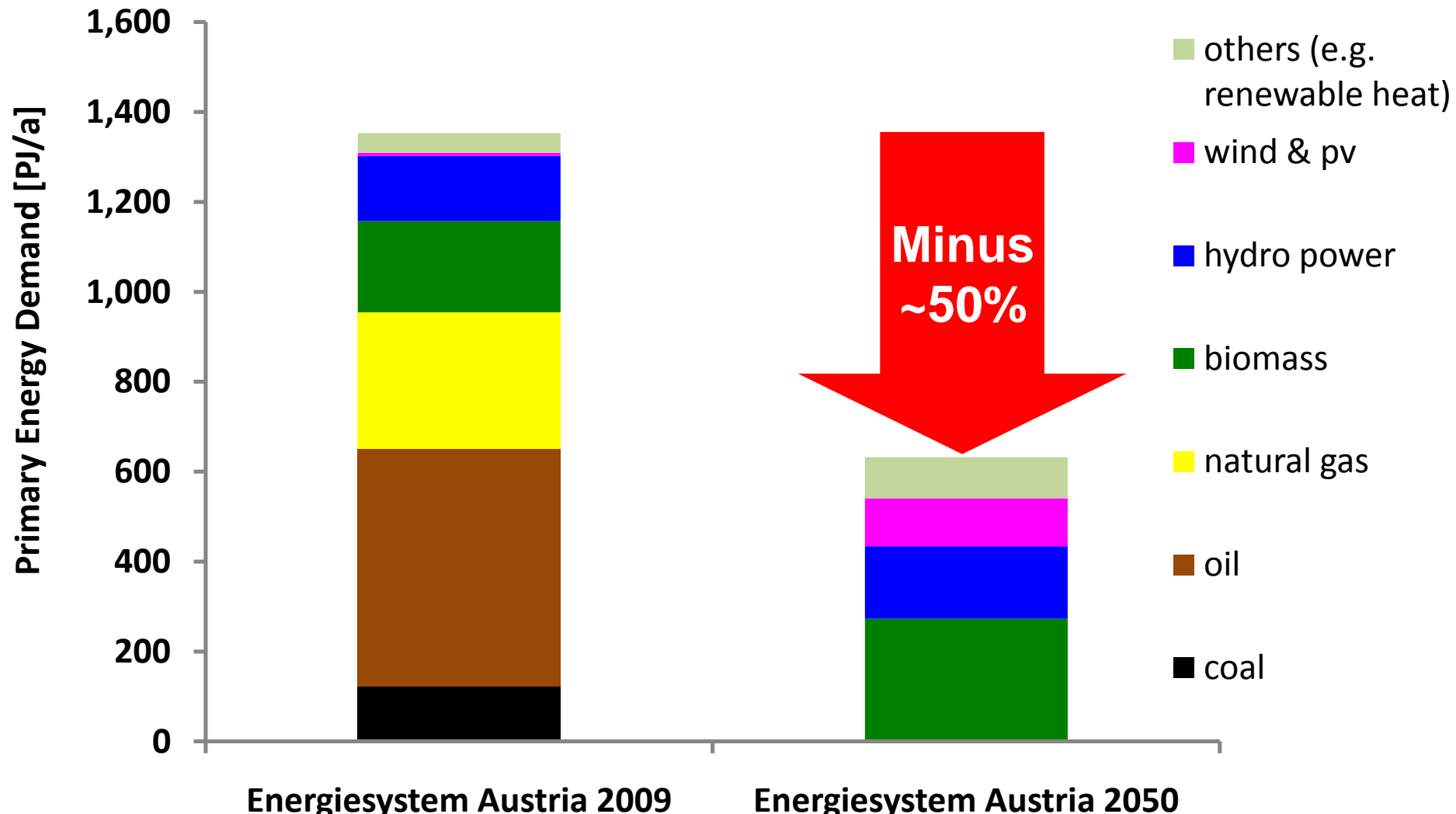


Modelling Energy System Austria III

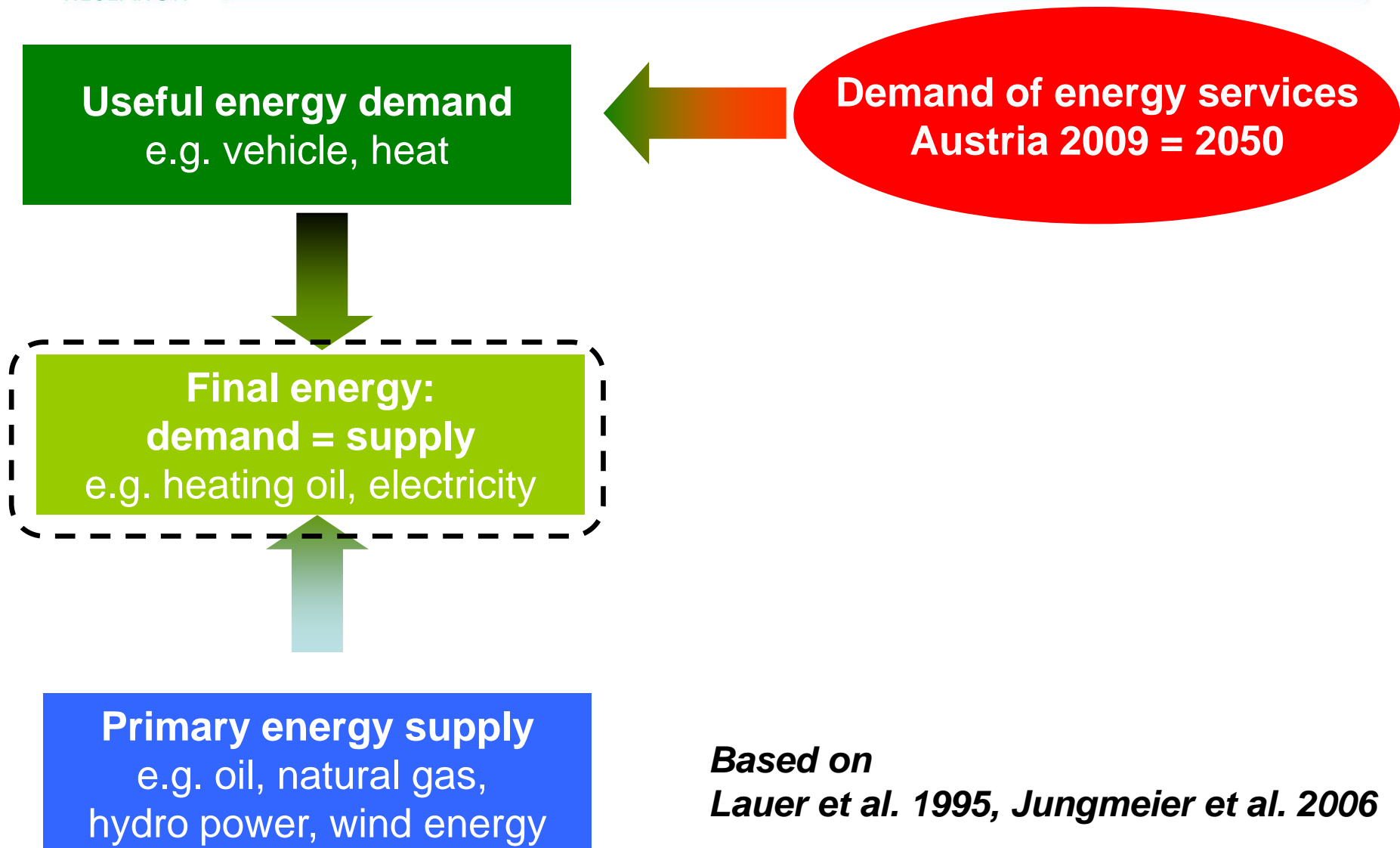


***Based on
Lauer et al. 1995, Jungmeier et al. 2006***

Primary Energy Supply in „Scenario 2050: 100 % RES“



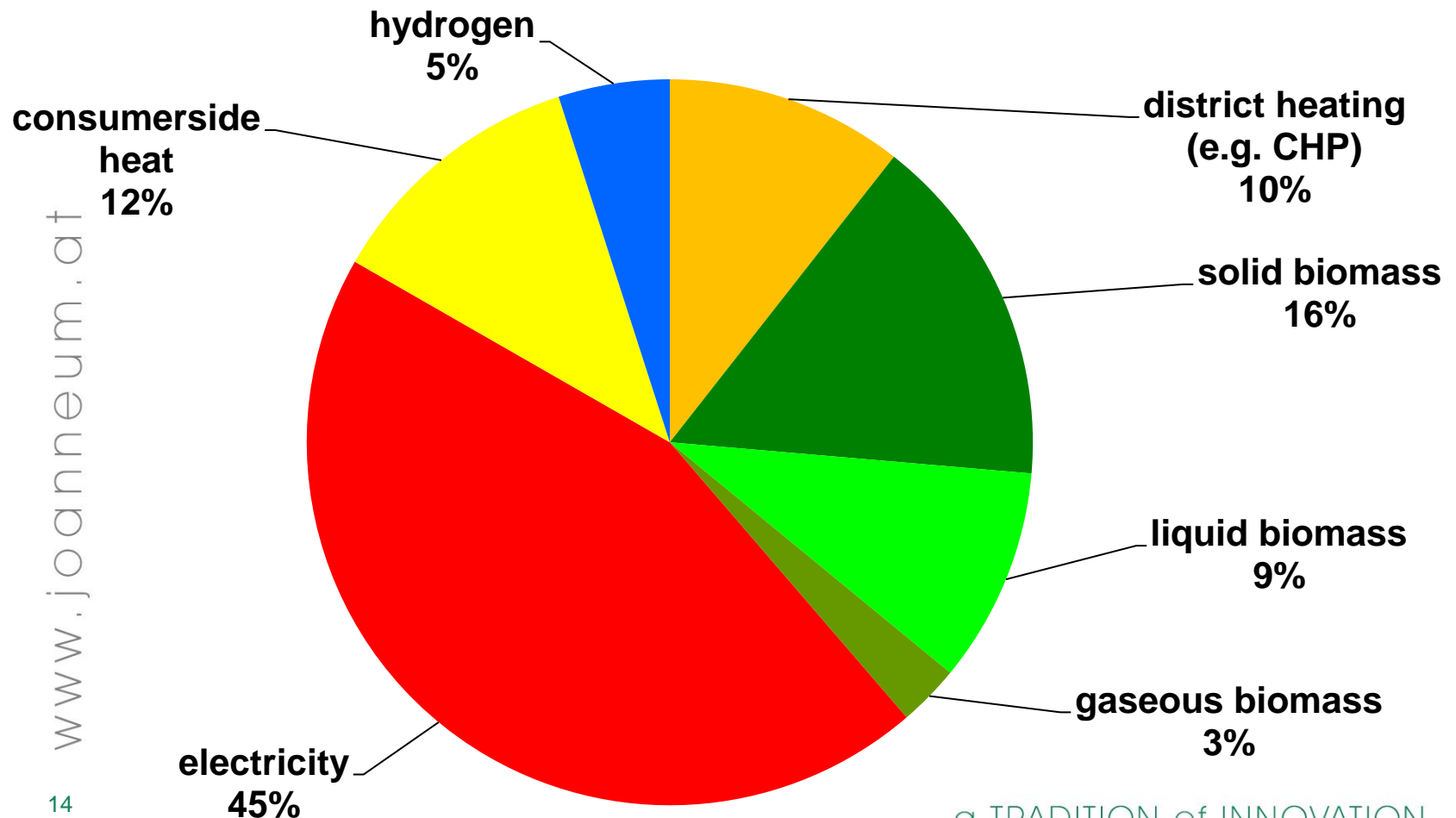
Modelling Energy System Austria IV

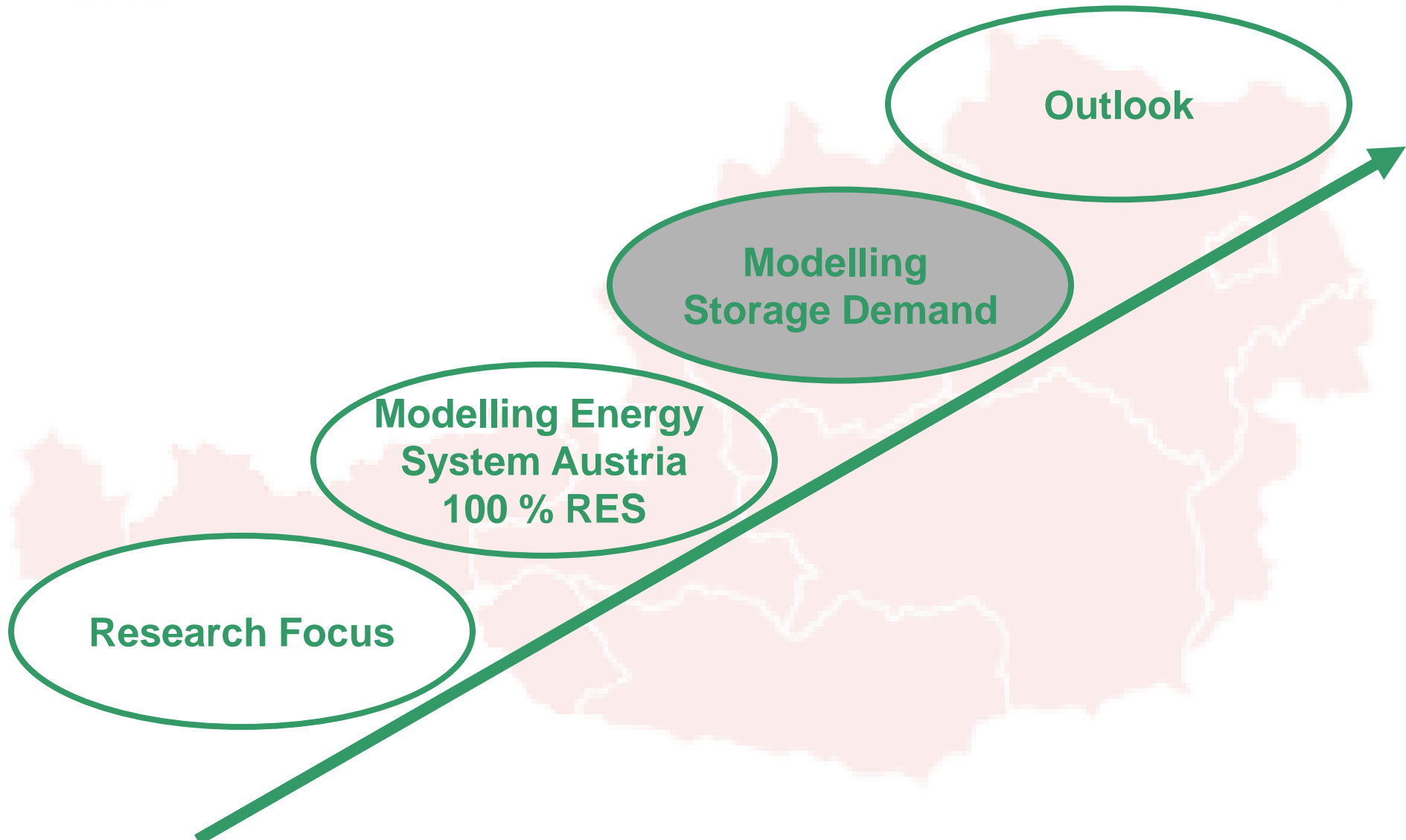


*Based on
Lauer et al. 1995, Jungmeier et al. 2006*

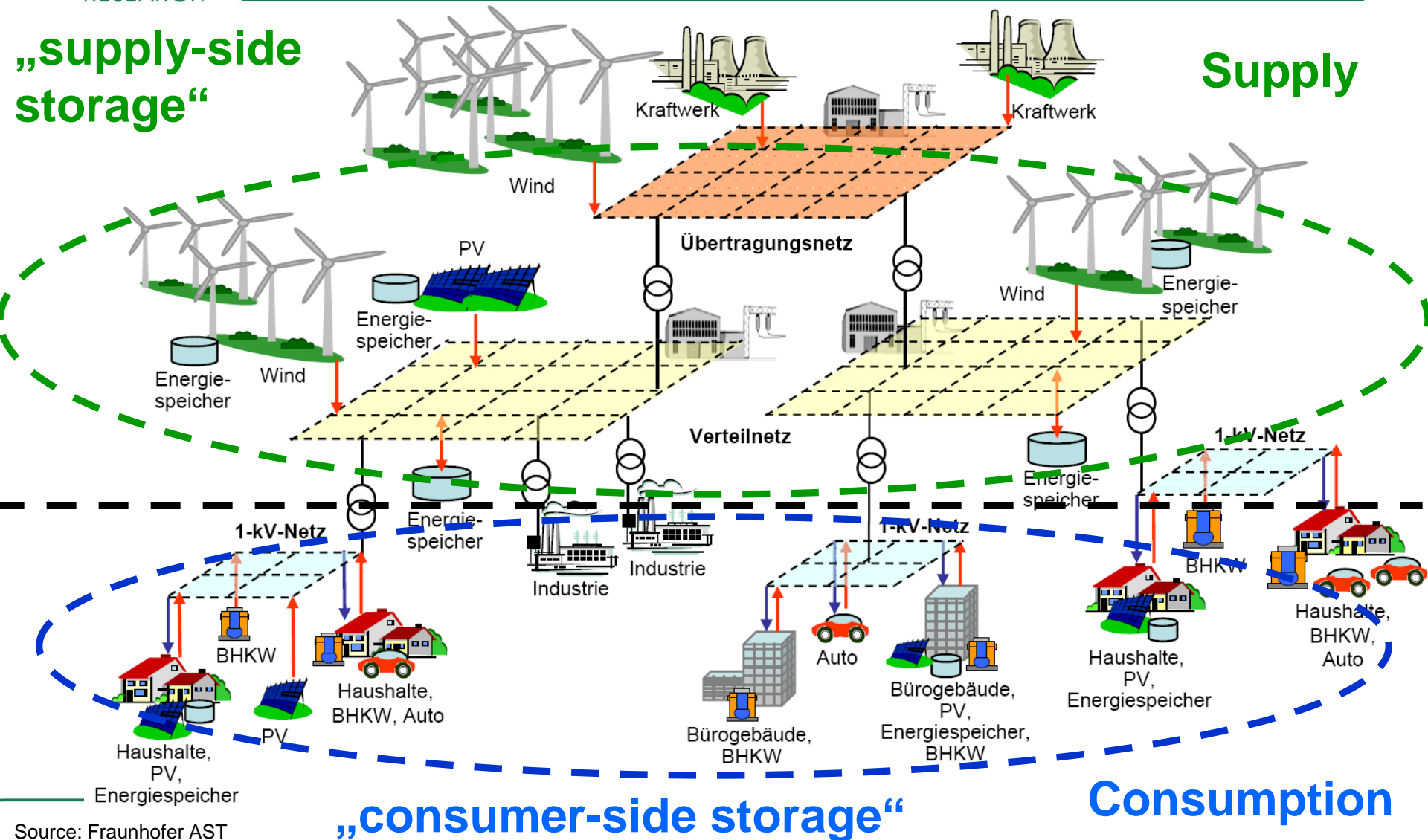
Final Energy Demand Scenario 2050: 100 % RES

Total final energy demand 550 PJ/a (currently 1,060 PJ/a)

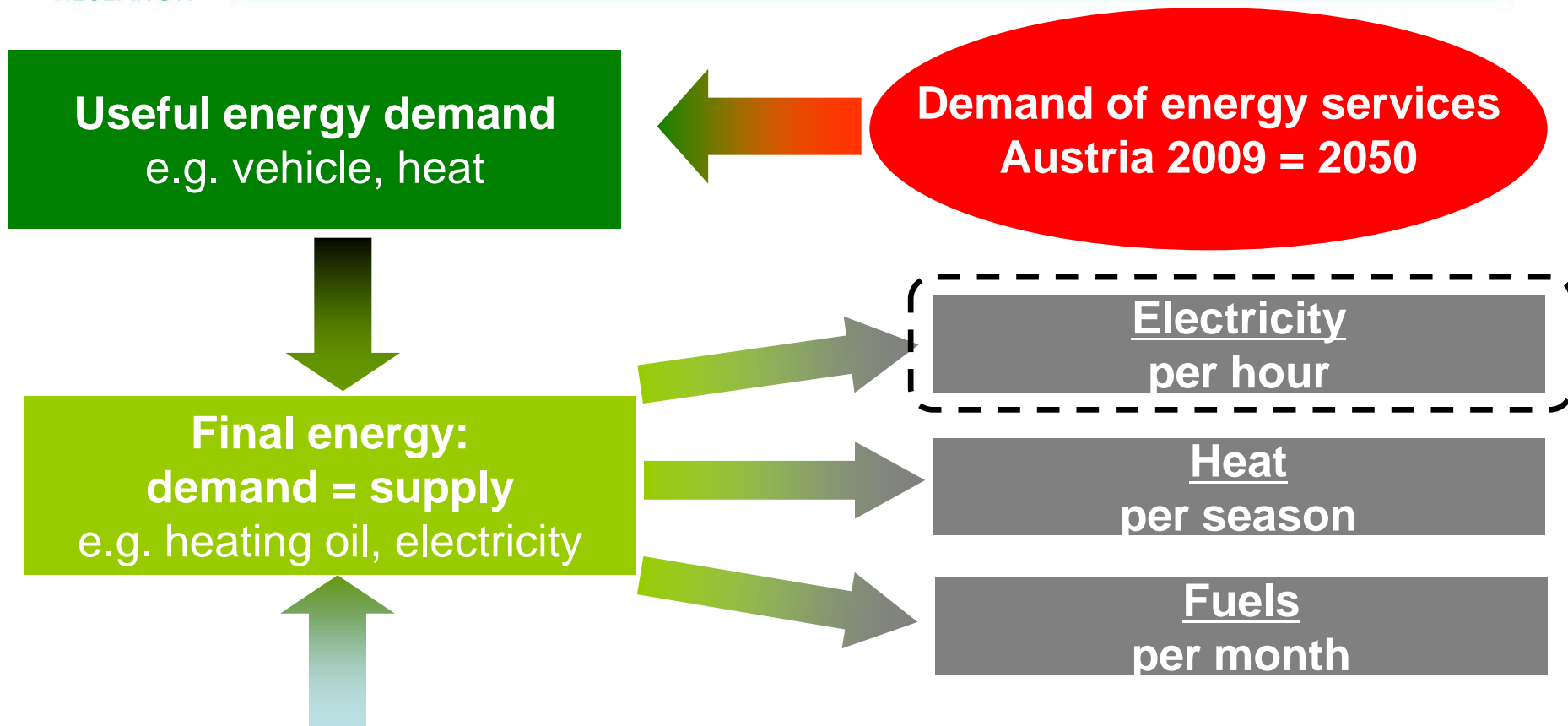




Modelling Energy Storage Demand – Location of Storage

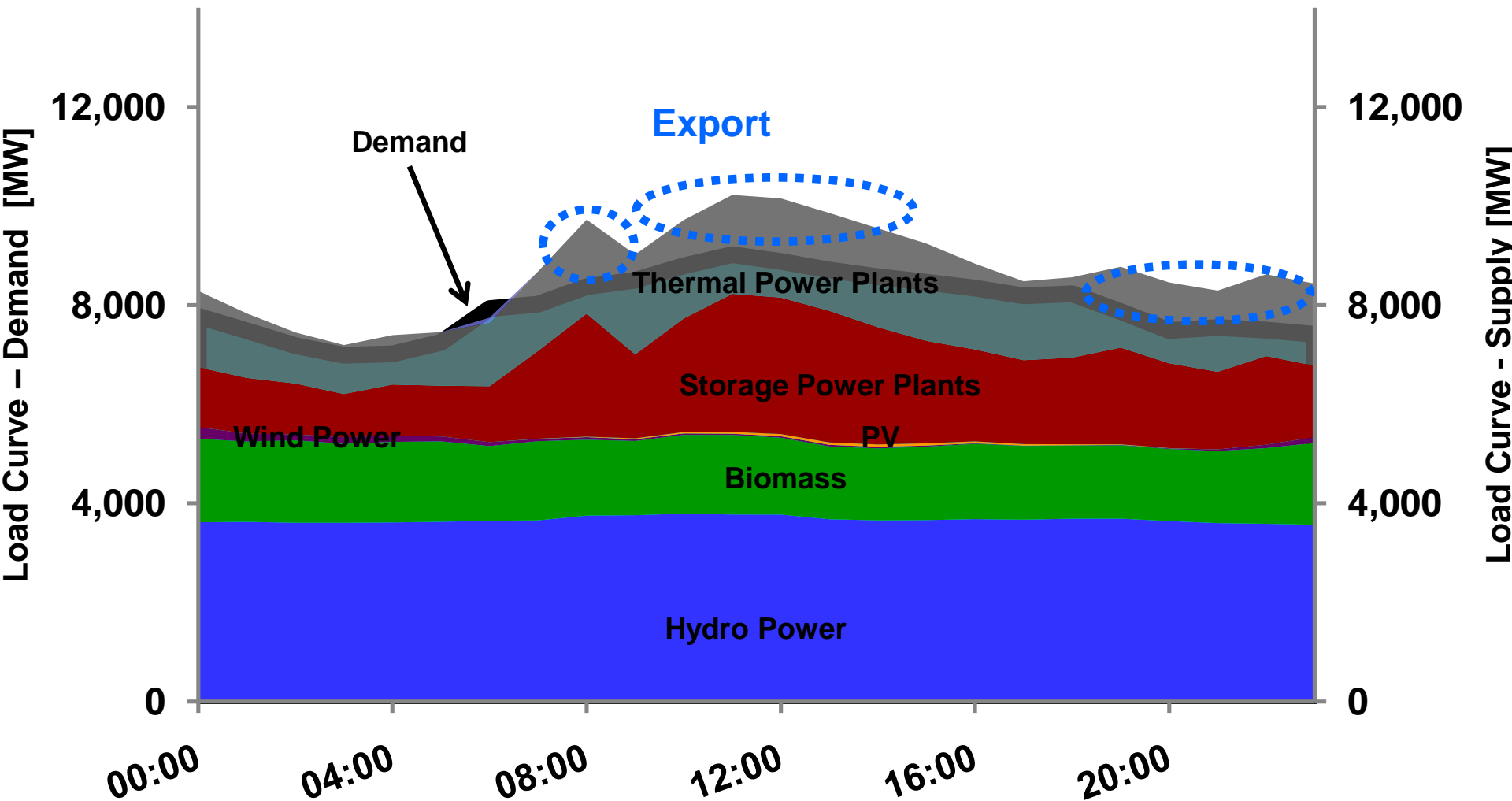


Modelling Energy Storage Demand

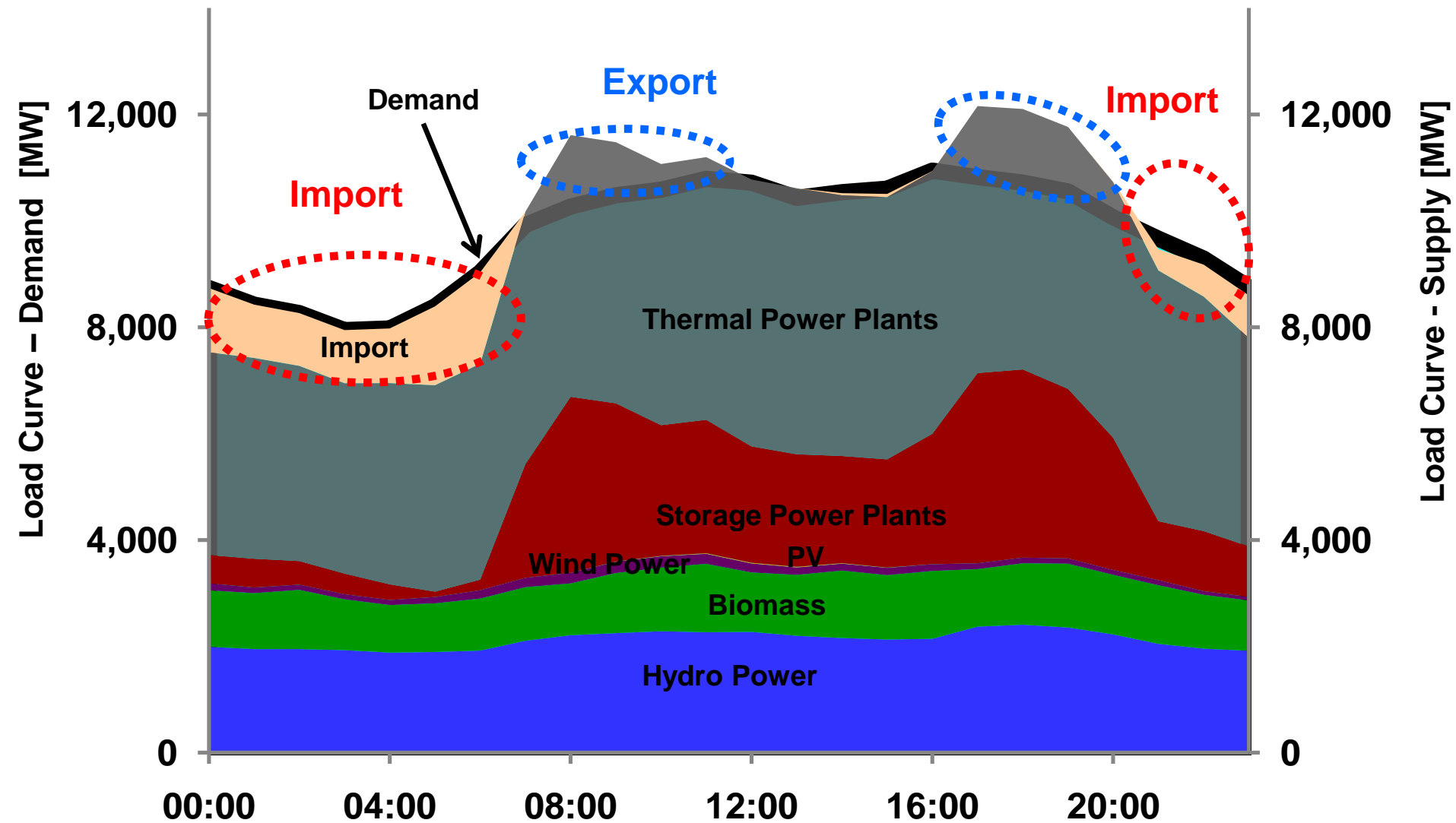


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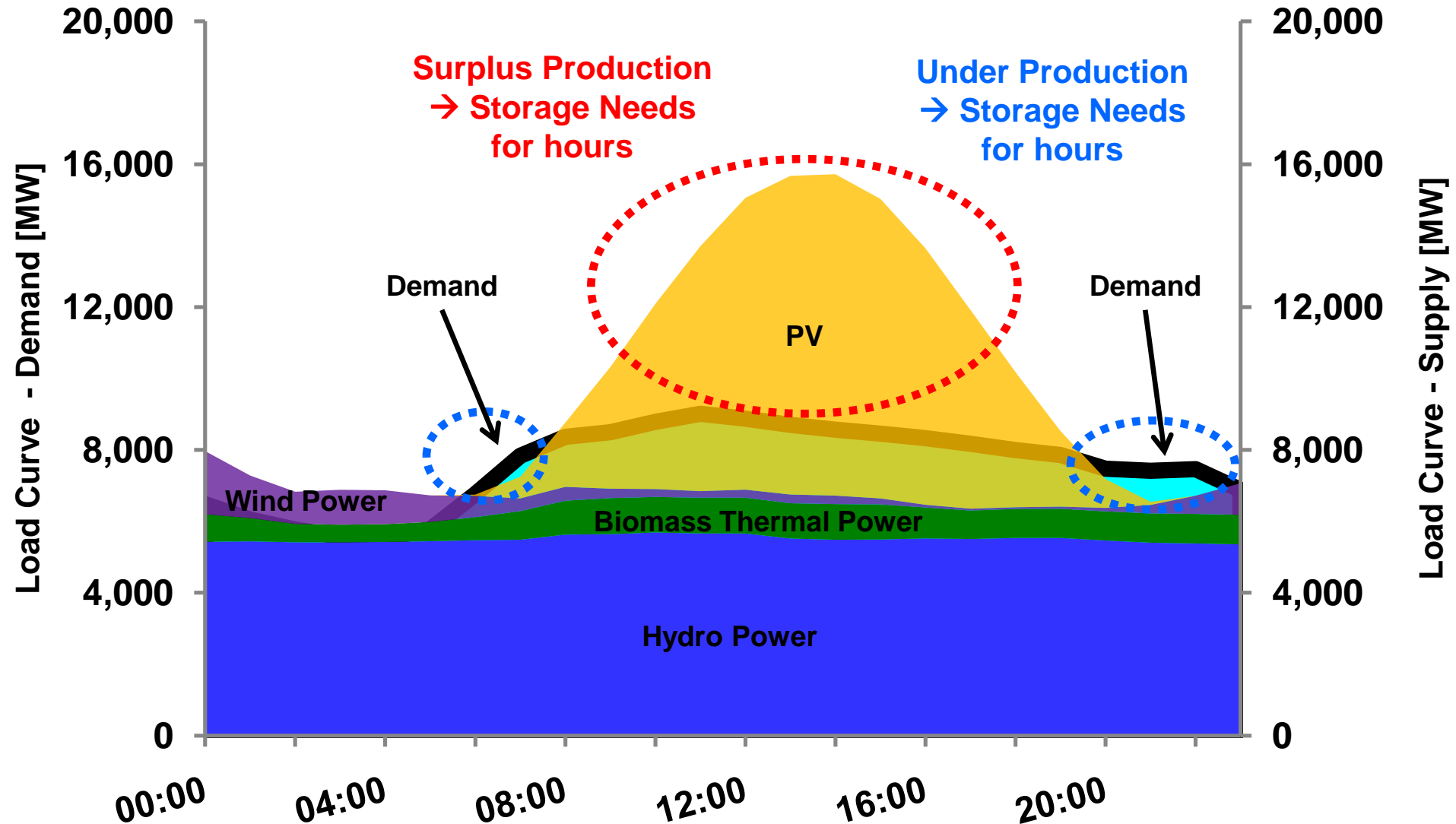
Example - Electricity Summerday 2009



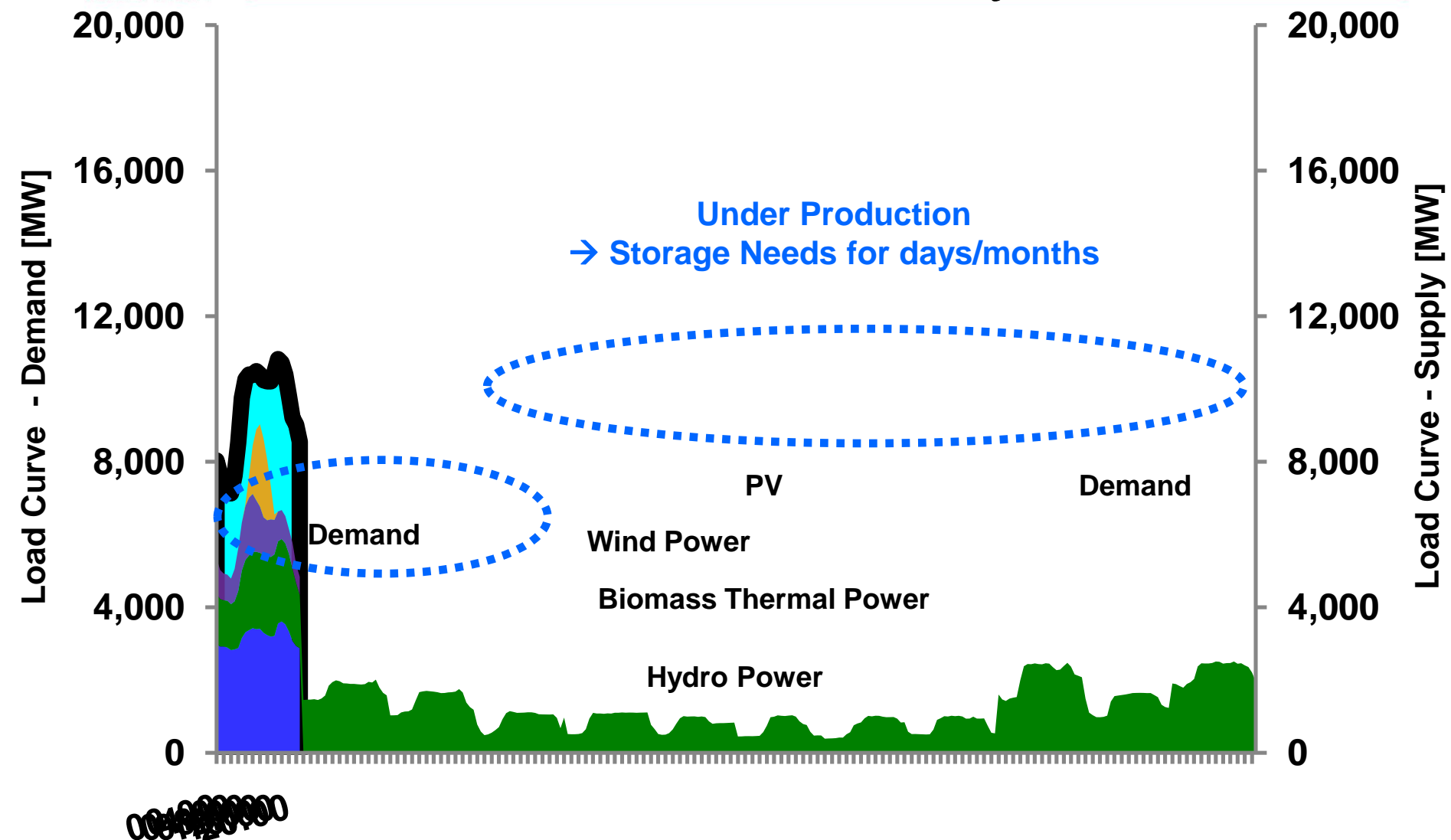
Example - Electricity Winterday 2009



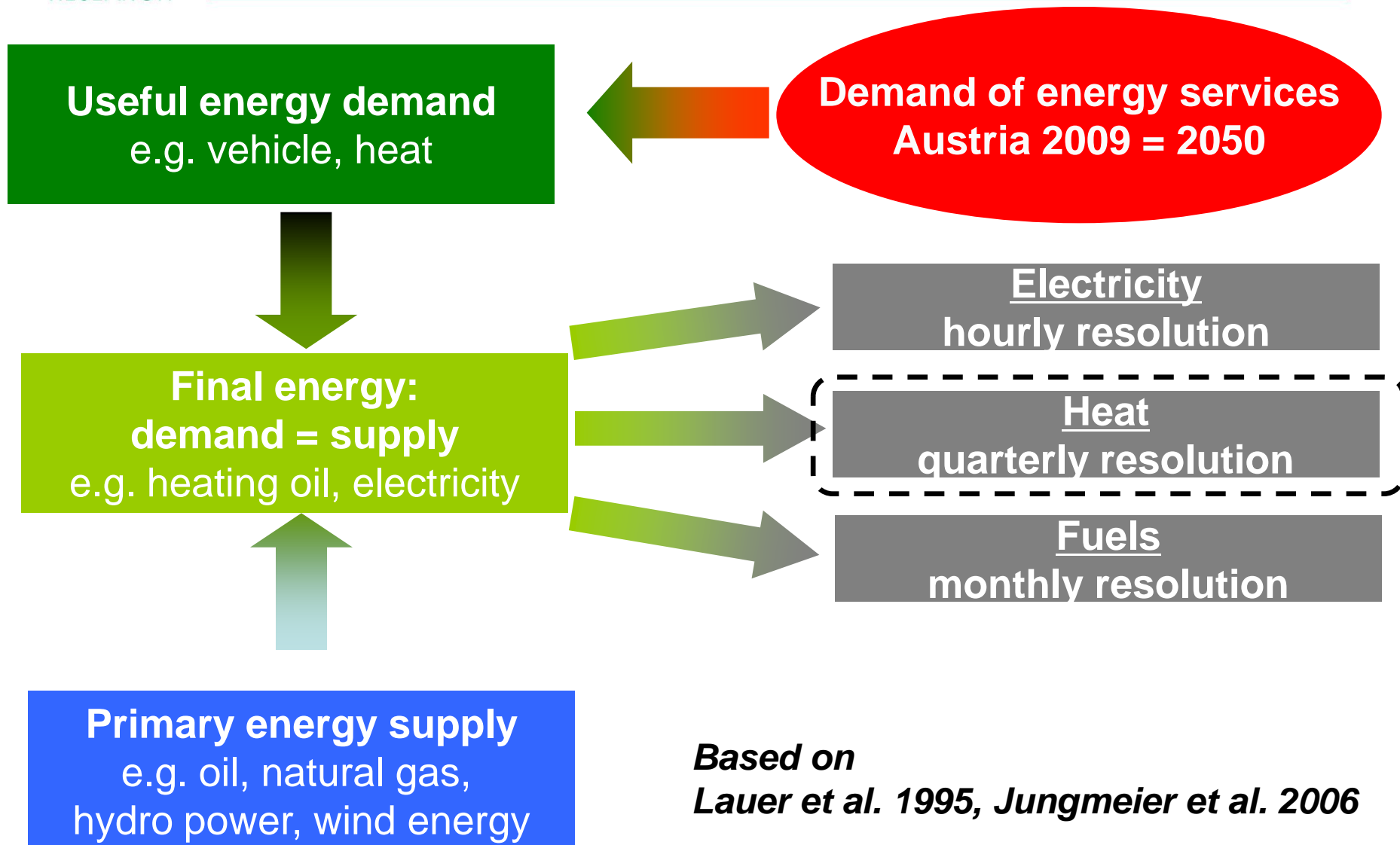
Example „Scenario 2050: 100 % RES“ - Electricity Summerday 2050



Example – „Scenario 2050: 100 % RES“ – Electricity Winter 2050

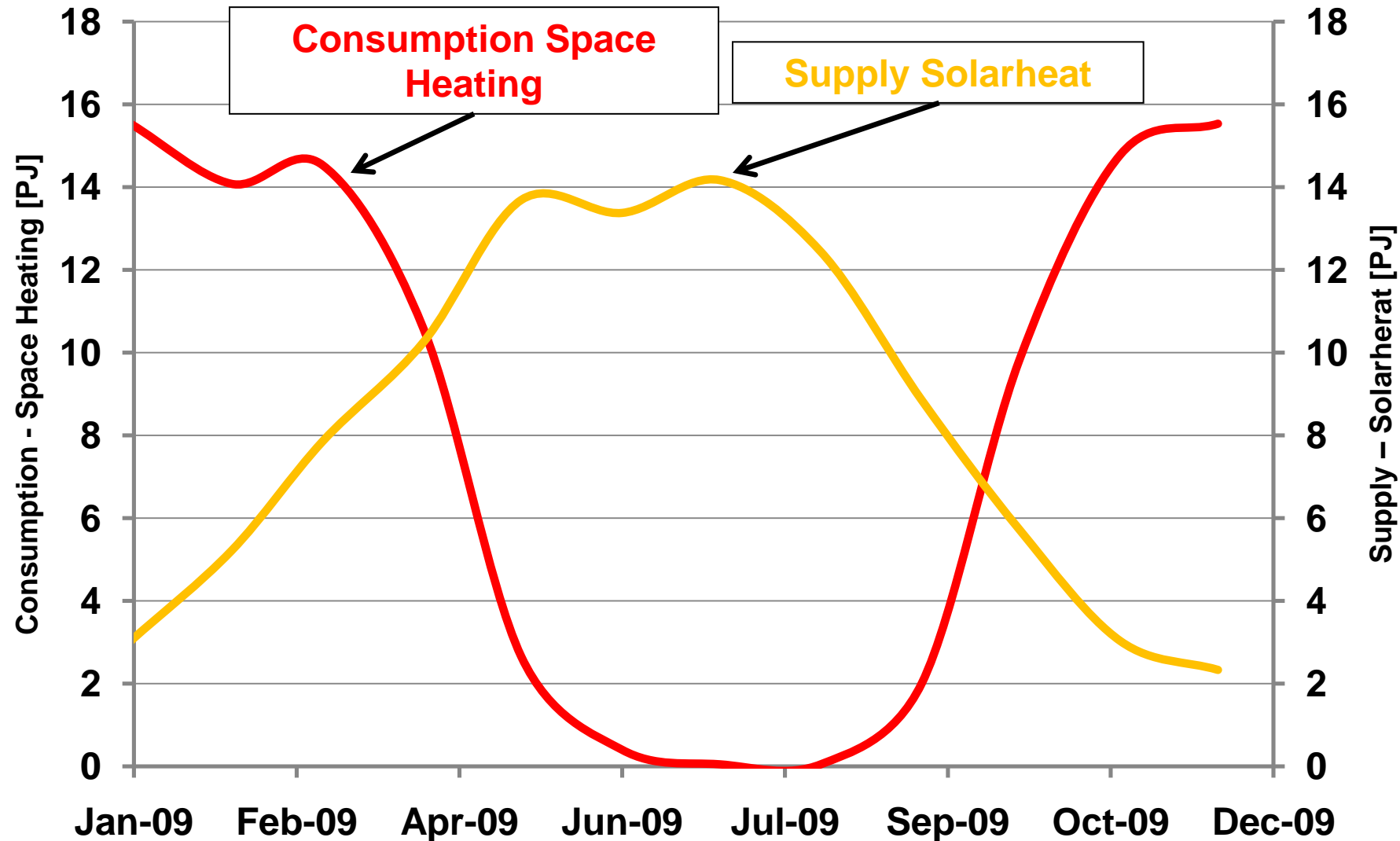


Modelling Energy System Austria & Storage Demand

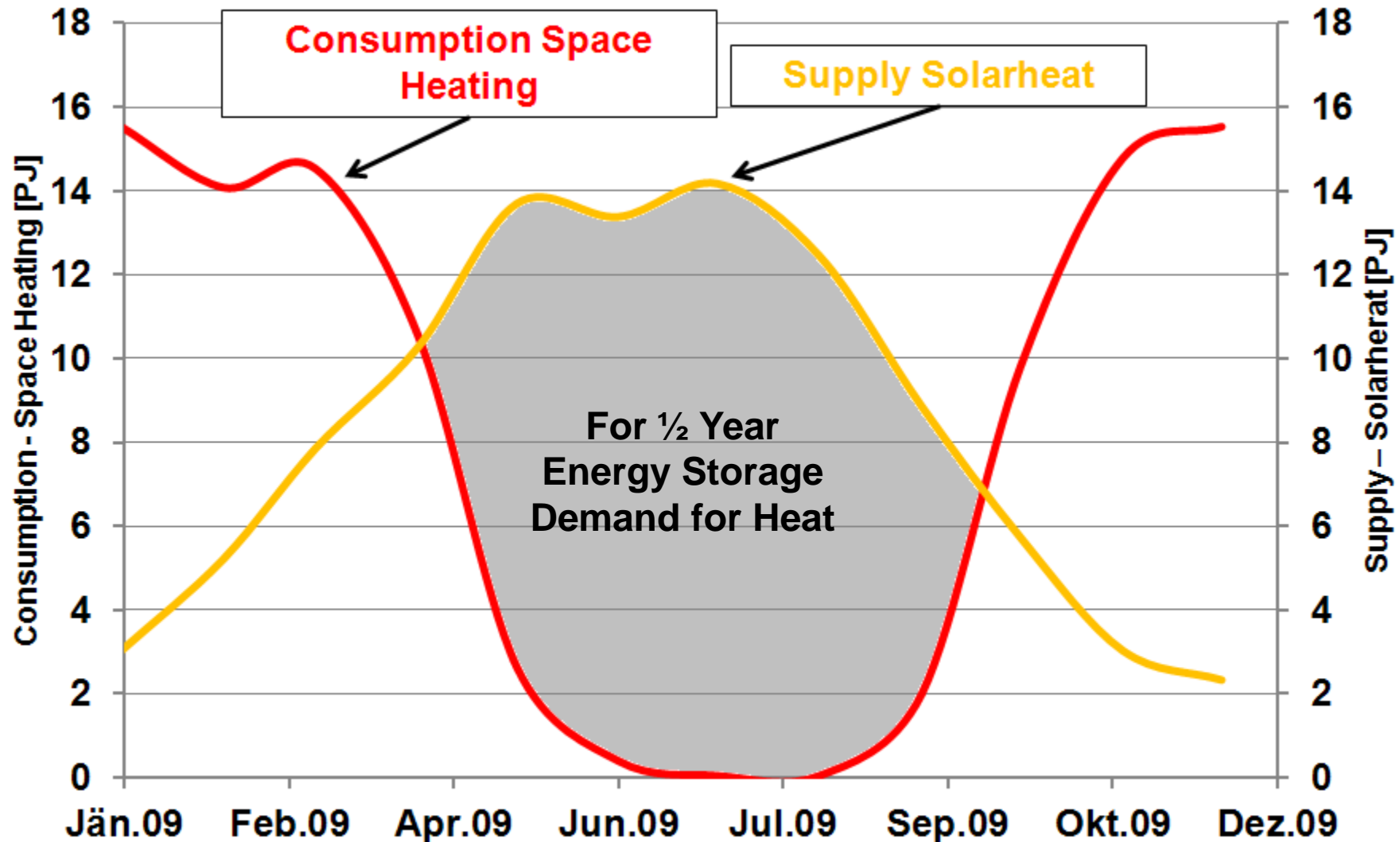


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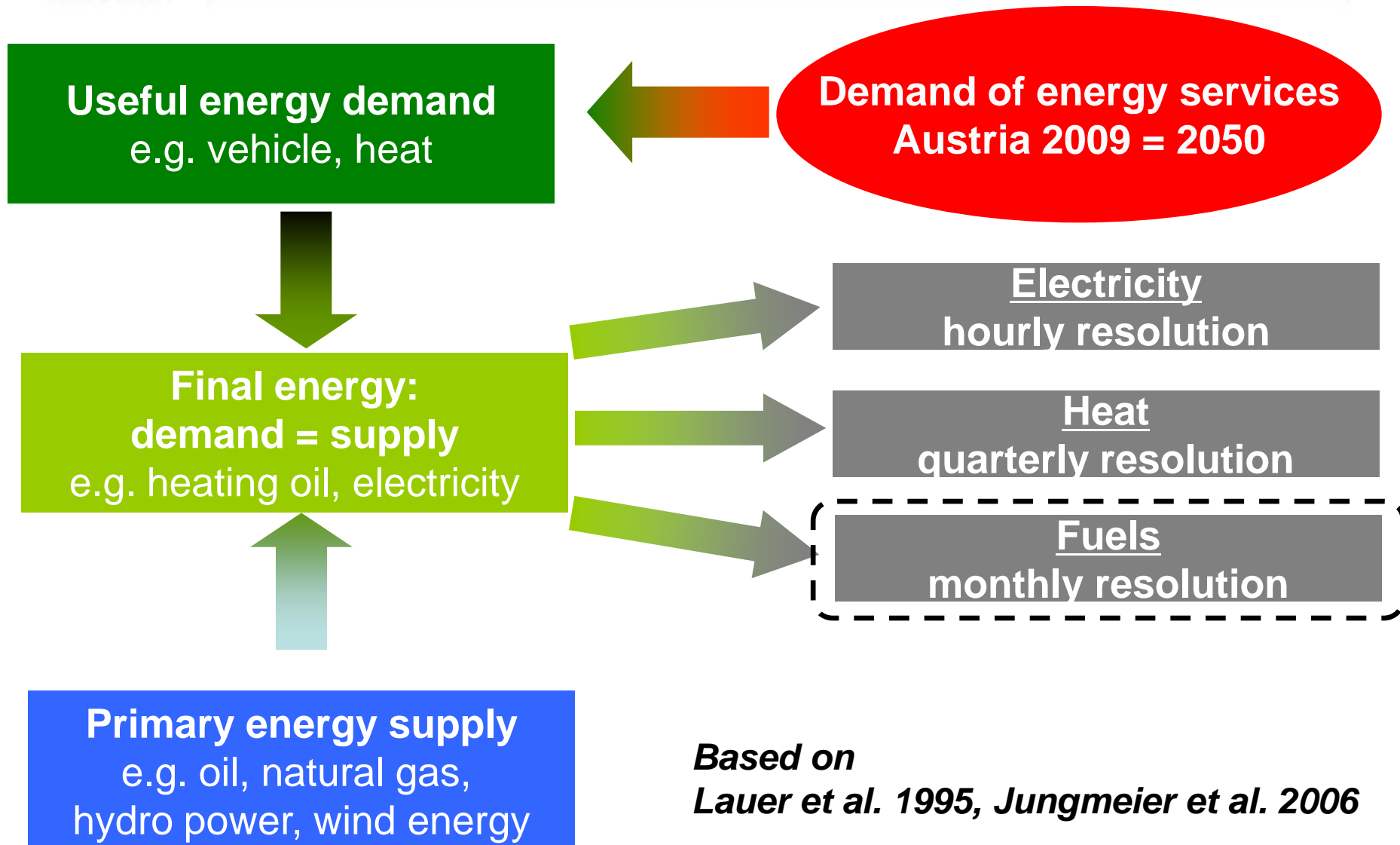
Modelling Heat Energy Storage Demand – Solarheat I



Modelling Heat Energy Storage Demand – Solarheat II

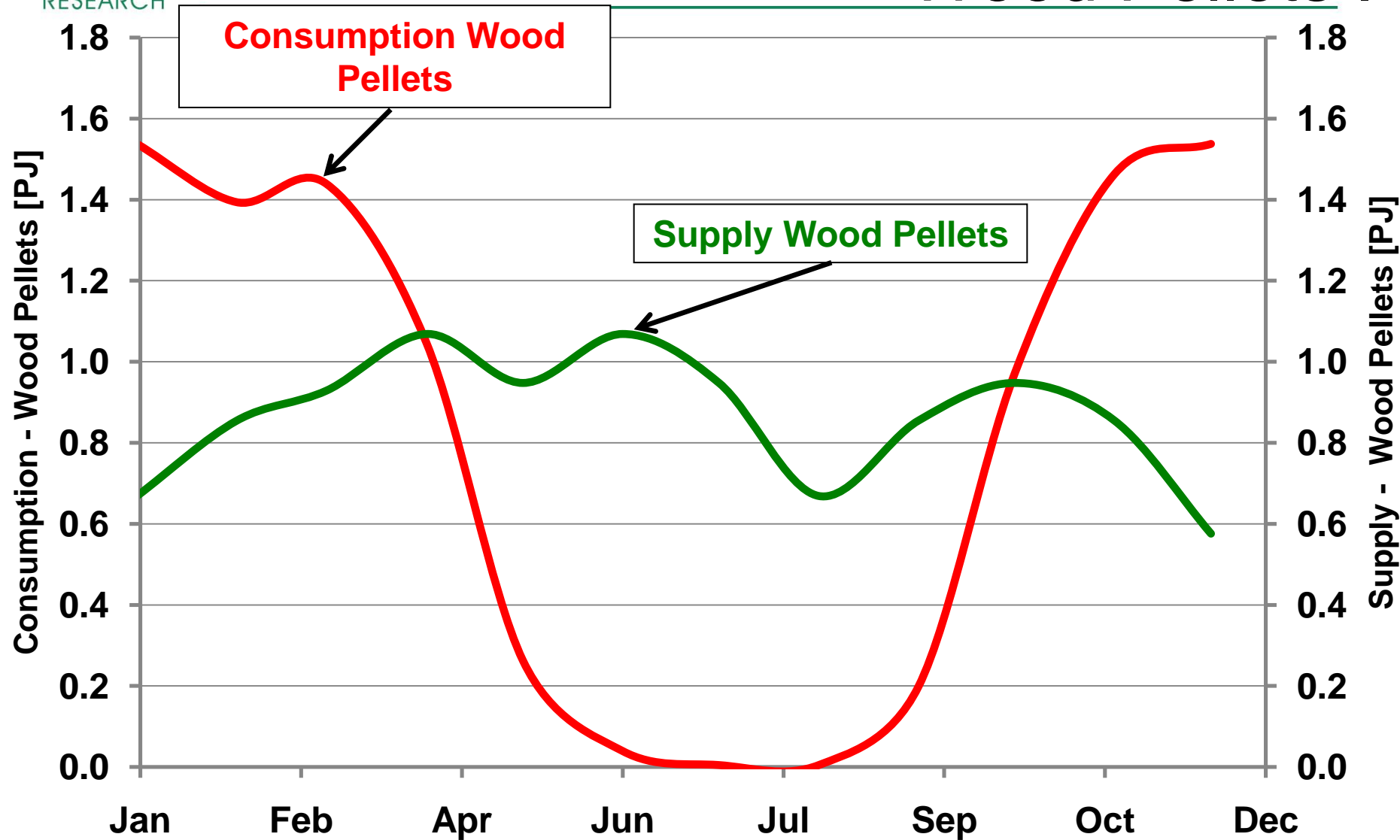


Modelling Energy System Austria & Storage Demand

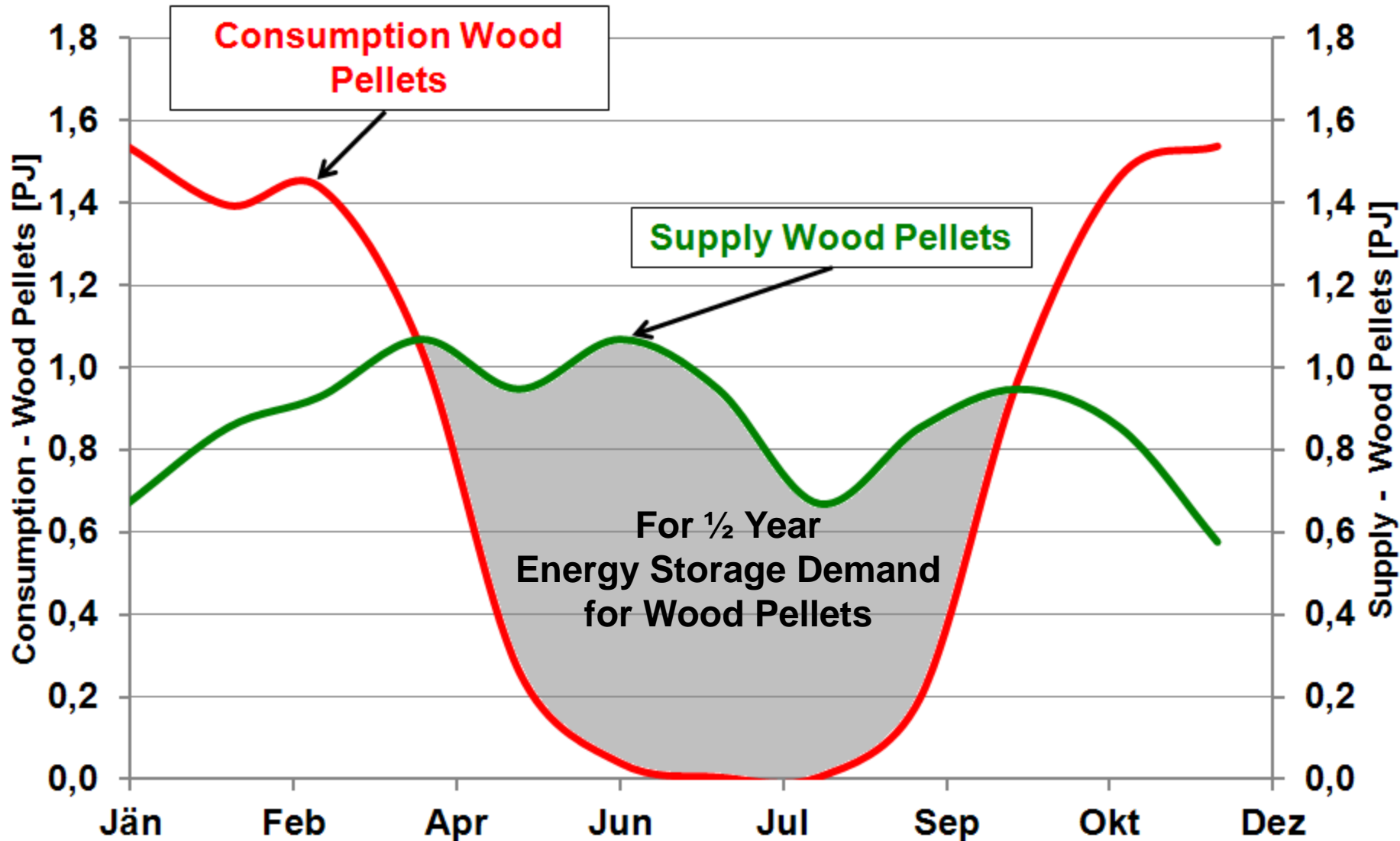


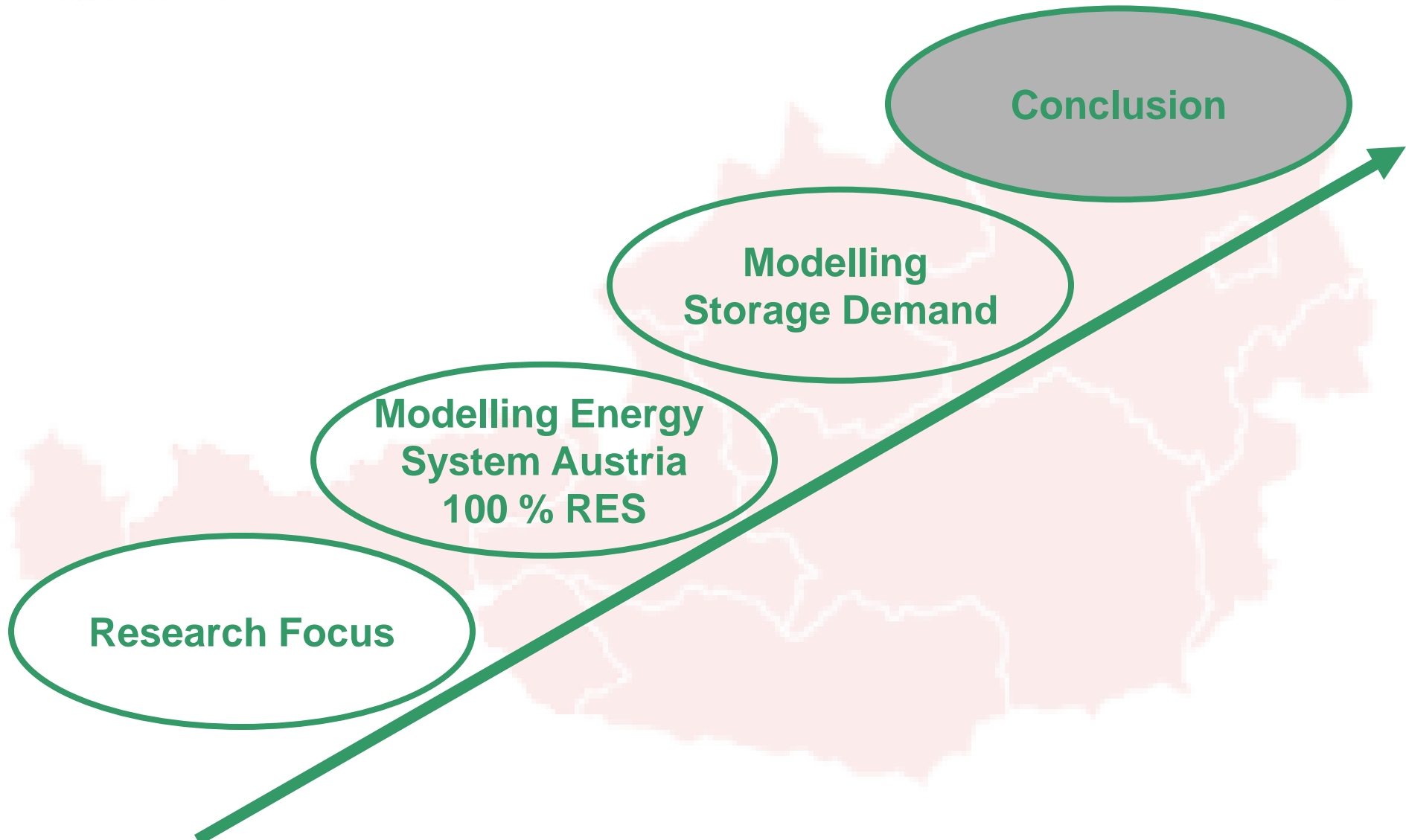
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Modelling Fuel Energy Storage Demand - Wood Pellets I

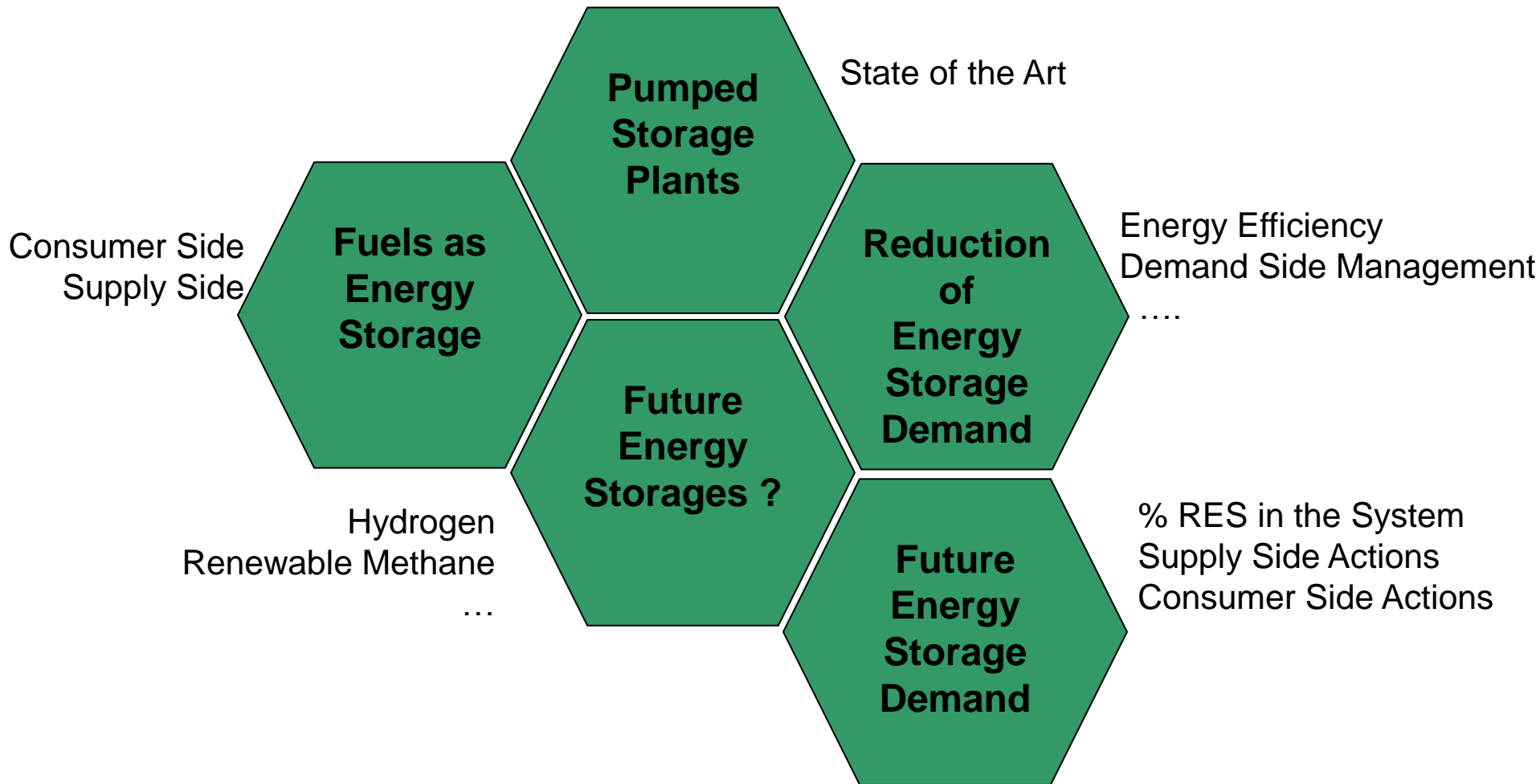


Modelling Fuel Energy Storage Demand - Wood Pellets II





Conclusion



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**Thank you for your kind attention !
Time for Questions !**

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