



Redefining the Energy Modelling- Policy Interface:

Developing a Fully Open Source UK TIMES Model

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UKTM – The UK TIMES Model

- **Overview**

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

Successor of UK MARKAL

- ***New functionality of TIMES & UKTM***

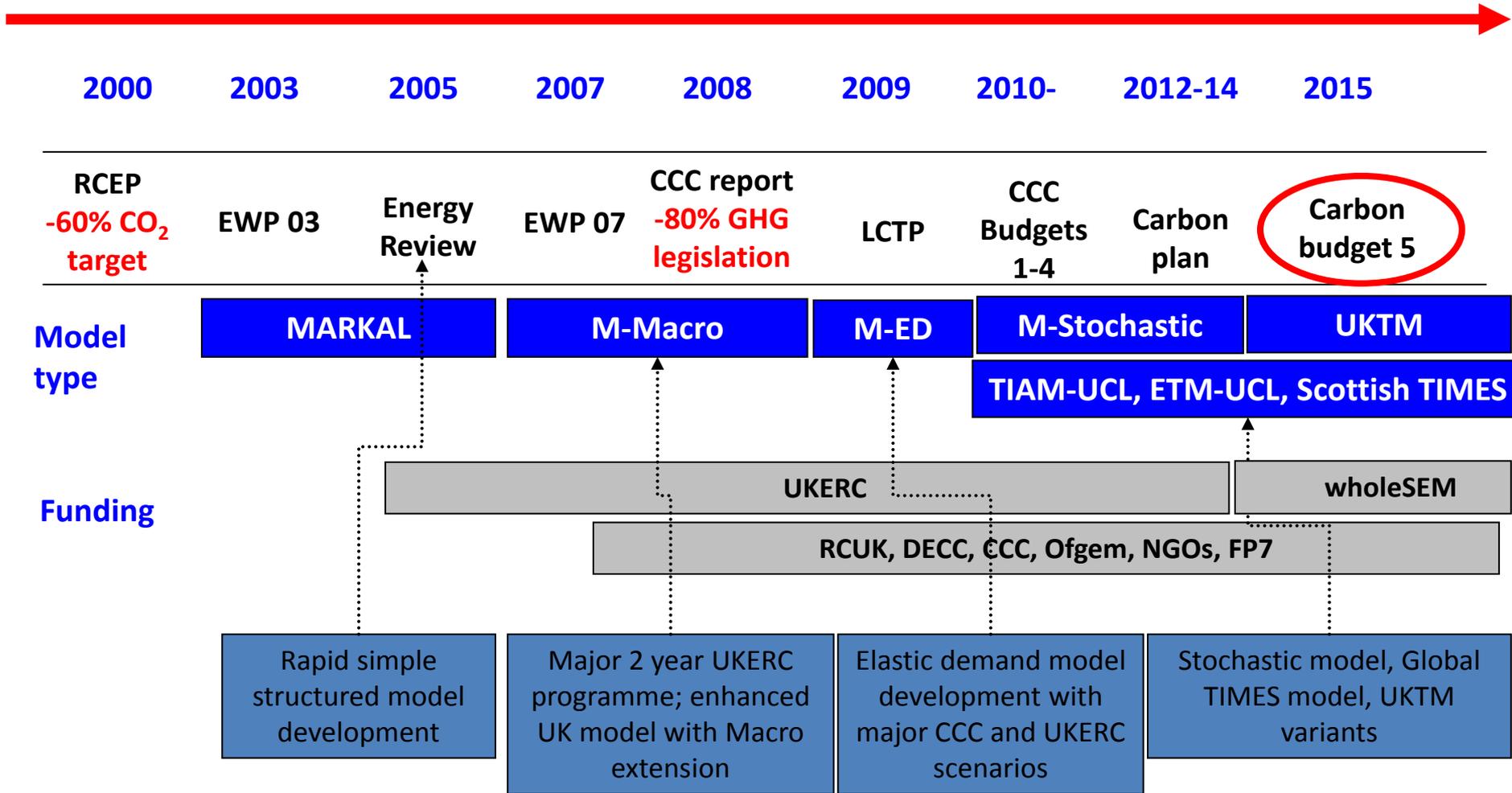
- All GHG emissions;
- Storage, temporal flexibility;
- Industrial & residential sector disaggregation;
- Linkages with European & global TIMES models;
- Full and transparent data update.

- ***Ongoing research development***

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



Strong involvement in UK energy and climate policy...



... and DECC are improving their own modelling capacity

UK Government new focus: Model Quality

After West Coast rail bid fiasco

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→ DECC Modelling

Integrity team

- focus on quality assurance
- Formal Review of key DECC Models
- best practice, guidance and tools



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 spring 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)



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
- **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)
- Benefit from the wide range of modelling expertise in academia, industry, and government → user group



- **IMPACT!!**

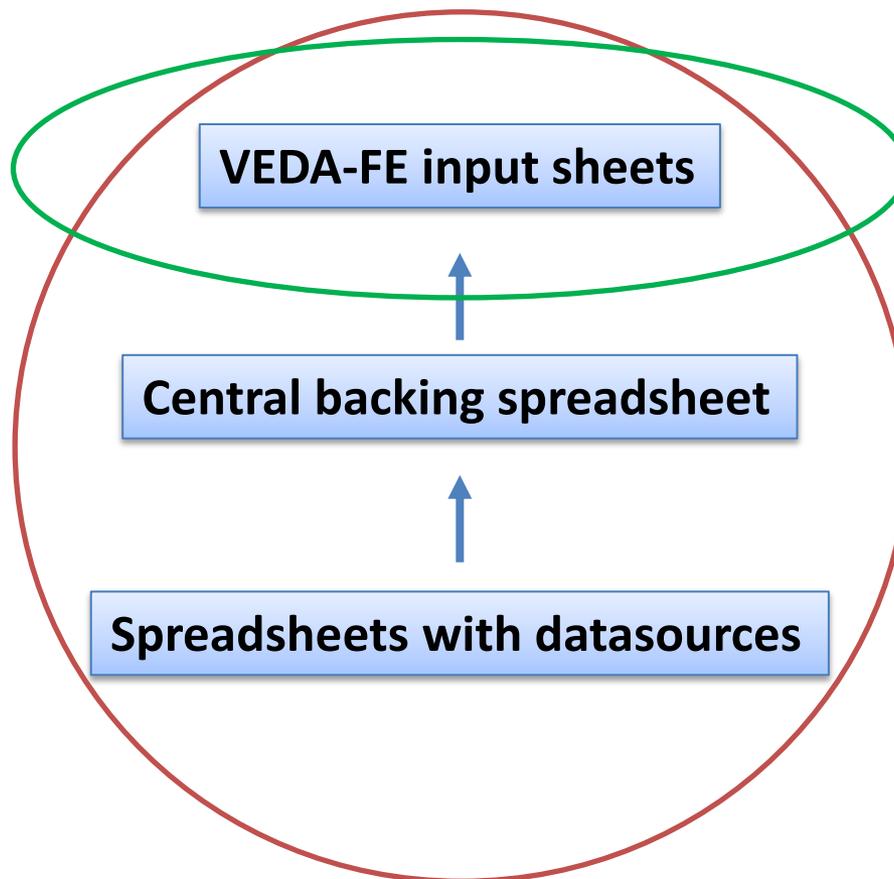
Our challenges (to date...)

- **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
- Some initial evidence of free riding in data collation, calibration, maintenance and documentation



What will be open source?

Three-layered structure in excel



“Light” version for download (user group still gets everything)?

Only for user group or as download for everybody?

Software licenses still required!



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

