Building energy resilience
solar nights & other stories

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Content

The UK energy trilemma

- **Climate change** - unprecedented global challenge will be *"…superimposed on existing vulnerabilities"* (OECD, nd).

- **Security of supply** - increasing demand alongside decreasing supply. Eg as transport becomes electrified & old power stations are retired.

- **Affordability** - price of electricity rose by 61% & gas by 98 % between 2004 to 2016 (Committee on Climate Change, 2017)

"Keeping the lights on, at an affordable price, while decarbonising our power system" (Decc, 2014)

One solution: solar power

- Renewable technology has been heralded as a technology that can help address the energy trilemma (Brett and Staffell).

- In 2008 UK Govt introduced ‘feed-in-tariffs’ - a subsidy scheme to encourage households to adopt renewable technologies

- It has helped drive a massive increase in solar electricity. From 17 GWh in 2008 to 10,000 GWh in 2016.

- For those who could afford the thousands of pounds for solar panels, scheme offered a good return on the investment.

- The scheme also offered ‘free’ solar electricity to the households.

- But one Durham study showed that many of the solar PV homeowners did not appear to use the solar power they were generating (Bulkeley, 2014)

Producers & consumers ‘prosumers’ of solar power

- While many solar panels are in affluent areas (DECC, 2012), not all are. Before cuts to the subsidy, some social housing providers also invested in solar panels (Clark, 2014).

- Solar offered a good financial return but also the potential to help build energy resilience in households faced with multiple vulnerabilities:

  > “Certain households in our research demonstrated a particular vulnerability to external shocks (eg loss of income/extreme weather/deteriorating health). These households are vulnerable because they face more intense and non-negotiable energy needs as well as a lack of social and/or financial capital in emergencies. Any further rises in fuel prices or decline in incomes will hit these households hard, even if they are currently coping”(Middlemiss and Gillard 2013).

- But to help build energy resilience households need to become producers and consumers - **‘prosumers’** of solar power.

- **What factors do you think can influence whether households are able to become prosumers. That is both producing *and* consuming solar power in the home?**

- Breakout into small groups to discuss for 5 mins. Then we will discuss as a group

Developing a case study

- Prosuming sounds easy but is in fact influenced by many different factors eg:

    - changing weather
    - daylight hours
    - number of panels
    - battery storage
    - seasonal changes
    - appliance use
    - sequencing of domestic routines
    - work schedules
    - meal time routines
    - household members
    - solar energy monitor etc

I was interested in active prosuming not accidental For my research I define **prosuming** as **“deliberately and simultaneously producing and consuming solar energy”.**

I developed a **case study** to look at these issues:

- Followed solar journeys, over 10 month, of 7 families living with their children in social housing.

- All lived in a community in the top 10% most deprived areas of England (DCLG, 2015).

- While feed-in-tariffs went to the social housing provider to pay for the panels, the households were given the free solar power they generated from their homes.

- All families in the study had electricity prepayment meters.

- I conducted series of interviews to explore lived experiences of prosuming.

Initial findings

1) Energy Consumption is deeply embedded in daily life

- the washing (up to 4 x a day),
- the drying,
- the ironing,
- the cooking
- leisure & educational activities based around various screens…

Most of these routines ‘social practices’ were not conscious behaviours, but part and parcel of daily life (Shove et al., 2012).

2) The role of projects in family life

But ‘projects’ were more conscious (Pred, 1981, Hagerstrannd, 1982). From finding a job to organising a party or undertaking DIY, projects shape family life (Pred, 1981, Hägerstrand 1982). Three most relevant for this study:

‘Maintaining-Family-Routines’ Project
Used to keep family life together. Helped meet demands of school, work etc as well as being a good parent. A dominant, institutional family project.

Feeding-the-Meter Project
Juggling demands to ensure electricity available for essential routines. Trading off one family demand against another Eg cutting back on heating to ensure clean school uniforms. A dominant, institutional family project.

The Prosuming Project
Households adopted prosuming when it fitted round their work and daily domestic routines. Plus aligned with institutional family projects. A voluntary, individual project.

3) Prosuming dynamical evolved over three stages

Adopting, Establishing & Committing to the Prosuming Project

Stage 1: Adopting the Prosuming Project

Initially a nos. of the households ignored offer letter of solar panels because felt it was too good to be true. But once convinced, they mobilised the ‘elements’ - meanings, materials & skills - needed to adopt the Prosuming Project:

- **Meanings** - As people talked & panels appeared on roofs - so the physical & social fabric of community started to change. Shifted from prosuming being primarily associated with ‘posh’ areas to also include social housing.

- **Materials** - Could not be a prosumer without solar panels but households also needed another material element. Turned to electricity prepayment meter (ppm) to help them experiment with the Prosuming Project.

- **Skills** - Given solar info by installers but a number still confused. Eg thought panels came with batteries & should use solar at night. But households developed own embodied skills by experimenting with the Prosuming Project and starting to see positive results on their ppm.

- During this stage householders were **‘tentative prosumers’** in so far as most were cautious about adopting the project, as well as experimental. Did not want to invest a lot of time and be disappointed by lack of financial savings.

Stage 2: Establishing the Prosuming Project

- Started to embed the **Prosuming Project** in daily life but needed to fit round busy lives. So it was undertaken sporadically depending on what else was going on. Householders became **Periodic Prosumers.**

- But to become established it was essential that prosuming supported the **Maintaining-Family-Routines Project.** Eg:

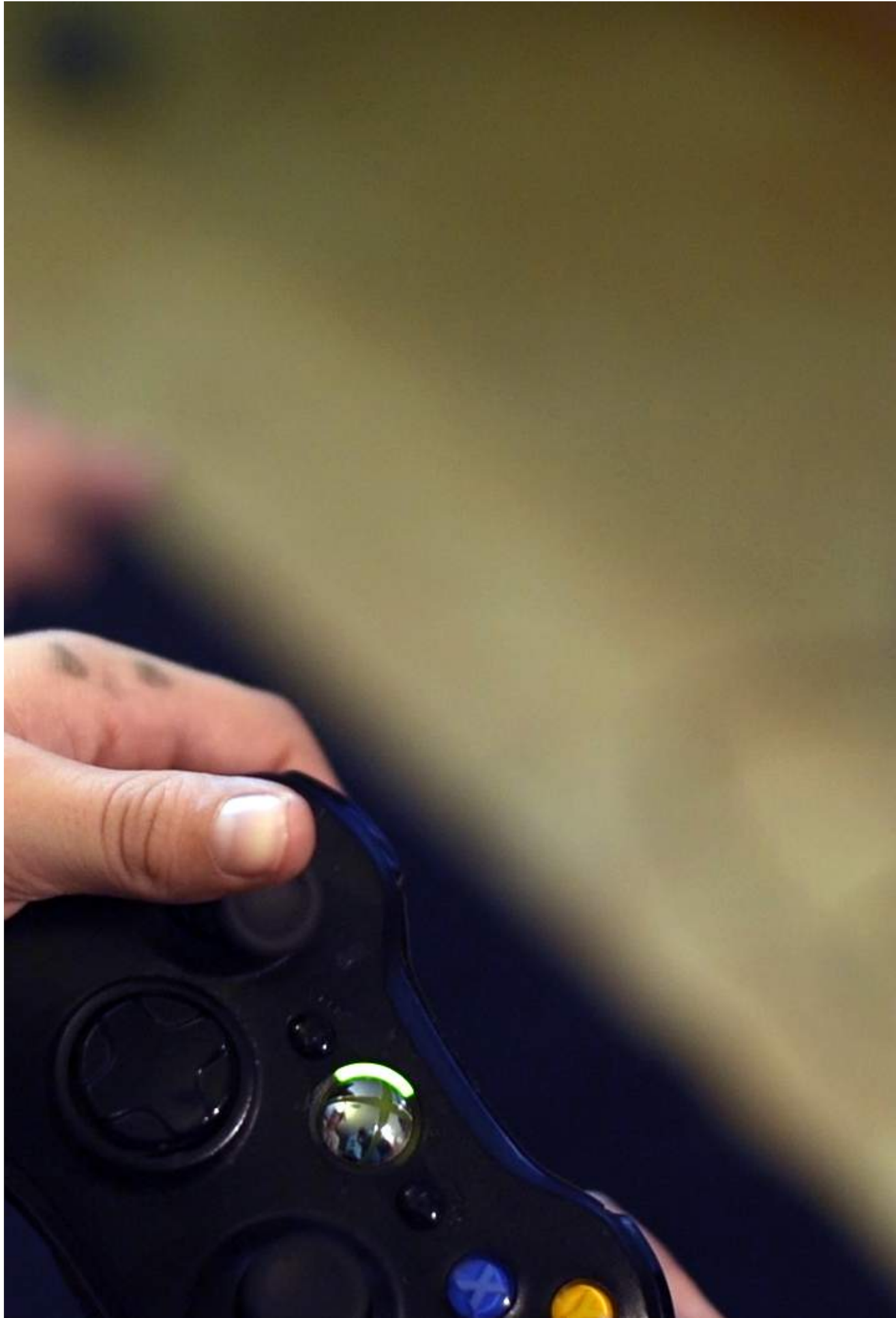
  Families did not change children's dinner time to fit with solar generation as too disruptive to routines.

  But did change washing times as usually only involve 1 person. One woman used weather forecasts & washing machine timer to help her maximise solar power while at work.

- Also vital it supported the **Feeding-the-Meter Project.** All families saw savings of up to **£50** a month over the summer. Helped with difficult 'heat or eat' type decisions. Eg Sunday roast versus washing.

- Sun often acted as 'cue'. Thus when clocks changed a number of households gave up prosuming for the winter…became seasonal periodic prosumers.

- But some others did the opposite…



Stage 3 Committing to the Prosuming Project

- During this stage, which coincided with the winter, prosumers who committed to the project turned to experimentation again. One woman monitored electricity meter during winter & saved up to £15 a week. This was not only from solar power but from finding new ways so save energy in the home. Eg eating together as a family and reducing oven use.

- Started to see **Transformative Prosumers.** Eg one teenager started to question whether she needed to clean her jumpers after only one use. Also she encouraged the family to get rid of tumble dryer and put up washing lines.

- But also saw the potential for the Prosuming Project itself to transform. A number of the households wanted the solar energy kept within the community so more people could benefit rather than excess being sent back to the electricity network. For some solar power was seen as a valuable community resource.

Prosuming & energy resilience

- In just 10 months many of the households started to become more energy resilient although this was dependent on seasons and the generation of solar power. Resilience could possibly be extended by use of a solar energy monitor, particularly over the winter.

- While energy costs were reduced, households retained their energy services. Some even improved them. Eg one family could now afford to do their laundry more than once or twice a week - at least over the summer.

- Also helped decrease difficult trade offs. Eg one woman said she no longer ran out of money the weekend before her benefits were paid - again over the summer.

- Saved money could also be used for other essential goods. Eg the woman who saved up to £15 a week in the winter could now afford school shoes for her children.

- Also saw other wellbeing benefits, particularly less stress from constantly having to 'feed-the-meter'

- But only part of the solution for building energy resilience. Many other factors including income security, family composition, health etc (Middlemiss and Gillard 2013).

- Prosuming is influenced by many different factors eg seasons, fitting around work, domestic routines, family projects. Plus of course solar panels - many social housing providers stopped their solar programmes when feed-in-tariffs were significantly cut.

- Yet the context is changing fast. Technological changes are bringing down the cost of solar panels and batteries. But also increasing opportunities for selling energy.

- Given access to the elements needed for a Prosuming Project, there is the potential to support energy resilience.

- Not only within households but across communities.

Welcome your thoughts!

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