



2050

Heat Roadmap Europe

A low-carbon heating and cooling strategy



4DH

4th Generation District Heating
Technologies and Systems



Quantifying the impact of district heating, heat pumps and electric vehicles in Italy, Romania and the UK

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Choosing the countries



Italy



United Kingdom



Romania

Same measures for all countries

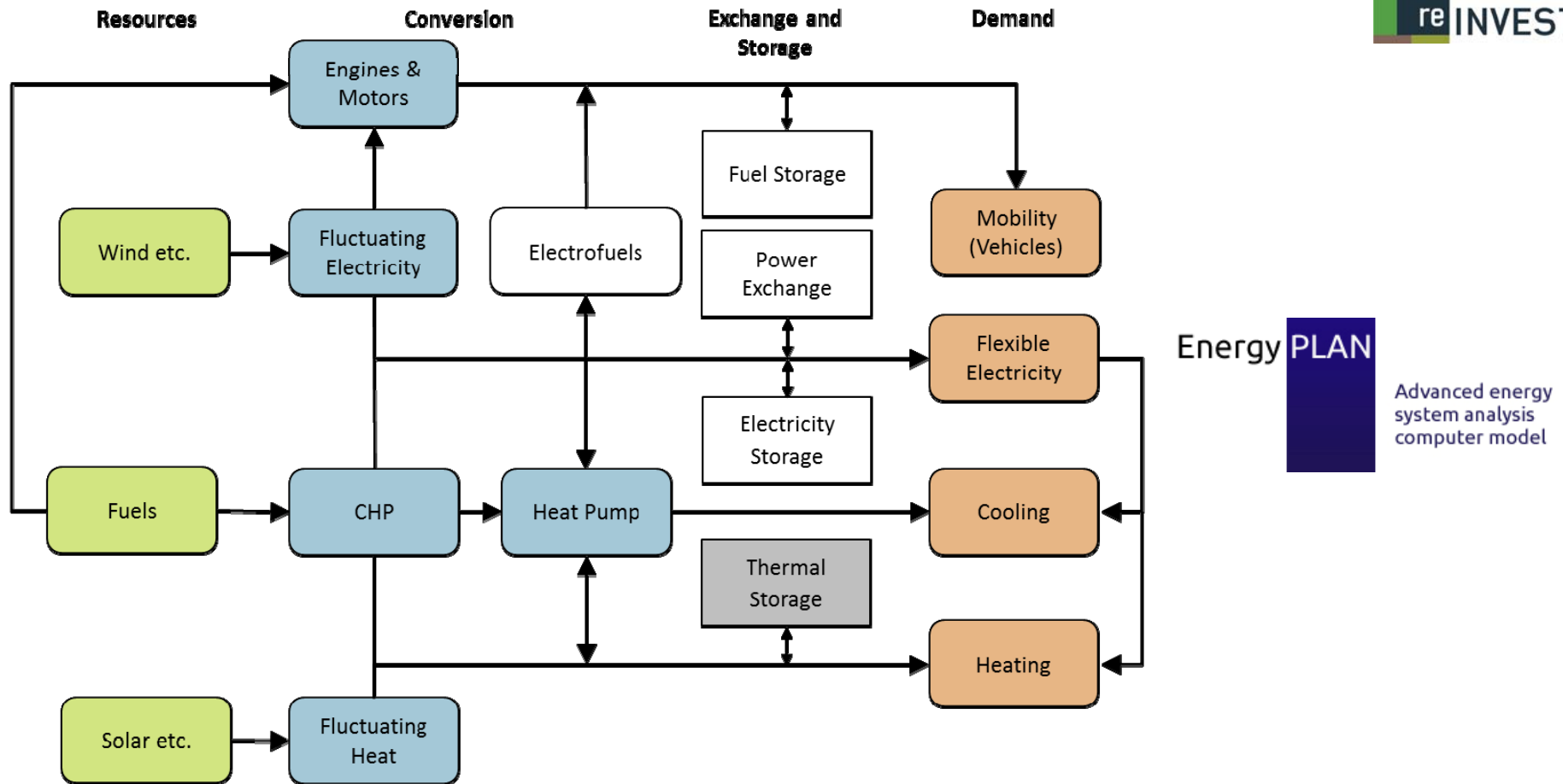


Methods and scenarios



- **Scenario 1 – Business-as-usual 2050**
 - Heat savings are added (30% Italy; 50% Romania; 40% UK)
- **Scenario 2 – District heating**
 - Stratego recommendations (60% Italy; 40% Romania; 70% UK)
 - Large-scale heat pumps
- **Scenario 3 – Individual heat pumps**
 - Cover remaining heat demands
- **Scenario 4 – Electric vehicles**
 - 50% of the transport demand
- **Wind and solar integrated separately in steps of 10% of EU-CPI electricity demand until lowest PES, CO2 emissions and costs are achieved**

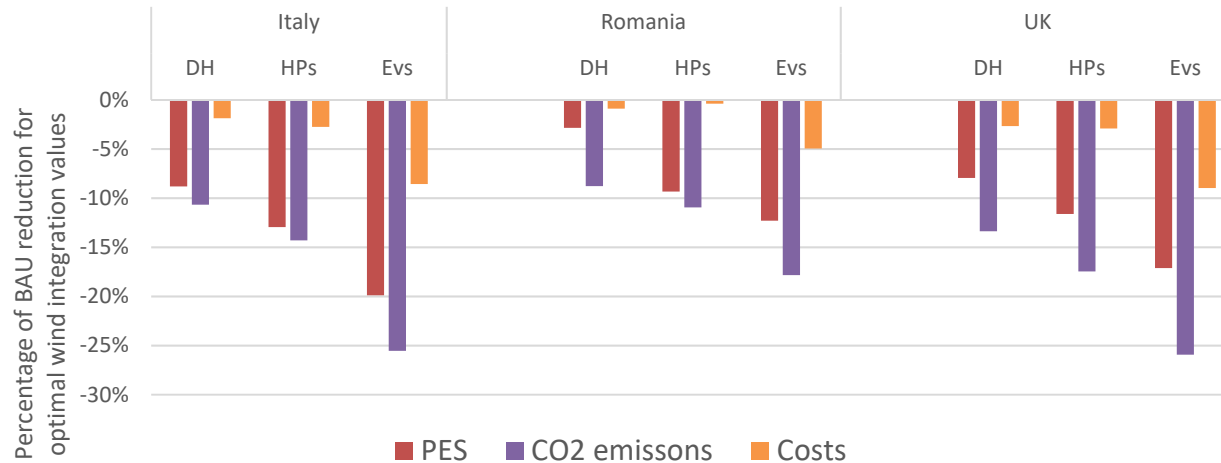
Changes in the energy system



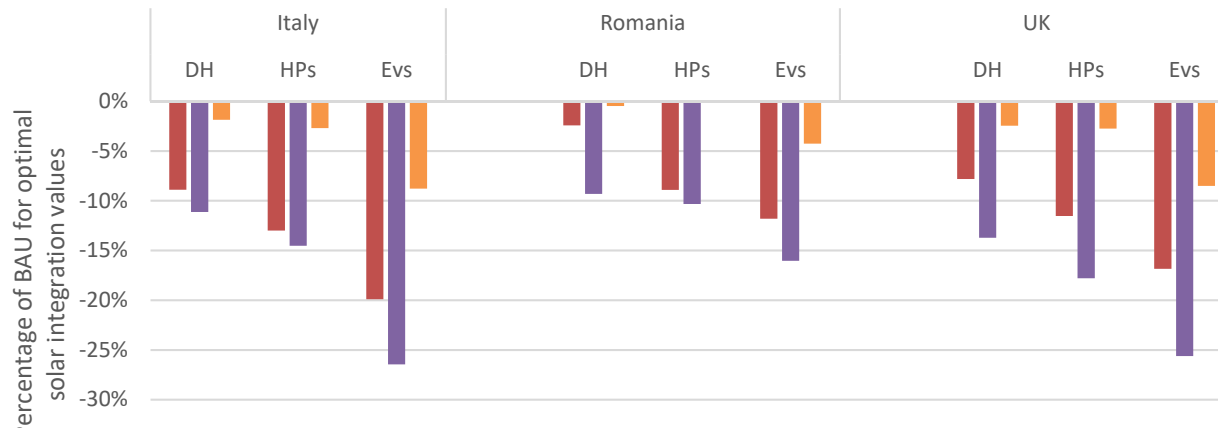
Main results – gains on all metrics



Wind



Solar

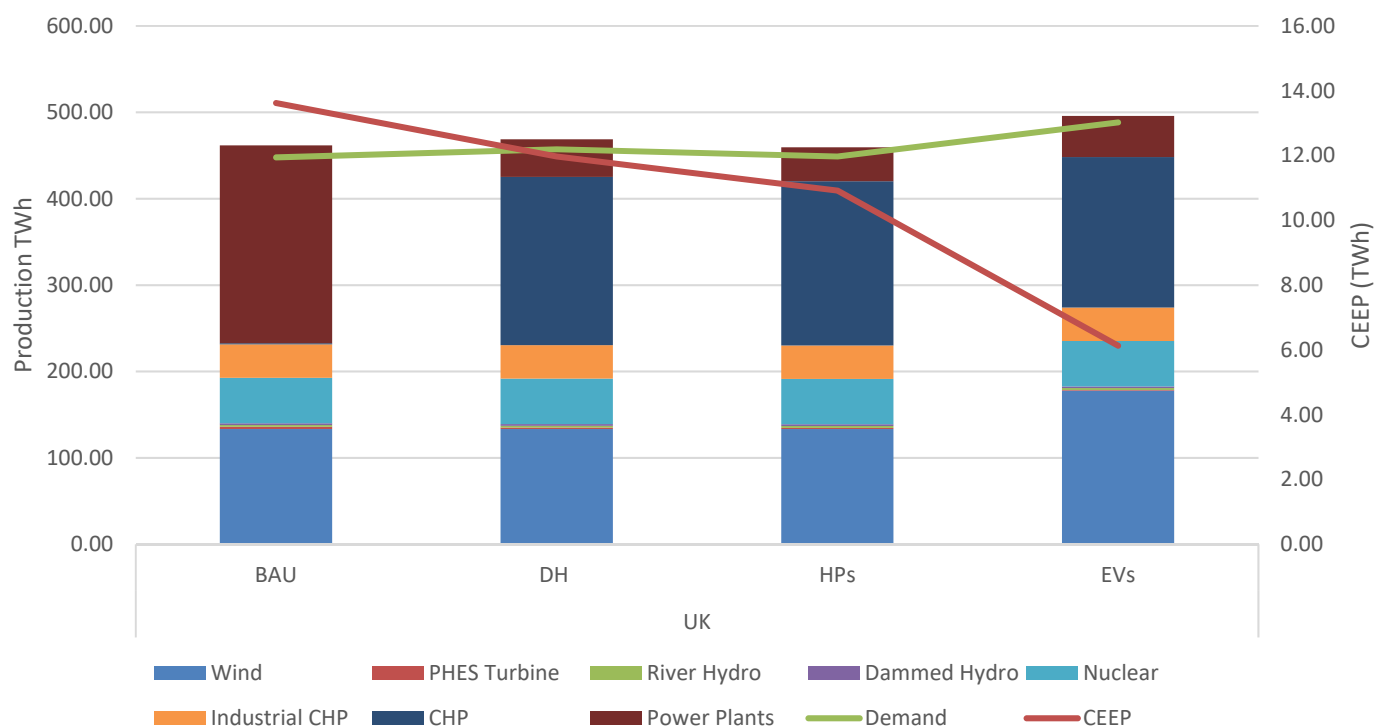


UK – wind integration based on lowest costs



Wind integration (% of EU CPI el. demand)

BAU – 30%
 DH – 30%
 HP – 30%
 EV – 40%

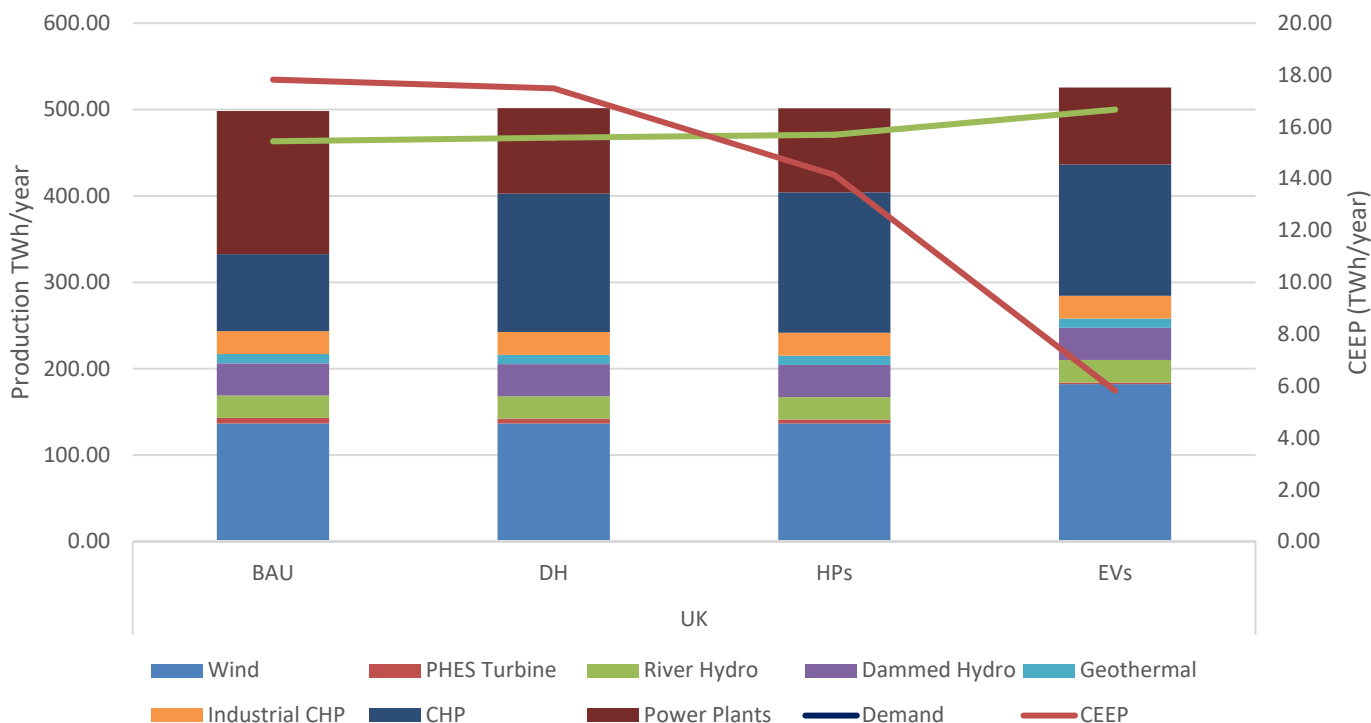


Italy - wind integration based on lowest costs

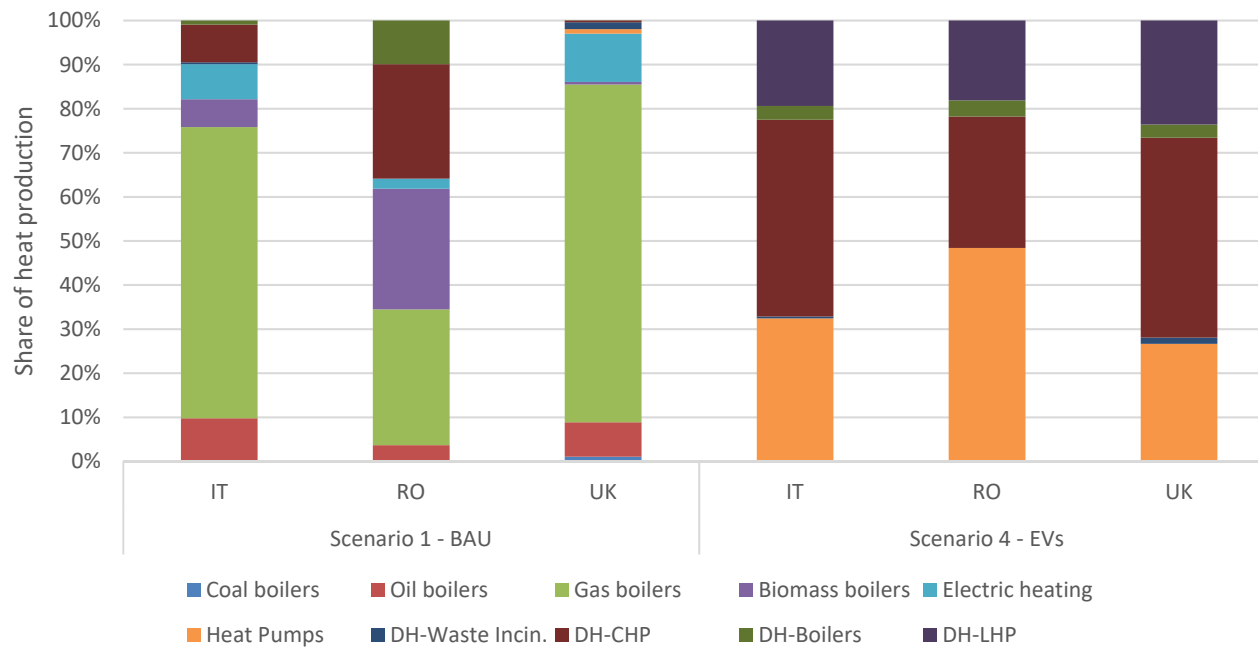


Wind integration (% of EU CPI el. demand)

BAU – 30%
 DH – 30%
 HP – 30%
 EV – 40%



New heat production



Part conclusions



- All measures bring improvements in all countries
- In general, for all countries:
 - DH and HP improve efficiency
 - EVs reduce the costs
 - All measures reduce CO2 emissions

BUT

**The measures do not (or slightly) integrate more
RES compared to BAU**

**Minimum grid regulation share has huge impact
on results**

Italy



- With CHP – PP stabilisation of 30%

Wind	BAU	DH	HP	EV
% of EU-CPI	30%	30%	30%	40%
MW	63.500			84.500
Solar	BAU	DH	HP	EV
% of EU-CPI	30%	30%	30%	40%
MW	75.500			101.000

- With RES stabilisation share of 50%

Wind	BAU	DH	HP	EV
% of EU-CPI	50%	50%	50%	60%
MW	105.500			126.500
Solar	BAU	DH	HP	EV
% of EU-CPI	60%	60%	60%	70%
MW	151.500			176.500



Conclusions so far...



- Current grid regulation measures limit the amount of wind and solar in energy system
- Heat sector improvements do not or slightly increase the RES amount, but considerably improve efficiency
- More RES requires changing how we manage our electricity grids (?)



Thank you!

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