2050

Heat Roadmap Europe

A low-carbon heating and cooling strategy

A method for linking TIMES and EnergyPLAN energy system models

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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 695989.

Agenda

- Background
- Aim: Combining strengths of different models
- Work Process

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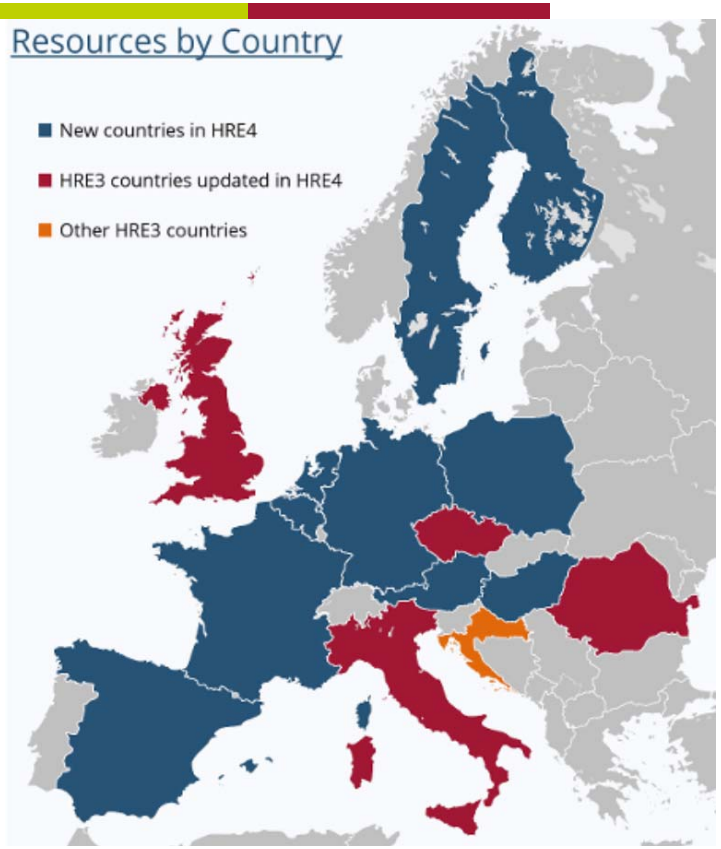
Heat Roadmap Europe

- Three preceeding projects
  - Increasing level of details
- Heating and cooling in Europe
- Current project (HRE4):
  - 14 member states (90% heat demand)
  - Scenarios for 2050
  - 24 contributing partner organisations



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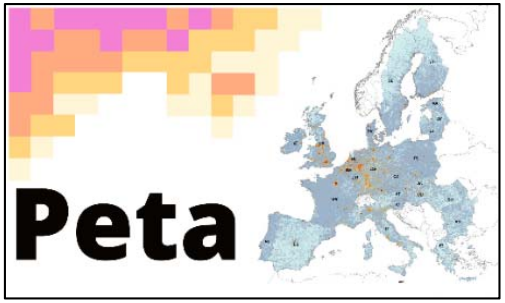
Combining the Strengths of Different Energy Models



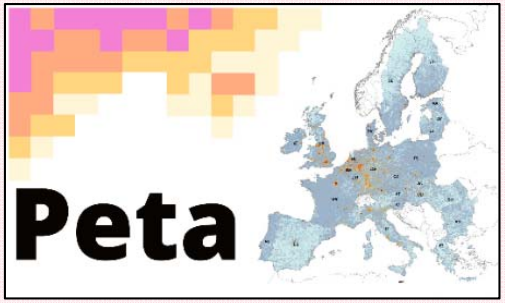
FORECAST
FORecasting Energy Consumption Analysis and Simulation Tool

Energy PLAN
Advanced energy system analysis computer model

Combining the Strengths of Different Energy Models

Heating & Cooling
(Creating Data)

Energy System
(Creating Scenarios)



FORECAST
FORecasting Energy Consumption Analysis and Simulation Tool

The JRC-EU-TIMES model

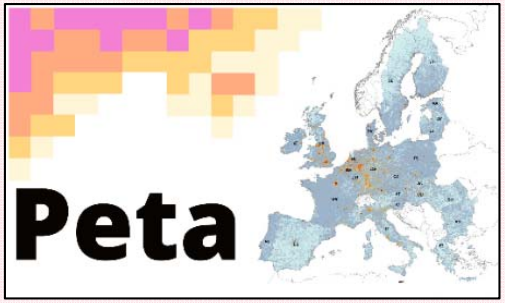
Energy PLAN
Advanced energy system analysis computer model

Combining the Strengths of Different Energy Models

Heating & Cooling (Creating Data)

Energy System (Creating Scenarios)

Location of Heating & Cooling



Profile of Heating & Cooling

FORECAST
FORecasting Energy Consumption Analysis and Simulation Tool

Energy System Transition

The JRC-EU-TIMES model

Energy System Operation

Energy PLAN
Advanced energy system analysis computer model

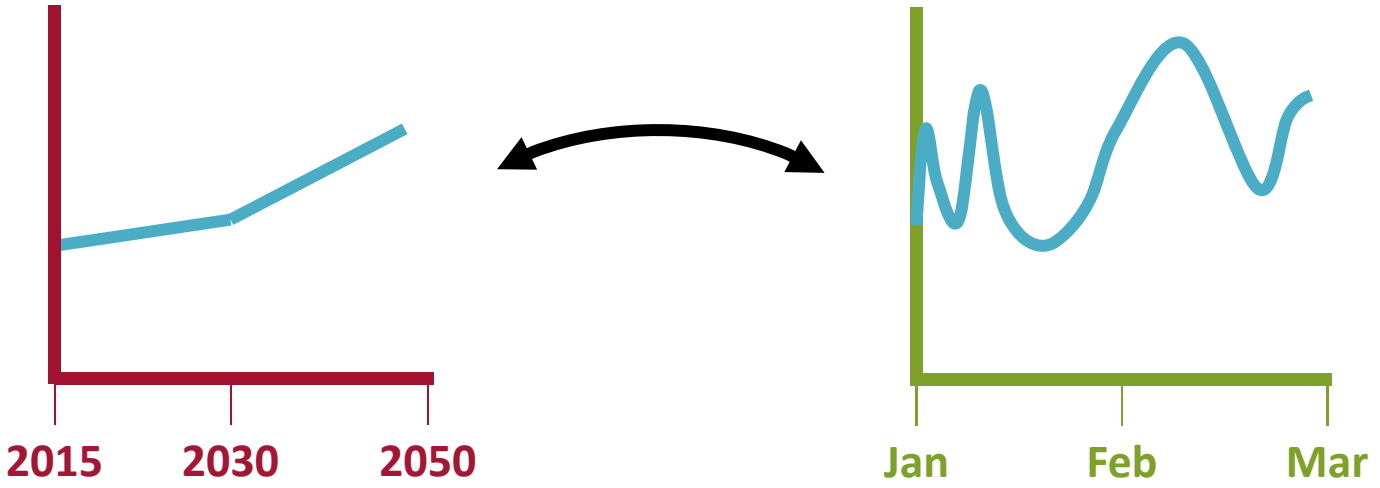
Connecting Energy Models
Using the Strengths of Each One

JRC-EU-TIMES

Tells us what happens between now and 2050

EnergyPLAN

Explains what is going on in each hour of the year



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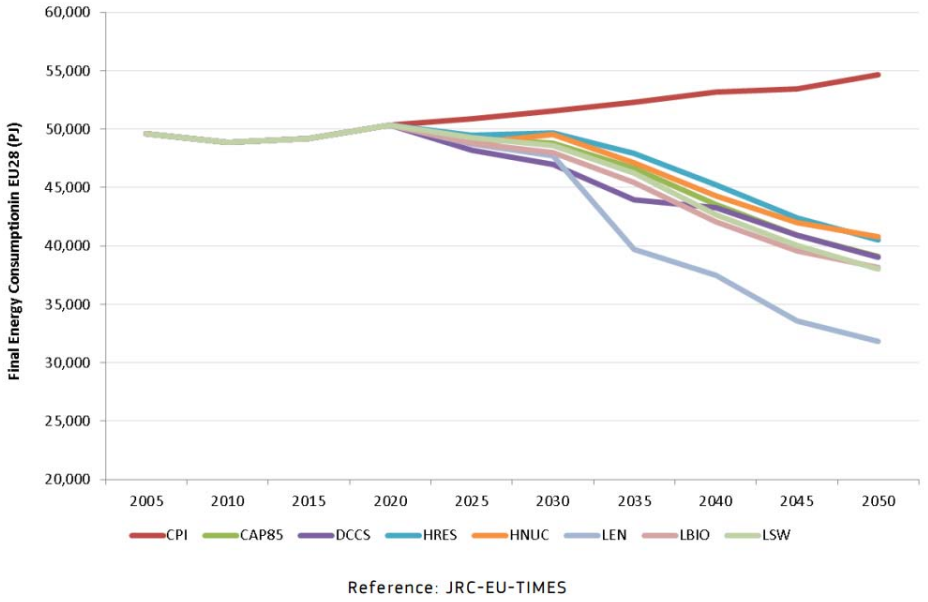
JRC-EU-TIMES
Energy System Transition

- Long-term transition
- Cost optimisation
- EU directives
- EU28 (+3) interconnected



Reference: JRC-EU-TIMES

Figure 21 – Evolution of final energy consumption in EU28 from JRC-EU-TIMES for the studied scenarios (values for 2005 are taken from Eurostat)

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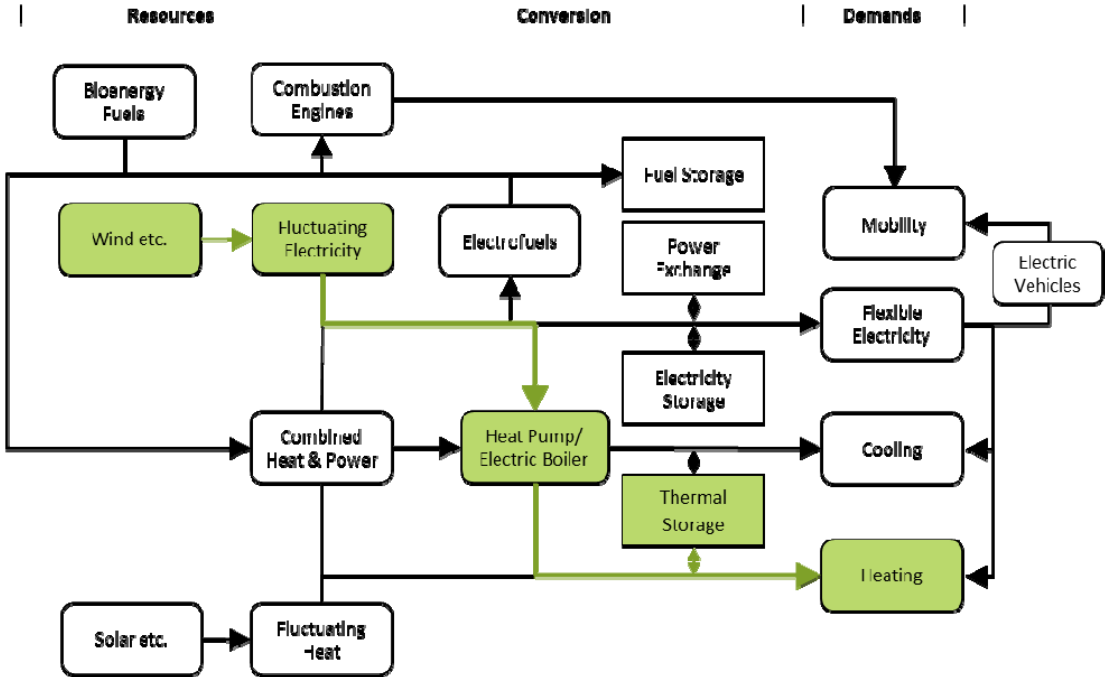
EnergyPLAN - Hourly Operation in a Smart Energy System

- Hourly resolution
- One year operation
- Interaction between sectors
- Detailed system dynamics



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Work Process

Initial alignment

- Terminology
  - Baseline, CHP, industrial excess heat
- Measuring points
  - Final energy, primary energy, losses…

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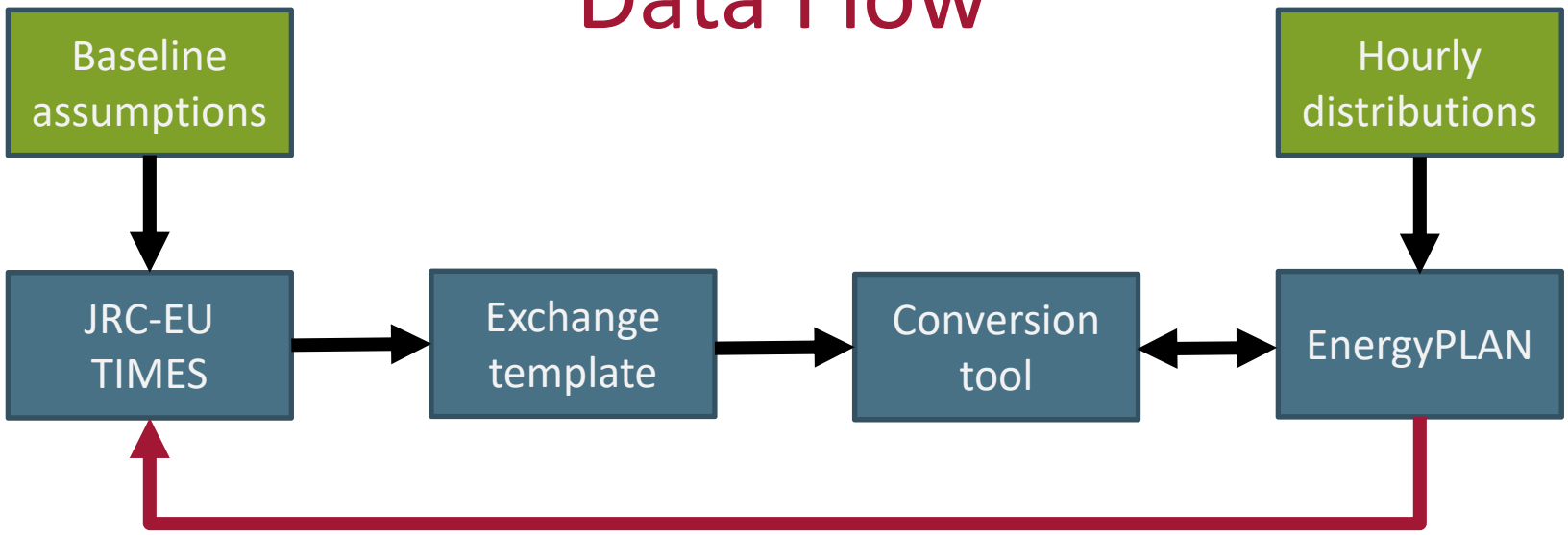
Work Process

Data Flow



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Work Process

1. Develop TIMES baseline model
2. Convert data to EnergyPLAN format
3. Run the model
4. Identify imbalances
5. Implement calibration measures
6. Final validation of model
7. **Evaluate feasibility of this method**

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Future Work

- Baseline scenarios for 14 EU-MS
  - 2015 to 2050
- Development of HRs for 2050
  - Heat savings
  - District heating and cooling
  - Renewable energy

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Heat Roadmap Europe 2050

A low-carbon heating and cooling strategy

Thank you for the attention

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