11th International Conference of the European Society for Ecological Economics

EXTENDED STUDENT ABSTRACT

Take 7

7 families. 7 PV panels. 7 pro-sumers. 1 estate
Shining a light on energy demand, flexibility & resilience to fuel poverty

Summary

A low carbon network needs increased flexibility of demand to cope with intermittent renewables. "Pro-sumers" - producers and consumers - of renewable energy offer such potential, however a recent study of solar PV owners suggests that free off-peak electricity was not actively utilised. This UK study explores what happens when seven families, who are vulnerable to fuel poverty, are given solar panels. Using a social practice approach, this six-month longitudinal study shows that households are quick to adapt certain practices to utilise their solar electricity, although as the seasons changed they were increasingly unsure of how much energy they were generating and could therefore use. The majority also started to develop other strategies to help them save more money on energy costs. Initial findings suggest that active pro-sumers not only offer flexibility to the grid, but also the potential to improve resilience to fuel poverty.

Introduction

Part of the UK Government's vision for a future low carbon energy network is that it needs to be inherently flexible to cope with fluctuations in both supply and demand. It believes that households that produce *and* consume their own energy, in effect "pro-sumers", can help with the demand-side flexibility needed such as increased off peak-use, as well as minimising transmission losses (DECC 2010:12).

For households, a key attraction of being a pro-sumer is the opportunity to save money on electricity bills that have risen rapidly in recent years. And yet one of the first major studies (Bulkeley et al 2014) to look at solar photovoltaic (PV) households in the UK, found that while such households had increased energy awareness, they were generally not active pro-sumers. Instead their focus was much more on the income stream from the Government's feed-in-tariffs, rather than saving money through using their own electricity.

Winners and losers

Even if such households are not currently making the most of their solar energy, they are, arguably, well placed to cope with the anticipated increases to electricity prices (Newbery, Green 2011: xxv). As energy supply becomes increasingly decarbonised, there will inevitably be "winners and losers" (Walker 2013:183). Some households will be more able to afford low carbon technologies, while others are left out in the cold. Households who are currently vulnerable to fuel poverty are at the front line of those who could well be the "losers" in a transition to a decarbonised world.

But what happens when those vulnerable to fuel poverty are given the means to create their own energy without access to feed-in-tariffs? How do they adapt their routines to capture solar power given that its

generation is influenced by weather, seasons and changing daylight hours? What knowledge and skills are required to make the best use of solar energy? How does pro-suming evolve and, critically, can it offer the potential not only for demand flexibility but also improved resilience to fuel poverty?

Theory and method

This is the UK's first in-depth investigation as to whether households, with pre-payment electricity meters, become pro-sumers following the installation of solar panels. A social practice perspective was taken viewing energy demand as shaped by social practices such as cooking, laundering or bathing, rather than primarily driven by behaviour or technology (SPRG 2013).

This study follows in the footsteps of a number of scholars (for example, Christensen and Ropke (2005), Pink (2012)) who have highlighted the value of studying empirically the performance of a social practice. Gordon Walker points out that a social practice approach is successful in capturing*"…shared, cultural and material basis of past and present patterns of consumption…"* (2013:181) but, at times, a focus on broad sweeping trends can be at the expense of understanding diversity and variation in how practices are performed.

> *"It is, for instance, hard to find examples of research that is inspired by theories of social practice, and…analyses the failure to successfully perform everyday practices, or that directly engages with the reproduction of social inequality and injustice."* (Walker 2013:181)

This six-month study directly looks at how energy is embedded in the daily practices of families who are vulnerable to energy poverty. All seven families, with between one and four children, live in social housing and rely on pre-payment meters for their electricity. They were randomly chosen from 100+ households that received solar panels from their social landlord. The study covers summer, autumn and winter months and uses a range of ethnographic inspired methods including home energy tours, video diaries and a series of interviews.

Initial findings

Analysis within NVivo is still on going, but already a rich seam of material has highlighted how strongly solar energy was embraced by families who are vulnerable to energy poverty. The ability to generate and use their own power helped them significantly reduce their electricity costs.

> *"I was keeping a diary of what I was putting on my electric meter. I've been using £7 a week to the normal £20… it's made a difference to us big time."*

The biggest savings, of around £50 a month, were in the summer, but even in the winter, some of the families were saving half this amount. The money saved, gave them the opportunity to increase spending on other basic needs such as food and heating.

> *"I haven't got to panic thinking, "Oh no I've only got like a pound on the (electric meter) that needs to last me until tomorrow…The saving on my electric will go extra onto my gas so then I won't be running out and I can afford to heat my home then."*

It was striking that following the installation of solar panels all seven households quickly developed new routines that adapted to the sun:

> *"They said, "Use it or lose it"…So for today, for example, I was sitting down and thought I better get …the washing on, while it's free and while we've got the sun, so it's good in a way that it sort of motivates you."*

Many of the families used a sunny day as a cue to remind themselves to use the solar electricity they were generating. Although many were also quick to point out that they were not going to let the weather shape their lives; if it was a sunny day they were just as likely to go out with their children as do the washing. Householders were also highly selective in the routines they shifted. Cooking was often singled out as non-negotiable, as parents were not prepared to change their children's routines.

As the seasons and weather changed, the households were less certain about the energy they were generating. For example, if it was a rainy day they weren't sure how much they were producing and whether it was enough to run their washing machine. Some questioned whether they needed to keep to their new solar-based routines, although by and large many of them still did. At the same time, there was also evidence that some of the families were finding new ways of saving energy and therefore money, as solar generation diminished as the seasons changed. For example, putting washing on their line if the weather was suitable, or turning off appliances at the socket.

Initial conclusions

Geoff O'Brien and Andrew Hope point out that a resilient energy system can cope with disruptions and *"…is characterised by the knowledge, skills and learning capacity of stakeholders…"*(2010:7552). While reasons for energy poverty are complex (Walker, Day 2012), it would appear that becoming an active pro-sumer, while not a panacea, can potentially help build resilience.

O'Brien and Hope (2010) also highlight that central to understanding resilience is looking at what is present rather than what is missing. So instead of just focusing on needs and vulnerabilities, it is also important to turn attention to available resources and the capacity to adapt to challenges (O'Brien, Hope 2010). The families in the study have all demonstrated resourcefulness in finding ways to get the most out of the solar energy they are generating.

One of the outcomes of the research has been the production of a collaborative booklet based on the solar PV experiences of the families and to be distributed to several hundred council's tenants with panels. Although beyond the scope of this study, this approach to knowledge sharing could be more widely used with solar PV households, whether they own them or not. It is potentially a different way of the energy industry engaging with households, through learning from and sharing their experiences, rather than the more common approach of cascading information down to them. It is also a chance to see what is present rather than just what is missing.

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