

## **Solar villages in Huddersfield**

### **Summary**

Kirklees Metropolitan Borough Council (MBC) has undertaken the largest photovoltaic (PV) programme in the UK, with 351 kWp of PV installed on social housing, community buildings and luxury flats.

Photovoltaics are the easiest renewable energy technology to integrate in towns and cities, because they can be installed on roofs and building facades with minimal intrusion, and they have the highest acceptance by the general public. They are now widely used in Germany and the Netherlands. Starting in 2000, Kirklees MBC, based in Huddersfield, took part in a major European project to supply electricity from PV in city buildings. The EU-funded SunCities Project contributed to the installation of 351 kWp of PV (also solar thermal systems) on a range of private and public-sector housing and residential homes in Huddersfield. This is the largest domestic PV programme in the UK, and represents about 5% of installed PV capacity. All buildings were either refurbished or newly built to high environmental standards, so households gained the benefits of energy efficiency as well as the more visible PV.

A typical household system rated at 1 kWp generates about 750 kWh of electricity per year in the UK, which would give a saving of £50 per year if it all replaced imported electricity. Kirklees MBC has lobbied to get better payment for export of electricity, and also easier access to Renewable Obligation Certificates (ROCs) for small generators.

The Ashden Award was made to Kirklees MBC in recognition of their success in installing PV on a wide range of refurbished and new properties, and in showing that a PV array could be a 'normal' part of a UK home or building development.

### **The organisation**

Kirklees Metropolitan Borough Council serves over 380,000 people in an area of 253 km<sup>2</sup>, consisting of the town of Huddersfield and surrounding semi-urban and rural areas. They employ 19,000 staff and actively support sustainable energy schemes.

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## Technology and use

Since 2000, Kirklees MBC has participated in the European SunCities project, which aimed to install 3 MWp of solar photovoltaic (PV) systems on 2000 homes in Germany, the Netherlands and Kirklees, UK. This includes 351 kWp of PV systems and 62 solar thermal systems in Kirklees. This has directly benefited 425 residents in a wide range of properties, from inner city social housing flats and bungalows to a prestige out-of-town mill conversion. Some were old properties being refurbished, others were newly-built.

Part of the programme worked with three housing estates owned by the council or housing associations. Installations started in 2002. Bolt-on arrays of PV modules in aluminium frames were installed on the roof of each property as part of a general refurbishment programme which improved insulation and other facilities in the homes. Each PV array is connected via an inverter (d.c. to a.c. converter) to the electricity supply of the house, so that the power generated is used when there is demand, or exported to the grid if the supply exceeds demand. A total of 169 homes were included in this programme, with PV arrays rated between 1 kWp and 1.3 kWp, giving a total capacity of 206 kWp. On one estate, 32 homes also had bolt-on 3 m<sup>2</sup> solar hot-water heaters installed.

A contrasting retrofit installation was included in the refurbishment of Titanic Mill, an old textile mill which has been converted to luxury flats, a hotel and spa. Their 50 kWp PV array contributes towards the aim of eventually making the whole development carbon-neutral. Because the mill is a listed building, the PV array had to be mounted in the roof valley, which limits visual intrusion.

Other installations were made on new buildings. These included a housing association development of 31 new-build homes and 48 flats, all with high levels of efficiency and achieving Ecohomes 'very good' and 'excellent' standards. The homes each have both 1 kWp of PV and a 3 m<sup>2</sup> solar hot-water heater integrated into the roof as it is constructed, which gives a neater appearance than a bolt-on unit. Four new council-run care homes and two sheltered accommodation houses have included roof-integrated PV systems, with a total capacity of 40 kWp.

Each development was tendered separately, so there is a mixture of mono- and poly-crystalline PV and several different PV manufacturers, including Astropower, NAPS and BP Solar. All the inverters were made by Fronius.

## How users pay

The housing associations and Lowry Renaissance (owner of the Titanic Mill) all part-funded the systems on their properties. Social housing tenants have not had to pay for their systems.

## Training, support and quality control

The installers have two-year contracts with the two housing associations to maintain the systems on their properties. The other housing association, Kirklees Neighbourhood Housing, is making a contract with Kirklees MBC Building Services, who are training staff and working to become accredited as an installer by the Energy Savings Trust. This will enable them to take over the maintenance, and also manage new projects in-house.

The installers explained the basic operation of the retrofit systems to the tenants when they were working on them. Kirklees MBC has prepared simple leaflets about the systems for the tenants. There has been fairly regular follow-up as part of the monitoring programme, but very few problems have occurred. The main problem is inverters tripping out; and some tenants have accidentally switched off the PV system! Kirklees MBC expect that the inverters will last for 15 years and the PV modules for longer.

## **Benefits and replicability**

A key benefit of the programme is to demonstrate how well PV can be integrated in both existing and new buildings. The residential care homes were particularly concerned that the PV array was 'just part of home' and did not look like an experiment. By concentrating the installations on a small number of housing estates and community buildings, Kirklees MBC has provided a good visual impression of how the widespread use of PV would appear. This is a common sight in Germany and the Netherlands, but only just starting in the UK.

The monitoring of energy output is not yet completed, but the programme is estimated to generate about 260 MWh of electricity per year, and save about 110 tonnes of CO<sub>2</sub>. Some of the homes where PV systems have been installed use electric heating, so the contribution of the PV to their electricity demand is relatively small at about 15%. The value of the electricity generated on individual homes is about £50 per year at current prices, although the owners get the financial benefit only from electricity which is generated at the time they can use it. The residential homes and Titanic Mill have significant electricity demand during the day, so most of the PV electricity is used on site, even in summer.

The enthusiasm of the tenant representatives was instrumental in the project running smoothly. They informed local residents about the scheme and were a focal point for enquiries and feedback. Tenants have taken part in energy information workshops, talked to the media and provided feedback on PV system performance. This project has raised awareness of sustainable energy and its benefits. Some tenants have become keenly interested in how their PV system works and what it supplies. However a follow-up survey among residents of the first retrofit estate found fairly poor understanding of energy issues, particularly among residents who were not living there when the PV was first installed. This is being addressed during maintenance visits.

The solar installation companies were from outside the area, but they recruited local staff to assist with installation. One local boiler fitter has now diversified into installing both PV and solar water heating systems. The housing associations involved in this project are now able to replicate the SunCities project on other parts of their housing stock. Kirklees MBC is assisting other housing associations in the development of new PV projects

Kirklees MBC is using the expertise which it gained to inform its own development of other renewable energy projects. It also carried out a study of the tariff options available to residents, and highlighted the difficulties for small generators wanting to sell electricity to the grid and obtain renewable obligation certificates (ROCs) in submission to the recent microgeneration consultation.

## **Management, finance and partnerships**

Kirklees MBC has a committed environment team led by Phil Webber. William Edrich (Programme Manager), Kate Parsons (Environment Officer) and Vicky Dumbrell (Environment Assistant) are leading the renewables projects. A number of initiatives promote the use of renewable energy within the Council. One innovative venture is the Kirklees Council Renewable Energy Capital Fund, through which savings from National Insurance contributions under the Climate Change levy are redirected into the match-funding of renewable energy projects. This fund contributed to the PV programme and is now being used to build up a range of small wind, hydro and biomass projects within the area. Kirklees MBC is also one of an increasing number of local authorities which are requiring developers to supply 10% of the energy needs of new developments from on-site renewables. They have a much more ambitious target of 30% of renewable energy in council-procured buildings by 2011.

The links with other organisations and the willingness to learn from others have been key factors in the success of this project. Partners include Energy for Sustainable Development Ltd who advised on the project, Yorkshire Housing Group, Kirklees Neighbourhood Housing, Kirklees Community Association, and Lowry Renaissance.

The overall cost of the programme was about £2 million, or about £6,700 per kWp installed. Costs were brought down during the lifetime of the project, in particular by local organisations taking over project management and procurement, so latterly the cost of the bolt-on systems was only about £3,400 per kWp. 16% of the project funding came from the EU as part of its SunCities programme, 53% from the Department of Trade and Industry's Major PV Programme, and the remainder from local sources including the housing associations, Lowry Renaissance and the Kirklees Council Renewable Energy Capital Fund

## **Use of the Ashden Award**

Kirklees MBC will use the Award to build capacity for more housing associations to deliver sustainable energy projects. This will be achieved by providing training events and an on-going mentoring programme of support. It is already working with another housing association which hopes to use PV on a new development.

*This report is based on information from the application submitted to the Ashden Awards by Kirklees Metropolitan Borough Council, findings from a visit by one of the judges to see their work in and around Huddersfield, discussions between Kate Parsos and William Edrich and the Ashden judges at interview, and a presentation by Kate Parsons at an Ashden Awards seminar.*

*Dr Anne Wheldon, Technical Director of the Ashden Awards  
Jeremy Rawlings, Technical Assistant July 2006.*

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