

Introduction

Photovoltaic panels are a form of clean electricity generation which integrates well into buildings. The panels are visually appealing and generate electricity at the point of demand. Many photovoltaic (PV) systems have recently been installed in the UK through the DTI's PV Field Trials and PV Major Demonstration Programme. This enables a detailed study of clusters of grid-connected PV systems on domestic buildings. This poster describes some of the recent PV sites and outlines their performance.

Systems studied



Nottingham:

- 22 domestic PV systems
- New-build bungalows
- Panels integrated into roof
- Installation completed March 2002

Glasgow:

- 12 domestic PV systems
- New-build block of flats
- Panels mounted above zinc roof
- Installation completed Dec 2003



Bristol:

- 20 domestic PV systems
- New self-build site
- Panels mounted above roof tiles
- Installation completed June 2004

Leeds:

- 30 domestic PV systems
- Retrofit site on 2 storey properties
- Panels mounted above roof tiles
- Installation completed Dec 2002



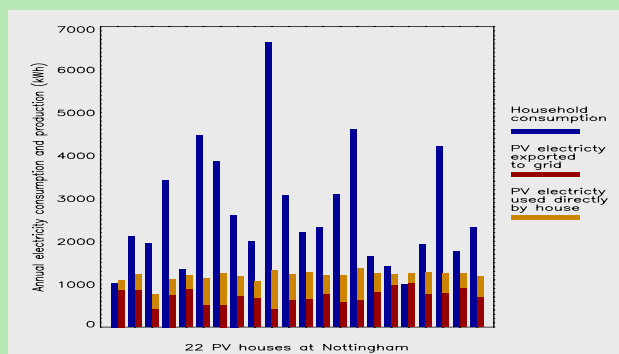
Performance Monitoring

Monitoring allows PV electricity generation, PV efficiency and household electricity consumption to be calculated. The amount of PV electricity used directly or exported to the grid can also be examined. Data is collected every 5 minutes for a 2 year period and is used to:

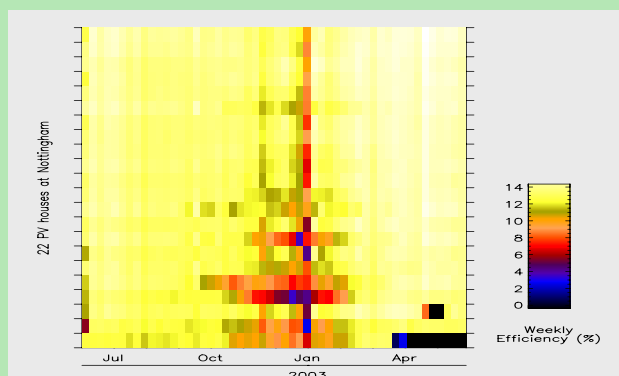
- Check if the array is generating electricity as expected
- Calculate savings made on electricity bills
- Assess the design of the PV system
- Calculate CO₂ savings

Performance Analysis

The graph below shows the annual electricity consumption, PV electricity direct use and export for 22 households with PV systems at Nottingham.



Analysis of the weekly efficiencies of the PV systems highlights the time of year that any poor performance is occurring. In the example below the darker colours highlight some performance problems. These are mostly due to shading in the winter months when the sun is lower in the sky.



Outcomes

The 22 PV systems at Nottingham have been analysed: annual average household electricity consumption - 2700kWh; annual average PV electricity generation - 1200kWh; 40% of PV electricity used directly by the households; 60% of PV electricity exported to the grid; annual CO₂ emissions from electricity reduced by 56%

References and Acknowledgements

UK Photovoltaic Field Trials – Observations on Buildability, UK-ISES Conference C79: Photovoltaic Science, Applications and Technology, 2003
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