

ENERGYPLAN AND THE MULTIPLE EXECUTION TOOL

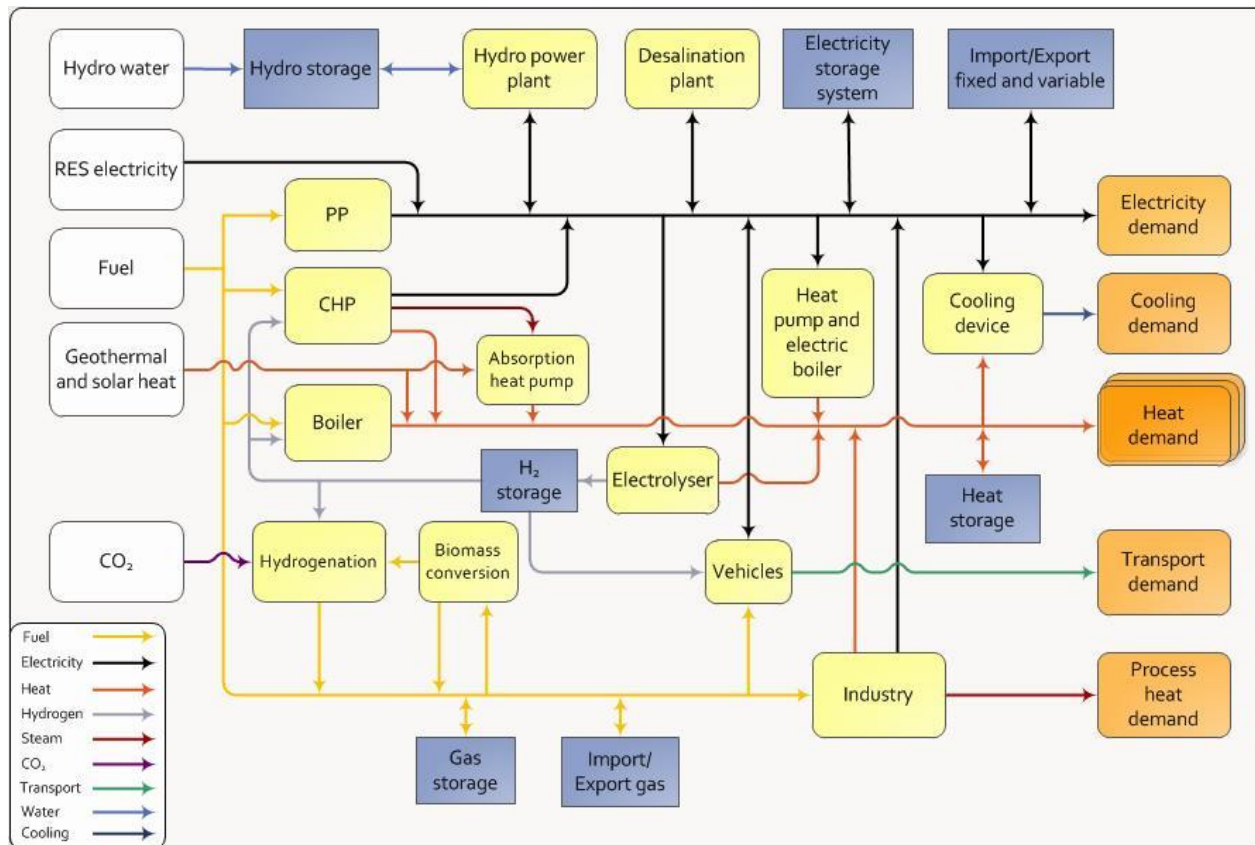
PhD/PostDoc Seminar
26/10/15
Jakob Zinck Thellufsen

OUTLINE

EnergyPLAN as an energy system analysis tool

My work in the PhD on a multiple execution tool to EnergyPLAN

ENERGYPLAN



ENERGYPLAN

Analytically programmed simulation model

- Hourly simulation
- Deterministic model -> Same inputs results in same outputs

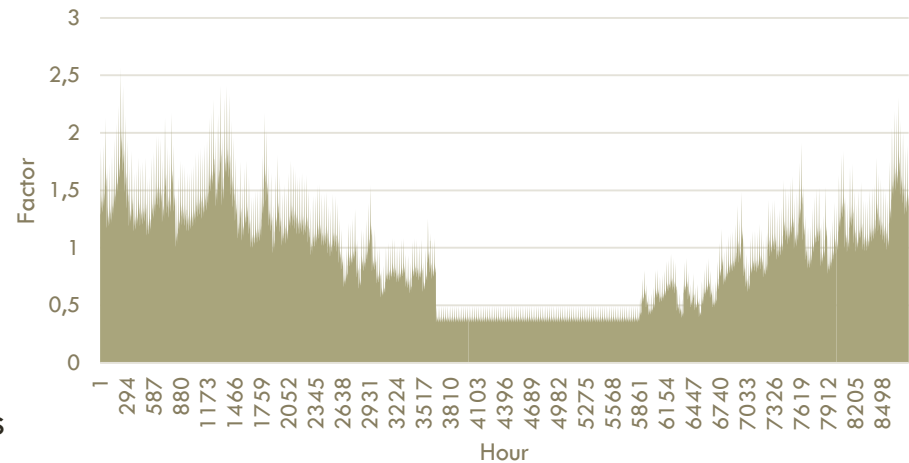
Inputs

- Demands
- Capacities
- Efficiencies
- Distribution files

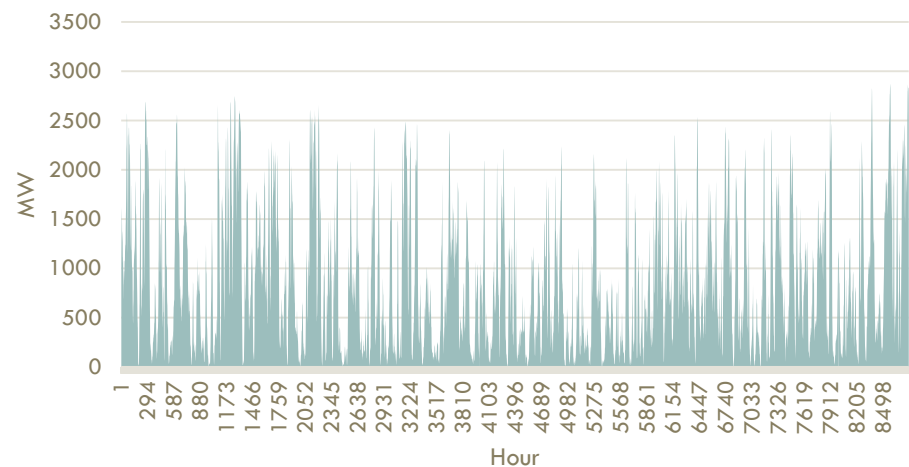
Outputs

- Costs
- CO₂ emissions
- Fuel consumption

Distribution of heat demand



Wind distribution



TWO MAIN SIMULATION MODES

Technical simulation

- Choose most fuel efficient technology each hour that fulfills demand
- Reduces fuel use
 - Avoid Power plant and boiler production
- Does not take costs into account when choosing plants
- Calculate total economic costs

Economic simulation

- Chooses based on lowest marginal cost
- Simulates the system based on that

MULTIPLE EXECUTION TOOL

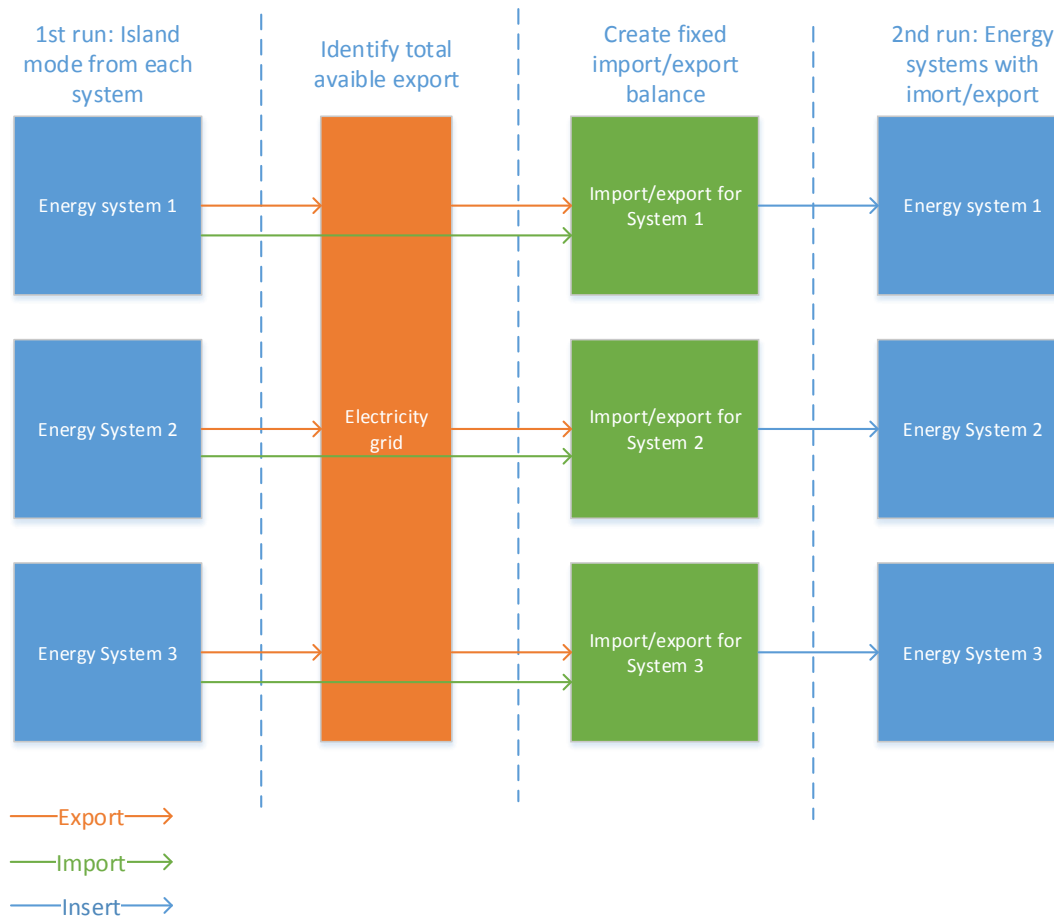
Add on to EnergyPLAN

Uses outputs from EnergyPLAN to link multiple EnergyPLAN analyses

- Import
 - Lack of production
 - Power plant production
 - Available storage
- Export
 - Over production

Identifies situations with overlaps between import demand and available export

MULTIPLE EXECUTION TOOL



CASES

City in nations

- Copenhagen and Denmark

Nations as regions

- Denmark as the Five Regions

Continents as countries

- EU as 28 member states