Mapping UK's energy modelling expertise

Marianne Zeyringer

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m.zeyringer@ucl.ac.uk
UCL Energy Institute

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Motivation

A wide range of models is required to support UK's energy policy:

→ Renewable energy targets + Greenhouse gas emission reduction targets
→ Security of supply

BUT

- 2003: Only 6 academic research groups held energy modelling capacity (Berkhout et al., 2003)
- 2011: Challenges remain in sustaining consistent funding of energy modelling teams (Strachan, 2011)

⇩

What is UK's current energy modelling expertise?
Is it ready to perform the energy modelling and analysis required?

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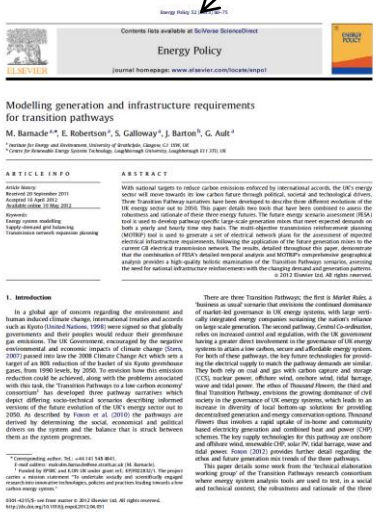
Method

Our Model Definition:

- Name
- Output
- Several parts of the energy system
- UK wide application



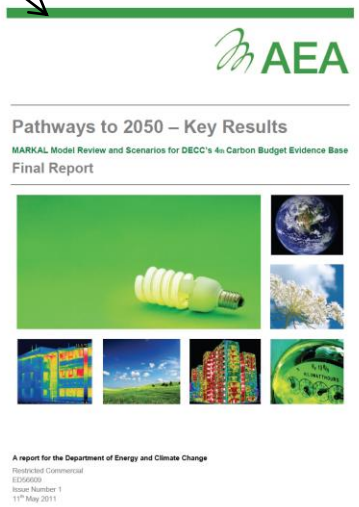
Contents lists available at SciVerse ScienceDirect

Energy Policy

journal homepage: www.elsevier.com/locate/enpol

Modelling generation and infrastructure requirements for transition pathways

M. Barnacle, E. Robertson, S. Galloway, J. Barton, G. Ault



AEA

Pathways to 2050 – Key Results

MARKAL Model Review and Scenarios for DECC's 4th Carbon Budget Evidence Base

Final Report

A report for the Department of Energy and Climate Change

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Method

Model coverage

- Energy system
- Electricity system
- Electricity and Gas
- Grid
- Transport sector
- Aviation
- Buildings and Household sector
- Hydrogen Oil and Gas
- Climate Change
- Macro- economy

Model types

	Optimization	Simulation
Stock model		
Integrated Assessment		
Spatial		
Input Output CGE		
Accounting		
Resource		
Agent based		

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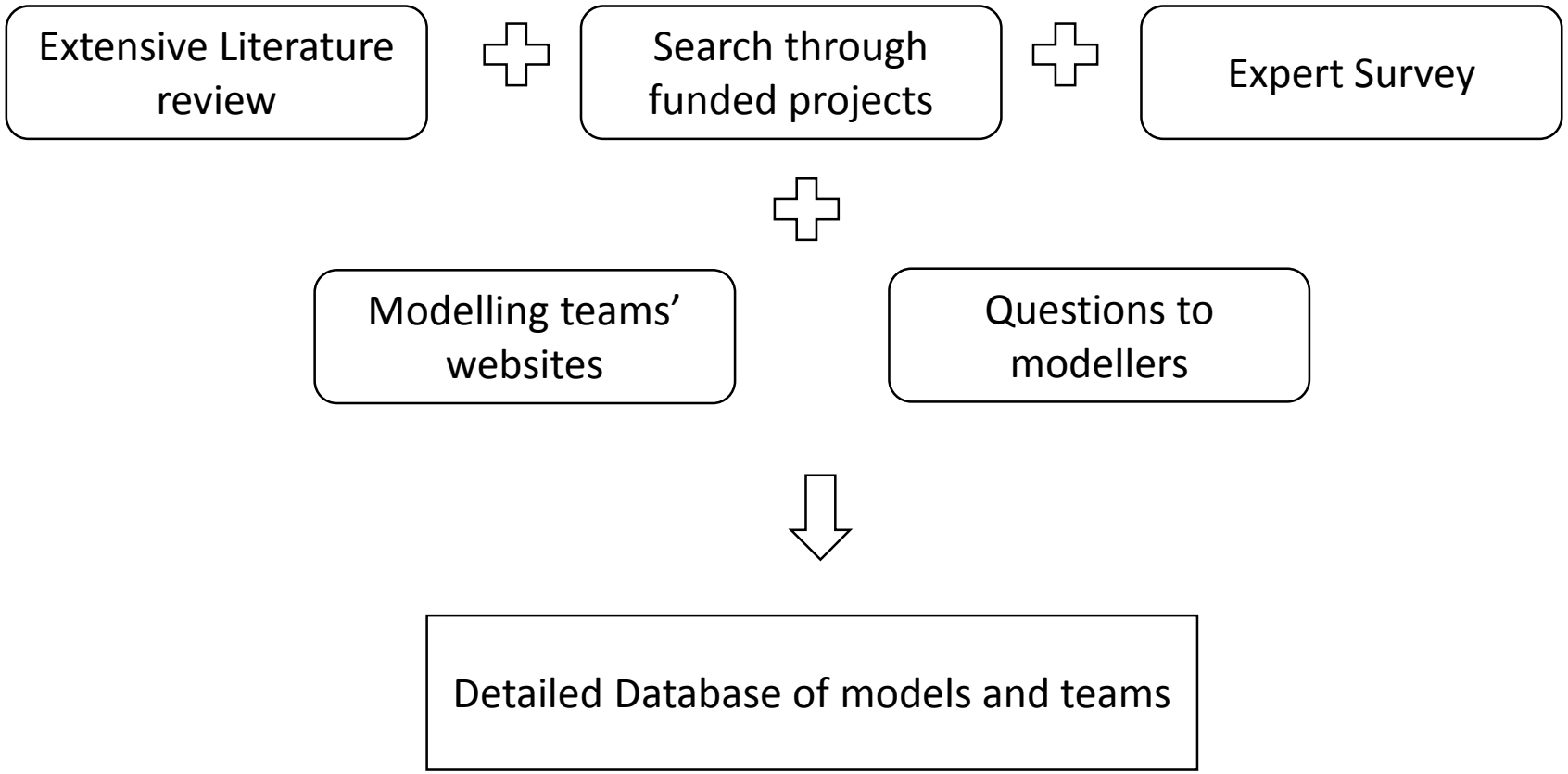
Method



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Results

Type of Organisation	Number per Organisational Type	Number of models
Government	5	8
Company	1	1
Research	1	1
Consultancy	9	11
University	16	32
Departments	20	
Total	**32**	**53**

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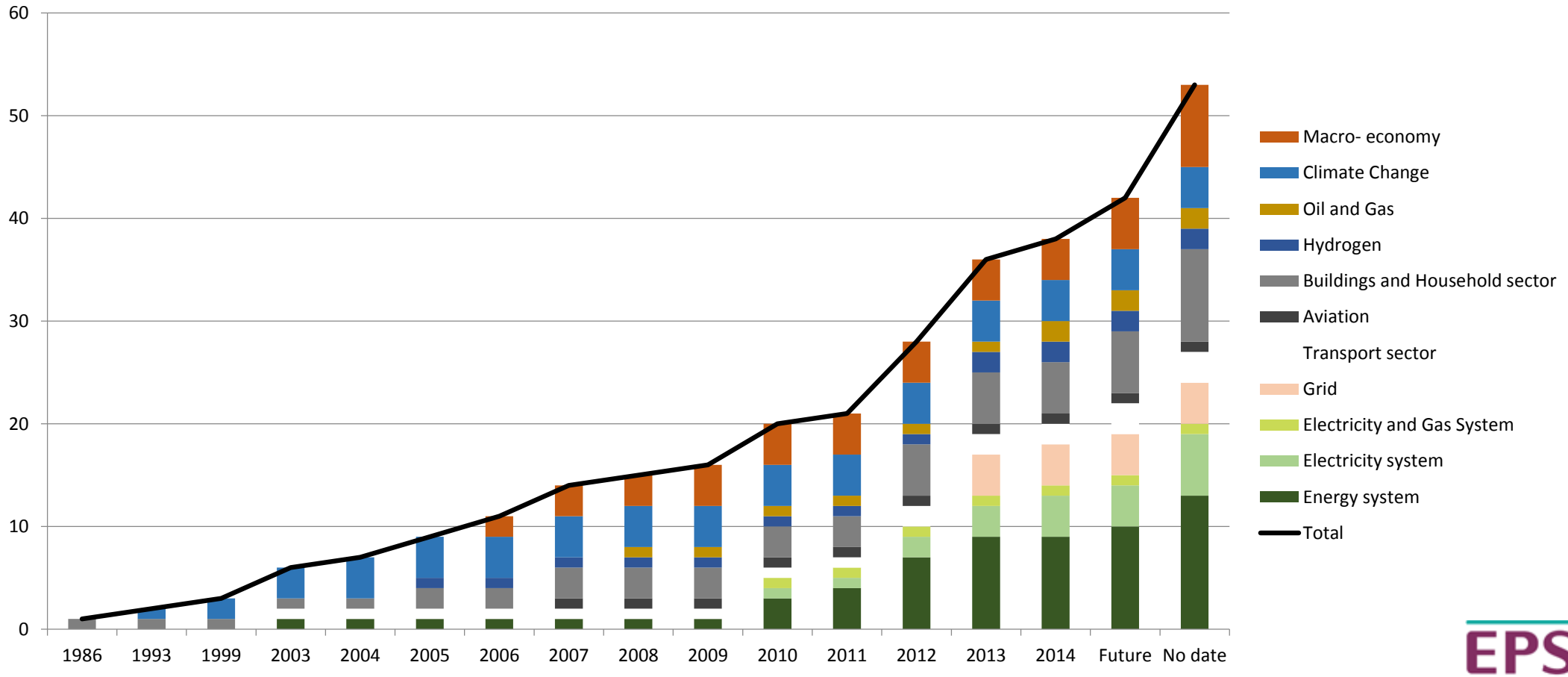
Results

Model coverage over time



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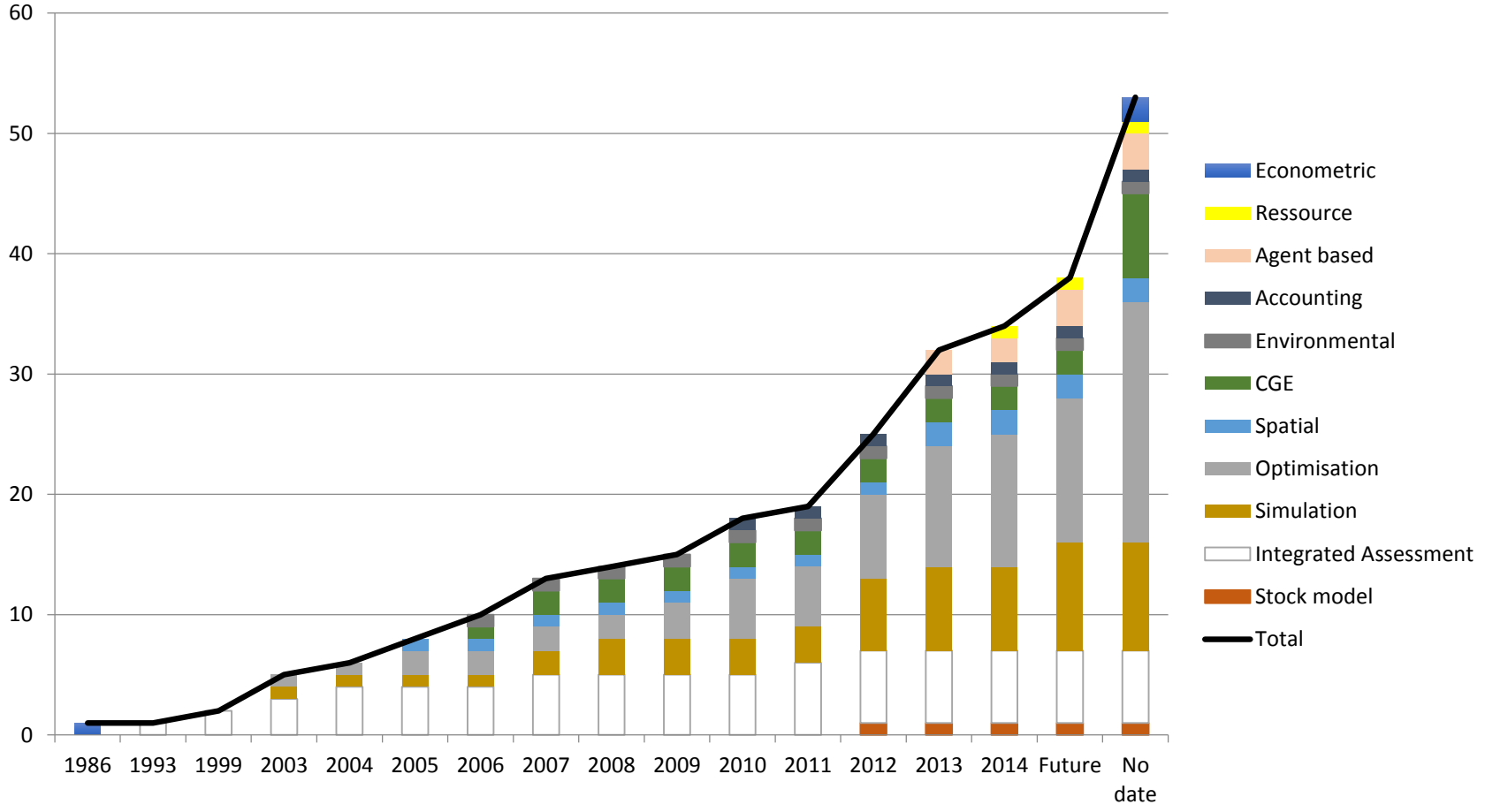
Results

Model types over time



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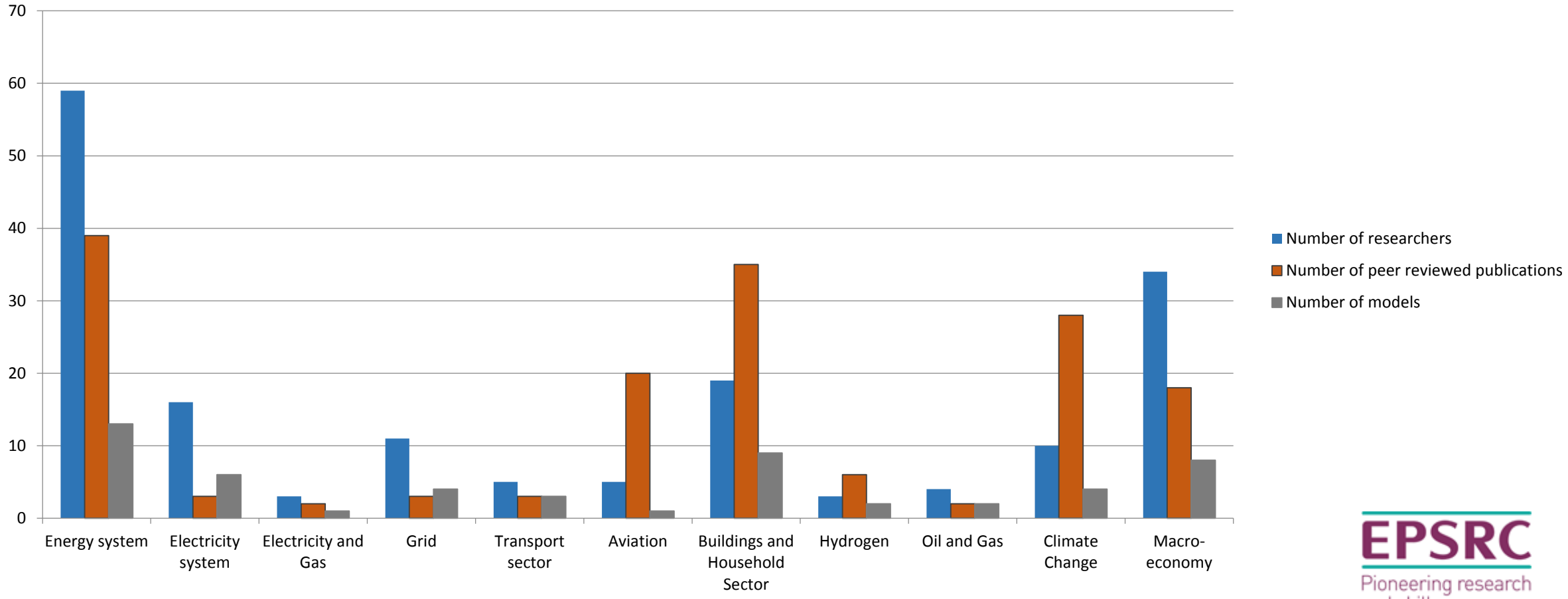
Results

Number of researchers, models and peer reviewed publications



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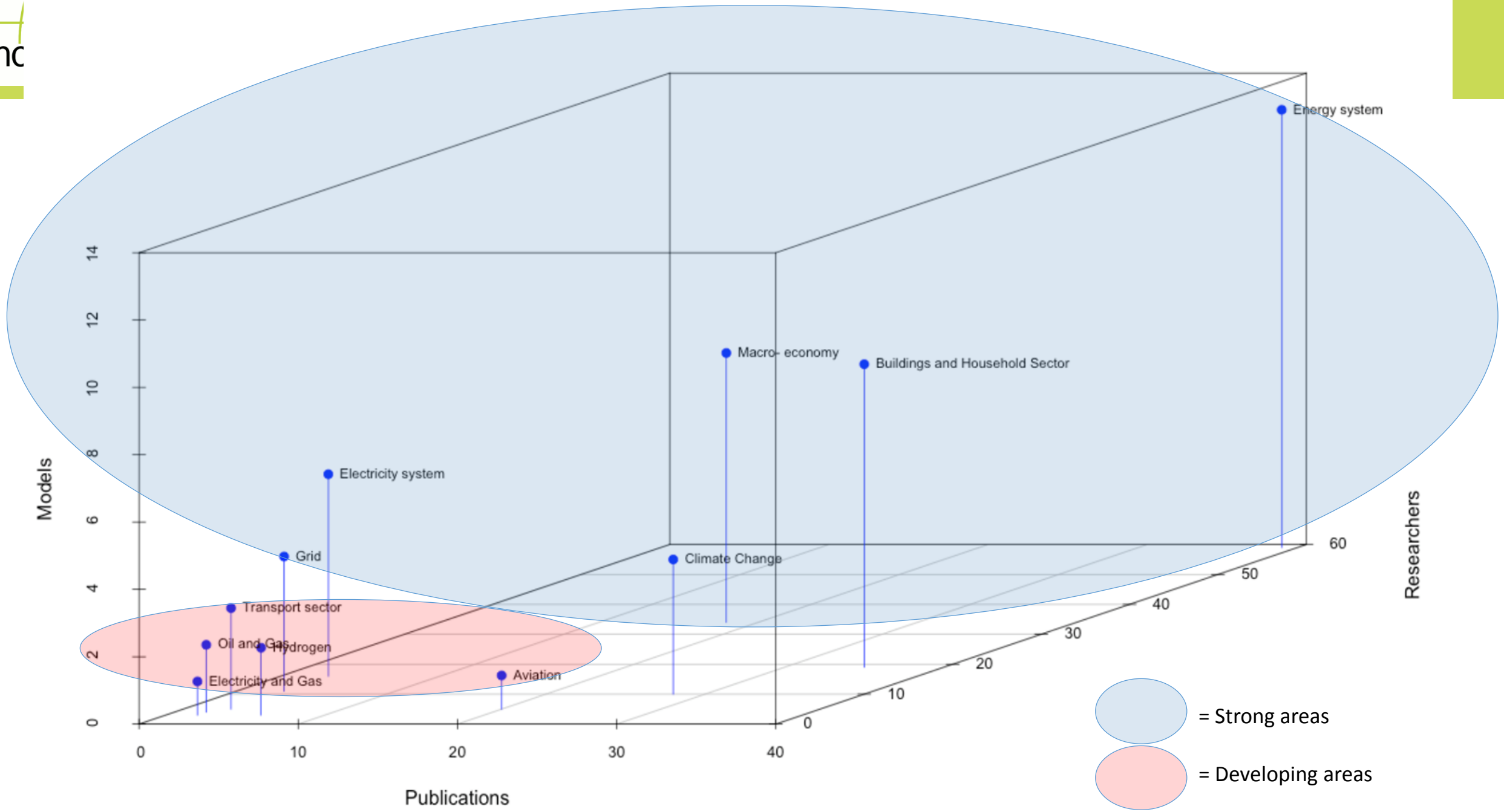
Conclusions

- Strong and persistent growth over last 5 years (more than doubling in model numbers)

Strong areas	Developing areas	Weak areas
2 out of 3: - Number of researchers: ≥ 10 - Number of publications: ≥ 10 - Number of models: ≥ 3	- Number of researchers: <10 - Number of publications: <10 - Number of models: <3	No models fulfilling our criteria


Energy system
Macro- economy
Buildings and Household Sector
Electricity system
Grid
Climate Change
Transport sector
Oil and Gas
Hydrogen
Electricity and Gas
Aviation
Models
Publications
Researchers
0
2
4
6
8
10
12
14
0
10
20
30
40
0
10
20
30
40
50
60
= Strong areas
= Developing areas

Conclusions

Strong areas	Developing areas	Weak areas
Energy systems Electricity Systems Electricity Grid infrastructure Buildings and Households Climate Change Macro -economy	Electricity and gas Transport Aviation Hydrogen Oil and Gas	Sector specific models: Industry Service sector Biomass Demand

→ Efforts required to maintain modeling capacity in strong areas and build up the developing and weak areas

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Outlook

→ Ongoing work on 2 papers

- Mapping UK's energy modelling expertise
- An international comparison of energy modelling capacities (together with international partners)