Heat Roadmap Europe 2050 Pre-study 2012

Decarbonising the European heating and cooling markets

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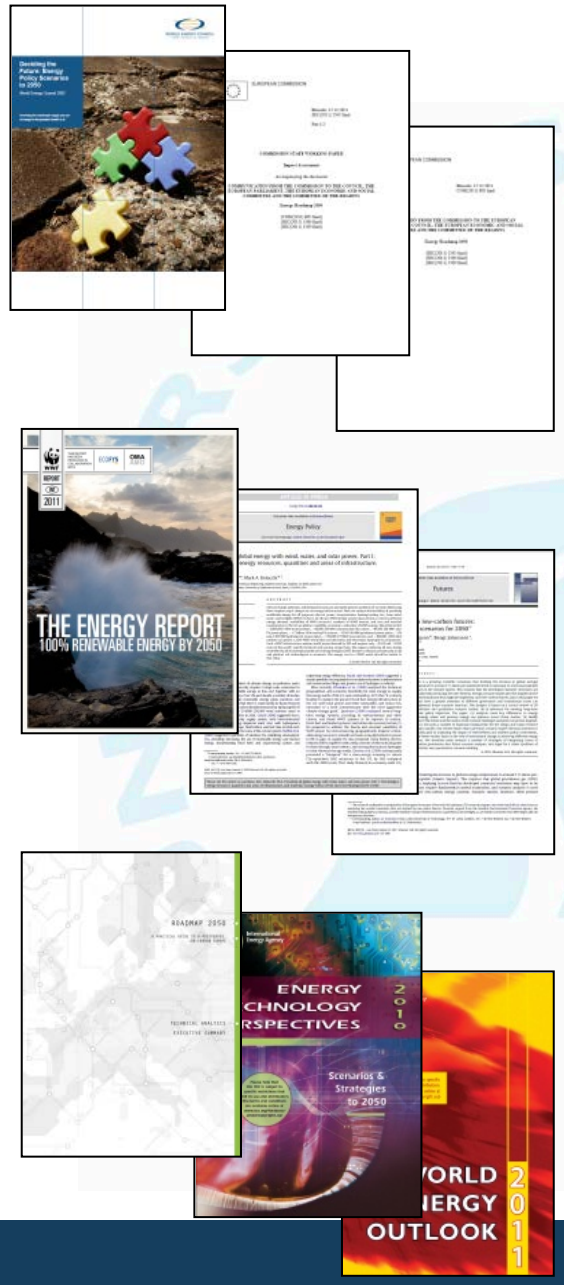
Existing Studies

- Energy Roadmap 2050 (**EU Commission**)
- Roadmap 2050 (**European Climate Foundation**)
- The energy report – 100% renewable energy by 2050 (**WWF**)
- Energy Technology Perspectives 2010 (**IEA**)
- World Energy Outlook (**IEA**)
- Deciding the Future: Energy Policy Scenarios to 2050 (**WEC**)
- 2 Academic Journal Papers (**Stanford, UC Davis, Lund University, *et al.***)



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Existing Studies

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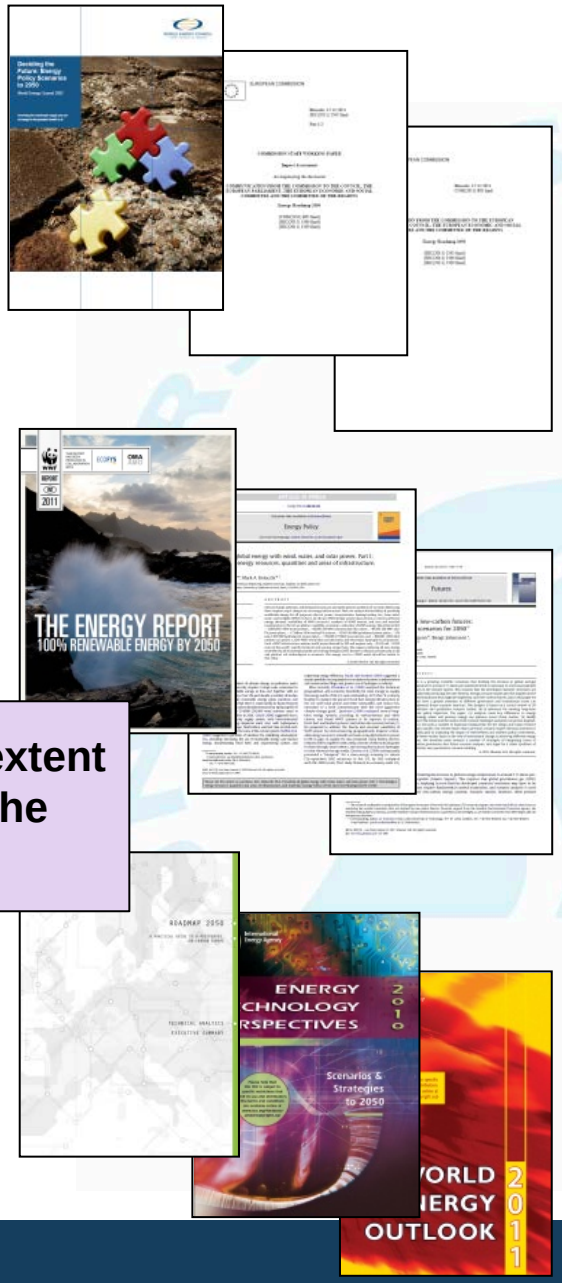
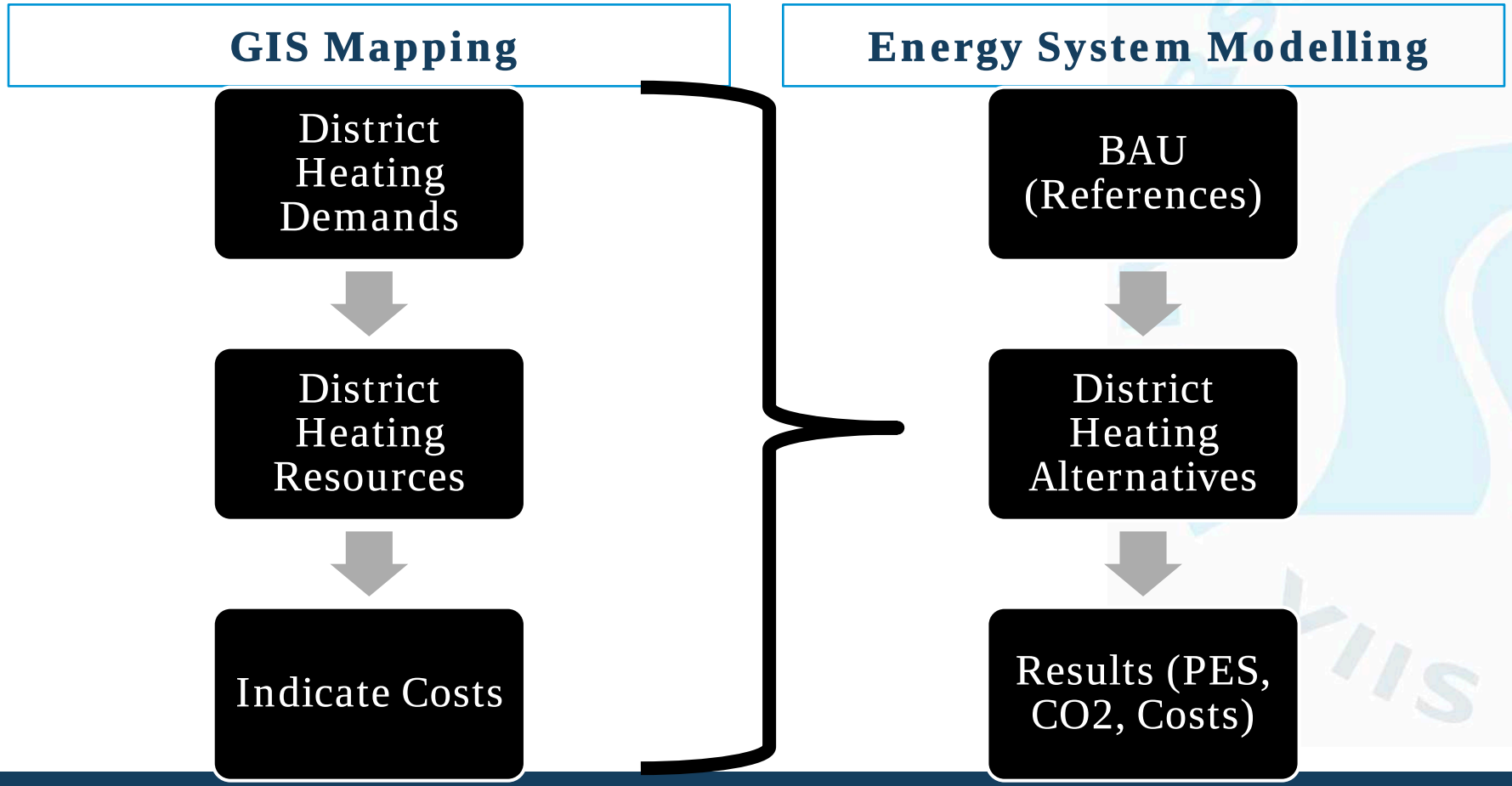
General Consensus:
"Combined heat & power (CHP) and district heating (DH) are important"

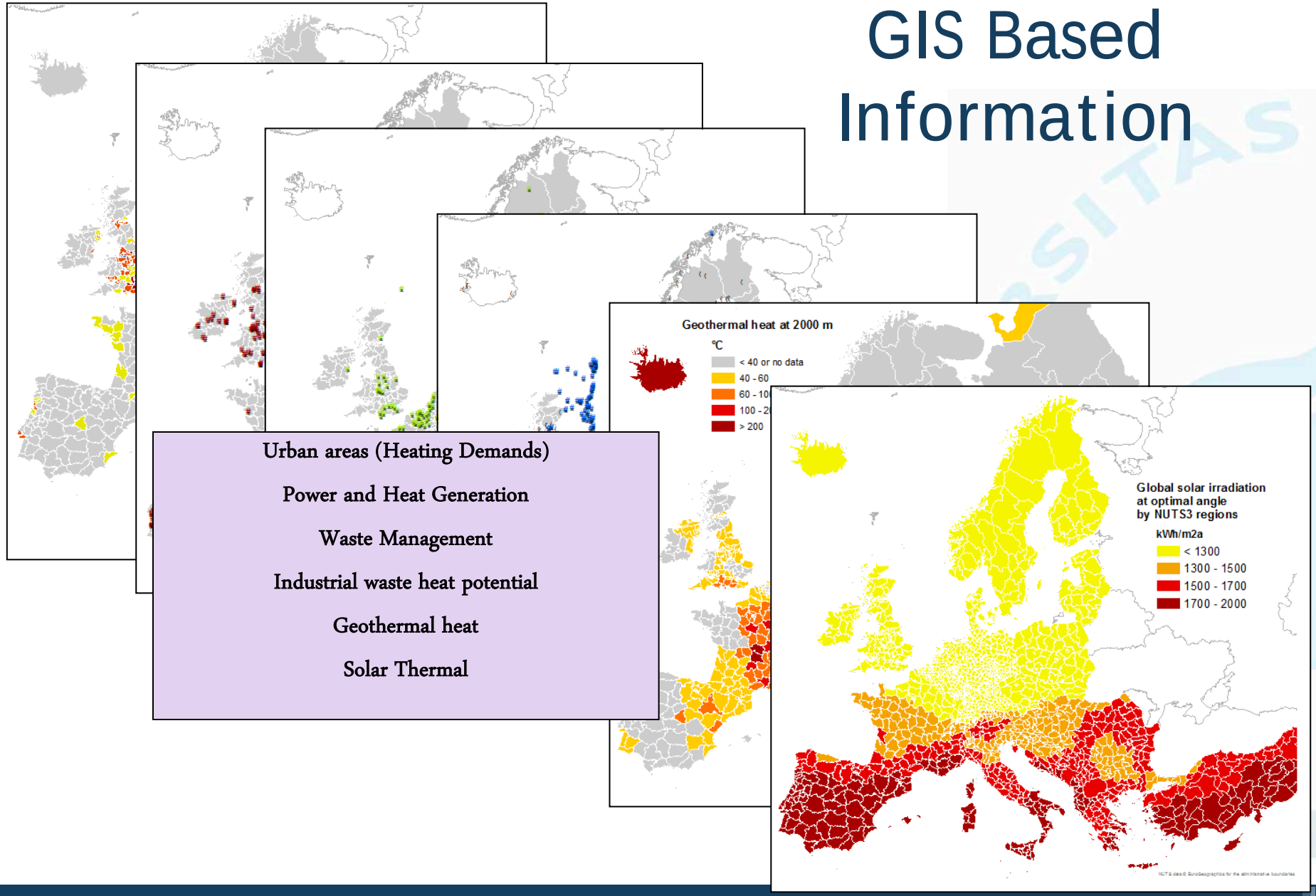
. . . but fail to quantify to which extent these options can be used in the future energy system . . .



Methodology



GIS Based Information



Urban areas (Heating Demands)

Power and Heat Generation

Waste Management

Industrial waste heat potential

Geothermal heat

Solar Thermal

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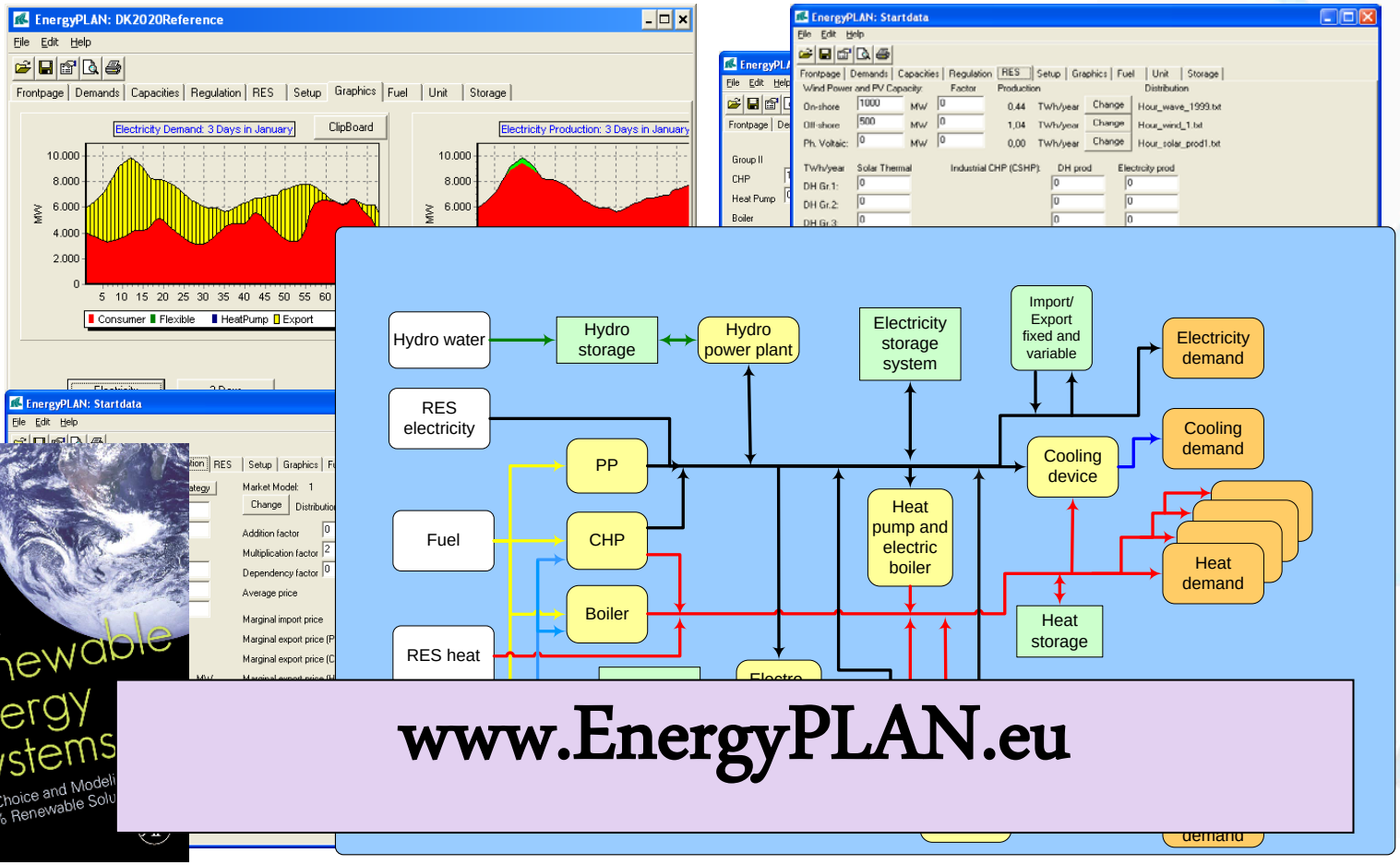
Energy System Analysis Tool



Showing DH Benefits in 2 Steps

Step 1: (Energy Efficiency)

- **Increasing DH Penetrations**
- **Increasing CHP**
- **Using Oil/Natural gas in CC-CHP**

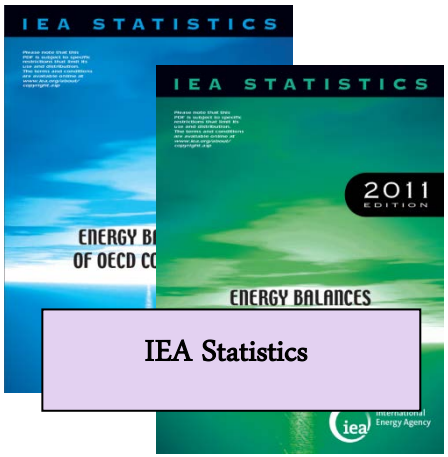


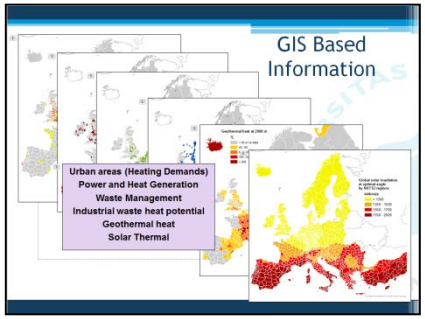
Step 2: (Utilise waste and RE sources)

- **Industrial waste heat**
- **Waste incineration**
- **Geothermal heat**
- **Large-scale Solar Thermal**




2010 Modelling





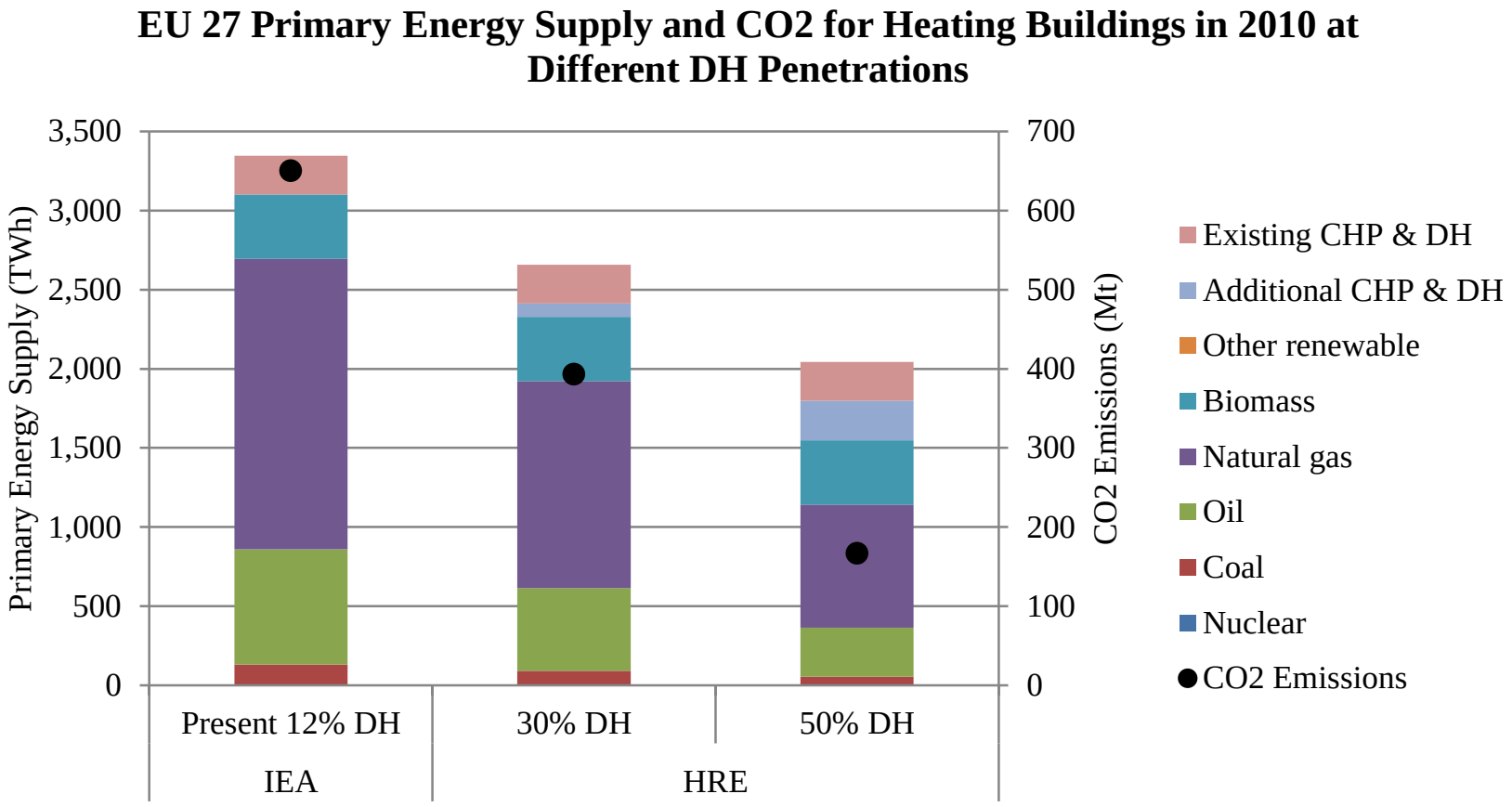
IEA Data
2010 Model

District Heating
Alternatives

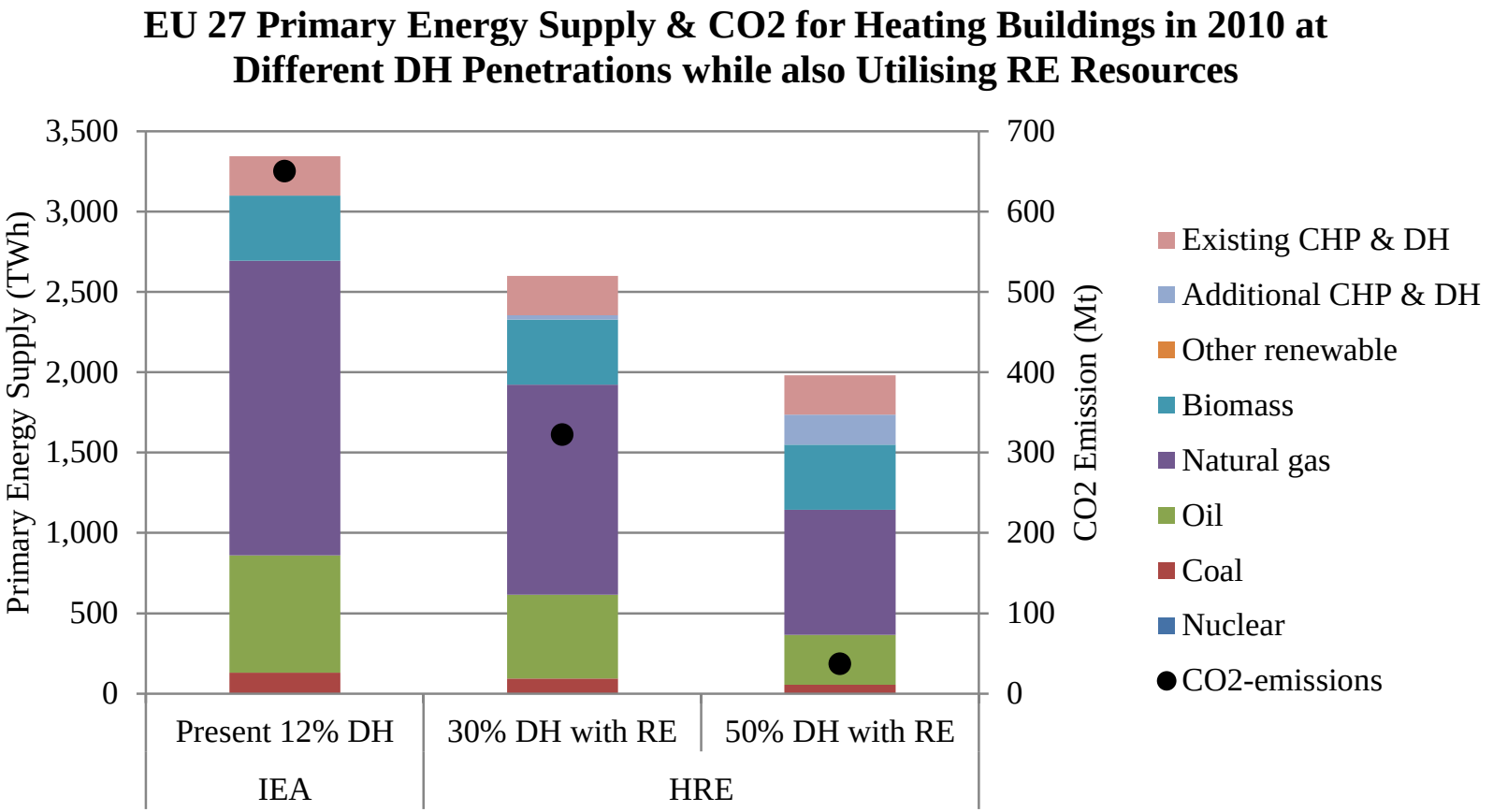
Ref = 12% DH
2010 = 30% DH
2010= 50% DH

Results
(PES, CO2,
Costs)

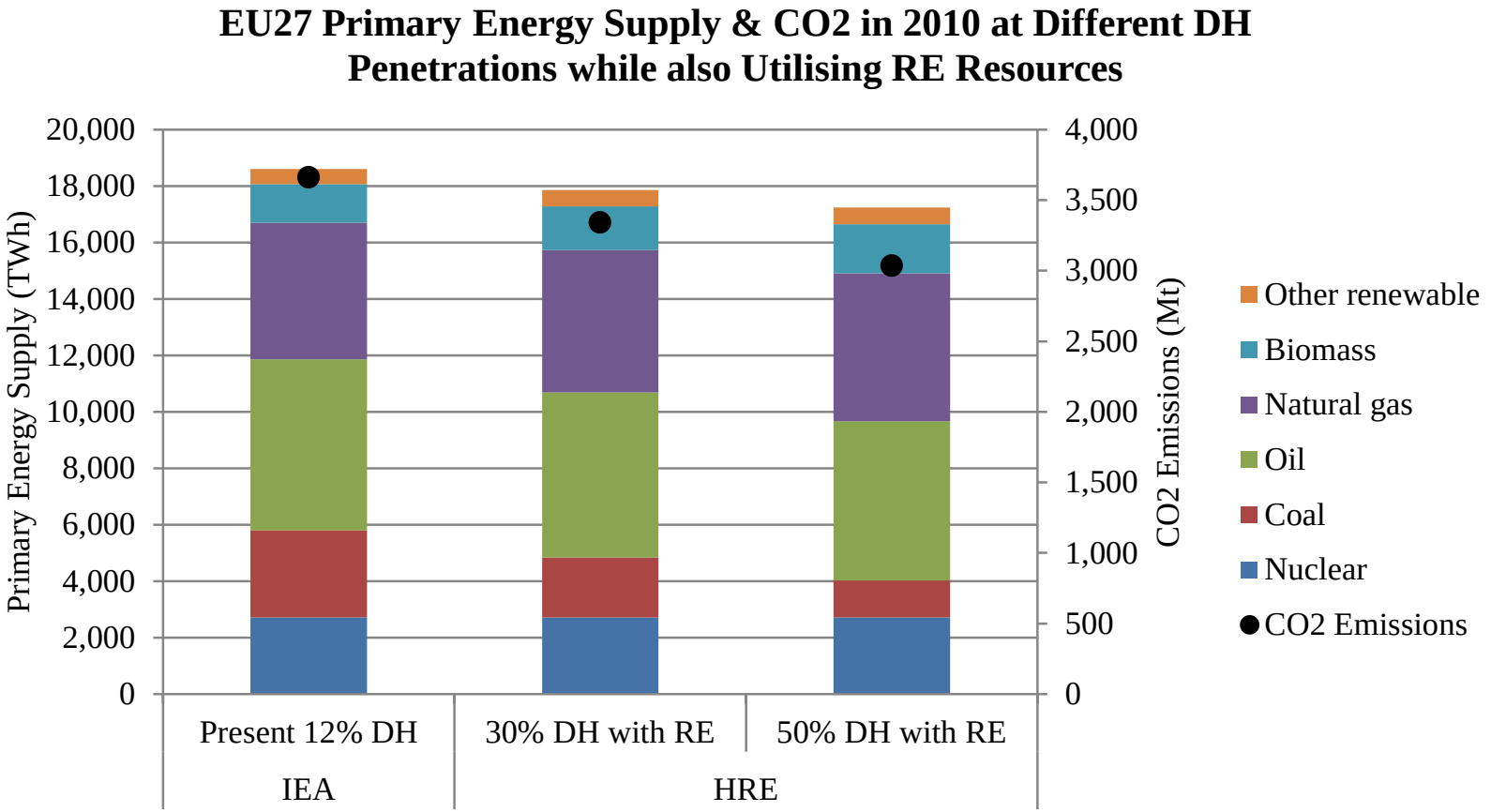
2010 Step 1: Energy Efficiency



2010 Step 2: Utilising Resources



Total European Energy Supply



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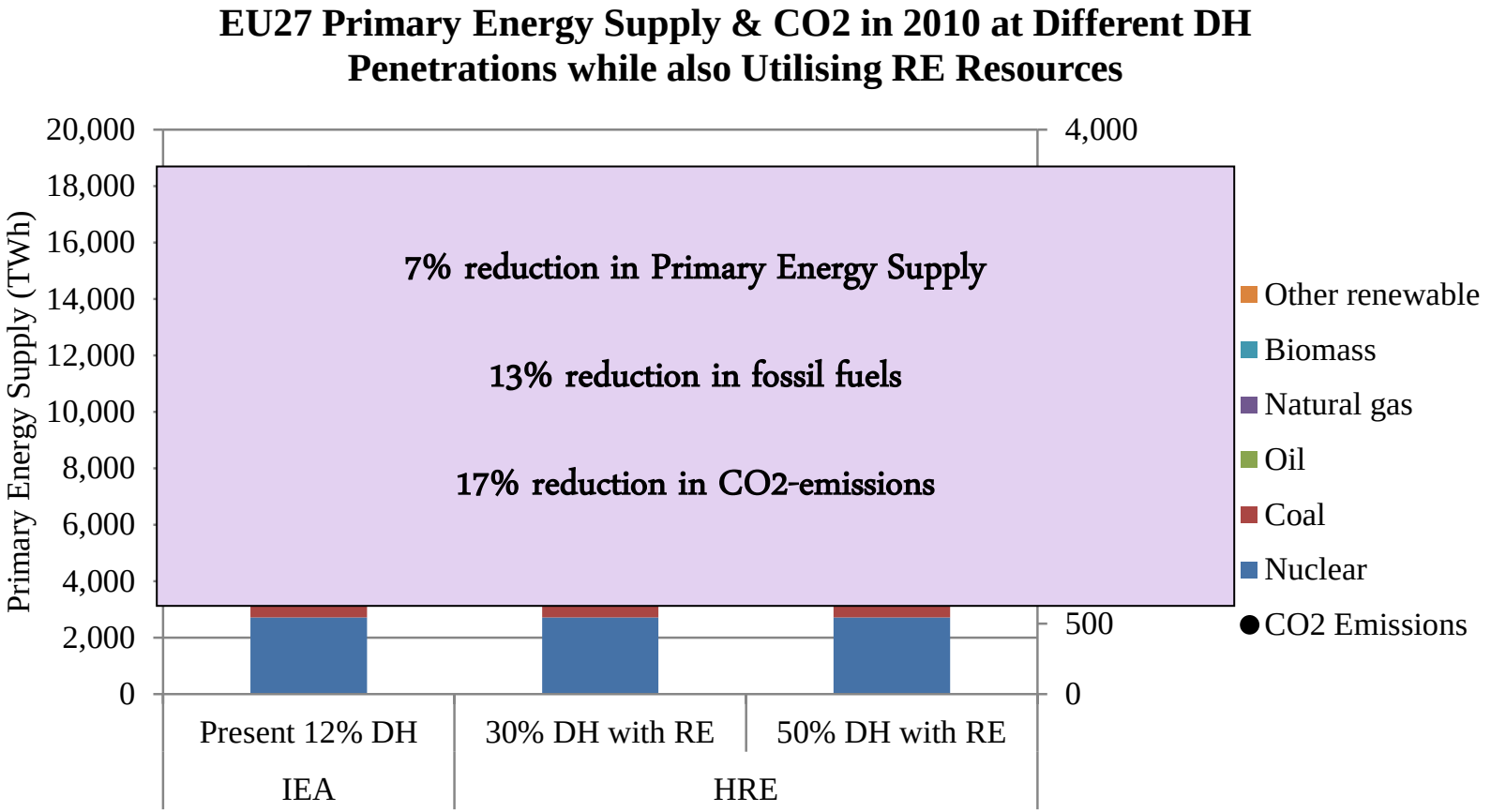
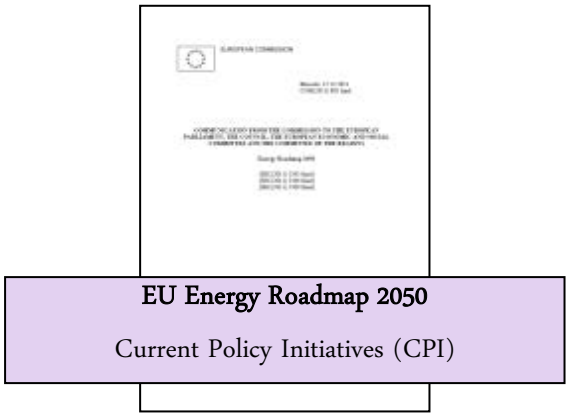
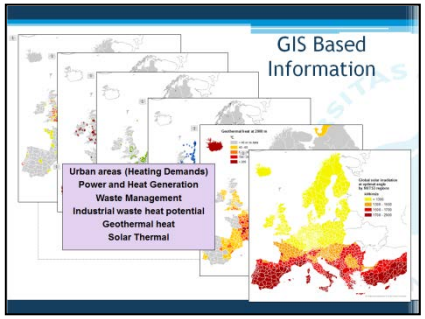


2030/2050 Modelling



EU Energy Roadmap 2050

Current Policy Initiatives (CPI)



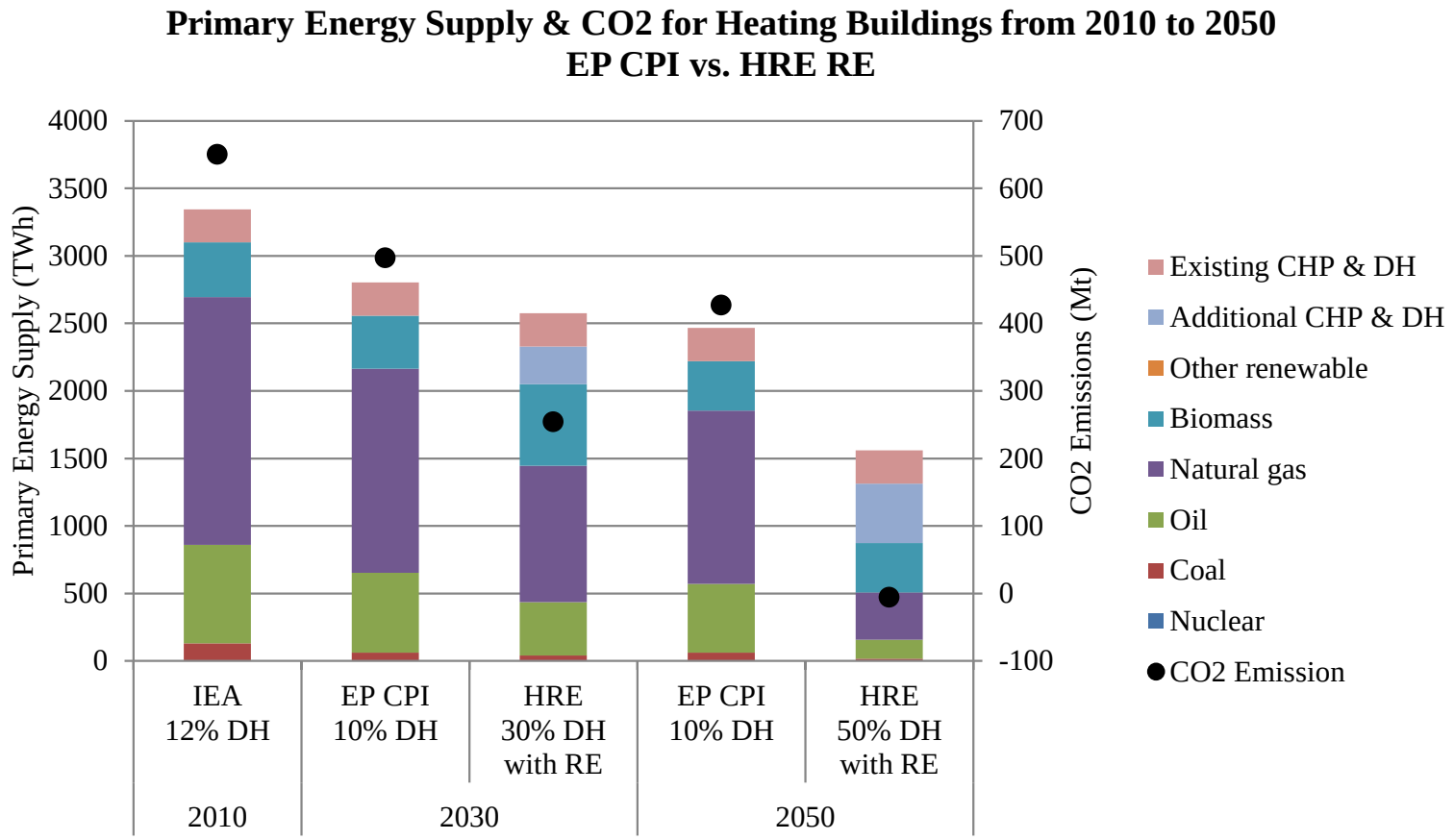
EU CPI
PRIMES Data
2030 & 2050 Model

District Heating
Alternatives

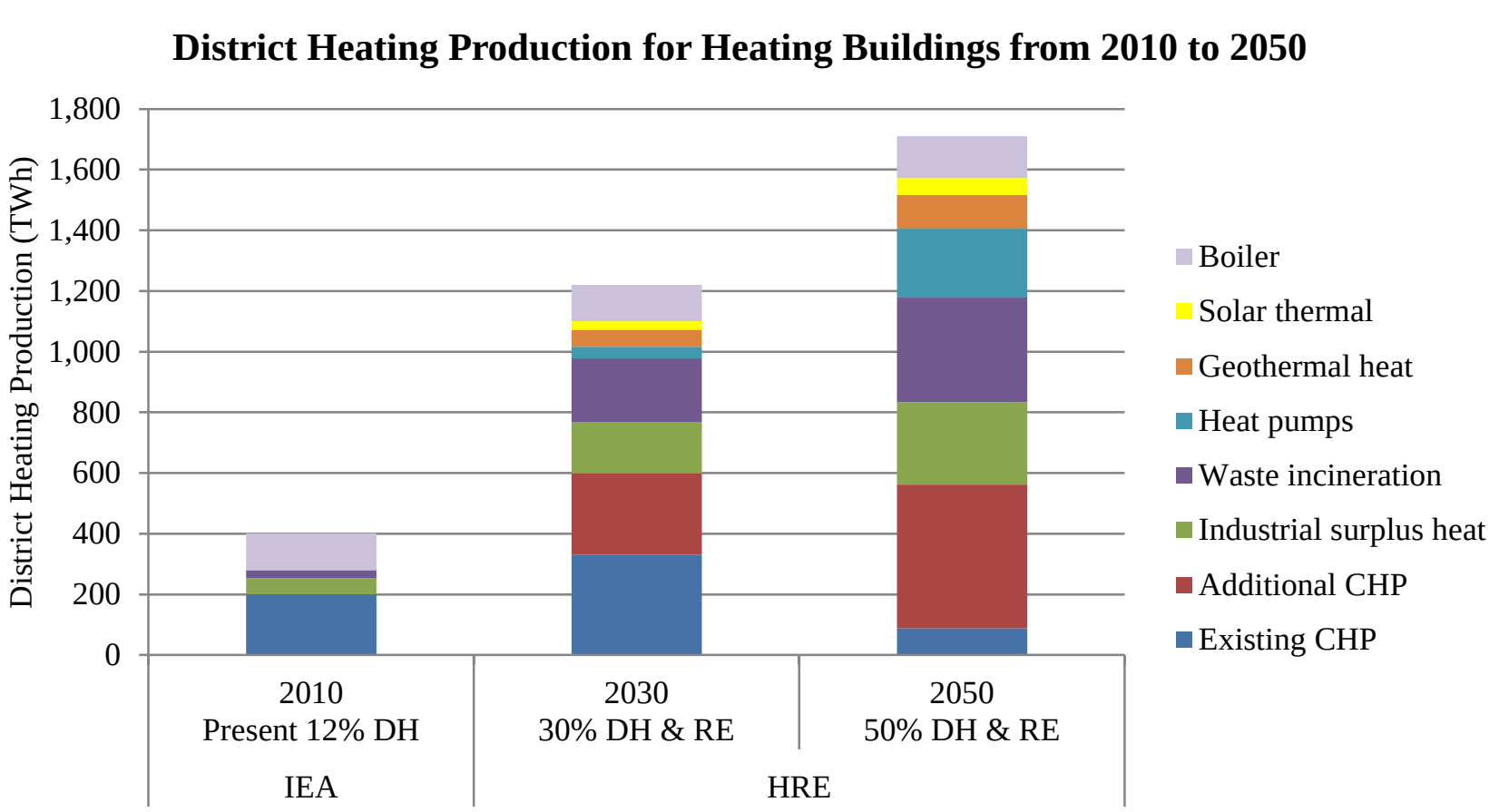
2010 = 12% DH
2030 = 30% DH
2050= 50% DH

Results
(PES, CO2, Costs)

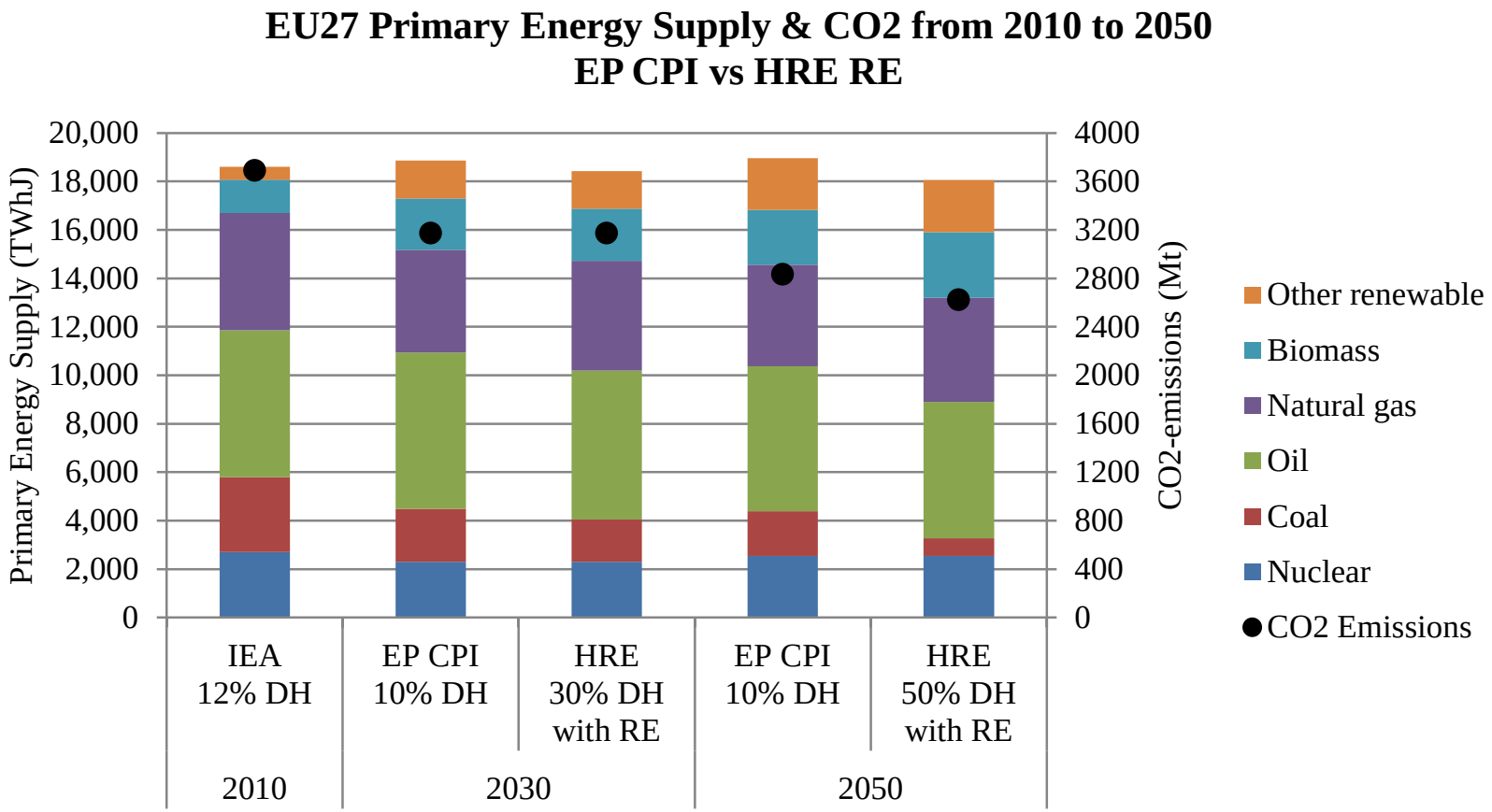
2030/2050 Step 1 & 2



District Heating Supply



Total European Energy Supply



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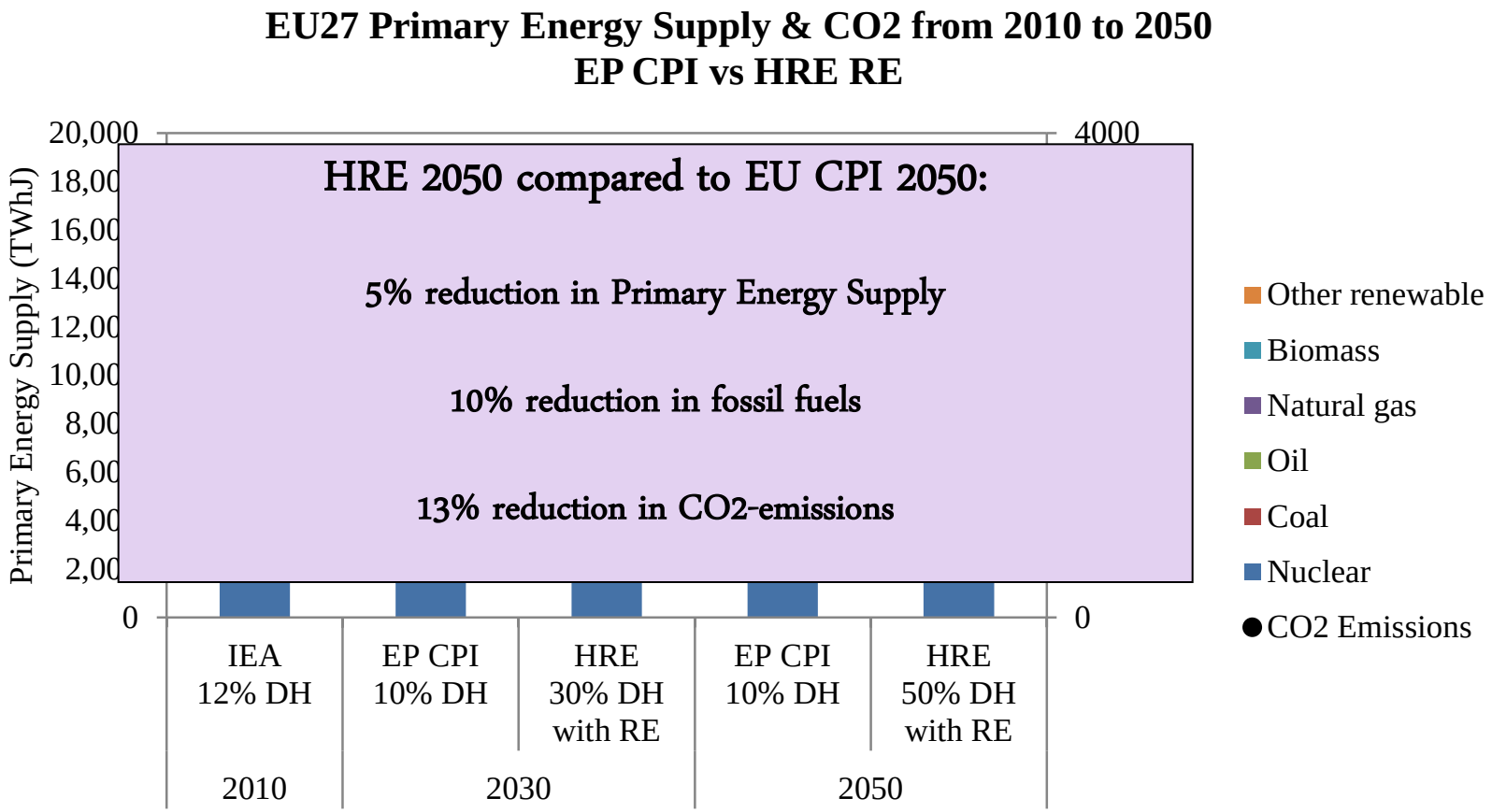
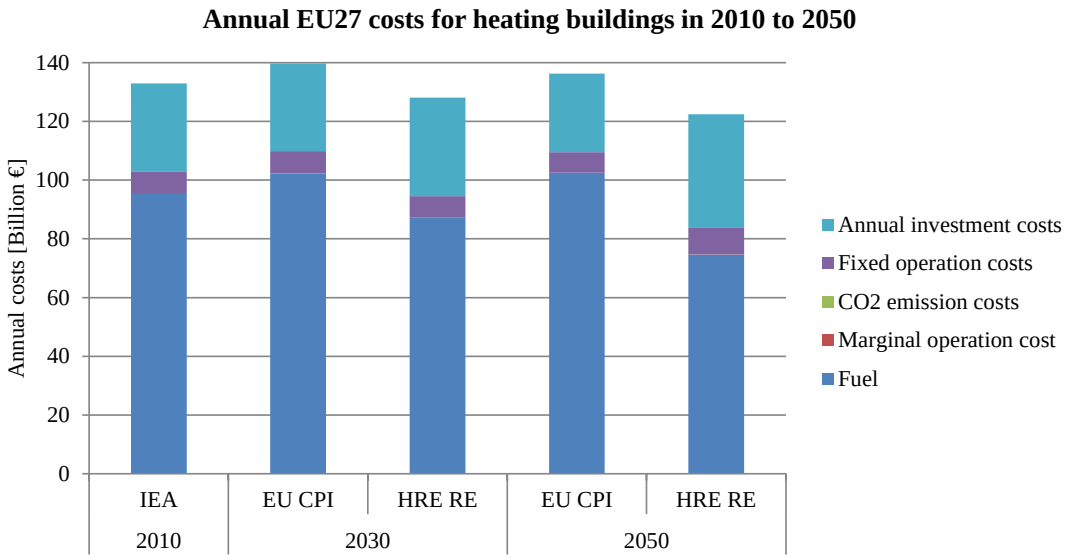


Cost and Jobs

2050

- Annual saved fuel costs of ~€30 Billion
- Total costs reduced by ~€14 Billion



2013-2050

- Total Additional Investment of ~€500 Billion
- Additional jobs:
  - 8-9 million man-years in total
  - Approximately 220,000 jobs/year

Conclusion: 50% DH and CHP

- Decrease primary energy supply and especially fossil fuels and CO2 emissions
- Decrease annual costs of energy in Europe by approximately €14 Billion in 2050
- Create additional 220,000 jobs over the period 2013-2050
- Further integration of RES

Conclusion: 50% DH and CHP

- Decrease primary energy supply and esp[illegible]d CO2 emissions

LESS FUEL

- Decrease annual costs of energy in Europe [illegible]4 Billion in 2050

LESS MONEY

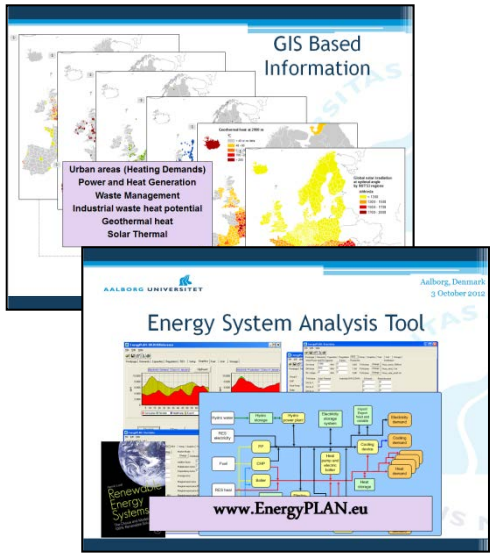
- Create a[illegible]obs over the period 2013-2050

MORE EU JOBS

- Further [illegible]

MORE RE

Conclusion: Methodology



- Use a low-heat demand scenario i.e. energy efficiency scenario
- More detailed understanding of the energy balance data
- Advocate more heat data in future IEA/PRIMES energy balances
- Further optimise the DH-scenarios (replace electric heating, expand CHP and HP, include district cooling, further the integration of wind and PV etc.)

Questions?

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http://www.euroheat.org/Heat-Roadmap-Europe-165.aspx