

**Smart
Homes
Integrating
Meters
Money
Energy
Research**



**saving money
reducing energy use
cutting carbon emissions**



Introducing SHIMMER

SHIMMER is about smart homes, not just smart meters.

SHIMMER is a unique system that uses smart meters as a starting point to help fuel-poor, low-income households to manage their energy consumption and finances more efficiently. Unlike existing smart meters that simply measure energy use, SHIMMER combines a metering system with an online interface to offer a range of energy and money management tools. These enable users to *maximize* their disposable income, *reduce* excessive bills and *control* their expenditure. Initial results from the pilot suggest that SHIMMER can save fuel-poor households between £200 and £3,500 a year.

The SHIMMER energy management tool provides the information that households need to change the way they use energy. When users log on to SHIMMER they can see in real time how much each appliance is actually costing them, how much they could be saving and what actions they need to take to make those savings.

The SHIMMER household money management tools help people to make savings by firstly optimising their income by making sure they are claiming all the benefits they are entitled to, then by reducing their spending on utilities by helping them to switch provider or claim a 'social tariff', and finally helping them to control their finances better through budgeting support.

In the near future SHIMMER will enable users to automate their appliances to maximise their bill savings with minimal hassle. It will also allow users to put the savings they are making straight into an online account from which they can make and receive payments as well as purchase other services such as energy-efficiency measures and emergency loans.

SHIMMER helps households to save money through a combination of services:

- Solar panels
- Information on how much energy use is actually costing
- Personalised advice based on household energy use, type of housing and family circumstances
- A household budgeting tool
- Utility-switching tool
- A system for checking benefit entitlements

Tackling fuel poverty

Over five million UK households live in fuel poverty

These families struggle to afford to heat and power their homes to even basic levels of comfort. Fuel poverty impacts health, increases demand on the NHS and social services and can even kill. It is estimated that more than 35,000 people died in the winter of 2009 because they were unable to heat their homes properly. As people live longer and energy prices rise, and because Britain's older housing stock is thermally inefficient, fuel poverty is expected to rise.

Fuel poverty often overlaps with financial exclusion (that is, the lack of access to affordable and appropriate financial services). Households without access to online services are clearly unable to take advantage of the direct debit discounts or reductions that are available to those who pay online, and so have to pay more for their energy – on average £300 a year more. Whilst in most walks of life there is often a discount for paying in advance, pre-payment 'keys' for poorer households can also make utilities more expensive.

Now there's an opportunity to address the issue. Before 2020, the UK needs to meet stringent carbon emissions targets and ensure that its energy supply is sufficient for the future. Smart meters are a central element of the plan and will help individual households to manage their energy use.

However, these plans come at a cost. The public will have to pay for much of the £200 billion investment, either through taxation or through higher energy prices. This has implications for people who already struggle with their energy bills, especially those on low or fixed incomes.

Smart home energy and money management systems, such as SHIMMER, can help tackle fuel poverty and make an important contribution to the country's ambitious carbon emissions targets.

SHIMMER and smart meters

In 2010 SHIMMER received funding from the UK's innovation agency, the Technology Strategy Board, following a competition to assess initiatives to 'integrate smart meters into systems for smart homes.'

Smart meters provide real-time information about how much energy is being used in the home. The UK has committed to rolling them out by 2020 – but energy companies have started installing them already. The information provided by these meters will enable the electricity grid to balance the supply and demand of energy more effectively – but consumers need to see the benefits too.

If smart meters are going to benefit low-income consumers they should be able to:

- Help reduce household energy usage and to make financial savings by controlling and automating appliances, central heating and household finances.
- Integrate with microgeneration technologies, for example, turning on appliances when a home's solar panels are making free energy and reducing the amount of energy imported from the grid.
- Link to online bank accounts. Bills could be paid more easily and money managed all from one place, with any savings going into a special account to save for home improvements like super-insulation which saves more money.
- Act as portal for innovative new energy services such as alternatives to prepayment meters, pay-as-you-save loans or remote care services for the elderly or those with mobility issues.
- Ultimately, be the starting point in creating smarter homes.

SHIMMER addresses these opportunities and goes further too

SHIMMER and solar panels

Wealthier or astute homeowners have been able to benefit from energy innovations. As part of plans to produce 15 per cent of the country's electricity from sustainable means, in 2010 the government introduced 'Feed-In Tariffs' (FiTs) that allowed owners of solar panel heating to sell electricity back to the national grid. Suddenly there was an extra reason for investing in renewable energy. Not only could homeowners meet their own energy needs; they could earn a little extra money too.

However, while the cost of solar photo-voltaic (PV) panel installations is falling, costs still exclude the fuel poor. Moreover, because FiTs are funded through a universal levy on energy bills, low-income consumers can end up in effect subsidising wealthier ones.

Rent-a-Roof

Some companies offer to install solar panels in return for the Feed-In Tariff payment. Whilst some low-income households may benefit from these schemes and from the electricity that is generated, many are excluded. This could be because they rent their homes and thus cannot give permission for installation, or because their roofs are of insufficient size to generate the returns a solar panel company expects.

SHIMMER offers a chance for social housing providers or other social enterprises to provide low-income households with solar PV installations whatever kind of home they live in and whether they rent or own their property. A proportion of the income from the Feed-In Tariff can be reinvested in energy-efficient improvements in their homes.



How SHIMMER works

SHIMMER is an open system hub that collects data from smart plugs placed in key points around the home such as the electricity meter, any micro-generation meters and household appliances.

This data is sent to the cloud by piggy-backing on the household's internet connection. It is analysed and cross-referenced with wider demographic and financial information about the individual household to create a profile of the household's energy consumption. It uses this profile to provide a real-time breakdown of how much each appliance is costing to run, very much like an itemised bill, and to deliver tailored energy-efficiency advice to drive behavioural change.

SHIMMER users complete an online profile that establishes their energy use, financial situation and property details. SHIMMER checks whether they are entitled to grants or benefits and if they could save money by switching utilities providers. It then monitors energy use to create a baseline that can be used to identify inefficient, costly consumption patterns and appliances.

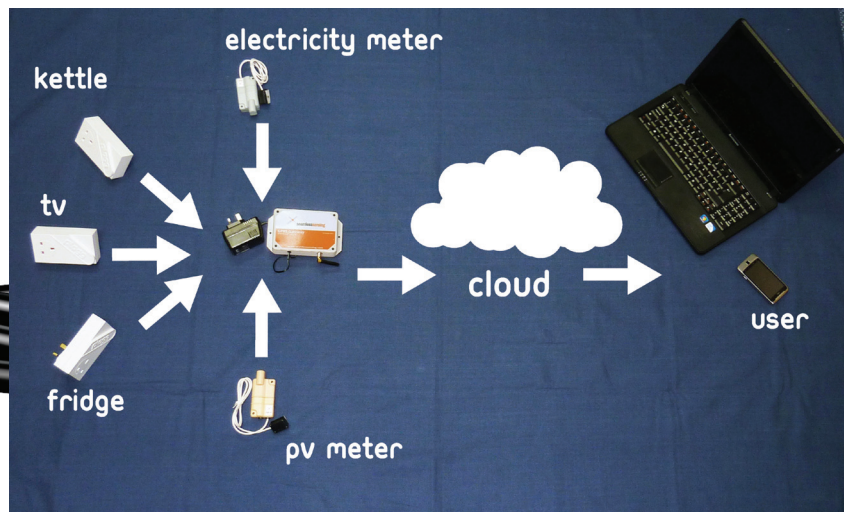
Households will be set realistic energy-saving targets and provided with specific actions they can take to achieve them. Once the scheme is rolled out fully the plan is that SHIMMER will reward users for energy-saving behaviour through 'green credits' that can be used to buy energy-efficient appliances or make home improvements, or that can help the household to move away from their pre-payment meter, if they have one.

The SHIMMER pilot

In a pilot scheme, 18 homes were fitted with prototype SHIMMER appliance devices and solar panels. After completing the SHIMMER online profile, each household's energy consumption habits were assessed by the Energy Saving Trust.

As the pilot progressed, homeowners, most of whom were in arrears and had little or no disposable income, were able to access SHIMMER's online financial and energy management tool. The pilot won't finish until June 2012, but early results show that each household increased its income – in one case almost doubling household income – by changing their consumption behaviour. Key findings are:

- Information about how much individual appliances cost as they are used, together with advice about alternatives, encourages a change in behaviour
- Support in managing household finance helps users to keep on top of their energy bills
- Smaller, frequent rewards motivate households to change their consumption patterns
- The greatest savings come from helping with financial literacy, such as helping users to claim benefits
- Using SHIMMER encourages people who do not normally use digital technologies to enjoy other online services too, including social media



Reinvesting savings

Results from the pilot programme indicate that SHIMMER can save households anything from £200 to £3,500 a year. This is a large range, but it highlights the importance of *behaviour change* on the back of more information about energy use. And it's just the start, because the money saved can be reinvested in further energy-saving measures, and two-thirds of participants expected to do just that. Furthermore, everyone who took part in the pilot said they would buy a new service or product that would bring them additional savings.

The results of the pilot were clear. Because SHIMMER helps households to cut their energy bills, participants have more disposable income. This could potentially give them the capital to invest in more substantial home improvement projects. As they continue to enjoy lower monthly energy bills because of the changes they have made, they are able to finance their loans and be no worse off. It becomes a virtuous circle as their home improvements bring further energy savings.

CASE STUDY

Household A is a family of six; parents aged 37 and 32, one in ill health and four children under the age of 18. Their earned income for 2009/2010 – £7,965 – averaged just £153 a week. The family receives benefits and tax credits worth £317 weekly. Mortgage repayments and living expenses, including groceries, travel and expenditure on the children cost £627, leaving the family £158 short of what they need to live on every week. As a result, debts are piling up.

The family wants to make greater strides to be environmentally friendly but say they can't afford to do so. In particular, they want to improve insulation and replace the windows, boiler and white goods.

The installation of solar panels means that they will save £150 to £200 per year if they make the most use of their appliances during the day when panels generate electricity. SHIMMER also helped them to apply for the Energy Assist social tariff, which saves them an average of £83 a year. In this case, the biggest gain comes from the benefits and entitlements checker element of SHIMMER, which saves the household £2,132.

SHIMMER allowed the household to make predictable, measureable savings. Under this model, the savings can be used to leverage credit. This credit can then be invested in further energy-efficiency measures, which increase the household's savings (which are projected and measured by SHIMMER), thereby compounding the users' savings and providing access to new services.



Next steps

With a successful pilot completed, SHIMMER is now undergoing redevelopment in advance of a full commercial rollout. We are also developing a range of new services such as Assisted Living Alerts to help vulnerable people to live independently, and fair alternatives to prepayment meters.

SHIMMER is now being offered to social housing providers as a fully financed package including solar PV and the shimmer system. This package will help them to fulfil their statutory duties to fuel-poor or vulnerable households, to meet reporting requirements on carbon emissions and to help tenants become more financially stable.

In the longer term, SHIMMER could act as a portal to innovative new services such as assisted-living alerts, green deal loans and arrears management. It could even become a financial cooperative, such as a credit union, that pools the savings that consumers make and increase their access to low-cost credit.

In particular, we're looking at:

- Allowing users to make payments or run their savings accounts through SHIMMER
- Delivering rewards and incentives, such as vouchers, that encourage energy saving
- New plug-and-play hardware that integrates a wireless network with broadband, possibly via a Freeview box, which will reduce the cost of SHIMMER and allow households without broadband to take part
- New services that can be delivered via SHIMMER such as Assisted Living Alerts, alternatives to prepayment meters and pay-as-you-save loans

The team

SHIMMER has been created by the London Rebuilding Society (LRS), the Energy Saving Trust and HomeZone, supported by a number of associates.

London Rebuilding Society provides affordable finance such as loans and micro-credit to underserved communities and organisations in the capital.

The Energy Saving Trust is the UK's leading independent organisation that helps people reduce their carbon emissions and save money on fuel.

Homezone CIC uses environmental initiatives to generate money for local charities, reinvest in communities and create green jobs.

For more information on SHIMMER:

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