
The 6th Carbon Budget and BEIS

A personal view.

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Agenda

- **A quick introduction**
- Overview of energy modelling landscape
- Our main “work horses”
- Setting the 6th Carbon Budget – scenario planning
- Modelling Quality Assurance
- What next?
- Questions

Our modelling landscape



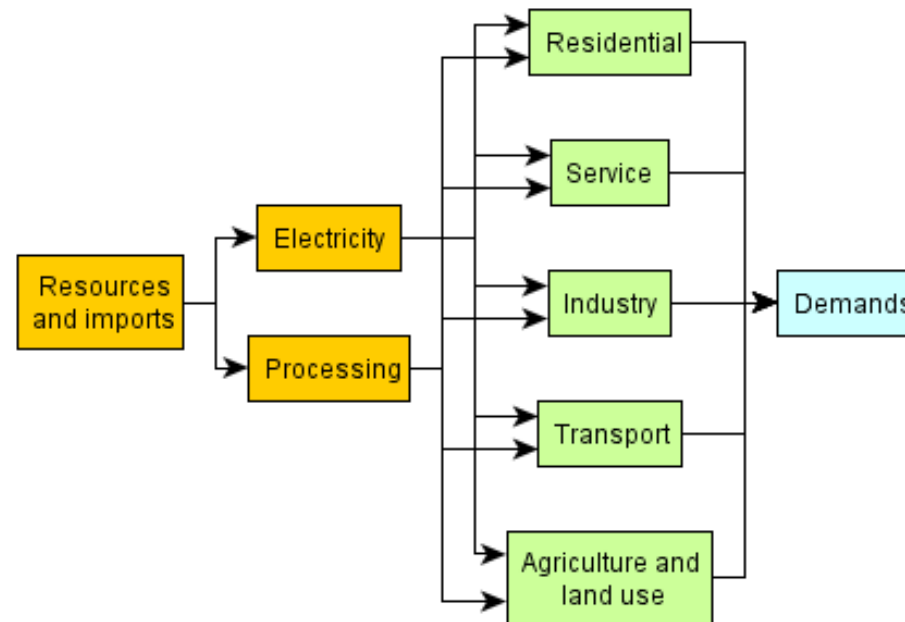
UK TIMES – our whole system model

Least cost optimisation:

- Perfect foresight
- Scenario based
- Not a forecast!

Inputs:

- Covers whole system
- Emission factors
- Technologies (~1500):
 - Costs (Capital and O&M)
 - Lifetime
 - Efficiencies
- Demand trajectory
- Air quality



Outputs:

Total system cost
Deployment of technologies
Energy generation/use
Etc...

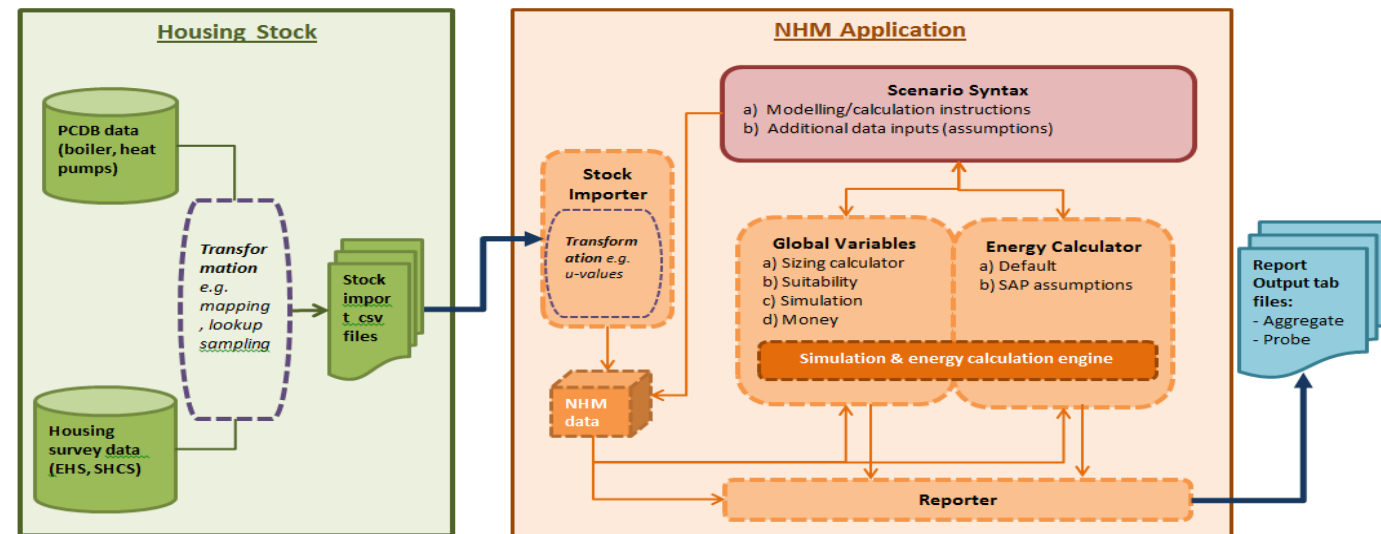
National Household Model

Policy simulation

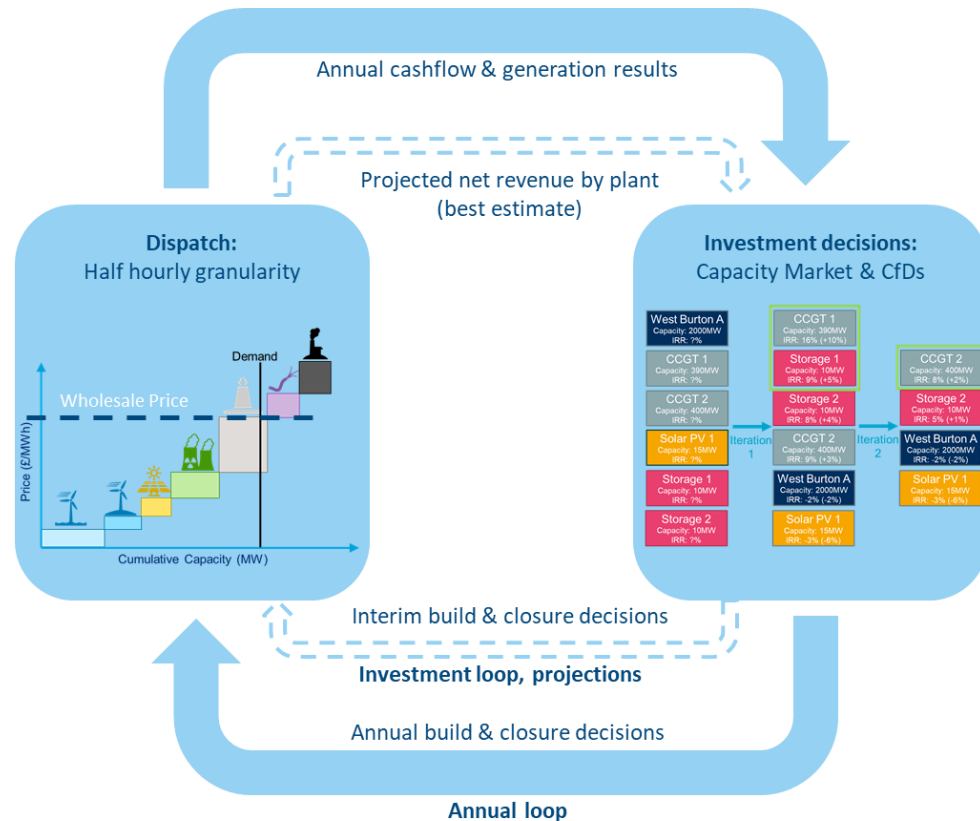
- Domestic energy modelling software
- Energy calculator
- Data driven
- Policy modelling – effect of
- Energy demand - GB housing stock

Installing energy efficiency measures

- Consumer choice
- Fuel prices over time
- Weather conditions over time
- Housing stock change
- Heating schedules
- Financing



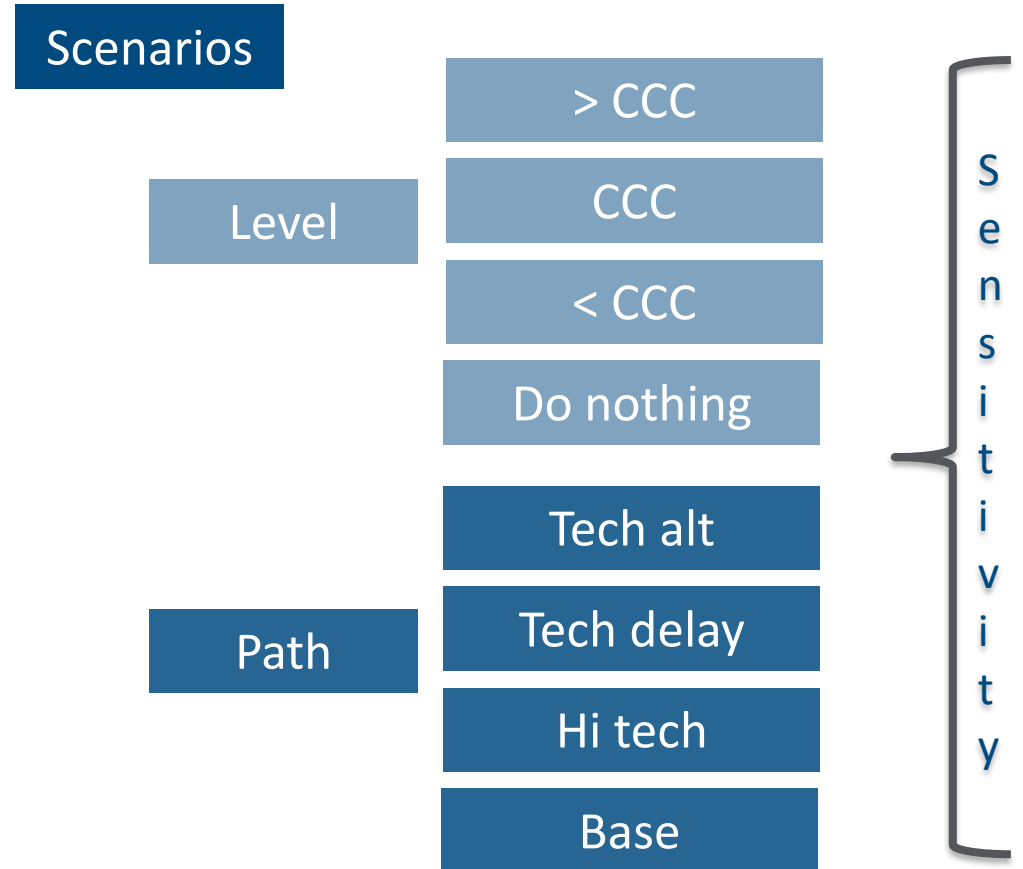
Dynamic Dispatch Model



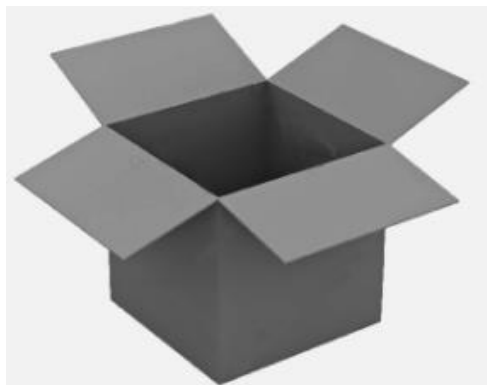
- Electricity supply model to 2050
- Models electricity generation and makes investment decisions
- The Investment Algorithm, decides what plants build and retire based on forecasts revenue and costs.
- Used to model the
 - Wholesale market,
 - Capacity market,
 - Balancing market and
 - Low carbon policy mechanisms

The homework question...& the approach

Technical feasibility of reaching NZ/CB6	<ul style="list-style-type: none">• Meeting carbon Budget levels• Technology deployment requirements
Costs and benefits	<ul style="list-style-type: none">• What are the estimated costs and benefits associated with the Carbon Budget levels?
International ambition	<ul style="list-style-type: none">• What appropriate actions should the UK take in the context of global effort to tackle climate change?
Delivery risks	<ul style="list-style-type: none">• What is the performance gap against the Carbon Budget levels?
Wider considerations	<ul style="list-style-type: none">• Wider economic, social, distributional, environmental issues

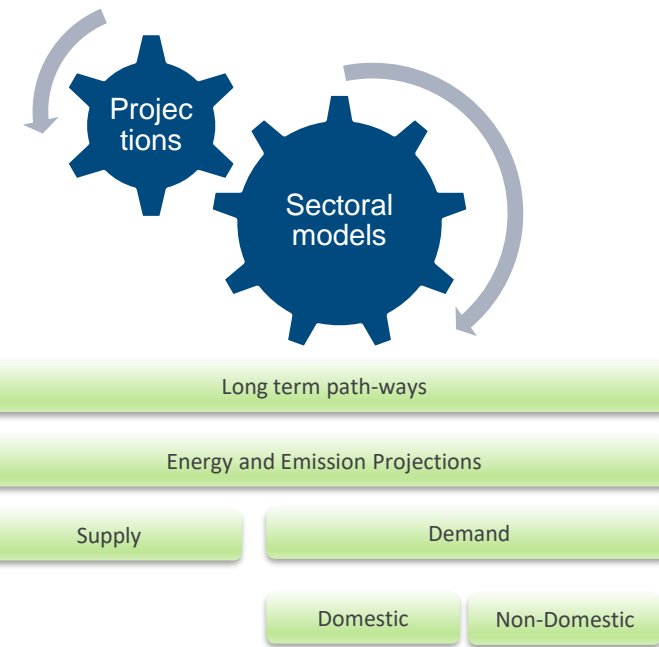
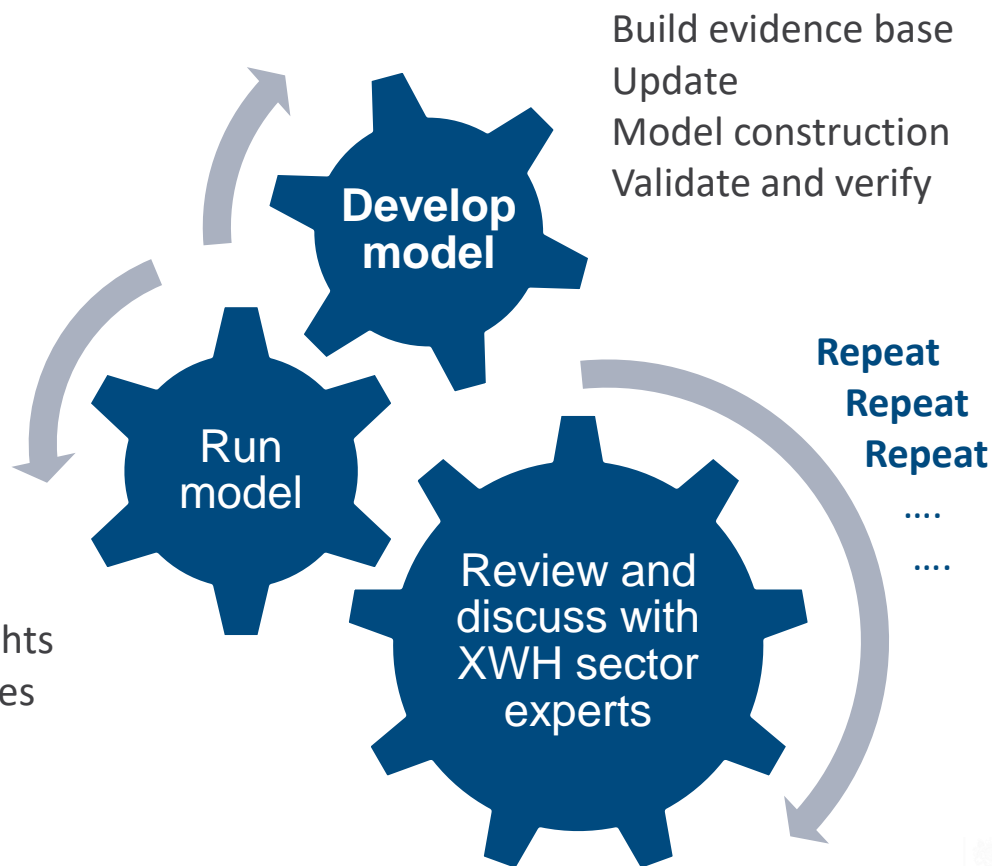


Modelling process for UK TIMES



Batch runs to:

- Relax or introduce constraints to gain insights
- “Knock out” technologies
- What ifs?



Interaction with policy area specific models.
TIMES as part of a suite models used iteratively to develop insights .

Department for Business, Energy & Industrial Strategy

And the answer is...

- Yes it is technically feasible just
 - we have to do pretty much all we can do
 - high reliance on electricity, hydrogen etc etc.
- CCC a lot more bullish on
 - costs
 - speed
 - behaviour change
- Uncertainty about technology for 2050
- Next steps...

6th Carbon Budget Impact
Assessment

Some reflections

- Behaviour change is hard to
 - evidence
 - incorporate
 - cost
- Alternatives
 - valuing
 - go / no go points
- Cost reduction
- Spatial and temporal disaggregation
- Uncertainty
 - Monte Carlo any one?
- Visualisation
 - Models
 - Choice