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Heat Deep Dive


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HEAT?

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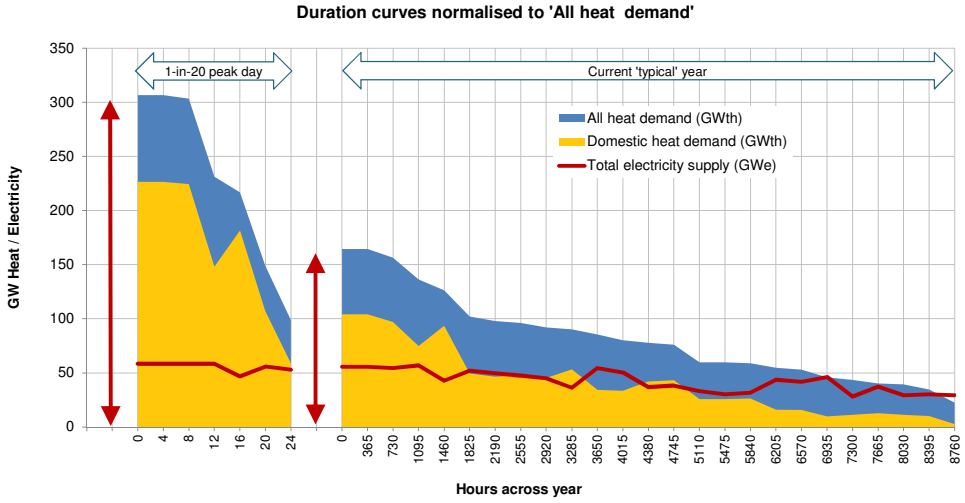
Pathways for decarbonising heat

- This study undertaken by Redpoint is a full system *cost optimisation* model using DECC core assumptions plus:
- Different demands for different property types across the year and within day.
- Increased technology options (heat networks, hydrogen, gas heat pumps, hybrid heat pumps)



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Cost Optimal pathway by sector: Residential (buildings)

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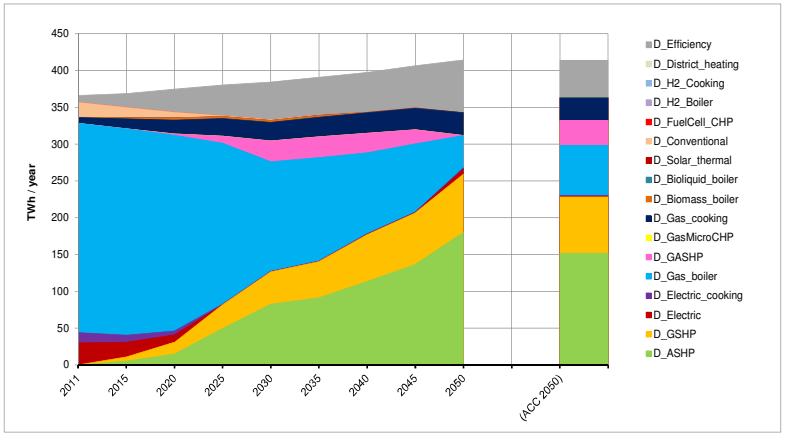
2012 → **2020** → **2030** → **2040** → **2050**

- Energy efficiency and insulation key
- Condensing boilers replace old boilers
- Heat pumps deploy in off gas network properties

- Efficiency optimised
- Hybrid gas/electric heat pumps start to deploy in on gas network properties
- Gas Heat Pumps start to replace gas boilers

- Heat pumps continue to increase
- Gas/electric hybrids continue to increase

- All heating by hybrids or heat pumps



Cost optimal pathway by sector:
Services (buildings)

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2012

- Rapid transition from gas to Heat pumps
- 50% of gas displaced
- Minor role for district heating

2020

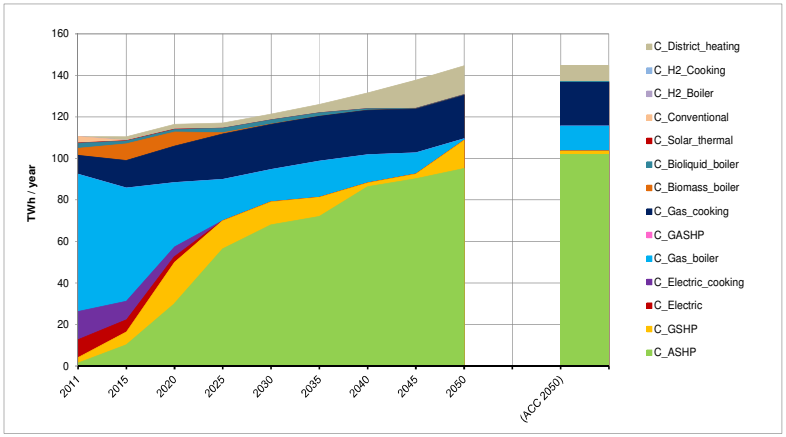
- Air source heat Pumps continues to replace gas
- Ground source heat pumps growth slows

2030

- Air source heat pumps continue to replace remaining gas
- District heating starts to develop

2040

- Gas only for peak day back up
- District heat increases



Cost optimal pathway by sector: Industrial

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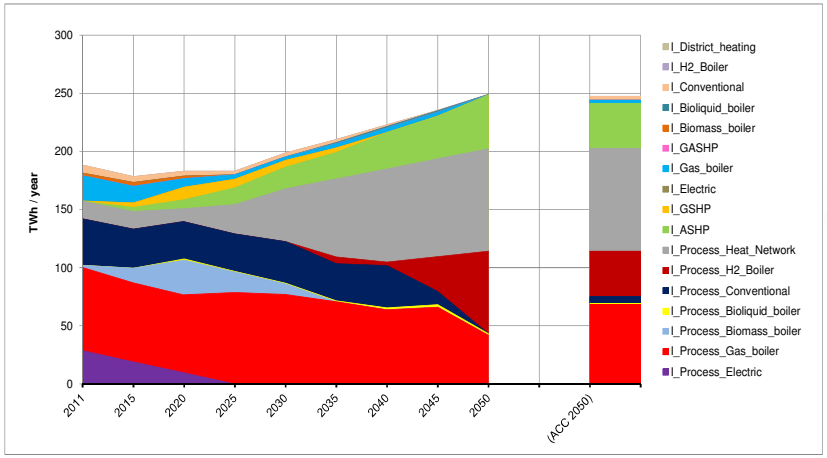
2012 → **2020** → **2030** → **2040** → **2050**

- Direct electric replaced by biomass
- Heat networks utilising recovered heat
- Gas/conventional continues in process heat

- CHP with CCS
- Heat Networks key
- Gas/ conventional fuel continues in process heat
- Slow build up of heat pumps

- Heat networks increase
- H2 boilers start to deploy
- Gas/ conventional fuel continues in process heat

- Heat networks optimised
- H2 replaces conventional and some gas



Conclusions

- Costs of meeting the 2050 target are likely to be in the range of 1-2% of GDP
- Pathways are dependent on electricity decarbonisation, with CCS, Nuclear and Heat pumps playing pivotal roles.
- A balance across technologies and fuels provides the cost optimal route, with different priorities for each sector.
- Gas has a role meeting seasonal and peak demand in buildings through hybrids.
- In scenarios without gas in buildings, energy costs are ~12% higher than with.

For more info…

- Marcus.stewart@nationalgrid.com
- Pathways for decarbonising heat :Redpoint
  - http://www.baringa.com/our_point_of_view/item/uk_heat_economics_study_pathways_for_decarbonising_heat/

Coming soon…

- 2050 Pathways for Domestic Heat. ENA/DELTA –EE
  - Publication date 16th October