

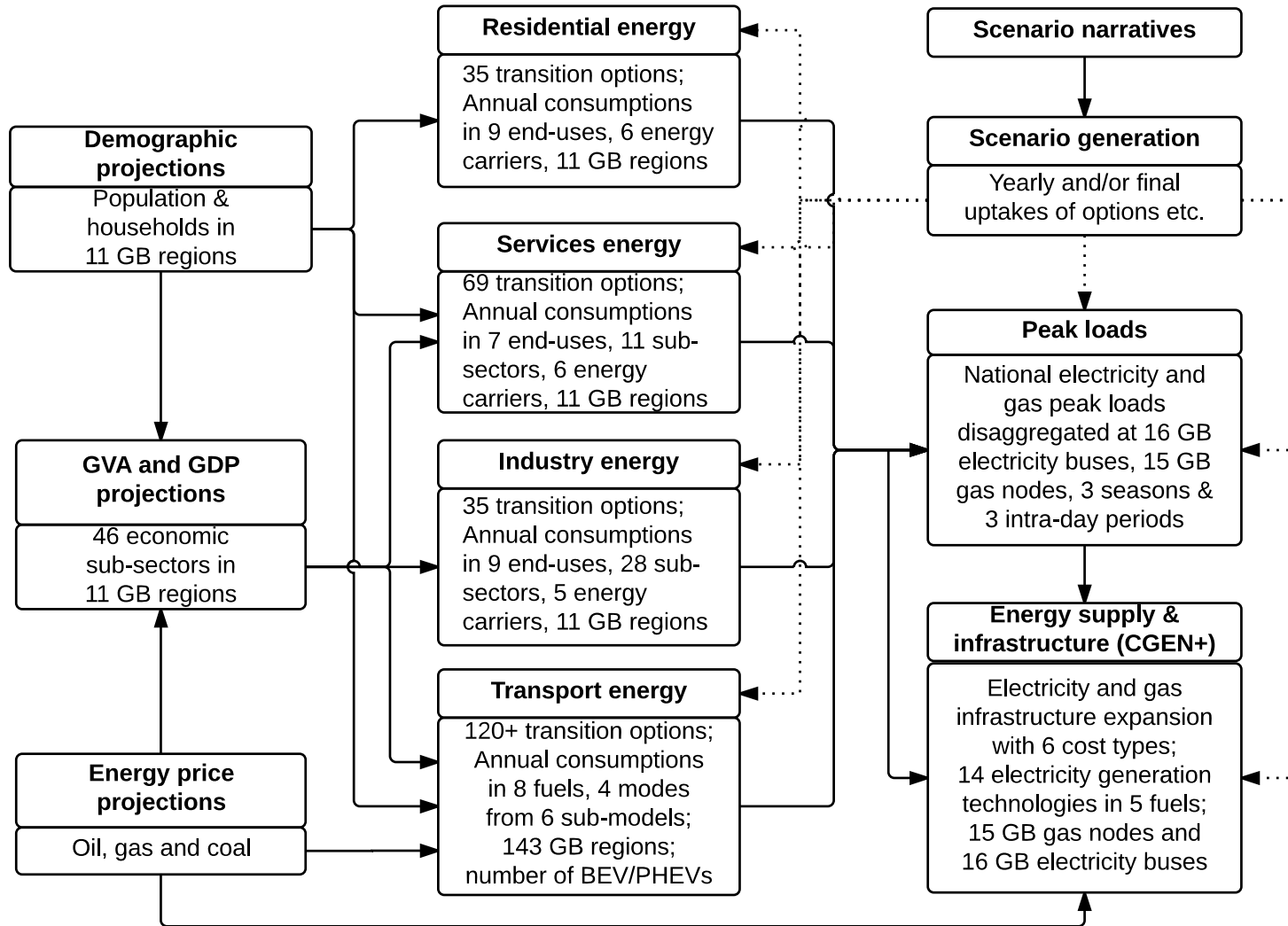


Interdependence in energy and water, supply and demand

Nick Eyre, Pranab Baruah

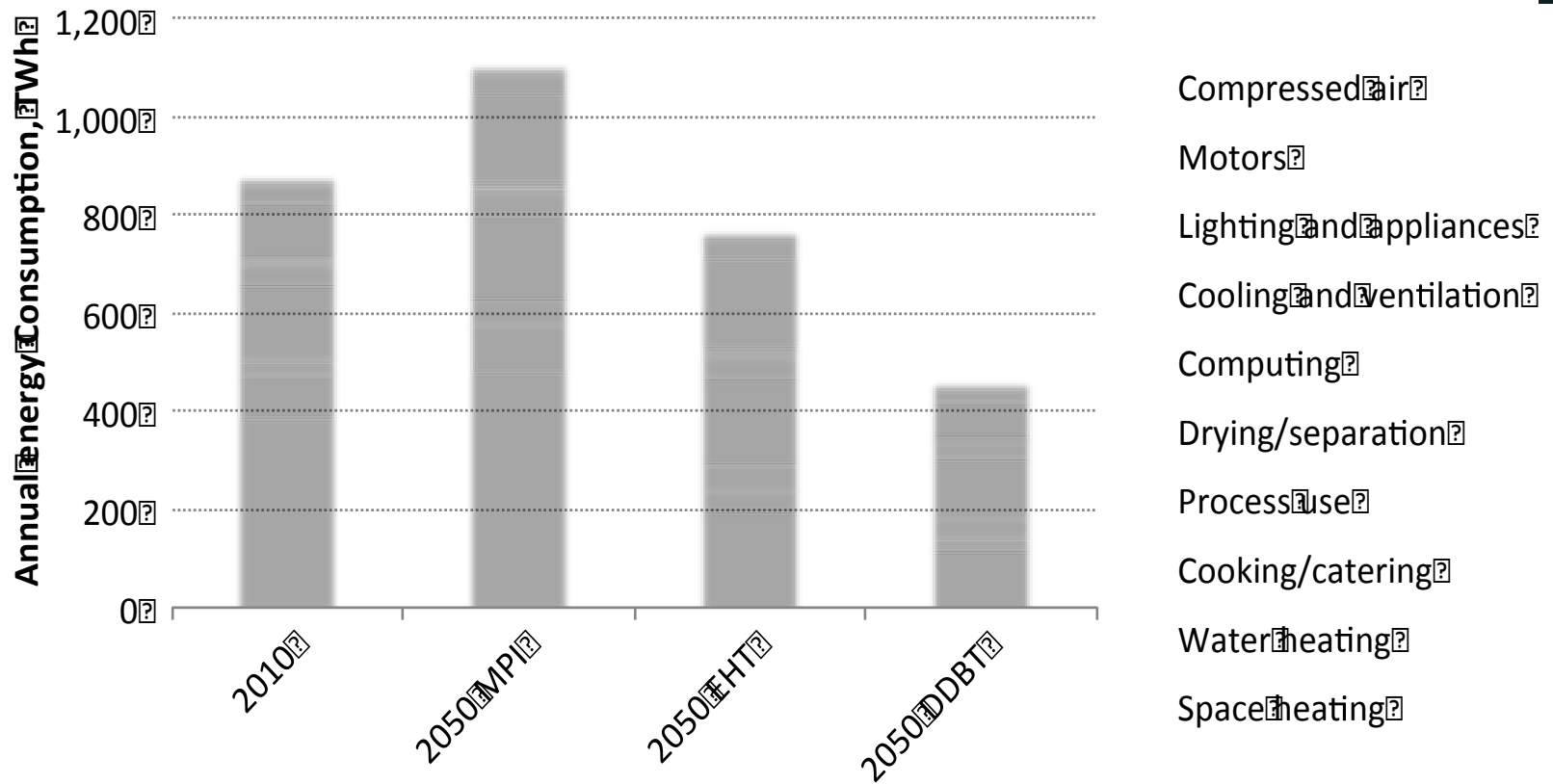
December 2014

Energy modelling in NISMOD-LP



Annual UK energy consumption by future scenario

Residential + Services + Industry



- Current trend of modest reduction is the most likely short term trend
- Longer term there are high levels of scenario dependence, and therefore uncertainty

Insights into energy water interactions

- Water use in energy production
 - Dominated by cooling water for power generation
- Energy use in water supply and treatment
 - High fraction of water industry costs; ~2% of UK electricity and <<1% of total energy.
 - Mainly in water treatment
- Interactions in use of water and energy
 - Co-production of steam and hot water
 - Interactions in industrial processes
 - In both cases, there are implications for infrastructure inter-dependence and efficiency

Energy and water: the importance of hot water

Energy Use in UK homes

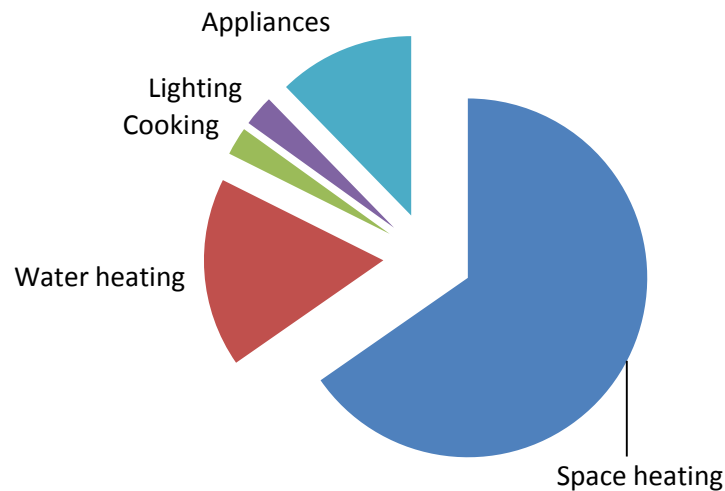
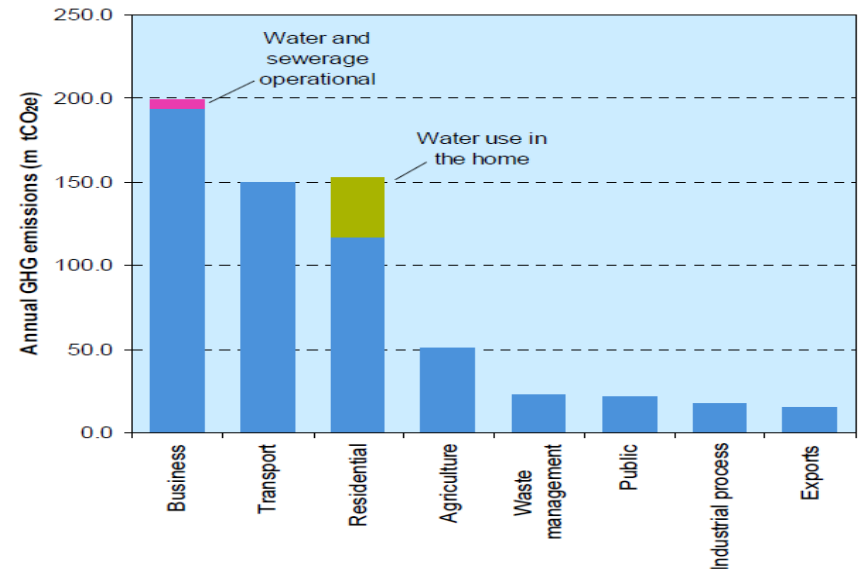


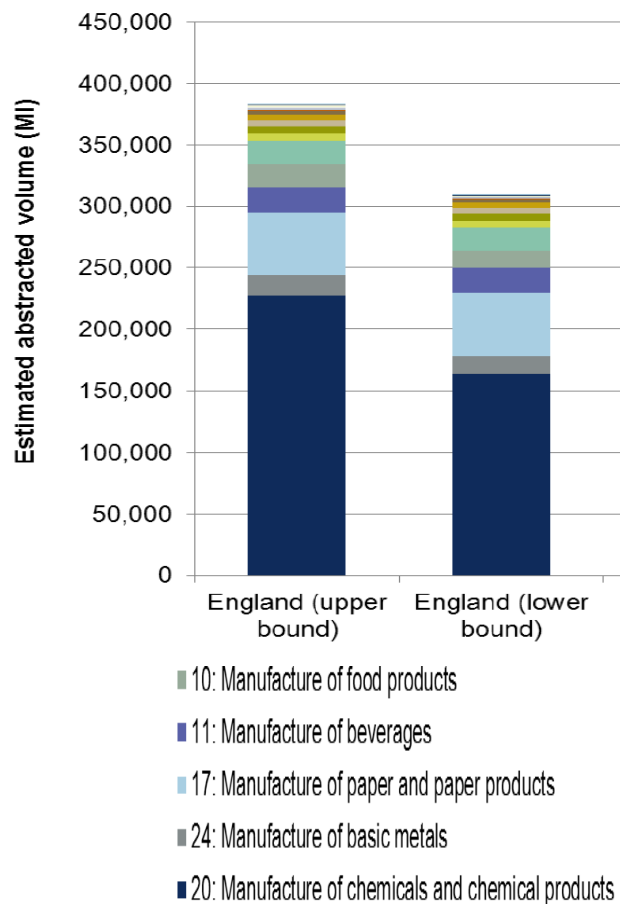
Figure 2 Annual UK emissions of all greenhouse gases t



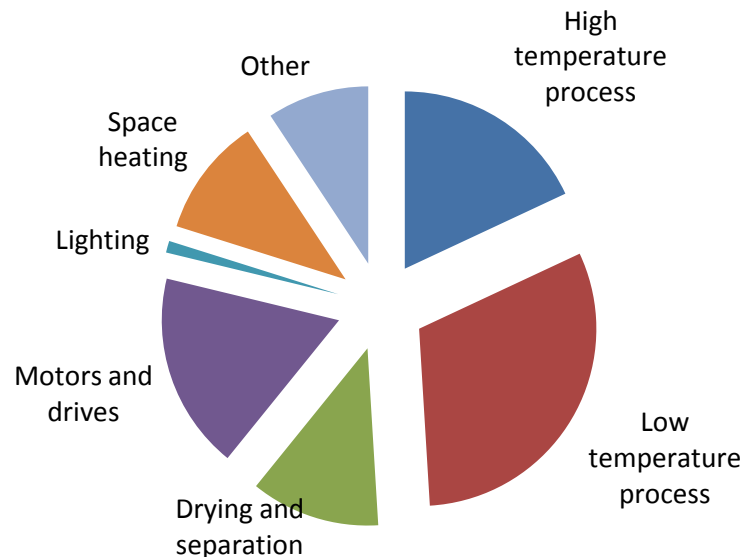
- Energy use to produce hot water in buildings is very much larger than energy use in the water industry
- Saving hot water has benefits in both sectors, but separation of programmes does not allow this to be recognised.

Energy and water in industrial processes

Figure 3.1 Estimated volume directly abstracted for manufacturing purposes from non-tidal sources in England and Wales, excluding major non-consumptive uses (upper and lower bounds) and excluding that abstracted for public water supply, by sub-sector classification (divisions for SIC section C) (MI, 2006)



Energy Use in UK Industry



- In high temperature processes industries, energy heats up the materials; water cools them down.
- New, resource efficient processes address both.



Contact details

Nick Eyre

+44 (0)1865 285129

nick.eyre@ouce.ox.ac.uk

<http://www.eci.ox.ac.uk/people/eyrenick.php>