



Redefining the Energy Modelling- Policy Interface:

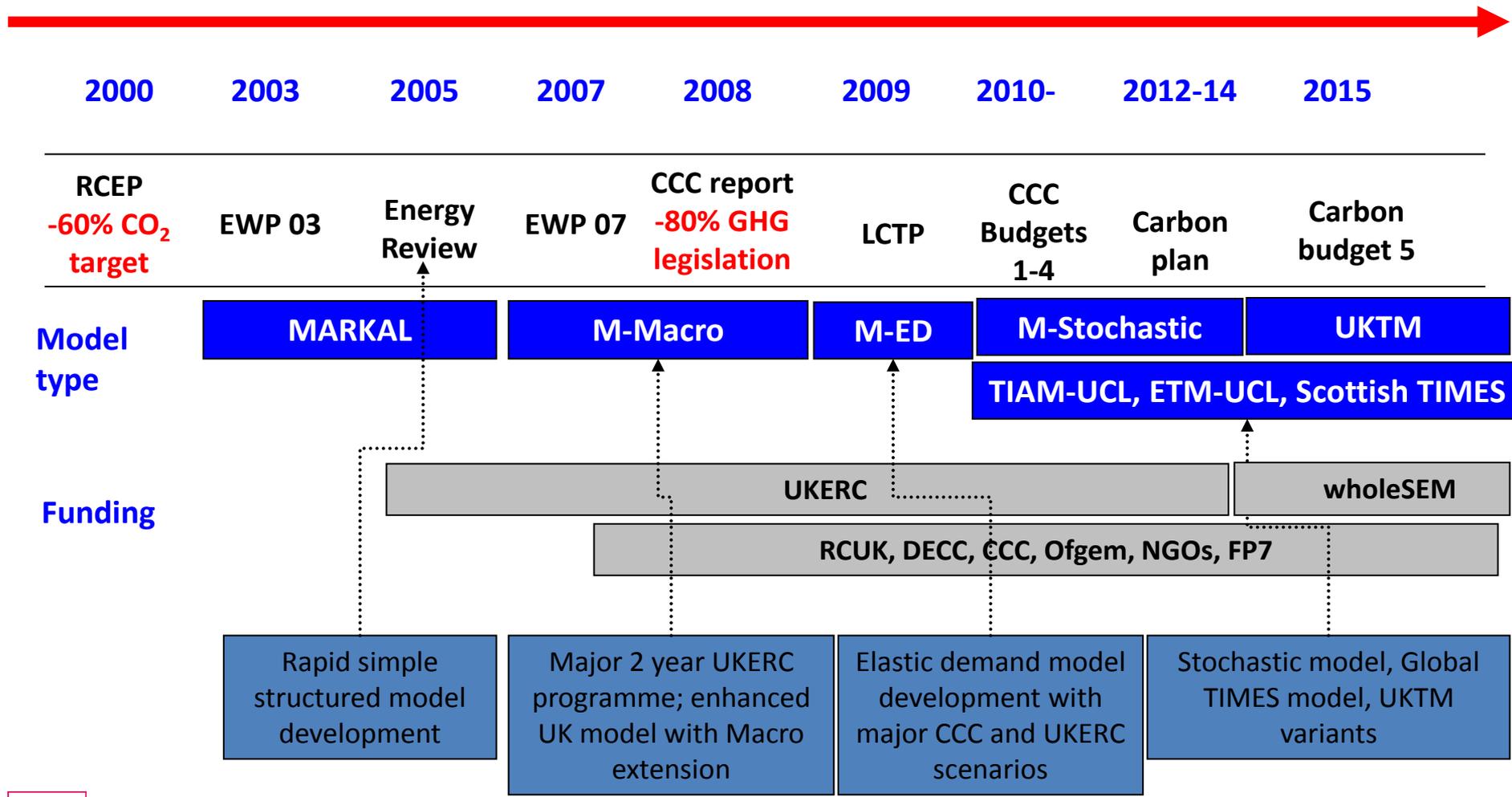
Developing a Fully Open Source UK TIMES Model

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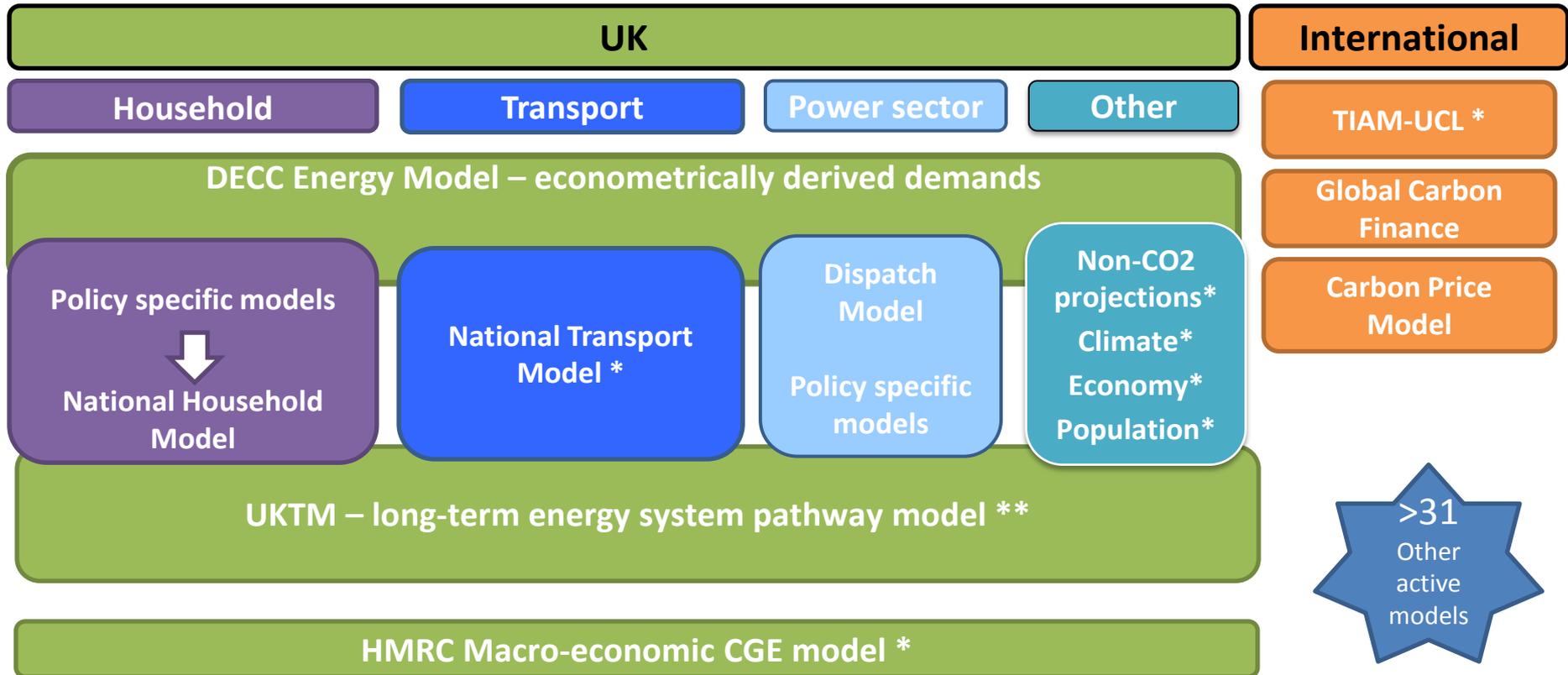
ETSAP Workshop
DTU, Copenhagen
18th November 2014



Energy systems modelling for UK policy



Overview of DECC's modelling landscape



UK GHG budgets

| 5 year Carbon budget | Years | Budget (MtCO ₂ e) | % reduction vs 1990 levels | Status |
|----------------------|-----------|------------------------------|----------------------------|----------------------------|
| 1 st | 2008-2012 | 3,018 | 23% | Achieved |
| 2 nd | 2013-2017 | 2,782 | 29% | On target |
| 3 rd | 2018-2022 | 2,544 | 35% | Legislated |
| 4 th | 2023-2027 | 1,950 | 50% | Legislated |
| 5 th | 2028-2032 | ?? | ?? | To be set in December 2015 |

- UK General election in May 2015
- EU 2030 target
 - Overall ambition (-40% GHGs), relative effort between MS, overlapping additional targets
- Paris COP November 2015
 - USA GHG target 26-28% *below 2005 levels* by 2025
 - China CO₂ aims to peak emissions around 2030



UK Government new focus: Model Quality

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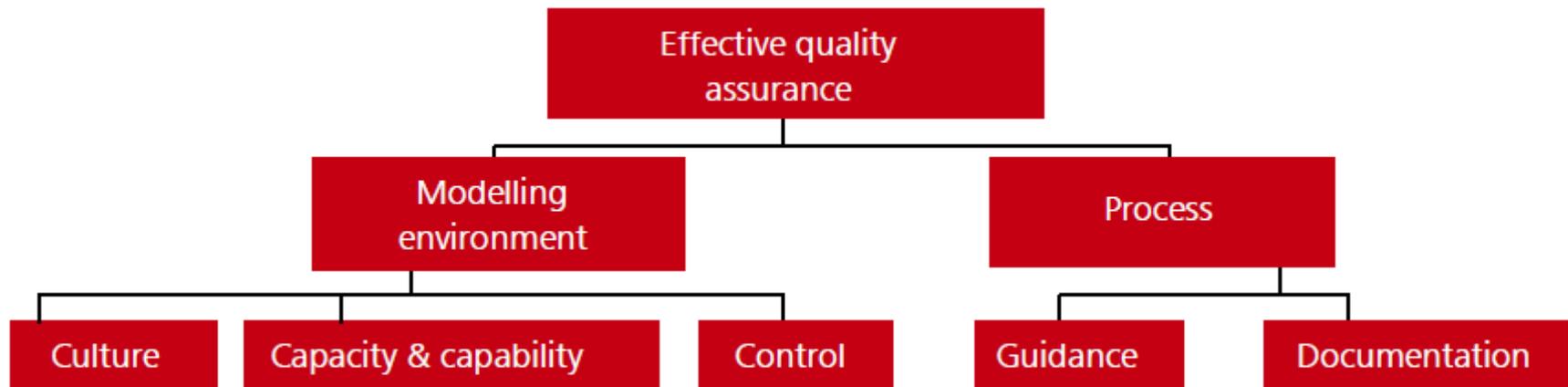
**Review of quality assurance
of Government analytical
models:**

final report



DECC Modelling Integrity team

- Highly prominent focus on quality assurance
 - Formal Review of key DECC Models
 - Ongoing DECC Model Support
 - Developing and embedding best practice, guidance and tools



UKTM – The UK TIMES Model

- **Overview**

Integrated energy systems model - Least cost optimization
- Partial equilibrium - Technology rich - sensitivity and uncertainty analysis

- **New functionality of TIMES & UKTM**

- All GHG emissions;
- Storage, temporal flexibility;
- Industrial & residential sector disaggregation;
- Linkages with European & global TIMES models;
- Full and transparent data update.

- **Ongoing research development**

- Behaviour & fuel poverty;
- Land-Energy-Water nexus;
- Spatial & temporal detail;
- Macro-economic impacts;
- Technology learning.



Why go open source?

- Energy modelling must be replicable and verifiable to be considered part of the scientific process
- The UK's drive towards clarity and quality assurance in the provision of policy insights
 - Consistent with the general movement to open access in publically funded research
- Benefit from the wide range of modelling expertise in academia, industry, and government



It's not just open source modelling

- It's not just open source modelling, it's a new modelling-policy interface
 - Black-box energy models have not been able to clear the muddy water of policy insights where competing models give alternate findings
 - The cottage industry of energy modellers have not been open enough to broader modelling processes and methods
 - Open source has been done before but generally simple models, or just the model (not the results, interpretation, model development)
- Modelling-policy iteration has much needed replicability via stringent version control
- But it also has a collaborative user group to test, improve and apply the model



UKTM open source process

- Long-term (initially 3 years) contract with DECC
 - Series of expert workshops to get buy-in from other government departments, advisors and regulators
 - Embed DECC modeller into UCL team via wholeSEM Fellowship
- Expert user group via memorandum of understanding (MoU)
 - Sharing of “silver version” of UKTM in Sept 2014
- Development of a “gold standard” UKTM
 - Release in Jan 2015
- Version control controlled via a UCL Gatekeeper function
 - Model dissemination via UCL web portal (www.wholesem.ac.uk)
- Broader engagement via Stakeholder workshops
- Research vs production versions (model archaeology)



Our challenges (to date...)

- Who has final control of model
 - What functionality and data improvements are essential?
 - What policies are included and do they all work?
 - Government assumptions = UCL assumptions (?)
- Staff turnover of key analytical people in government
- Resources for full Q&A are very considerable
 - Model plus backing spreadsheets
- Fragility of interlinked model structure
 - Under our version control and wiki platform (Huddle)
- Access, and learning curve, in using TIMES and VEDA
 - [TIMES training course in London in Nov 2014]
- Some initial evidence of free riding in data collation, calibration, maintenance and documentation



Conclusion: Risks and Gains

- Huge risks
 - Folks can take our model, never give us anything back, we lose our IP, we get outbid in future contracts, we don't publish enough, discourages future model development
 - Can we hold the line for in a white hot political environment?
 - Will we drown in Q/A for a fully fledged energy system model?
- Huge gains
 - Modelling at the heart of policy making, sets the bar high for competing models
 - Brings together fresh insights and new expertise, helps solve the problem of maintaining and updating a complex tool

