

# UCL ENERGY INSTITUTE

Development of the UK TIMES model:  
Learning the lessons of the past

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# Introduction

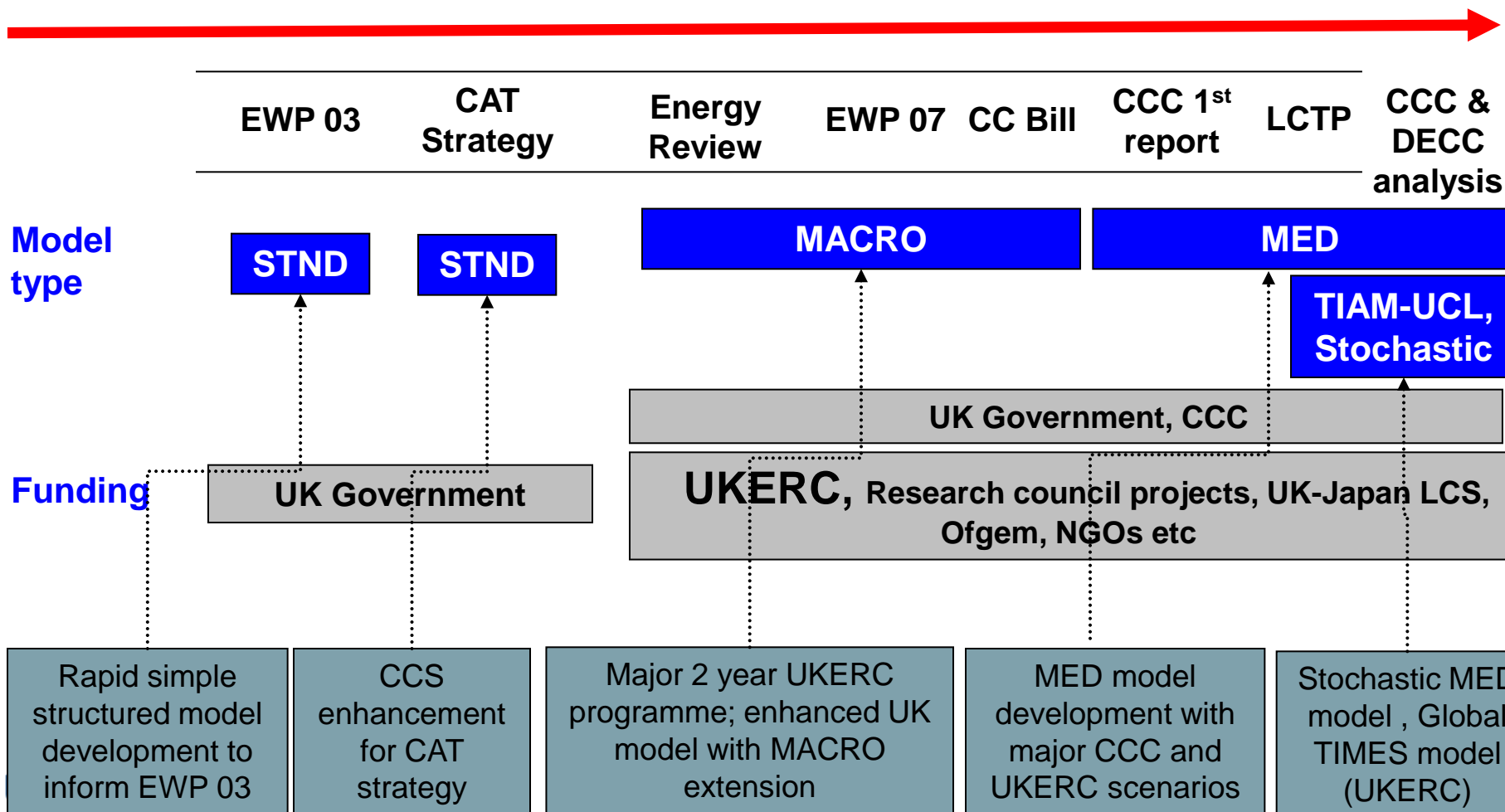
- New UK TIMES energy system model
- Model archaeology – how do energy system models change over time?
- What can we learn from our experience with UK MARKAL to improve UK TIMES?

# MARKAL modelling for UK policy

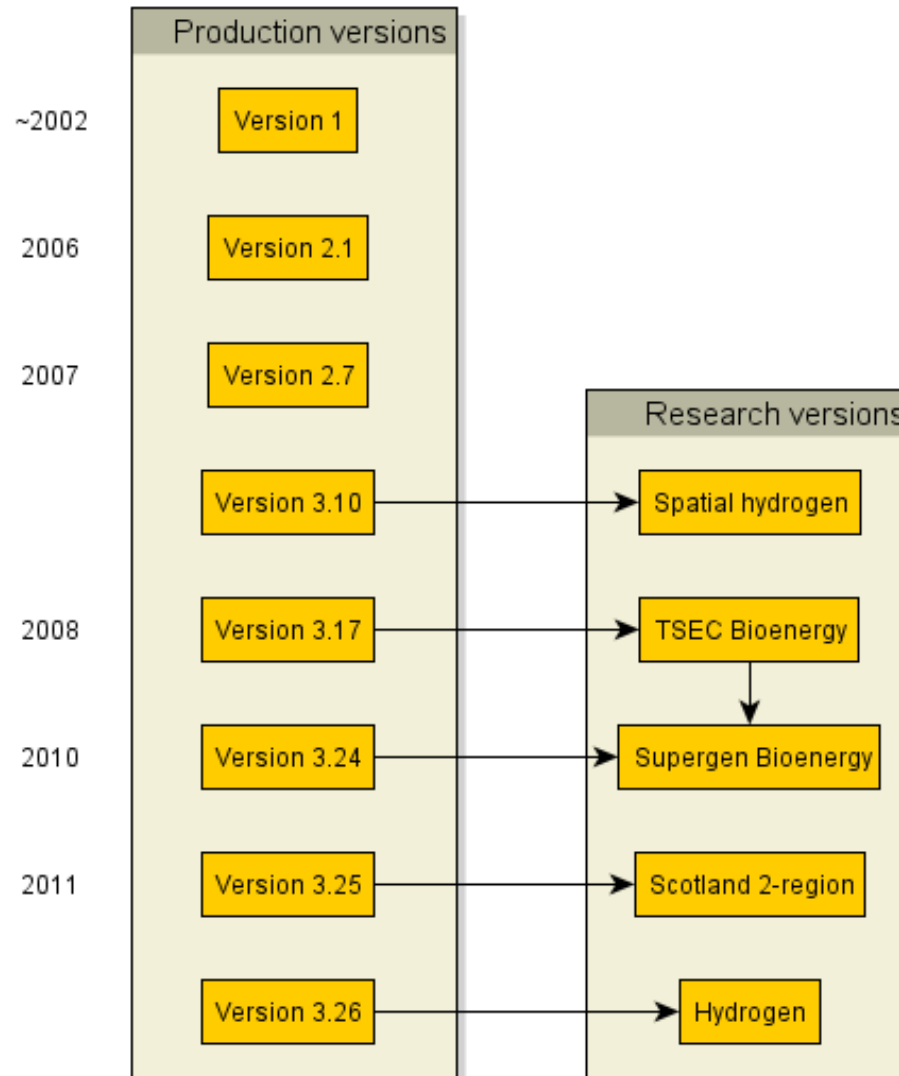
2000

2007

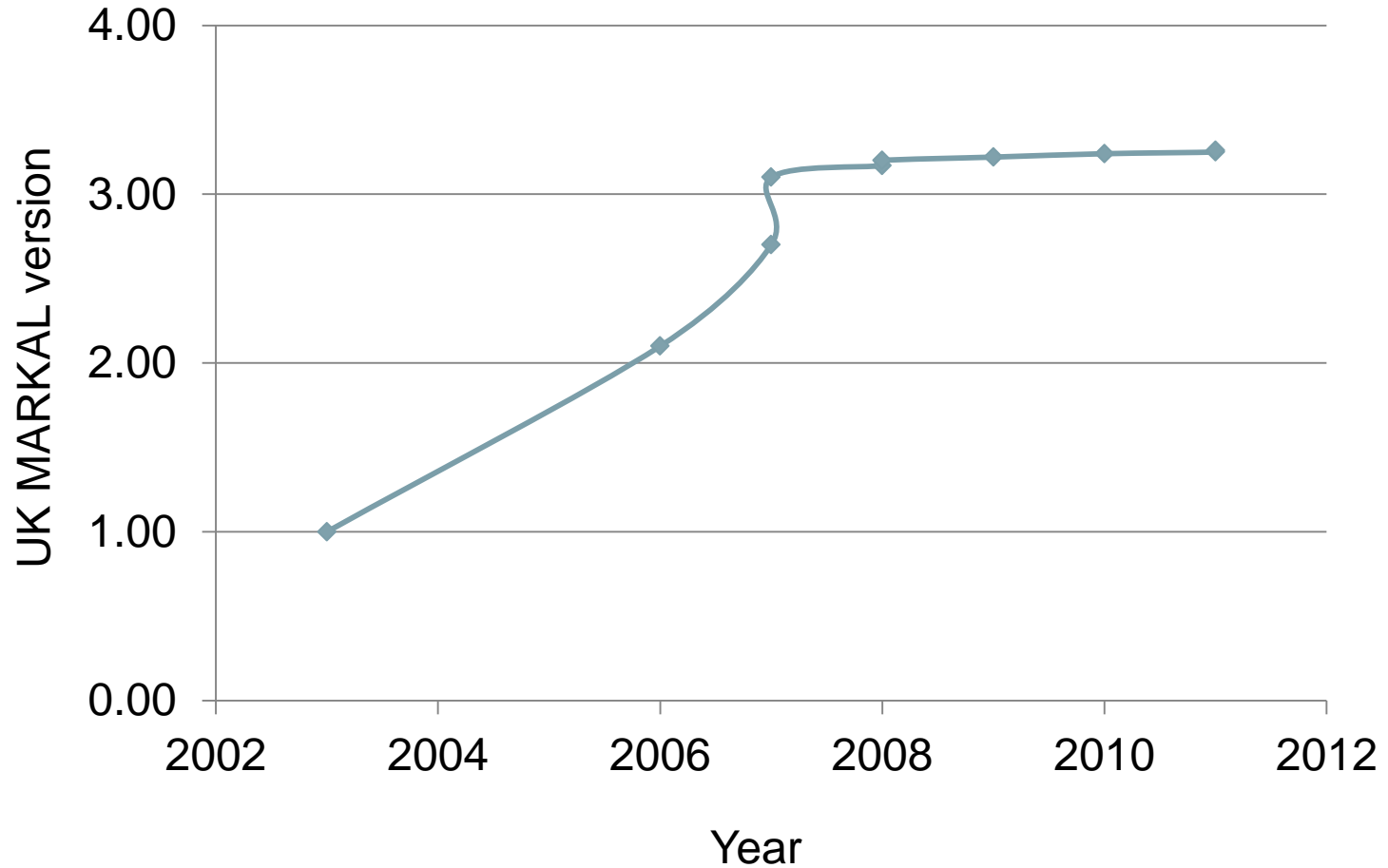
2010



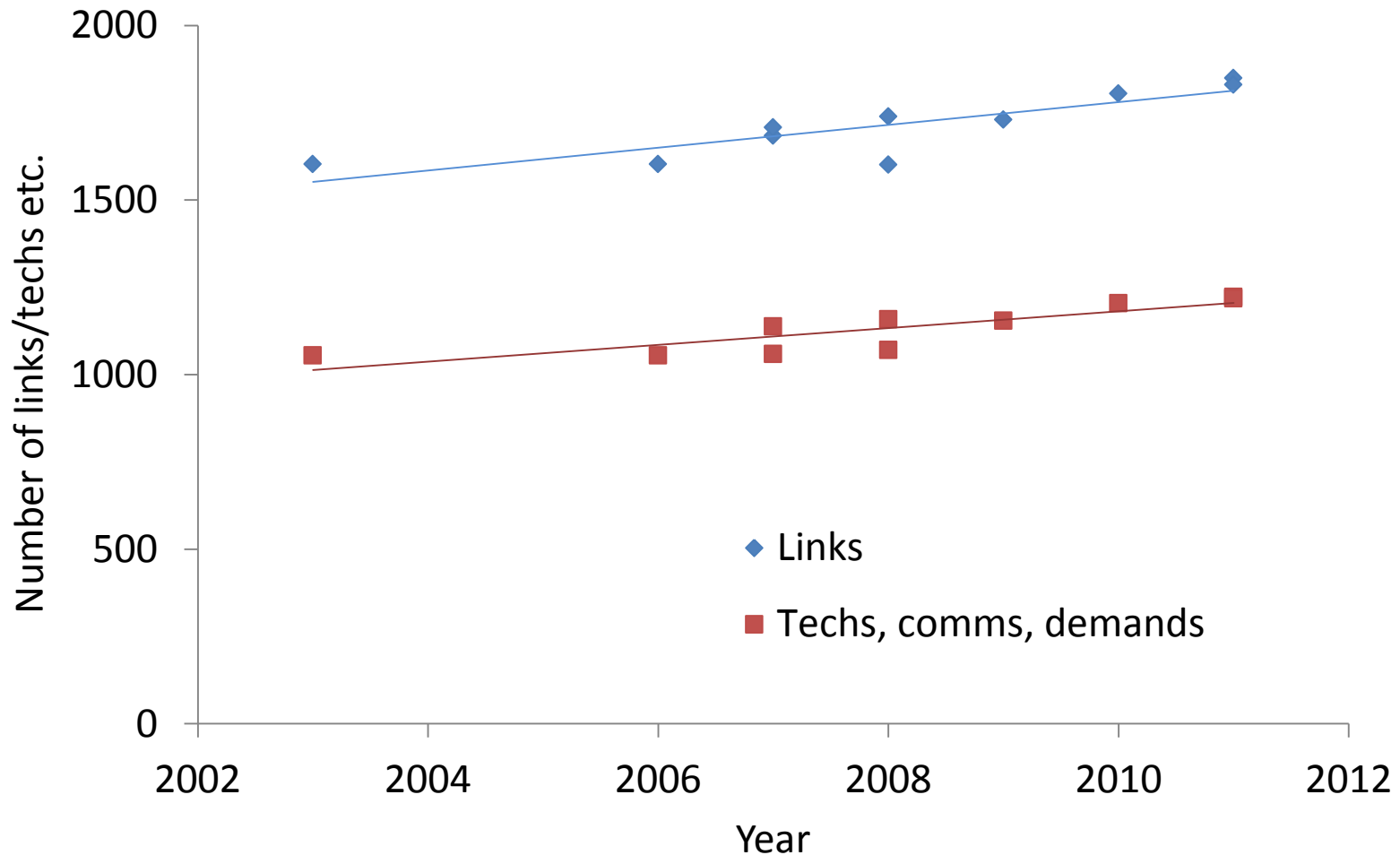
# UK MARKAL timeline



# UK MARKAL version numbering



# UK MARKAL structure: links, items



# Changes to UK MARKAL structure and parameter data

UK MARKAL version	Year	Number	Additions	Deletions	Cost changes	Flow changes
v1.0	2003	1270				
v2.1	2006	1270	0%	0%	0%	0%
v2.7	2007	1270	0%	0%	0%	0%
v3.17	2008	1266	17%	17%	9%	3%
v3.22	2009	1346	7%	1%	1%	3%
v3.25	2010	1401	4%	0%	3%	2%
v3.26	2011	1418	2%	1%	22%	3%

## What has gone well?

- Model data has been updated over time
- Different versions of the model have been developed to examine policy questions
- Strong input into the policy process
- Different teams using the model have shared improvements



## What could have gone better?

- Too many constraints – what do they all do?
- Some sectors have internally-inconsistent data
  - Inconsistencies from using data from different sources with different underlying assumptions
  - Inconsistencies from only updating some technologies in a sector
  - Errors introduced through mis-understandings between teams
- No long-term vision – perhaps linked to an unwillingness to greatly change the structure of the model

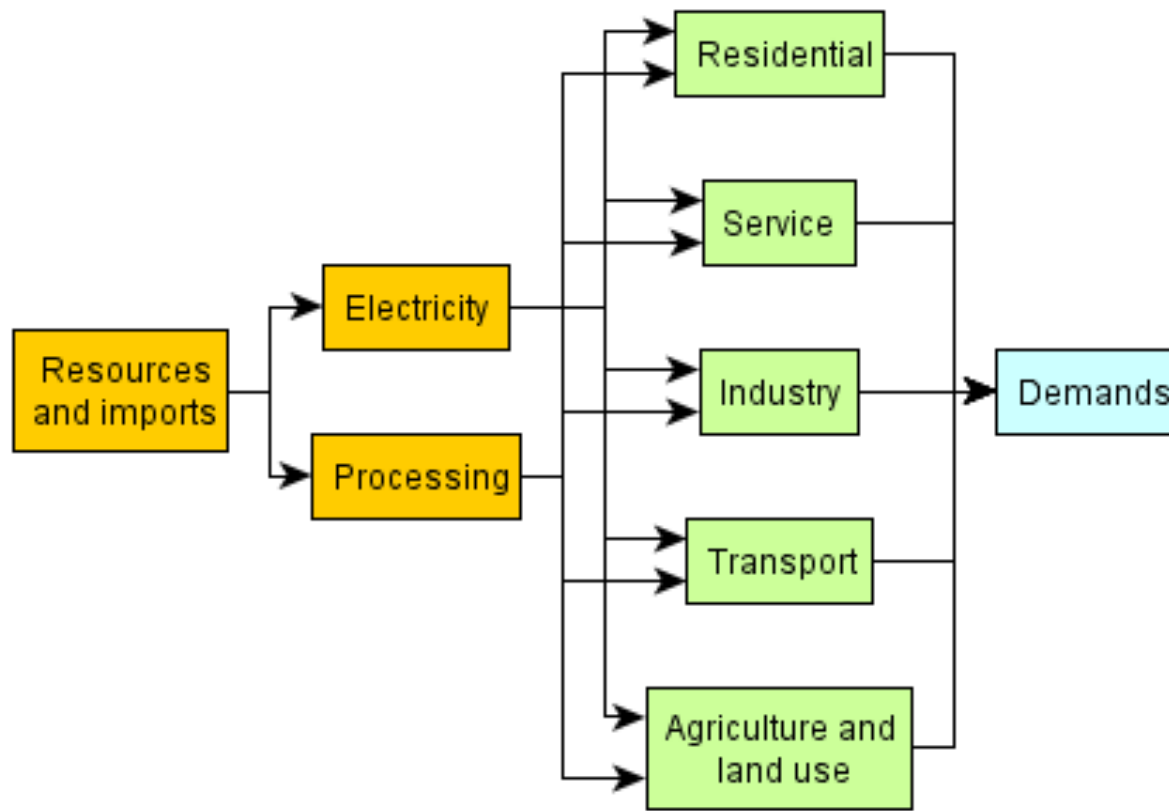
## What could have gone better?

- Improvements from research projects not always fed back into the production version of the model
- Inconsistent naming strategy in different sectors
- Manual not updated since 2008

## How does model updating work?

- MoU between partners requiring each partner to share and document changes with all of the other parties
  - AEAT (consultancy)
  - UCL
  - other universities for one-off projects
- UCL nominally look after the model but...
  - there are no formal processes for changing the model
  - there are no procedures (or resources) for understanding the whether the changes should be included

# UK TIMES design



## UK TIMES features

- Based on the UK MARKAL hydrogen and bioenergy research models
- All-GHG model so will include experimental agriculture and land use module
- Better representation of energy system infrastructure and energy storage

## UK TIMES features

- Better functionality for policy analysis: full separation of resources, technologies, energy service demands, taxes, subsidies, other policies and transition constraints
- Improved model version control, with processes for updating the model and documentation and UCL taking ownership
- More comprehensive model documentation

## UK TIMES vision for future development

- New types of energy service demands (funded)
- Spatial and temporal disaggregation
  
- Land use and materials
- Macroeconomic implications (funded)
- Technology diffusion and behavioural change (funded)
- Stochastic and myopic processes

# Thank you for listening

## Questions?



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