The Ashden Awards for sustainable energy

Energy Agency

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Hadyard Hill Community Energy Project

Summary

Throughout the UK there are a variety of schemes working to improve the energy efficiency of homes and tackle fuel poverty. The government requires energy suppliers to fund such schemes through the Energy Efficiency Commitment (EEC), now replaced by the Carbon Emission Reduction Target (CERT). Many local authorities and charities are involved in the delivery of such schemes and put in additional resources. One of the limitations that these schemes face is that they often cannot provide free or highly subsidised insulation to all households, so are targeted at those in receipt of benefits and those where the money will yield the greatest return. Also, people often do not take advantage of such schemes even when they are eligible, so take-up rates are low, typically between 10% and 20% of the target households.

The Energy Agency has found solutions to this problem. Firstly, they have used the community funds generated by a wind farm to enable 100% subsidy of insulation measures and above-average grants for other measures. Secondly, they have worked intensively to reach all households in a specific geographical area. The project they have implemented with Scottish and Southern Energy is based around the 120 MW Hadyard Hill wind farm in South Ayrshire. £120,000 a year has been allocated to providing a community benefit fund for the nearby communities of Dailly, Barr, Pinwherry and Pinmore, who can choose how the money is spent. However, an initial lump sum of £300,000 was ring-fenced for tackling fuel poverty and reducing energy demand in the communities. It is this fund, supplemented by EEC payments, that the Energy Agency manages, with the support of Scottish and Southern Energy and the local council.

The project started by making thermal images of properties, followed by locally recruited surveyors visiting all households in the area to assess the energy efficiency of their homes. Households were also referred to a local charity if they wanted their entitlement to extra benefits to be checked. All households visited received two low energy light bulbs and a report on their energy efficiency and ecological footprint. Where possible, loft or cavity wall insulation was installed, and doors draught-proofed, free of charge. More specialised forms of insulation and solar thermal water heating systems were also offered, although with a contribution from the householder. Solar photovoltaic systems were installed at three local schools, using money from the energy fund and the Low Carbon Buildings Programme. The project has achieved a survey success rate of over 90%, and over 63% of households surveyed had at least one insulation measure installed.

The project has resulted in 748 households being surveyed and given energy efficiency advice, with 469 properties receiving at least one significant energy efficiency measure, bringing an average 21% reduction in energy use for the three communities. This has saved 2.6GWh and resulted in the avoidance of 744 tonnes of CO_2 each year. For the residents in the communities, their fuel bills have been reduced and their homes are now better heated, behaviour changes have occurred, health benefits have been noted and people have full use of their homes all year round.

Scottish and Southern Energy have been so impressed with the project that they are already using the Energy Agency to replicate it elsewhere. With the growing number of wind farms under

development or awaiting planning approval, there is potential for significant further growth and replication. Projects like Hadyard Hill can deliver major social benefits and significant carbon savings at a cost that is small relative to the income of a wind farm.

The organisation

The Energy Agency was established as a registered charity in 1999, initially covering South Ayrshire, in Scotland, and employing three members of staff. At the outset it was funded by the EU and the local council. Since then they have expanded their operations to include North Ayrshire, East Ayrshire and Dumfries and Galloway, and increased the staff to 14 full-time plus six part-time, first running the Energy Efficiency Advice Centre (EEAC) for the area, and now the Energy Saving Scotland Advice Centre. The Energy Agency is focused on working with local authorities, communities and schools to save energy, increase the use of renewables and tackle fuel poverty.

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Context

South West Scotland, where the Energy Agency operates, is sparsely populated and predominantly rural. Historically there was significant employment in coal mining and agriculture – industries that have both declined. The result has been high unemployment (20%) and low incomes, with a large number of people suffering from long-term illnesses due to mining work.

As mining has been scaled back, another energy resource has come to the forefront: wind. There are more than 15 wind farms already operating or under construction in South West Scotland and more than 20 waiting approval. Although not compulsory, it has become the accepted norm that when a wind farm is built a fund will be set up for the local community, started with a lump sum and then topped up annually from the income of the wind farm. One particular example is the Hadyard Hill wind farm, near the communities of Dailly, Barr, Pinwherry and Pinmore. This consists of 52 turbines totalling 120 MW, and was built at a cost of £85m by Scottish and Southern Energy.

With Hadyard Hill, it was decided, in addition to a simple community fund, to set aside a further fund to reduce energy demand and tackle fuel poverty in the surrounding area. In order to achieve this, Scottish and Southern Energy, in consultation with the local council, brought in the Energy Agency to manage the project, starting in December 2006. The three local communities include 828 properties, 64% owner occupied, 16% council owned and 10% privately rented. Local businesses and community buildings represent 4%, with the remainder being housing association or tied. There are 32 local small businesses and community buildings. All the properties are off the gas grid, and heating is provided by oil in 36%, electricity in 34% and coal or wood in 23%. One of the barriers to changing energy use in the area is that a number of ex-mining households receive free coal; another is that incomes are low – almost 60% of households who provided an income for the survey are on less than £15,000 per annum, making it difficult for people to afford the capital costs required for efficiency measures.

How the project works

The Energy Agency identified several problems with existing subsidised energy efficiency schemes:

- Not providing energy efficiency measures completely free means that some people will be unable or unwilling to take them up.
- The Government scheme, implemented by energy companies, allows anyone to receive insulation for free, not just those on benefit. However, it is a generally accepted commercial decision that only priority group clients get this for free. Linking subsidies to receipt of benefits means that some households are missed, either because they do not claim benefits that they are entitled to, or because they still cannot afford efficiency measures despite having an income.
- The subsidies available through the Energy Efficiency Commitment programme (EEC) focus on high carbon savings. This has meant that measures such as topping up loft insulation that is already reasonably thick do not get subsidised, even though there are still significant energy and carbon savings to be made.

To address these problems the Energy Agency developed and implemented a new scheme that operated as follows:

- From December 2006, thermal images were taken of each house, giving a map of the outside surface temperature, and thus an indication of where there was high heat loss. This was used to generate interest in the project and persuade households to sign up to the free insulation on offer.

- Doorstep energy surveys were carried out between March and August in 2007, using locally recruited and trained surveyors, who were more likely to be invited into people's homes than outsiders. The surveys recorded details on hand held computers regarding the build and form of the households, their heating fuel and systems and other data which could be used to calculate the energy efficiency and ecological footprint of the household.

- Every house surveyed received a report on their energy efficiency and ecological footprint, as well as energy saving tips and two low energy light bulbs. Feedback suggests that over 80% of the community are acting on the energy efficiency advice.

- The survey also covered benefits, and when people were interested they were referred to a local charity, 'Stepping Stones for Families', to carry out checks to see if there were any benefits they were entitled to but not claiming.
- Insulation measures were installed by contractors wherever they were required, including 393 lofts, 87 cavity walls and 244 outer doors draught-proofed completely free of charge to the household.

- Further measures requiring a contribution from the household were also installed. These included insulation of sloping ceilings in five houses and solar thermal water heating at a further six.

In addition, the fund from the wind farm has insulated nine community buildings and five small businesses, and subsidised three 2.5 kWp solar PV systems at local schools. Energy lessons and games also took place at each of the three local schools.

How users pay

Installation of cavity wall or loft insulation would normally have cost about £400 each, but because the project was 100% funded, these measures were provided free to households. Where the houses had sloping (or 'coomb') ceilings in some rooms, insulation costs averaged £940, and households were asked to contribute about £250. Solar water heaters typically cost £3,700, and the household had to contribute about £1,270.

The solar PV installations were free of charge to the schools, being funded 50% from the energy fund, and 50% from the LCBP (Low Carbon Buildings Programme).

Training, support and quality control

All the surveyors used by the project were trained to ensure they fully understood the programme and were able to deliver a quality service. The surveyors also received training to gather data for use with NHER (National Home Energy Rating) software. The installers were already qualified for their work, and accredited through Clear Skies. The insulation contractors maintain quality control by inspecting 10% of installations to ensure that the work has been carried out correctly and to the householder's satisfaction. The Energy Agency carried out a separate customer survey following the work and feedback from householders was very positive for both the overall scheme and the installers.

Benefits

What is striking about the project is the exceptionally high take-up rate for practical measures. This was achieved through active engagement with the communities, the use of local surveyors, home visits and 100% funding for standard insulation measures. More than 90% of the 828 properties in the three villages around Hadyard Hill were surveyed, and more than 63% of the total surveyed had at least one insulation measure installed. The homes not surveyed were either unoccupied, derelict or chose not to participate, while most of those that were surveyed but had no measures installed were already up to the required energy efficiency standard. These figures compare to a typical take up rate for a subsidised insulation scheme of 10% to 20%.

The project resulted in the insulation of 393 lofts, 87 cavity walls and 244 households had outer doors draught-proofed. In addition to this, five homes had sloping ceilings insulated, and six solar thermal water heating systems were installed, while low energy light bulbs and advice on energy efficiency were given to all 748 households surveyed. The insulation alone has resulted in an estimated 21% reduction in energy use, saving 6.3MWh per year per household, or 2.6GWh per year in total. This equates to a reduction in carbon emissions of 744 tonnes per year.

The energy advice provided to households and the school energy lessons will have resulted in behavioural changes, the benefits of which have not been measured.

A key benefit of the project to households is warmer homes and reduced damp problems. Both of these have been shown, through detailed research surveys, to contribute to improved health, in particular reduced risk of respiratory disease. Prior to the insulation improvements some residents had found certain rooms too cold to use in the winter; they have now regained full use of their homes.

There is a significant financial benefit from lower fuel bills, averaging £178. In addition, the checks on entitlement to benefits have also proved useful; of the 25 households that took up the offer, eight of them have received increased benefits, averaging £4,700 per year.

Nine community buildings have been insulated, improving facilities for the use of the whole community. The solar PV installations at local schools are helping to encourage pupils and parents to think about energy and the environment. The Energy Agency has limited funding for its education programme, but the energy fund enabled it to visit the three local schools to run lessons based on energy issues.

The local economy has benefitted from the project. Insulation has been installed at five small businesses, bringing similar benefits to those found in homes. Employment of two local people for the survey work is a significant boost to an area with high unemployment, and when the Hadyard Hill project was completed the surveyors were kept on to work on further projects.

An unexpected benefit of the project came through the use of thermal imaging. Some housing association residents noticed how much heat was escaping through their single-glazed windows compared to properties that were double-glazed. When they approached the housing association the residents were able to use the thermal images to prove the point, and the housing association agreed to install double-glazed windows.

Potential for growth and replication

The Hadyard Hill scheme has reached virtually all the homes within the target area that could benefit from basic insulation measures. There is still funding for further work to be done, as almost half of the £300,000 energy efficiency fund is not yet spent. There is also the possibility that the communities will choose to spend some of the general wind farm fund on energy work as well, with one of the options being a micro-renewable rental scheme, to bulk-buy renewable energy equipment and then lease it to householders, giving them access to the technology without having to fund the capital costs.

There is significant potential for future replication of the Hadyard Hill project, as there are over 20 wind farms awaiting approval in South West Scotland and over 200 in the rest of the UK, and all are likely to have community funds. Scottish and Southern Energy has been very impressed with the success of the intensive local targeting used in the Hadyard Hill project, and has started a similar project in Girvan, an urban area with 3,500 homes, also in South Ayrshire. This is again managed by the Energy Agency and funded by Scottish and Southern Energy, this time from their own funds and as part of their Energy Efficiency Commitment (EEC) (now replaced by CERT, the Carbon Emissions Reduction Target). Scottish and Southern Energy has also recently acquired Airtricity (a wind farm developer and operator), and will be reviewing the community benefit activities of all of its wind farms in the light of the Hadyard Hill experience. It is also looking to replicate the concept of a community energy fund as part of a major hydro scheme development in Scotland. The success of the project has also boosted the interest in Warm Zones.

The Energy Agency is also replicating the project with other energy suppliers. ScottishPower is providing funds to combine with CERT to facilitate a project targeting 800 private-sector households in Lochside, Ayr, and is in discussion about projects for several wind farm developments. Another project with Energy Agency assistance is in the small village of Fintry, in Stirlingshire, where the local community has taken out a £2.5 million mortgage to buy one of the 15 wind turbines in their local wind farm. The turbine generates an income of £50,000 to £100,000 annually for the community, after loan repayments, and when the loan has been repaid (after 15 years) it will generate an estimated £400,000 at today's prices. The residents have invited the Energy Agency to help them invest part of their income in energy efficiency measures in the community.

An important consideration when replicating projects like Hadyard Hill is the size of the community relative to the output of its local wind farm. At Hadyard Hill there is a 120 MW wind farm and 828 properties, but at other potential schemes there are several thousand households and a lower wind farm output. A lower output results in a smaller community fund, so it will not always be possible to 100% fund the installation of insulation measures, although it should be noted that the Hadyard Hill project came in well under budget. However, the general model will still work well, and the subsidies offered will always be higher than would be the case without the energy efficiency fund.

Management, finance and partnerships

The Energy Agency, in partnership with local councils, has a history and expertise in this kind of project management and an ability to enthuse and inspire householders and community groups through effective communication.

The project is managed by Michael Carr of the Energy Agency, who works closely with the community and supervises the work of the surveyors and installers. The wind farm fund is overseen by two community-led steering groups; one for the energy efficiency fund and the other for the ongoing community fund.

The finance is from a combination of the wind farm fund, £300,000, energy supplier funds under EEC, £82,000, a local council contribution of £56,000, and £40,000 coming from renewable grants and householder contributions. £333,000 had been spent by April 2008.

Scottish and Southern Energy estimate the production of zero carbon electricity by the wind farm to reduce emissions of carbon dioxide by almost 300,000 tonnes a year. At a cost of £85 million and assuming a 20 year lifetime, this works out as £14.20 per tonne of carbon dioxide saved.

The insulation measures in the community cost £200,000 to install saving 744 tons of carbon dioxide a year. This works out as £13.50 per tonne of carbon dioxide over 20 years although the insulation could be expected to last longer than 20 years and the saving does not take account of reduction in emissions following the energy saving advice.

The key partners in the Hadyard Hill project have been Scottish and Southern Energy and South Ayrshire Council for funding. The support of the communities and the active involvement of the community steering committees have been vital to the success of the project. IRT Surveys provided thermal imaging, and installations were carried out by Clyde Insulation Contracts and Miller Patterson. Stepping Stones for Families carried out the benefits checks for households.

This report is based on information provided to the Ashden Awards judges by the Energy Agency, and findings from a visit by two members of the judging team to see their work.

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May 2008

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