



Department
of Energy &
Climate Change

Modelling in DECC an Overview

Alec Waterhouse – July 2014



Introduction

- Overview of modelling landscape
- Some examples
- Modelling strategy
- Modelling Quality Assurance
- Challenges



Overview of the modelling landscape

Background

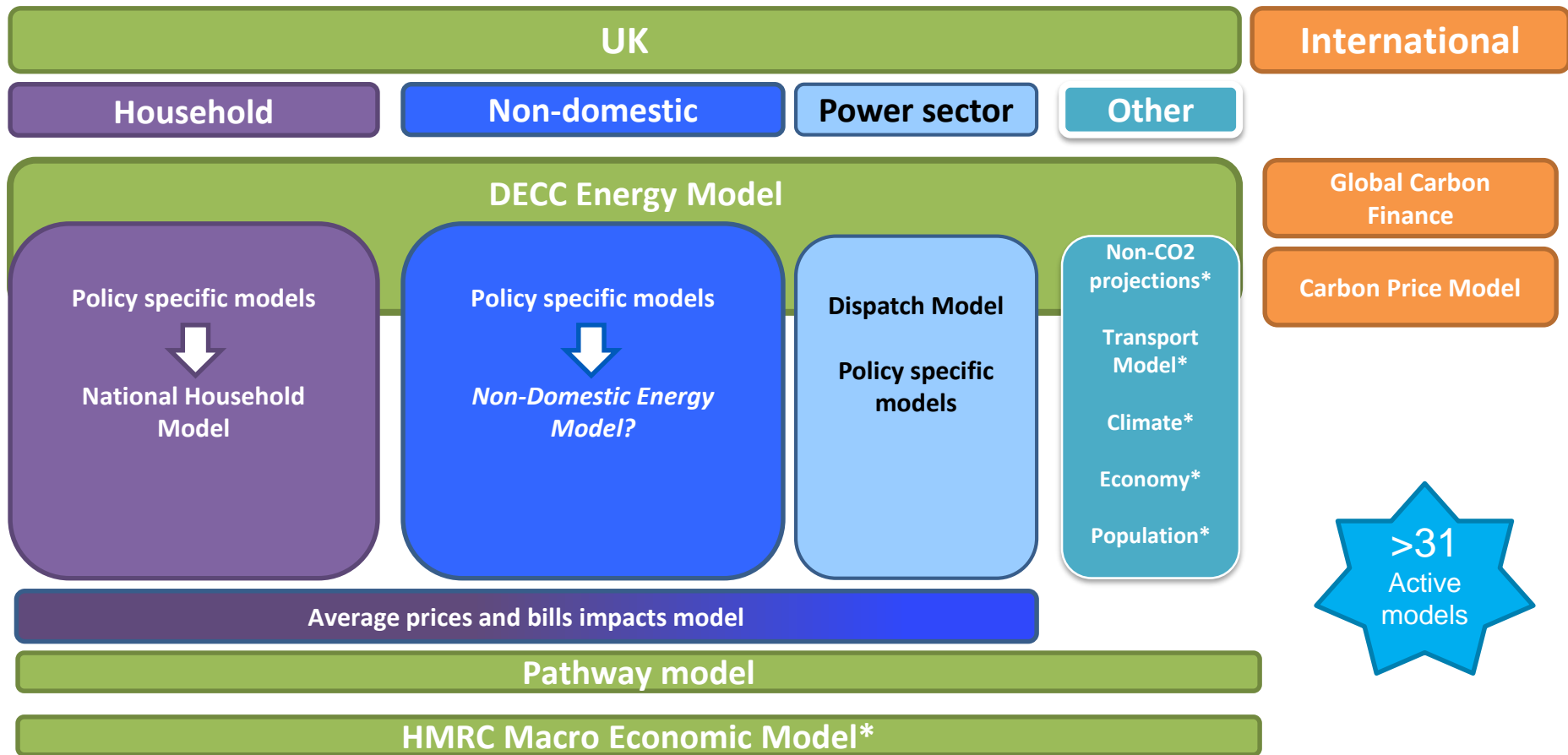
- Modelling is a key part of DECC's evidence base
- Central to
 - setting the UK's carbon budgets
 - assessing the impact of policies on emissions, energy markets, households, businesses and the wider economy

Modelling Objectives

- **Effective** in supporting evidence-based policy making
- **Accessible** for policy teams, open to all and trusted by the department and wider stakeholders
- **Coherent and coordinated**
- **Consistent and transparent** in the use of assumptions
- **Efficient** in the use of resources



Overview of the modelling landscape





Carbon Budgets / Long term pathway

Least cost optimisation tools

- We have used MARKAL, ESME
- Transition to UKTimes

Process

- Build evidence base
- Develop model and constraints
- Develop least cost trajectory
- Relax or introduce constraints to gain insights

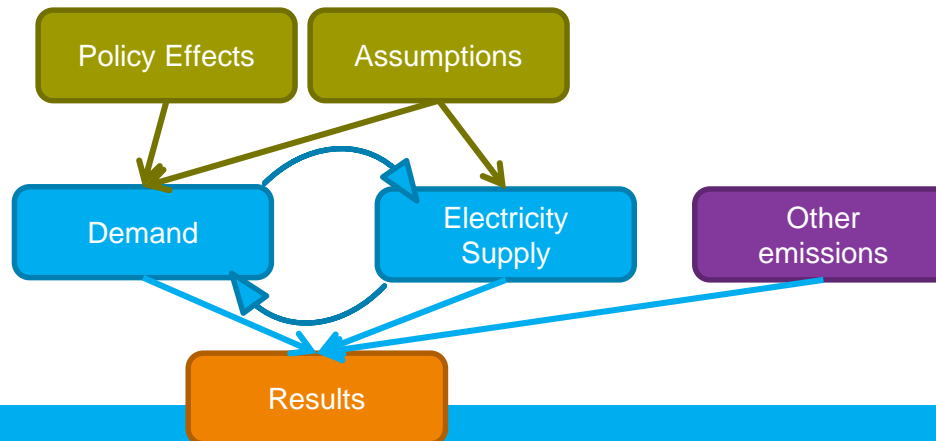


Energy and Emissions Projections

Econometric plus other models

- DECC developed core
- Links to electricity despatch
- Projects the
 - effect of policy on carbon budgets
 - energy demand

Process





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

```
(policy name: " Choice on install of heat pumps"  
  
  (target name: "Urban houses"  
    group: (group.filter  
      (any  
        (house.morphology-is Urban)  
        (house.buildyear-is above: 1920)  
        (house.has-boiler)))  
    )  
  
    exposure: (schedule.time-series  
      (expose on:01/01/2015 (sample.proportion 0.2))  
      (expose on:01/01/2016 (sample.proportion 0.3))  
      (expose on:01/01/2017 (sample.proportion 0.8))  
    )  
  
    action: (choice  
  
      (finance.with-subsidy  
        subsidy: 100  
        counterparty: JR  
  
      (measure.heat-pump  
        cop: 2.2  
        cylinder-insulation: 50  
        type: AirSource  
        cylinder-volume: 110)  
  
      )  
      (finance.with-subsidy  
        subsidy: 500  
        counterparty: JR  
        (measure.heat-pump  
          cop: 2.2  
          cylinder-insulation: 50  
          type: GroundSource  
          cylinder-volume: 110)  
  
        )  
  
    )  
  
    select: (select.minimum  
      (house.emissions)))
```



Modelling strategy

Modelling forum to encourage

- collaboration
- skills

Publish models

- constructive challenge
- improve quality

Assurance process

- standardise and support
- measure progress metrics
- harmonise assumptions and inputs



Model Quality

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20 April 2013 Last updated at 00:53
Reinhart, Rogoff... and Herndon: The student who caught out the profs
By Ruth Alexander
BBC News
This week, economists have been astonished to find that a famous academic paper often used to make the case for austerity cuts contains major errors. Another surprise is that the mistakes, by two eminent Harvard professors, were spotted by a student doing his homework.
It's 4 January 2010, the Marriott Hotel in Atlanta. At the annual meeting of the American Economic Association, Professor Carmen Reinhart and the former chief economist of the International Monetary Fund, Ken Rogoff, are presenting a research paper
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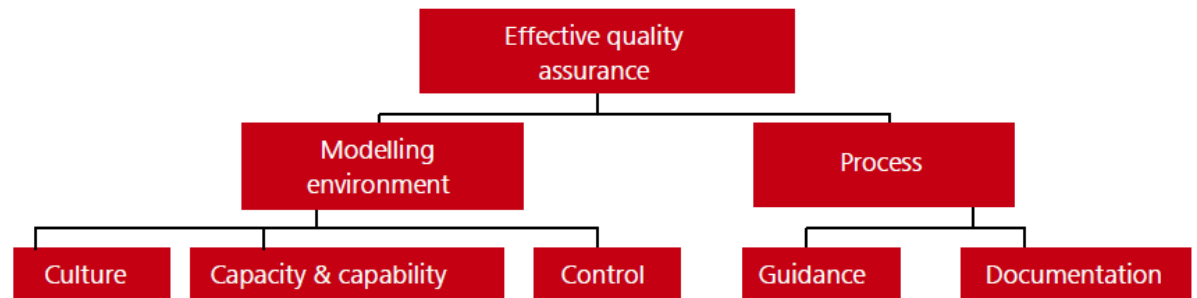


HM TREASURY
Review of quality assurance of Government analytical models:
final report



Modelling Quality Assurance

- Changed environment for models in government
- Increased focus on assurance
- Demonstrating application
- Applies to all





Challenges

Harmonising model inputs

- Data
- Assumptions
- Feedback

Model integrity

- Assurance
- Spread sheets

Knowledge management

- Staff movement
- Document storage and search
- Transparency