

Using Solar PV to Tackle Fuel Poverty

Research Summary

This study explored the experiences of social landlords and their tenants with solar PV and measured the bill savings arising from installations. Whilst it found that PV can be an effective way to reduce bills and contribute towards fuel poverty alleviation, too little attention is placed on supporting tenants to maximise savings through behaviour change and on monitoring and evaluation of this technology. A tenant leaflet and a landlord guide were created to help social landlords overcome these challenges in future projects.

Background

Since the introduction of the Feed-in Tariff (FIT) scheme in 2010 the number of solar photovoltaic (PV) installations in the UK has significantly increased: there are now half a million installations¹. However, due to its high cost, the only low income households to have benefited from PV are social housing tenants whose landlords have invested in it.

PV presents an opportunity for social landlords to reduce tenants' fuel bills, increase properties' energy efficiency ratings, reduce CO₂ emissions and benefit from FITs. Despite a number of landlords having installed PV, little research has been carried out to determine the reduction in household electricity bills resulting from PV, or the extent and effectiveness of user interaction with the technology. With fuel poverty still a significant problem across the UK, this research sought to assess what contribution PV could make to alleviating this issue.

¹ PV installations under 50 kW: DECC (2014)
<https://www.gov.uk/government/statistical-data-sets/weekly-solar-pv-installation-and-capacity-based-on-registration-date>



Aims

- Determine and demonstrate the extent to which PV can alleviate fuel poverty in low income households.
- Provide low income households with resources to maximise the benefits they receive from PV installations.
- Highlight PV's potential and benefits for social housing, focusing on savings for tenants.

Methodology

A number of methods were adopted:

- Background literature review (of relevant policies, research and reports).
- Online survey of social landlords to explore their experiences of installed PV systems.
- Postal survey and telephone interviews with 122 social housing tenants with PV to explore their understanding of PV and their electricity-use habits.
- Analysis of energy consumption data in 72 homes pre and post PV installation to determine PV's impact.
- Action research with seven social landlords including:
 - Production of a tenant leaflet explaining how to get the most from PV.
 - Training of social landlord staff to enable them to support tenants.
 - Analysis for selecting properties and tenants suitable for PV.
 - Creation of a social landlord guide explaining how to get the most out of PV projects.

Key findings

Average savings from PV

Analysis of electricity bills pre and post PV installation in 42 households² found average savings of £38/year/kWp. The average size of PV systems in this study was 2.4 kWp, which equates to a £90/year saving; an average reduction of 8% reduction on tenants' energy bills. The average size of panels in private

² The original sample was 72 households but data from 30 of these were excluded from the analysis. The savings these households achieved were considered unlikely or impossible to have arisen solely from the PV; or their bills had risen since PV installation. Data from these households was therefore not an accurate reflection of the savings arising from PV.

households is likely to be larger than this sample; for a 4kWp system, the saving would be £152/year.

However, a large proportion of tenants in this study did not understand how to adapt their electricity use to maximise savings from PV (see below). There is therefore significant opportunity to increase these savings through effective guidance and support.

Proportion of PV-generated electricity used in home

This study identified that, on average, households consumed approximately one third the electricity generated by their PV panels. This is less than often cited in the literature; it is often assumed that households consume around half. This means that the assumption made by many installers (and within the FITs scheme to calculate exported electricity) of 50%, is potentially inaccurate. As highlighted above, better tenant guidance could increase this proportion.

More positively, our research indicates that PV installers' predictions of electricity generation from PV panels are generally accurate.

Variation in savings

The study also found a considerable variation in bill reduction: some households made no savings (i.e. bills increased after PV installations) whilst others made greater savings than is possible wholly from their PV system. The reasons for this may be connected with tenants' understanding of PV systems. For example, some households

believed they would receive all their electricity requirements from PV and may have, accordingly, increased electricity use. Conversely, it is possible that the PV provided a prompt to some households to reduce energy consumption.

Problems measuring energy consumption

These results are only indicative since increases or decreases in electricity bills in these households will have been influenced by other factors affecting electricity demand, aside from PV installations. Export meters, which measure the amount of electricity exported to the national grid from a PV system, would have enabled accurate calculations. These are not normally installed in domestic installations due to cost; but for the purposes of monitoring savings would be recommended to social landlords in future installs. Gathering energy consumption data from energy companies was also very challenging: energy suppliers do not have adequate processes to provide such data and in other cases, sufficient data does not exist (i.e. only estimated meter readings were available).

Understanding of PV systems

Many tenants involved in this research demonstrated a lack of understanding about the PV system. For example, 60% did not realise that using appliances during the daytime would help maximise their savings from PV; even fewer appreciated the requirement not to use appliances simultaneously. This was despite tenants having received information from their landlord on PV. This guidance was judged by the

research team to have been too technical, complicated or insufficient.

Tenant expectations

Tenant expectations and assessment of a 'good saving' from PV varied, suggesting that social landlords should not over-promise savings to tenants. The research also highlighted a general lack of understanding about energy bills. For example, savings from PV may not be noticeable when energy prices are rising or when households pay by direct debit (as changes to bills will not be immediate). Tenants receive little feedback on savings achieved from PV but these would be more understandable if export meters were fitted.

Tenant and landlord guidance

Changeworks produced a leaflet for tenants explaining how to get the most out of PV. Tenants were surveyed following leaflet distribution; the majority found the leaflet useful or very useful. As a result, two-thirds had changed their electricity use (and most of the others had already changed habits since receiving the PV). The leaflet can be downloaded free of charge (see below).

A guide for social landlords was also produced and can be downloaded (see below). Drawing on research findings, this recommends best-practice guidance for supporting tenants to get the most from PV.

PV and social housing

The research has demonstrated the valuable contribution that PV can make in social housing. Social housing tenants are generally

well-suited to PV since daytime occupancy rates are usually high. In addition, the social housing tenants in this study had electricity bills that were comparable to the national average. Few energy efficiency schemes aim to reduce electricity usage, usually concentrating on heating use. As a result, PV has an important role to play in social housing, particularly where 'standard' energy efficiency measures (such as loft and cavity wall insulation) have been installed.

Conclusions

- Solar PV can make a valuable contribution to tackling fuel poverty in social housing.
- PV is well suited to social housing because there are typically high daytime occupancy rates and low-cost energy efficiency measures will already be in place as a result of energy efficiency standards.
- However, its benefits are severely limited if tenants do not understand or adapt their electricity use to maximise savings. This appears to be a widespread issue.
- In this respect, landlords need to provide more effective guidance to the tenants and support them to make behaviour changes.
- These findings have important implications for other microgeneration measures, such as heat pumps, which have a greater need for user interaction.
- Monitoring and evaluation is often neglected but needs greater attention in social housing microgeneration projects.

Recommendations

- Social landlords should consider PV as an effective measure to contribute towards tackling fuel poverty. However, they need

to put more resources into effectively providing guidance and support to tenants. They also need to place greater emphasis on monitoring and evaluating schemes, including installing export meters.

- The government should continue to recognise the important role of social housing in deploying microgeneration to fuel poor households and develop policies accordingly. It also has a role in encouraging landlords to monitor schemes effectively and promote the installation of export meters.
- Energy suppliers need to provide energy consumption data more readily to enable monitoring of energy consumption.

Project information

Outputs from this study can be downloaded:

- The full project report: consultancy.changeworks.org.uk/assets/uploads/eaga_PV_FinalReport_Feb14.pdf and <http://www.eagacharitabletrust.org/index.php/projects/item/using-solar-pv-to-tackle-fuel-poverty>
- The tenant leaflet can be downloaded at: consultancy.changeworks.org.uk/assets/uploads/Changeworks%20Solar%20Guide%20A5.pdf Alternatively, a print-friendly version can be obtained free of charge by emailing consultancy@changeworks.org.uk
- The social landlord guide can be downloaded from: consultancy.changeworks.org.uk/assets/uploads/PV_Landlord_Guide_Feb14.pdf

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March 2014