Modelling Smart Energy Systems in Different Energy System Analysis Tools
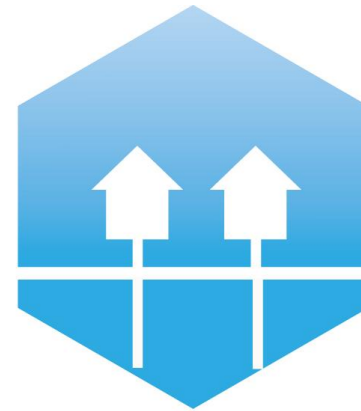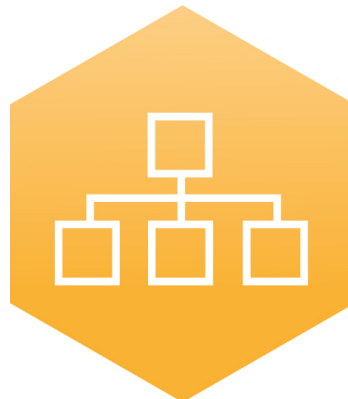
Jakob Zinck Thellufsen, PhD Aalborg University

The Smart Energy System

Towards 100 % Renewable Energy

Integration of the energy sectors
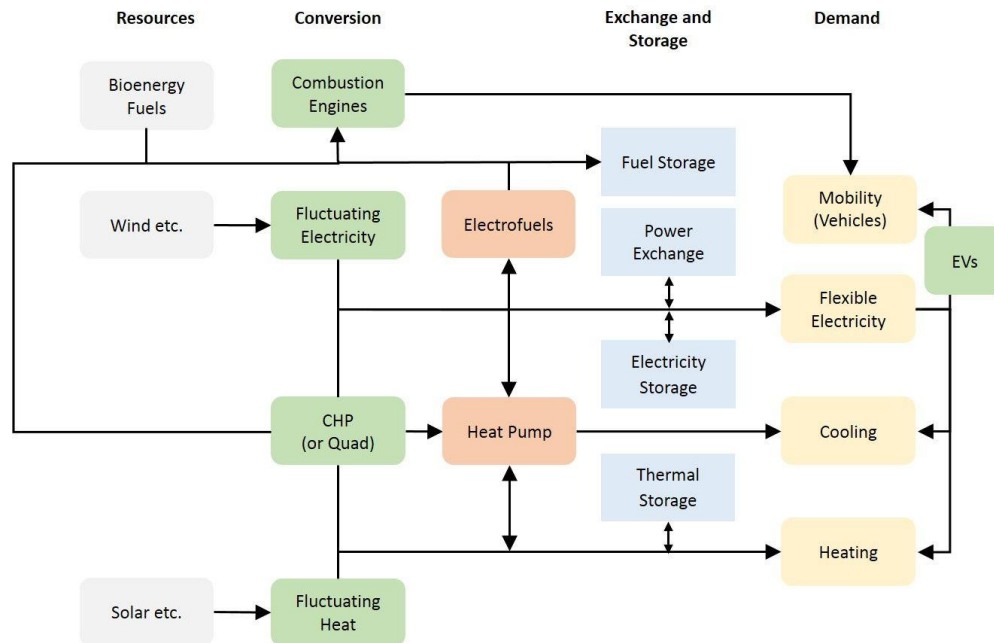
www.energyplan.eu

Modelling Smart Energy Systems

Simulations required to test the benefits.

Requirements for simulations
- Model on hourly level
- Model all sectors in the energy system
- Being able to include the necessary technologies

EnergyPLAN and Sifre

EnergyPLAN and Sifre

EnergyPLAN

- Analytically programmed
- Used before for Smart Energy Systems

Sifre

- Linear optimisation
- Currently mostly used internally in Energinet.dk

Comparing the two tools

Fuel consumption

Production of electricity and district heating

VRES and Demands must be equal
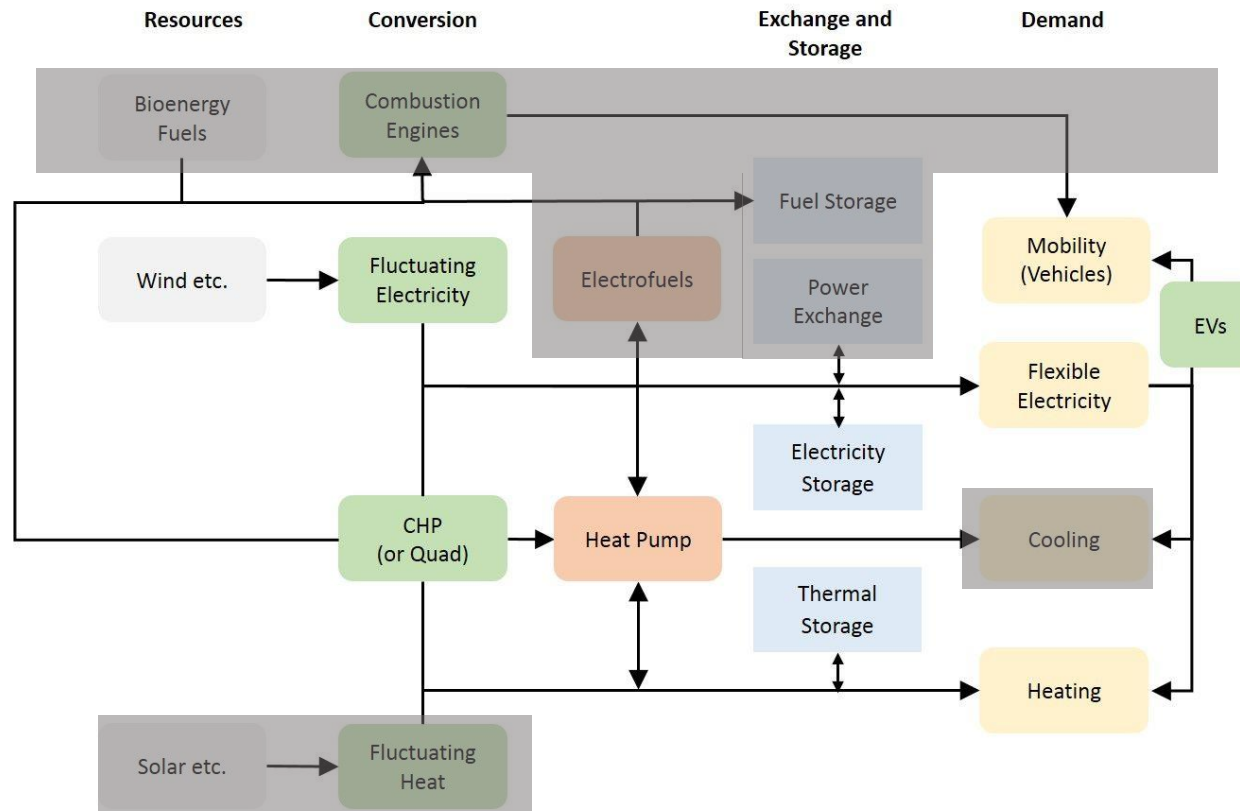
Case: A simplified IDA 2050 plan

The IDA 2050 Energy Vision for Denmark

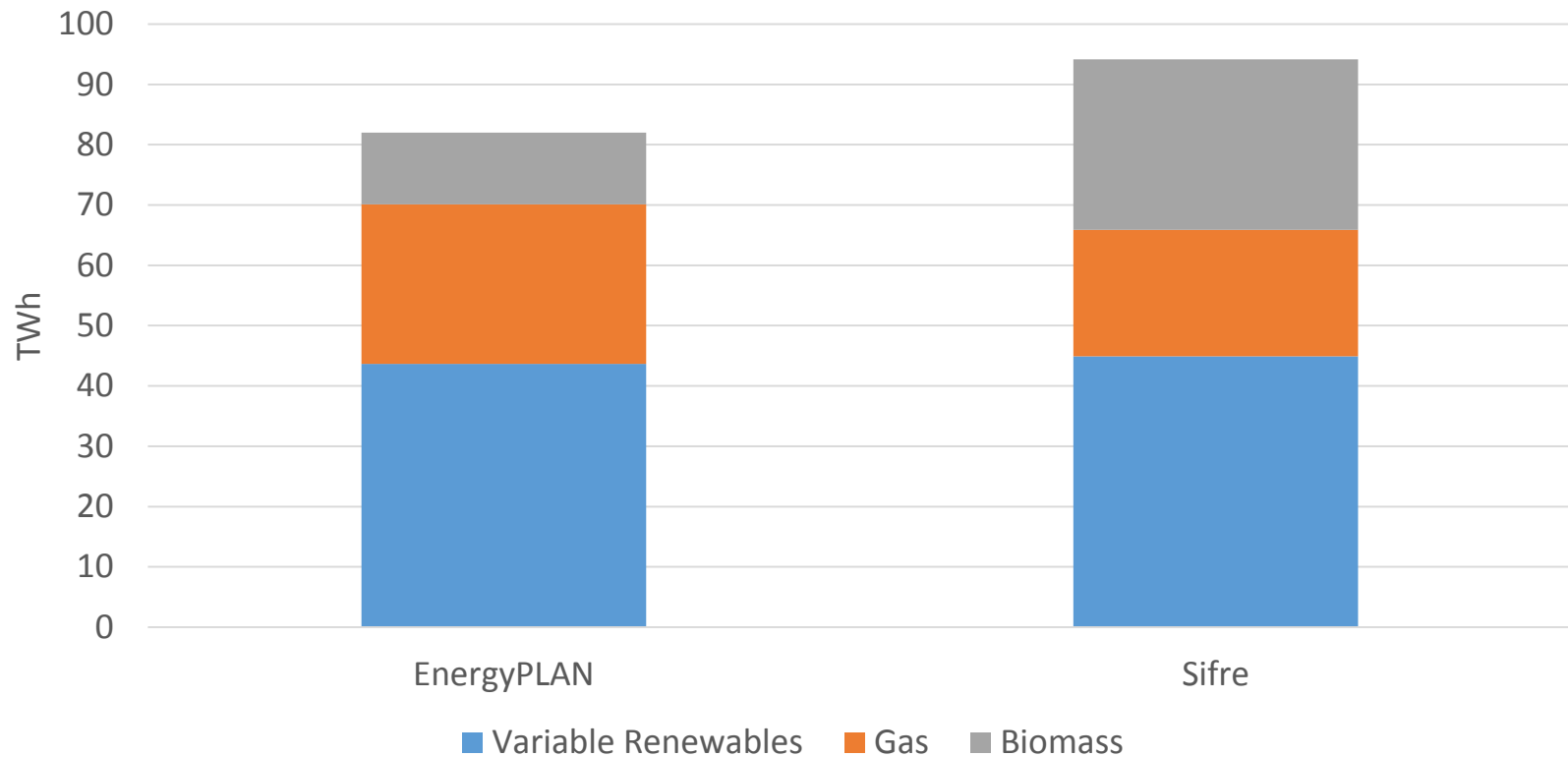Removed the Gasification and Synthetic Fuels
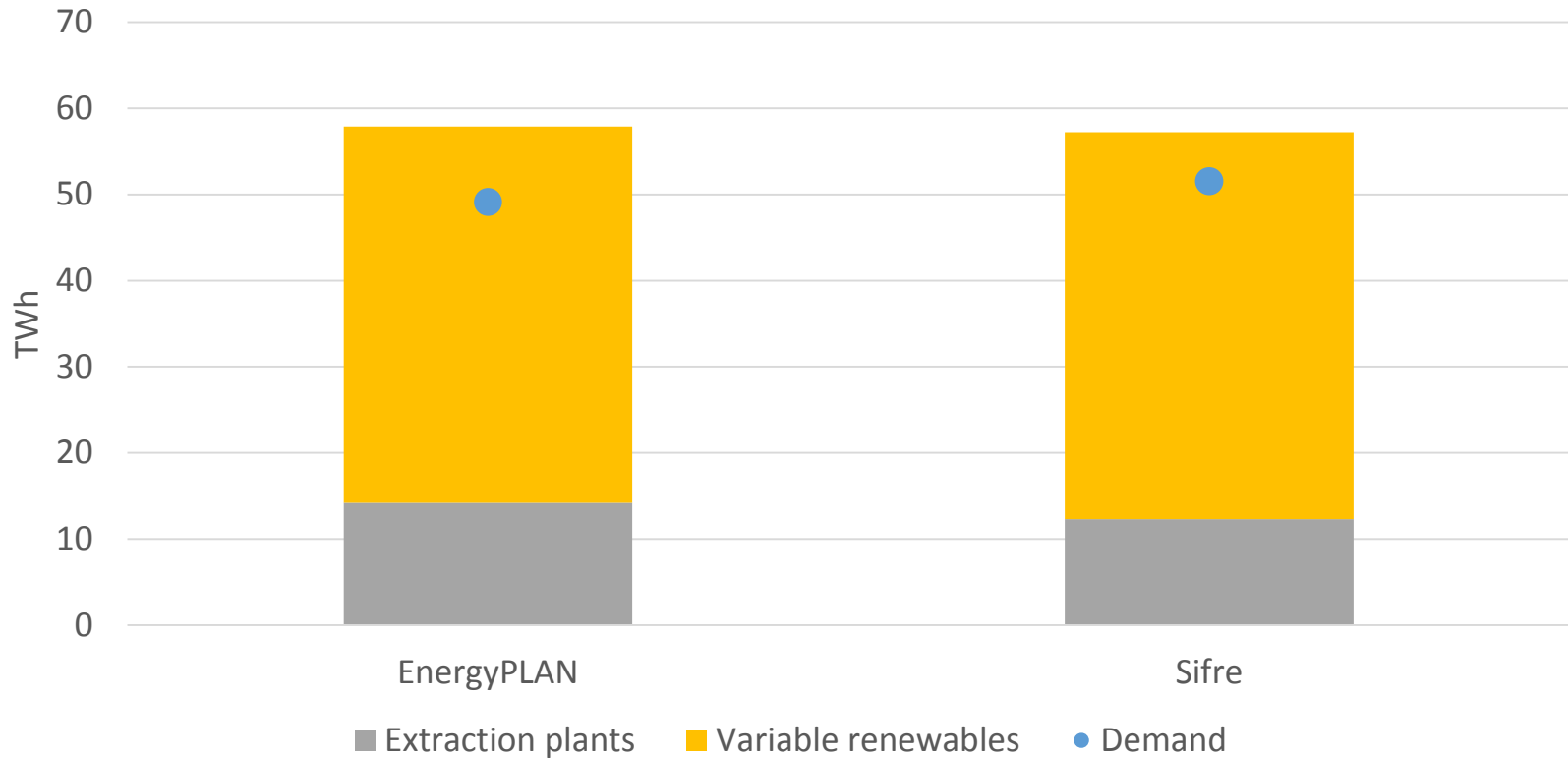
Removed the Industrial Part
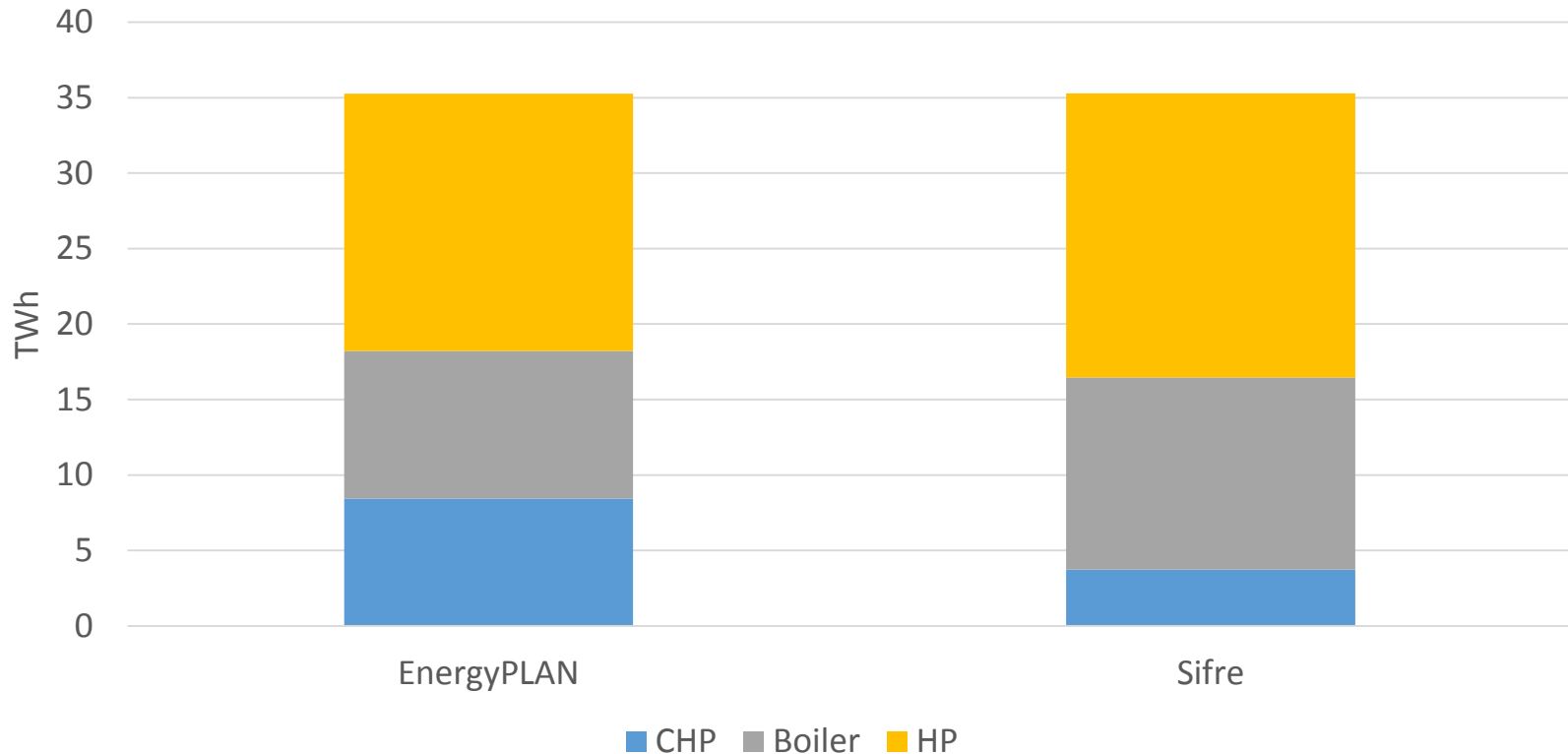
Simplified IDA 2050 Plan

Fuel Consumption

Electricity

District Heating

Conclusion

Equal renewable production

CHP power plants operate differently

More storage on electric vehicles in Sifre

Not yet a full Smart Energy System;
needs to be elaborated

Thank you!