

Supporting National Hydrogen and Fuel Cell Innovation Systems: Germany and the UK Compared

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Overview

- Research Aims
- Methodology
- German Case Study Areas
- UK Case Study Areas
- German-UK Comparisons
- Comparative Case Study Findings
- Conclusions

Research Aims

- To undertake an international comparative analysis of the hydrogen and fuel cell (H&FC) innovation systems* in the UK and Germany
- Explore lessons for policy and industrial development



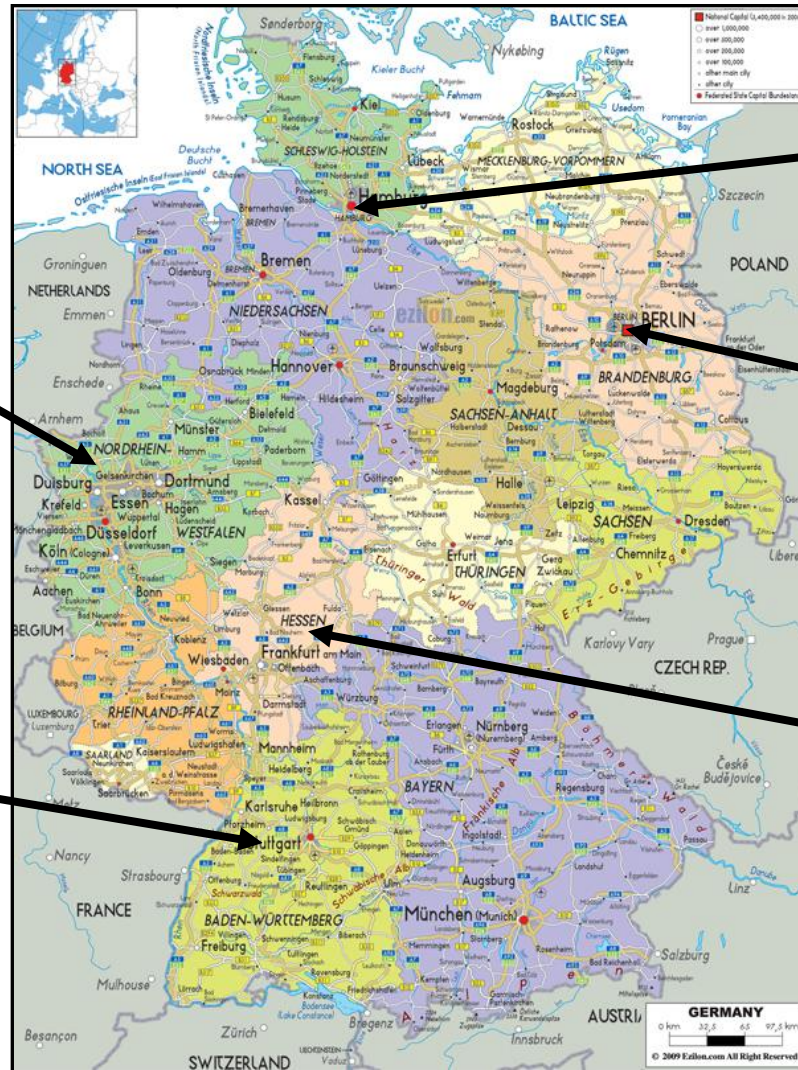
* the networks of actors and institutions whose activities and interactions bring about the development and diffusion of new technologies and industries



Methodology

- Forty nine in-depth qualitative interviews
- Nested comparative national and regional case studies
- Quantitative analysis of RD&D, market data and interviews

German Case Study Areas



Hamburg

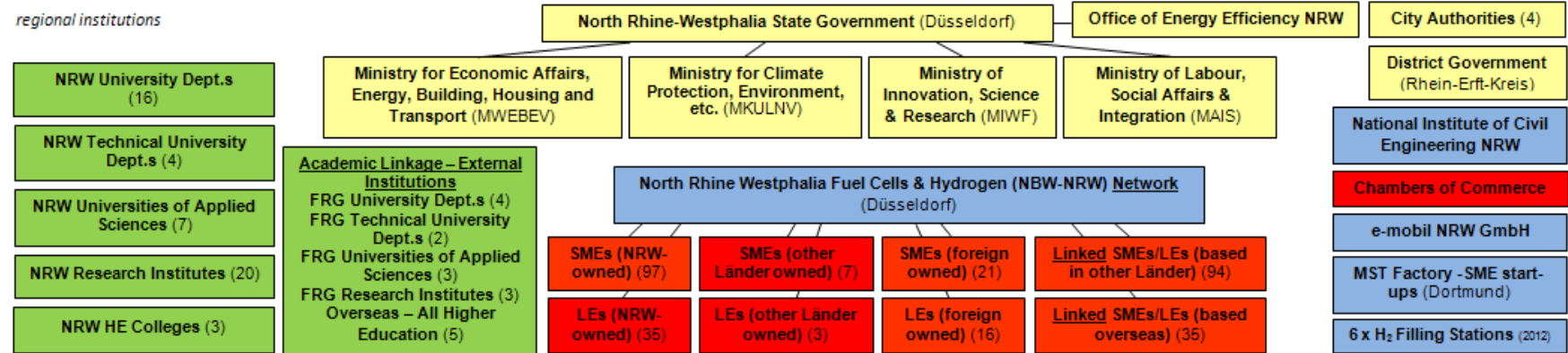
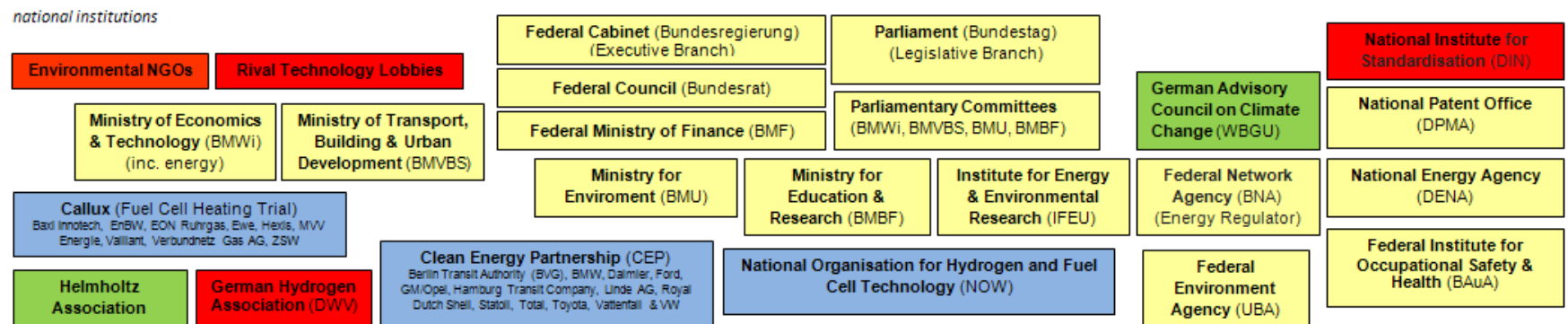
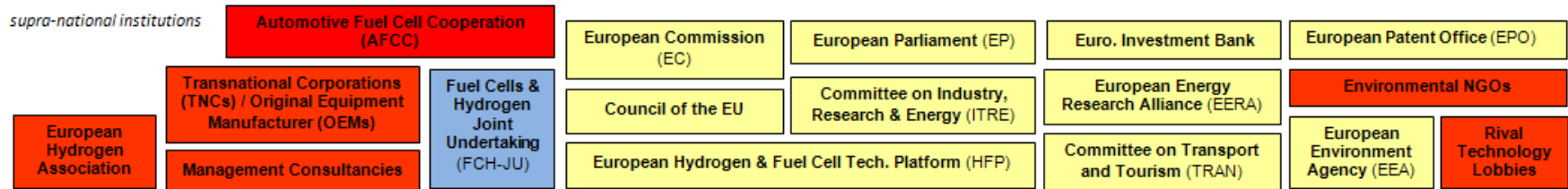
North Rhine-Westphalia

Berlin

Baden-Württemberg

Hesse

Institution key	public	private company / lobby
	public / private	academic / policy research



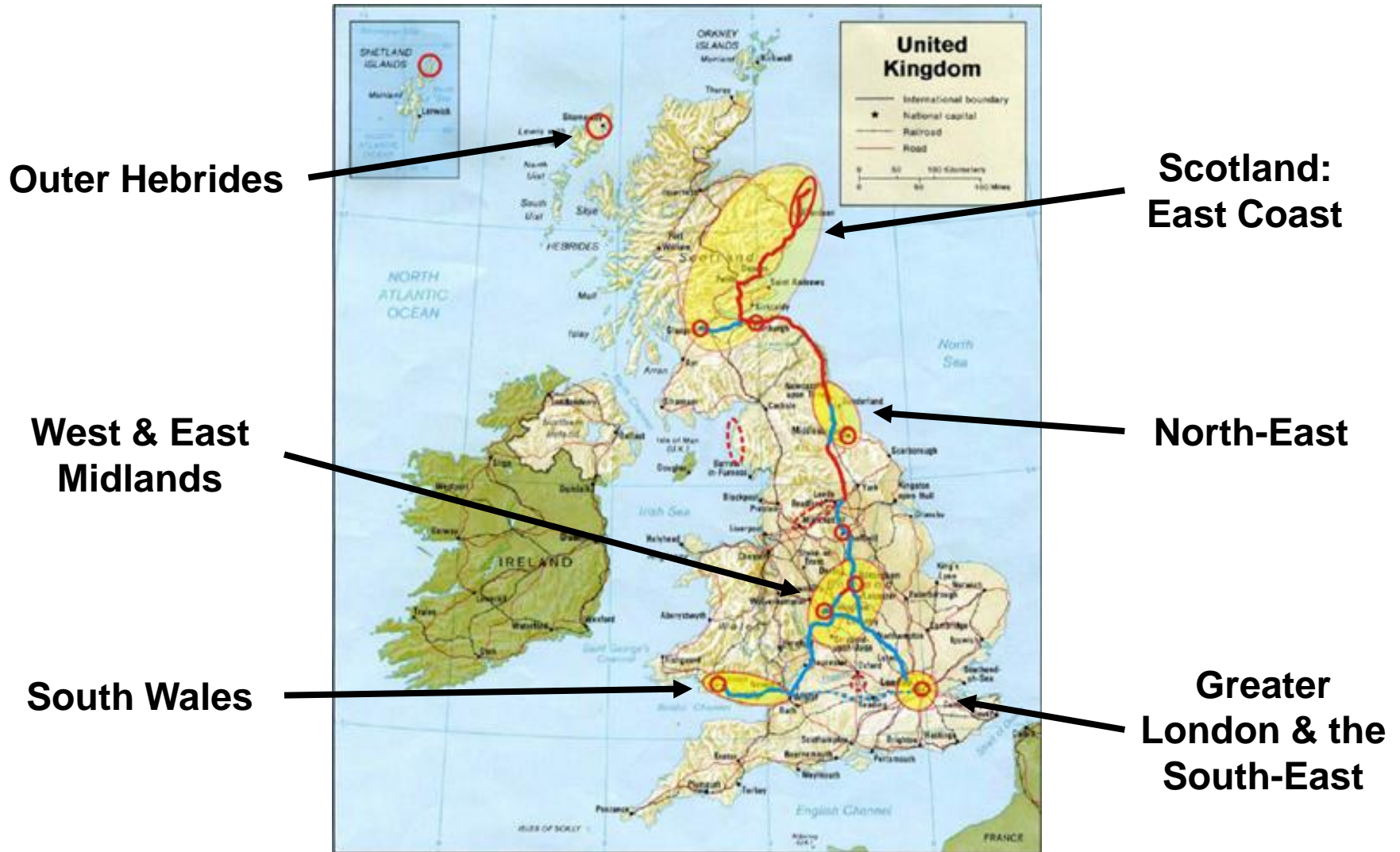
Institutional Mapping of Hydrogen and Fuel Cell (H&FC) Activity - North Rhine-Westphalia (NRW)



German Energy Policy & Decarbonisation

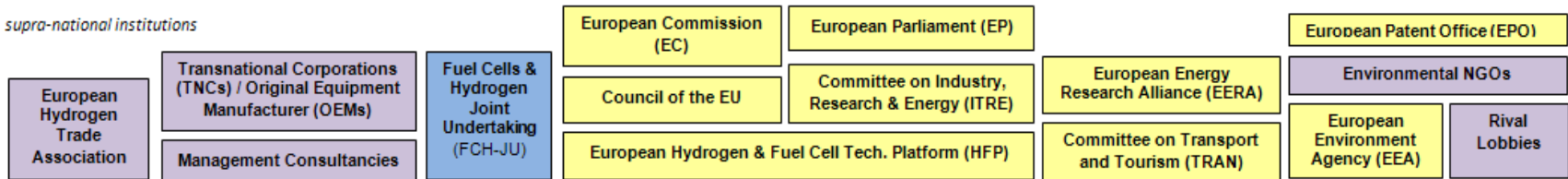
- Priority to Renewable Energy Sources Act (EEG) (2000)
- Clean Energy Partnership (CEP) (2002)
- National Innovation Programme (NIP) (2006)
- National Organization Hydrogen & Fuel Cell Technology (NOW) (2008-16)
- Memorandum of Understanding (MOU) (2009)
- H2 Mobility programme (2009)
- Konjunkturpaket II programme (2009)
- *Energiewende* Plan ('Energy Transformation') (2010)

UK Case Study Areas

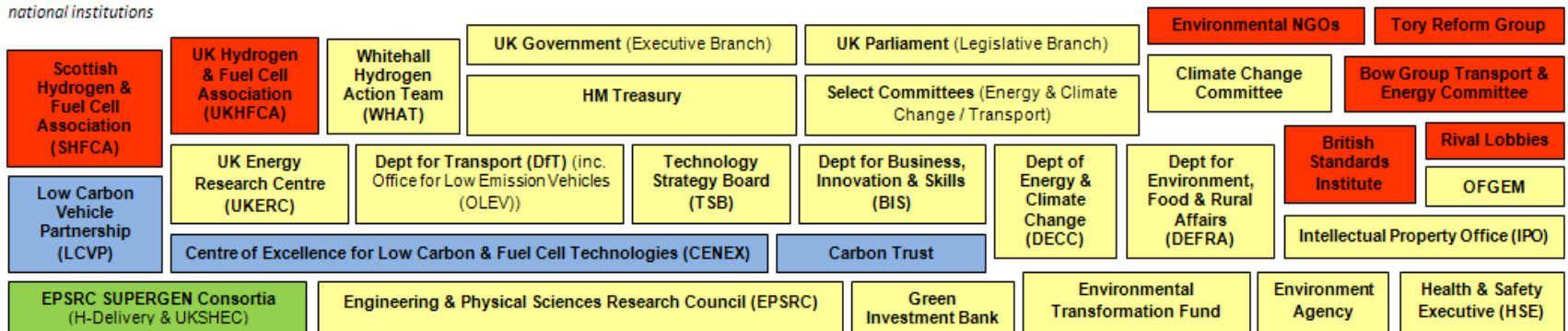


Institution key	public	private company / lobby
	public / private	academic / policy research

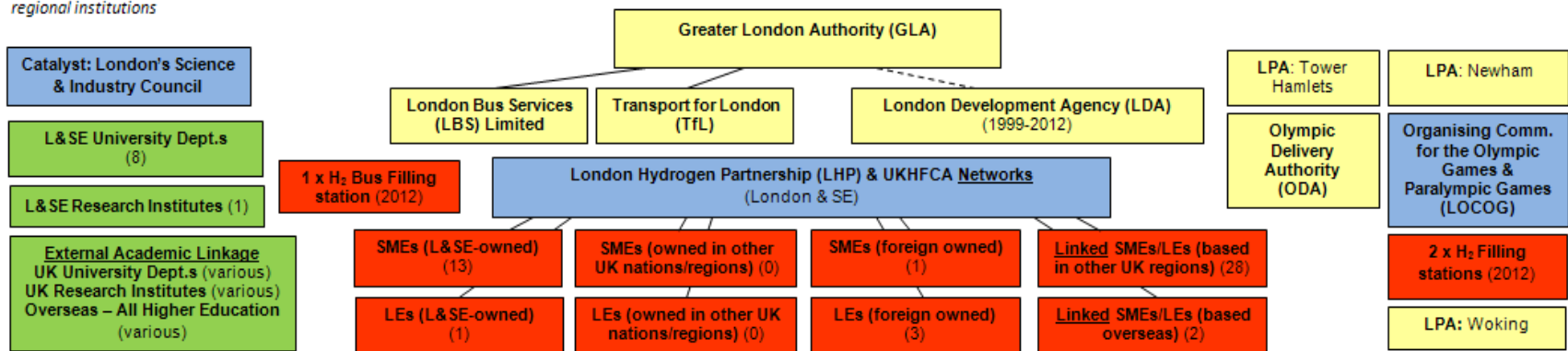
supra-national institutions



national institutions



regional institutions



LPA = Local Planning Authority

Institutional Mapping of Hydrogen and Fuel Cell (H&FC) Activity – London & SE Regions (LSE)



UK Energy Policy & Decarbonisation

- Climate Change and Sustainable Energy Act (2006)
- Microgeneration Strategy (2006)
- Energy Act (2008)
- Climate Change Act (2008)
- Low Carbon Transition Plan (2009)
- Energy Act (2010)
- Ultra-low Emission Vehicle (ULEV) Purchase Grant (2011)
- UKH₂Mobility programme evaluation (2012-13)



German-UK Comparisons



German public H₂ fuelling stations (2012) = 15

German planned hydrogen fuelling stations:

2013 = 15+

2015 = 50+

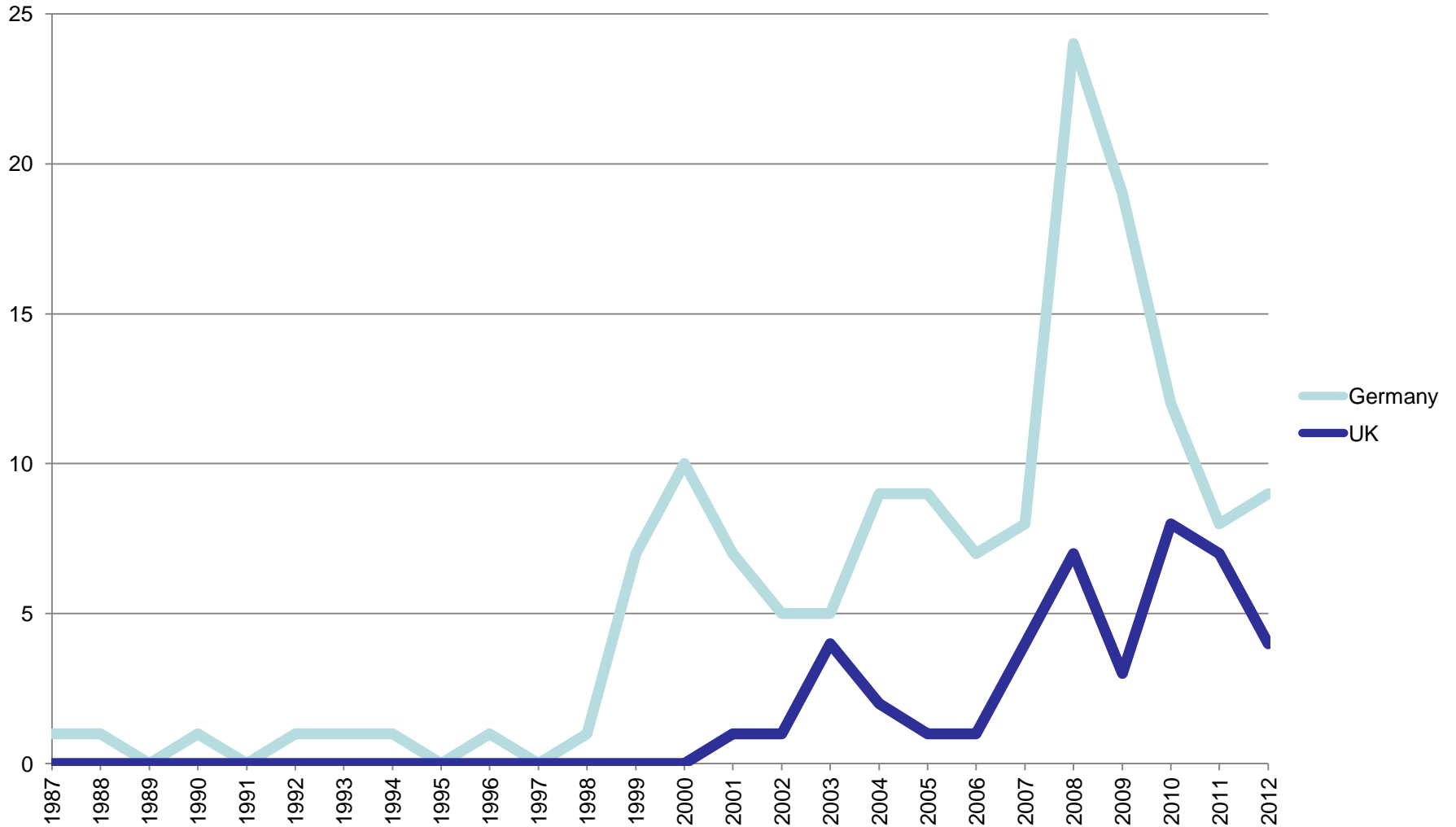
2020 = 1000



UK public H₂ fuelling stations (2012) = 4

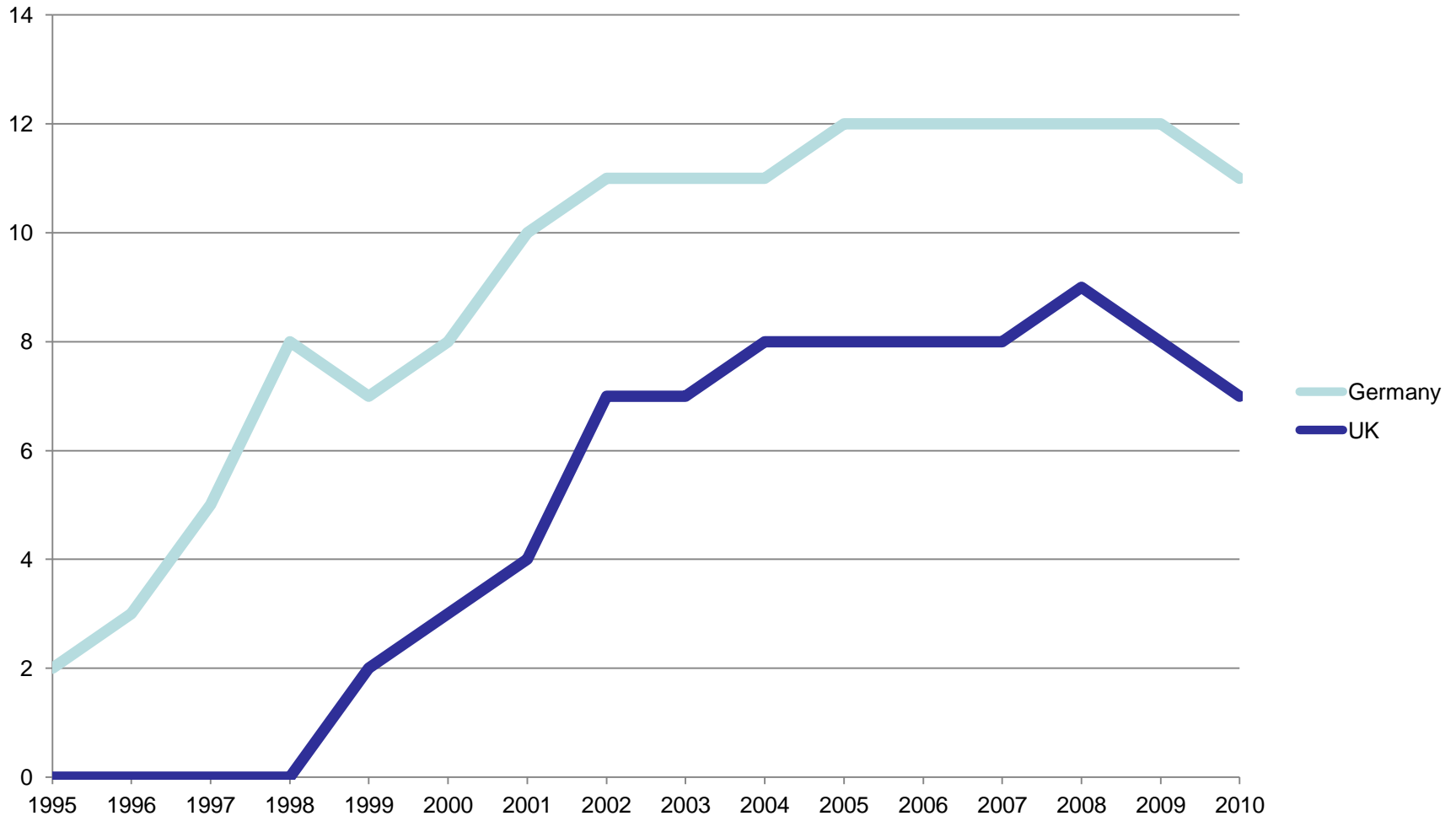


New Hydrogen/Fuel Cell Demonstration Start Dates (1987-2012)

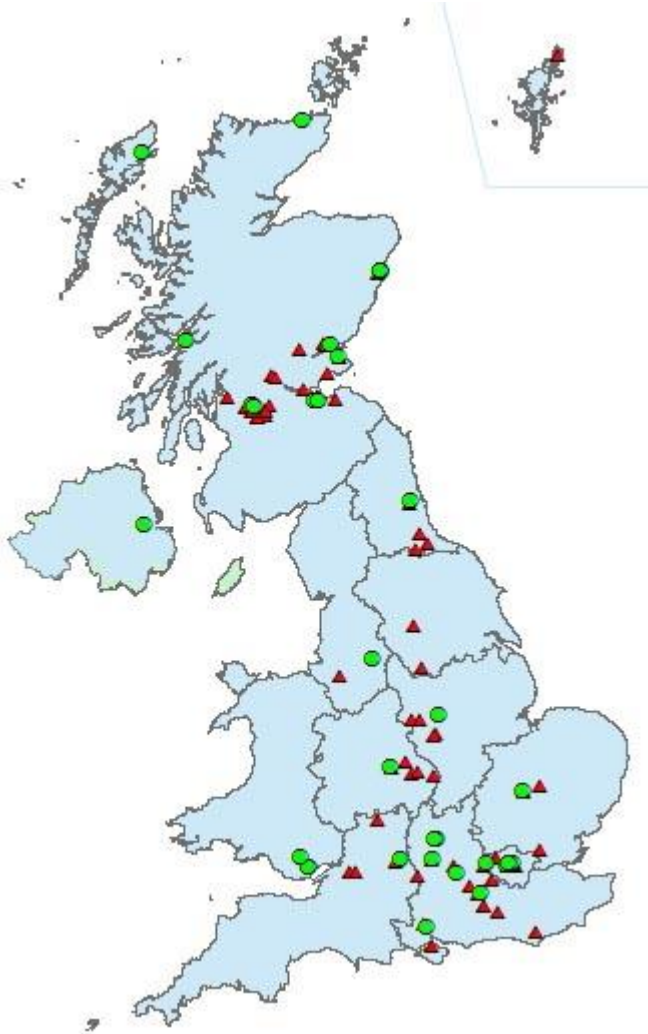




Cumulative Numbers of PEMFC Developers/Manufacturers (1995-2010)



Clustering



Region	Institutions	Clustered?
Scotland	37	Yes
South East	18	Yes
Greater London	15	Likely
West Midlands	8	No
East	7	No
North East	6	No
South West	5	No



German Interviewee

- *“We have a network, working together with the institutes, the universities with private companies, so little and medium ones, and also with the big OEMs ... in other industry sectors, and ... there might be also some very interesting ideas which you can also maybe collect, yes copy and paste onto your ... technology.” (GTNC1)*



UK Interviewee

- *“I think [we’re] trying to follow the same line as the German economy did, to inspire our company base and be able to produce the right products to benefit those microgen markets ... I think there are many levers we can pull for that, there’s ... direct grant support, information flow, there is collaboration ... and ... feed in tariffs would help.” (UKSCO1)*



Summary Comparisons

	Germany	UK
R&D base	world-class	world-class
Institutions (total)	443	109
<i>academic</i>	96	31
<i>corporate</i>	347	78
Academic-Corporate Linkage	stronger	weaker
Demos started (2012)	9	4
Active Networks (National & Regional)	Yes	Yes
Clustering	Yes	Emerging



Summary Comparisons

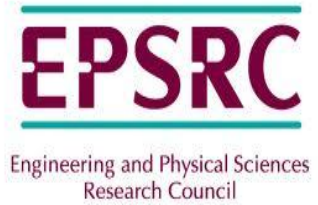
	Germany	UK
Long-term Government Commitment	Yes	No
Targeted Policy Measures	Yes	No
Collectively-agreed public-private vision	Yes	No
National Champions for H&FCs	Yes	No
Priority Given to Automotive Sector	Top	Medium
Priority for Electric Vehicle Prospects	Medium-High	High
Regional Funding for EU/Nat. Demos	More	Less
Views of Capital Markets	De-risked	Short-term
Education and Training	Highly valued	Less valued
Development & Planning Coordination	Effective	Less Effective



Recommendations

For the UK H&FC innovation system to compete internationally...

- A shared collective vision and political leadership
- Stable long-term roadmap and policy framework supporting RD&D and markets
- Stronger industry-university research links, together with support for regional clusters and innovation networks
- Investment in education and skills, and
- Public-private partnership to de-risk investment, mobilise capital and address short-term investor horizons



Thank you...

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