

Drivers and constraints to low carbon investment

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Research

- Building on our UK low carbon transition pathways
- Interviews with 36 stakeholders from private and civic energy companies, mainstream and alternative investors, renewables project developers, energy policy makers and civil society
- Papers:
 - Bolton, R., Foxon, T.J. and Hall, S. (2015). [Energy transitions and uncertainty: creating low carbon investment opportunities in the UK electricity sector](#). *Environment and Planning C* (online)
 - Hall, S., Foxon, T.J. and Bolton, R. (2015). [Investing in low carbon transitions: Energy finance as an adaptive market](#). *Climate Policy*
 - Hall, S., Foxon, T.J. and Bolton, R. (2016). [Financing the Civic Energy Sector: How financial institutions affect ownership models in Germany and the United Kingdom](#). *Energy Research and Social Science* **12**, 5-15

Reducing uncertainty in investment

- EMR – aiming to promote investment in large scale low carbon technologies, through Contract for Difference Feed-in Tariffs
- Providing a guaranteed price for low carbon generation removed one significant uncertainty, but policy and political risks were seen as remaining
- Differing view on governance of energy systems:
 - Those in favour of a liberalised market approach thought that the government should just set the rules, but otherwise not interfere to address price and other risks
 - Actors, particularly from mainstream investment community, remained concerned that other risks could prevent large scale investment in low carbon generation
- Levy Control Framework, which was put in place to 2020 with no clarity as to if it will be extended beyond that, created an additional policy uncertainty for investors

Actors' choices and energy trilemma

- Energy trilemma
 - Reducing carbon emissions, ensuring security of energy supply and maintain affordability of energy services to consumers
- Conflicting policy incentives
 - Levy Control Framework suggests limiting costs to consumers has greater priority than meeting carbon budgets
 - Capacity Markets suggest ensuring security of energy supply also has greater priority than meeting carbon budgets
- This creates uncertainty for investors, as regulatory frameworks and incentives are liable to change over time
- Aiming to bring in new actors, such as mainstream institutional investors, requires better understanding of how they perceive these risks and uncertainties

Constraints on traditional investment sources

- Constraints on traditional sources of capital for investment in renewable energy
- Both energy utility balance sheets and the availability of long-term project debt lending from banks have been constrained by the need for utilities and banks to strengthen their capital reserves, following the financial crisis:
 - *“So the wind farms that got funded in 2007, just before the climate got tough ... NES the American utility were putting up the equity, Barclays Bank put up the debt, in those days **Barclays Bank was prepared to lend 18 year term money and it was a sort of beautiful world in many ways because banks were interested in lending to projects**” (RE developer)*

Questioning economic policy assumptions

- Scepticism as to whether economic incentives alone will be enough to drive investment:
 - *“I think there is a general assumption in policy circles, an **economics driven assumption** that if you create the right incentive structure the money will just flow. But I wonder whether there are **institutional** factors that mean that it won’t flow or it will become much more expensive. There might just not be the right kind of match of people with money and investment instruments that fit their investment criteria”*

(Institutional Investment Professional, 2013 [our emphasis])

Structural constraints on Renewable Energy investment

- Immaturity of sector:
 - “...it’s a **pretty immature asset class**, unlike real estate or private equity and therefore the establishment of long term trends in terms of what is an appropriate return for the risk is not particularly well established.”
- Lack of liquidity of long-term investments in RE:
 - “So if you’re an investor like us and you have lots of retail investors who feel that they can put their money in and take their money out whenever they want, **we can’t just lock all the money up in a private equity project. We also have regulatory barriers to how much private equity we can invest anyway in these kinds of funds, but we just can’t lock that money up like that**
- Short-term drivers on fund managers:
 - “So there’s **massive financial incentives** at the individual and the firm level **to privilege the short term over the long term.**”
- Lack of secondary market vehicles:
 - “...it’s a real bleeding edge. We haven’t seen any **securitised bond issues** in this space So, it could be three or four years before we start to see a significant flow of these investment opportunities ... the **markets will gradually get educated** into doing it. It will happen but it could well take the **best part of a decade** before the mainstream investment community is a big funder and that timeline is rather behind what is probably needed in a UK context.”

Adaptive markets

- Adaptive Markets Hypothesis:
 - The investment environment, along with investor behaviour, can change over time; investors' heuristics must adapt to new realities in periods of turbulence or change (Lo, 2004, 2012)
 - Subject to institutional and structural constraints, behavioural routines and fundamental uncertainties
- Renewable investment finance is adaptive because
 - There are relatively few deals
 - Learning and adaptation is slow
 - Changes in policy supports, capital availability etc force variation, selection and retention in other parts of the system
 - Economic incentives such as CfD FiTs strike prices or ROs are only one driver of change
 - This means that providing stable incentives, or reaching grid parity, may not lead to market penetration of renewables investment

Civic energy systems in UK and Germany

- German system differs from UK system in at least four ways:
 - Low carbon transition ‘Energiewende’ is seen as a national priority
 - German system had a much greater degree of decentralisation and municipal ownership, following post-War reconstruction
 - More decentralised political institutions in the German federal system enable a greater degree of energy policy experimentation
 - More bank-based financial system in Germany, including a well-developed local banking system, contrasts with the centralised and market-based financial system in the UK
- This enabled local banks to build local knowledge and capacity for small-scale renewable investment, and became key promoters of civic and community ownership of electricity generation assets
- Municipal ownership enables a more long-term perspective to be taken, with a focus on good, safe, reliant energy infrastructure, and further economic and social benefits to accrue to local municipalities

Implications for UK energy policy

- Challenges identified in relation to our three transition pathways:
- Market-led pathway:
 - Current dominant energy policy paradigm in the UK is that of a market-led transition, with government intervention limited in time and extent: “We want to see a competitive electricity market, with government out of the way as much as possible, by 2025” (Rudd, 2015)
 - But this requires a high carbon price and stable framework
- Central Co-ordination pathway:
 - Elements of government-led pathway, e.g. Contract for Difference provides a guaranteed electricity price of £92.50/MWh for new nuclear power, but final investment decision in Hinkley Point C delayed again
 - But this requires strategic, ‘mission-oriented’ decision making
- Thousand Flowers pathway:
 - Strong interest in civil-society led pathway with high levels of decentralised generation from a large number of UK local authorities and community groups, but recent changes to feed-in tariffs have shaken confidence
 - But this requires institutional and regulatory change to enable action

Contribution to whole systems analysis

- Understanding energy systems
 - Energy systems as socio-technical systems made up of interacting technological and institutional elements, coevolving over time
 - Role of expectations about future pathway developments is vital in current decision-making, given fundamental uncertainties
 - Limitations of the current dominant paradigm, in which market actors are assumed to make rational decisions, for understanding long-term system change
- Governing a low carbon transition
 - Importance of governance and regulatory frameworks in managing risks for decision-makers and investors
 - Understanding the role of capital markets in long-term energy systems change in terms of adaptive markets for energy finance
 - Work on civic energy systems highlighted role of local banking systems, and of shared values, including public service, local economic development and a national low carbon transition