The small-scale feed-in tariff in Great Britain: its role in electricity system transition

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Summary

The UK electricity sector is at a crossroads. It needs to decarbonise by 2030 and address the growing concerns over energy security. Tackling these twin challenges will require a rapid transition away from an existing electricity system that is locked-in to a centralised, high-carbon configuration. Policy support is therefore required to break that lock-in and achieve change. One potentially disruptive policy in the UK energy policy framework is the small-scale feed-in tariff (FIT) which supports low-carbon electricity technologies under 5MW. This study asks what role the FIT is playing in the transition of the electricity sector. The empirical core of the research is a set of 35 interviews with stakeholders in the electricity sector, and it is triangulated with analysis of government documents and stakeholder consultation responses. A systems-based analytical framework, adapted from Kern (2012), is used to evaluate the policy.

The research finds that the FIT has driven significant technical, commercial and financial innovation in the solar PV sector but that this has been threatened by the management of the mechanism. PV is also benefitting from global developments in cost reduction but the FIT mechanism has been instrumental in bringing those developments to the UK. The FIT has been much less successful for the other renewable technologies (wind, hydro and anaerobic digestion) because the policy does not support the development risks that these projects face. Planning risk, licensing risks, stakeholder relationships, and long lead times all raise the risk profile of the non-PV technologies but the FIT provides just a guaranteed price for power.

The FIT may continue to drive innovation and cost reduction for solar PV and the recent review of the scheme provides greater certainty for investors and developers. PV may become a regime technology due to its sharply reducing costs and the diversity of potential applications. However, the non-PV technologies will continue to struggle to deal with the associated development risks. Unless policy begins to address these non-financial barriers decentralised electricity will play a marginal role within a large-scale, centralised, low-carbon regime that continues many of the characteristics and practices of the existing system. An opportunity would thus be lost at this time of change in the electricity system.

Research Questions

Central Question

•What role is the small-scale feed-in tariff playing in UK electricity system transition?

Secondary Questions

1. How has the FIT impacted on the four renewable technologies it supports?
2. Is the FIT meeting the indicators of transition identified in the transition literature?
3. What improvements could be made to the FIT mechanism, and DRE support, to drive transition?
4. What does this research tell us about the reality of transitions versus the theory?

Methods

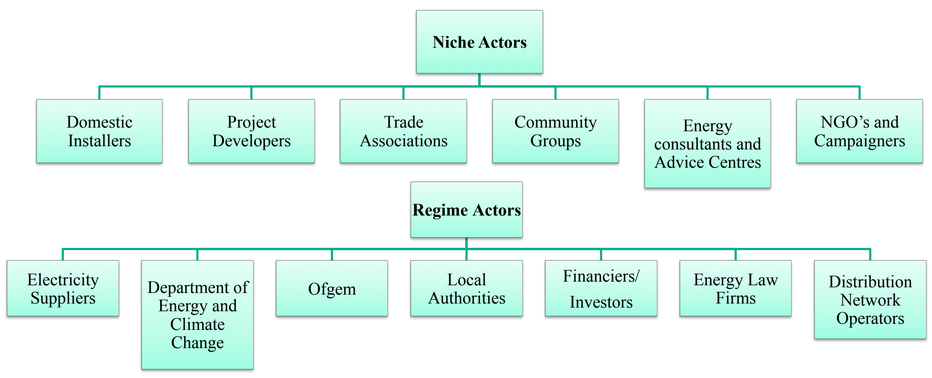
The methodological contribution of this thesis is to move beyond a conventional, rigid economic evaluation of a policy mechanism to demonstrate a systems-based analysis that explores the wider significance of the FIT in the UK's transition to a low-carbon electricity system. This thesis provides a narrative account of a system in flux which contributes to the understanding of how transitions are experienced, and how policy is able to affect this process.

The research builds on the theoretical work within the transitions literature and its recent application by Kern (2012) which *operationalises* that theory, and specifically the Multi-level Perspective. The indicators of internal momentum within a niche, the signs of destabilisation within a regime, and the broad developments at landscape level that put pressure on the socio-technical system, are all used as indicators of transition, built into an analytical framework that is here applied to the small-scale FIT.

Niche	Learning processes - stabilsised in a dominant design	Price-performance improvements	Support from powerful groups	Establishing market niches
Regime	Changes in rules/ regulations/standards/ laws	Changes in technologies – grid, resources, generation plant	Changes in social networks – new market entrants gain in importance	
Landscape	Macro-economic trends – e.g financial crises	Socio-economic trends – e.g. unemployment	Macro-political developments	Deep cultural patterns

Adapted from Kern (2012)

The research is based on a set of 35 interviews with the following stakeholder groups in the electricity sector.

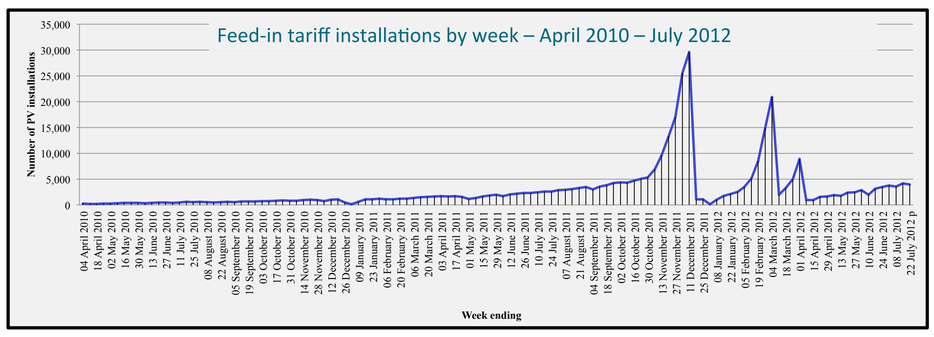


Source: E.ON Sustainable Energy

Results and Analysis

Niche

The niche processes within the analytical framework are evident for solar PV. Examples include commercial learning effects such as the introduction of aggregated schemes, illustrated in the photo above, and the support of powerful groups such as Local Authorities and investors who have moved in to the solar PV space in response to the FIT. Solar PV has been the clear dominant technology with 99% of installations but the installation profile below shows what impact the tariff changes, in December 2011 and March and April 2012, made to the sector.



The niche processes are not evident for wind, hydro or anaerobic digestion which have seen only small increases in installation numbers, despite offering greater capacity potential. These technologies have additional risks which the FIT does not address such as planning issues, licensing and permissions risk, long lead-times creating exposure to policy changes, and complex stakeholder relationships.

Regime

The FIT has had a relatively minimal impact at the regime level and there is considerable scepticism from regime actors over the potential of the FIT technologies. However, one outcome of the scheme for actors at this level is a perceived increase in policy risk due to a loss of confidence in government. This has come as a result of the management of the FIT scheme and the manner in which changes have been administered. The quotes below illustrate this well –

'For the players involved in the FIT it has been a textbook example of policy risk and how not to do something'. **Energy supplier consultant.**
'*One of the biggest effects the FIT has had on me is probably related to policy risk. The fact that the government will change the rules at such short notice, for albeit small scale, makes me worry about whether I want to invest in something at the large scale unless I have a guarantee up-front that I will get the support on something which is supported. So to me the biggest effect of the FIT so far is to undermine my confidence in government'.* **Big 6 Head of Generation Strategy**
'The number one question for investors is 'tell me about the regulatory risk, and what happens if the government changes its mind'. Every single meeting, top of the list…. And if someone asks me what is the number one risk, regulation is your number one risk'. **Renewable energy private equity fund manager**

The scheme is a part of the growing suite of policies and regulation placing pressure on the existing regime. This is creating an opportunity for alternative approaches, such as those supported under the FIT, but the greatest push is behind large-scale options such as offshore wind which do not challenge the centralised regime.

But one significant development in the formation of the low-carbon regime is approximately 250,000 new generators introduced under the FIT, mostly covering solar PV installations (DECC, 2012). If large numbers of generators continue to take advantage of the FIT it could be disruptive for the regime in terms of the impacts on the physical network but also the diversity of actors with a stake in the system.

Landscape

Both climate change and energy security concerns are influencing energy policy at the highest level. This is destabilising the existing regime and creating an opportunity for change in the system. However, macro-economic developments such as the 2008 financial crisis and the ongoing European debt crisis create a difficult environment for renewable energy development in terms of investment capacity and the support of policy makers. But despite the challenges, the electricity system is in a period of transition and a unique opportunity for alternative approaches exists.

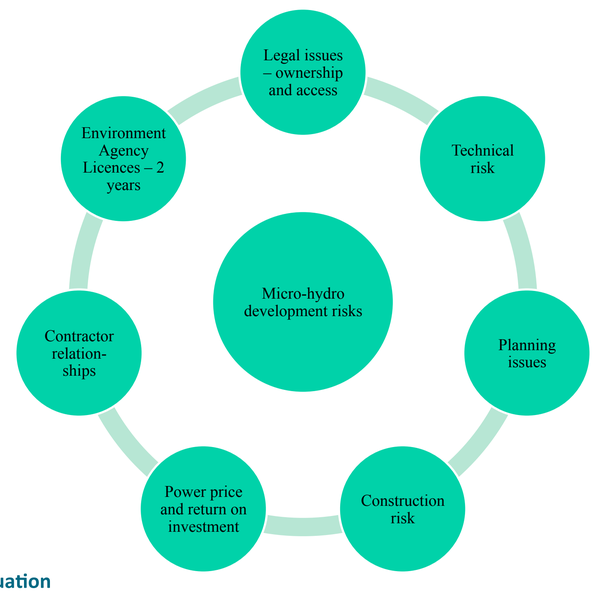
Conclusions

Price Focus of the FIT

The FIT has been effective at achieving scale for solar PV because the tariff addresses the last significant barrier to deployment, the return on investment. This has resulted in some progressive commercial and financial innovation. But the non-PV technologies have development risks such as planning, licensing, long-lead times and stakeholder relationship complexities which require more focused support.

Risk-led Policy Making

If the UK wants to scale-up non-PV, sub-5MW renewable capacity, policy needs to take a technology specific, risk-led approach that identifies all the development risks facing renewable projects and then seeks ways of addressing them. The diagram below shows some of the development risks for micro-hydro projects, any one of which can halt a project. Policy needs to move beyond the FIT to address these non-financial barriers in order to achieve scale.



Systems-based Policy Evaluation

A socio-technical transition requires system-wide innovation. This research has applied an analytical framework that evaluates the impacts of a policy mechanism across the interrelated parts of the electricity system. It moves beyond a narrow economic focus to encompass the broader impacts that the FIT has had. In capacity terms the scheme is still insignificant, but it has pump-primed the solar PV industry and the sectors that support it. Policy evaluation should embrace this whole-system approach in order to understand the real impacts of a policy and not just its costs.

References

DECC (2012). Montly central FIT register statistics. [Online]. Available at - http://www.decc.gov.uk/en/content/cms/statistics/energy_stats/source/fits/fits.aspx

Kern (2012). Using the multi-level perspective on socio-technical transitions to assess innovation policy. *Technol. Forecasting and Social Change 79* p. 298 – 310