

PV or not PV?

That is the question

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Smart Grids, local adoption of distributed generation and the Feed in Tariff policy incentive

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Smart Grids

Energy efficient use of electricity through intelligent use of Distributed Generation and Demand Side Management :

"electricity networks that can intelligently integrate the behaviour and actions of all users connected to it - generators, consumers and those that do both - in order to efficiently deliver sustainable, economic and secure electricity supplies." (ETP 2006)

Illustrations:

Density of photovoltaic (PV) installations registered for Feed in Tariff rates. Plotted for each Postcode District (~ 40000 households) Source Data: OFGEM, 2012

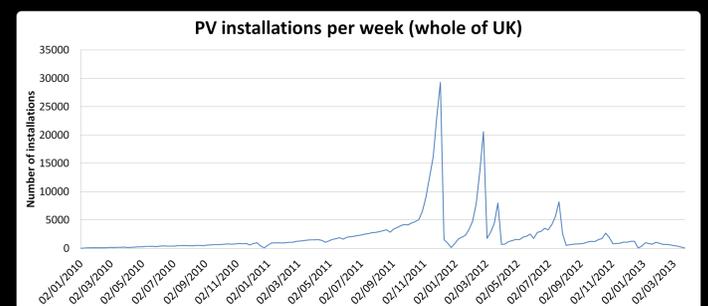
Key (installations per 10000 population):



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Adoption data

1. Feed in Tariff policy (introduced April 2010) has encouraged widespread adoption of domestic photovoltaic (PV) generators in particular.
2. Areas of high density adoption far from areas of high consumption – problematic for smart grid local balancing to increase distribution network efficiency.
3. Adoption highly "spiky" – announcements of policy changes drive high rates of adoption

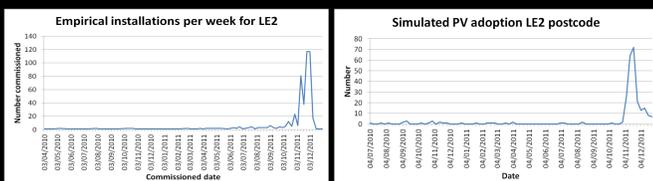


Source Data: OFGEM, 2012

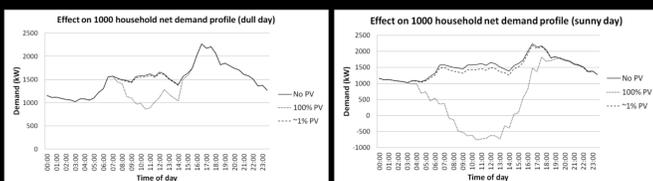
Simulation

1. Encode drivers of adoption behaviour
2. Systematically examine effect of each factor in adoption patterns (social effect, effect of policy change, rational economic effect...)
3. Use insight to inform models of distributed generation in wider smart grid simulations.

Comparison of simulated and empirical adoption in a single postcode district



Modelled effect of differing PV penetration on 1000 households' consumption profile



Discussion

FiTs have proved to be a successful incentivisation mechanism for the installation of local distributed generation. However, a deeper analysis shows that distributed generation adoption is neither at the scale nor in the geographical areas that would best suit a Smart Grid future where demand may be matched to supply at a variety of physical scales.

Dec 2011

References:

- ETP, 2006. Definition - SmartGrids: European Technology Platform for the Electricity Networks of the Future. Available at: <http://www.smartgrids.eu/?q=node/163> [Accessed December 22, 2010].
- Ofgem, 2012. Feed-in Tariff Installation Report [WWW Document]. Feed-in Tariff Installation Report. URL <http://www.ofgem.gov.uk/Pages/MoreInformation.aspx?docid=49&refer=Sustainability/Environment/fits>

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