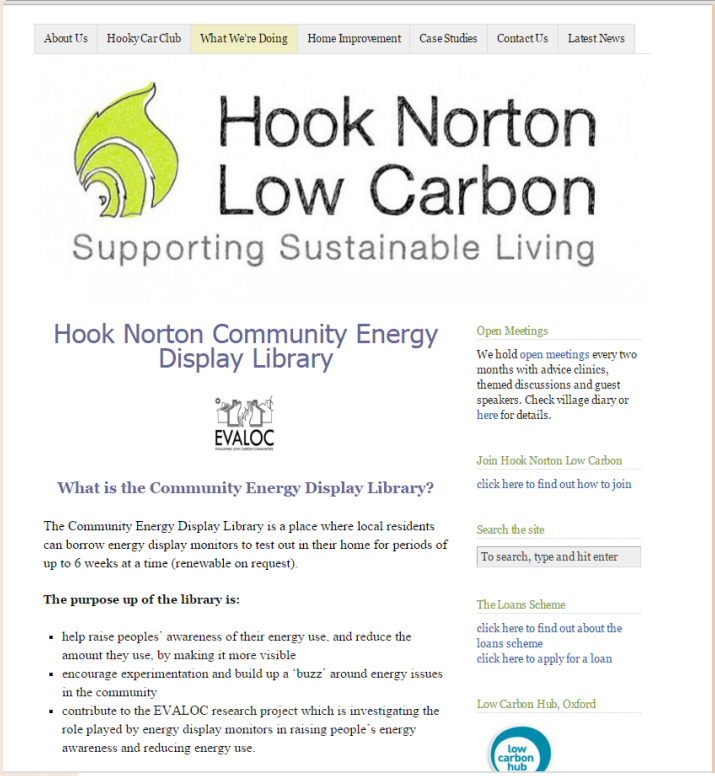
ENERGY FEEDBACK:
ENERGY DISPLAY LIBRARIES

EVALOC SUMMARY 5-2 OCTOBER 2015



KEY FINDINGS:

- Libraries with ~20 energy displays of various designs were set up in four EVALOC communities. Residents could borrow an energy display for up to 6 weeks.
- While EDM libraries can provide a useful service, it can be difficult to motivate people to use them unless they are part of a programme of activity such as household energy programmes, community clubs or school lessons.
- Some technical and behavioural support needs to be available at the time of borrowing or, ideally, in the home.
- Libraries are best located in a 'hub' like a school or community centre.
- Setting up and running a library does not have to be time-consuming, but it can still be difficult to find a host. Technical support and chasing up borrowers to return displays are likely to be the most time-consuming tasks.
- With smart meter rollout, the focus could shift from *lending* displays to *advising* people with smart meters on how to get the best results from the new information they have about their energy use.

1. Introduction

Since we moved away from solid fuel and candles, most home energy use, most of the time, has been invisible to householders. If we only have infrequent bills for feedback (and if these are often estimated), it becomes difficult to know how much electricity or gas we are using for different purposes and what difference we can make by changing day-to-day behaviour. An energy display monitor (EDM) (also called an in-home display or IHD, especially when linked to a smart meter) is a small gadget that shows how much electricity or gas people use in their homes and what it costs. It can also show, in real time, how much electricity different appliances are using. Research over the last two decades has shown that displays help householders to understand and reduce their energy usage, and that the outcomes include small average percentage reductions in consumption. However, these outcomes vary widely according to household circumstances and factors such as display design, feedback quality, and availability of additional advice, information and other support.[1]

As part of the EVALOC project, a number of energy feedback approaches were used, at household and community level. This summary outlines what we learned from attempts to set up 'libraries' in four of the six case study low carbon communities, from which local residents could borrow energy display monitors and try them out.

The four communities were; Eco Easterside (EE), Hook Norton Low Carbon (HN-LC), Kirklees-Hillhouse (KI) and Low Carbon West Oxford (LCWO).

1.1 The energy display monitors

Provision for better energy feedback through displays and bills has been incorporated into policy in Great Britain (GB) for rolling out smart meters: every customer who has a smart meter installed will also be offered an in-home display by an installer who has been trained to explain how to use it.[2] The Foundation Stage is already under way, with large-scale rollout planned to begin in 2016.

All of the EDMs in the libraries showed electricity use in real

[1] See Darby, S.J., Liddell, C., Hills, D. and Drabble, D. (2015) Smart Metering Early Learning Project: synthesis report. For the Department of Energy and Climate Change, London https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/407568/8_Synthesis_FINAL_25feb15.pdf

[2] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/407539/1_Early_Learning_Project_and_Behaviour_Change_Trials_Policy_Conclusions_FINAL.pdf

Figure 1. Eco-eye electricity monitor (image from: http://www.test-meter.co.uk/eco-eye-plug-in-energy-monitor/)

time, and this was the 'first screen' on all, the screen that everyone would have seen. There was a range in complexity between the different models, from the Eco-eye (Figure 1) offering a very simple, clear screen to the Saveometer, with many screen options offering a great deal of real-time and historical data. Some EDMs could be used in conjunction with a USB to download data and display it online. Gas use was only shown on the Saveometer (Figure 2).

2. EVALOC-supported display libraries

As part of its action research approach, the EVALOC project encouraged and supported some of the communities involved in the EVALOC study to set up libraries to create a buzz in the community and stimulate people to borrow and use energy displays. Residents could borrow an energy display for up to six weeks. All the displays contained instructions to help the borrowers install and use them, and

Figure 2. Saveometer display monitor (image from: http://globalcool.org/win/comp-win-energy-saving-monitor/attachment/eco1_georgian_04)

the librarian or LCC were able to provide some guidance if asked.

Libraries with ~20 energy displays of various designs (chosen by LCC members), were set up in four of the six EVALOC communities. They offered technical and behavioural support as outlined in Table 1. It shows rather disappointing outcomes, although there were some positive experiences. The main organisational difficulty was finding institutions or individuals with time to run the libraries and provide technical support to borrowers. There were no resources for this. In Kirklees-Hillhouse, for example, the secondary schoolteacher in charge of the display library was excited about taking on the project, and sent about it systematically, discussing the concept with the Student Council, who were keen and supportive. She reported that the children in years 7-11 who had borrowed displays had 'loved the displays' and been 'really keen to be involved'. They were 'mostly interested in them helping them save money but also loved the technology', and were 'very keen and reliable'. She and the children ended up working out how to use the monitors themselves. 'It was difficult …but they managed '. However, only eight displays were lent out, primarily because she had many other calls on her time and was not resourced to take on this extra task. To ensure continuity, the teacher suggested that EVALOC ask the school library to run the display library, and the science department to incorporate the idea into their lessons, but neither idea was taken up.

It could also be difficult to motivate residents to use the displays unless:

- The EDMs were part of an established programme of activity such as the Low Carbon West Oxford (LCWO) Low Carbon Living Programme, which provided a structured programme of action and learning groups involving carbon measurement and feedback through carbon footprints; learning, practical advice and support from neighbours and local experts; goal setting; and signposting to grants. The LCWO librarian commented that the EDMS *'helped make energy physical, but it needed to be part of a package / process of activities. E.g. they learnt about transformers, which continually suck energy … if they're left on.'*
- The librarian or an assistant could demonstrate how displays worked at the point of borrowing or, ideally, in the home. For that, though, the borrower needs to ask for help. This seems to have happened only rarely. One of the librarians in Hook Norton, for example, explained that while three people *'stuck with the energy display monitors'*, three (all very elderly) quickly returned them rapidly as they found them *'difficult to use'*. One didn't use the display because *'she thought it needed to be used with a computer'* and another thought that *'it kept setting off her door alarms'*. The librarian tried one of the displays out herself but *'couldn't get on with it'* and found it *'ever such a fiddle. Even my son found it difficult to set up'*. It was not long before she felt she had reached the limit of what the library could do.

As with the EDMs in the case study homes (and, indeed, with the LZTs used in the project), the library experience illustrates the

Community	Demography	Library Host	Start Date	Librarian and technical support	Outcomes; types of research feedback
Eco Easterside (EE)	Deprived, suburban	Community Library	April 2012	*Librarian:* Public librarian/community centre manager *Tech support:* Paid worker from Middlesbrough Environment City	Only one display was borrowed by a household involved in the EVALOC research because there had previously been so many distributed free to the community. Interview with 1 household
Hook Norton Low Carbon (HN-LC)	Affluent, rural	Primary school	Feb 2012	*Librarian:* Teacher *Tech support*: HN-LC volunteer	3 displays borrowed in first and 3 in second term Interviews with 3 households
		Baptist Church Care Group for elderly people	Spring 2012	*Librarian:* HN-LC volunteer *Tech support:* HN-LC volunteer	6 displays borrowed. Verbal feedback from librarian about borrowers' experiences
Kirklees (KI)	Deprived, multi ethnic, urban	Secondary School	January 2012	*Librarian:* Teacher, and school council *Tech support:* Teacher and children worked out how to use EDMs themselves	8 displays borrowed by students via Student Council. Verbal feedback received from librarian about borrowers' experiences.
Low Carbon West Oxford (LCWO)	Middle income, urban	Low carbon community group volunteer	November 2012	*Librarian:* LCWO volunteer *Tech support*: LCWO volunteer Part of structured residential carbon reduction project	16 displays borrowed by participants in Low Carbon Living Programme 9 feedback forms, in-depth interviews with households, and verbal feedback from librarian.
		Primary School	April 2012	*Librarian:* Teaching assistant & Eco-warriors (a group of students who champion environmental issues I) *Tech Support*: LCWO volunteer	Interested in lending displays and getting kids to use activity sheets at home with families. But none borrowed. The teaching assistant left, there was a new head teacher, and LCWO tried to re-stimulate interest

Table 1. A summary of the energy display libraries set up in the four EVALOC case study low carbon communities.

need to pass on knowledge along with technology. It also reflects the challenge of setting up and maintaining initiatives that rely purely on volunteers.

3. Key Findings

- Libraries with ~20 energy displays of various designs were set up in four EVALOC communities. Residents could borrow an energy display for up to 6 weeks.
- While EDM libraries can provide a useful service, it can be difficult to motivate people to use them unless they are part of a programme of activity such as household energy programmes, community clubs or school lessons.
- Some technical and behavioural support needs to be available at the time of borrowing or, ideally, in the home.
- Libraries are best located in a 'hub' like a school or community centre.
- Setting up and running a library does not have to be time-consuming, but it can still be difficult to find a host. Technical support and chasing up borrowers to return displays are likely to be the most time-consuming tasks.
- With smart meter rollout, the focus could shift from lending displays to advising people with smart meters on how to get the best results from the new information they have about their energy use.

Practical tools for setting up your own community energy display library are available online via the EVALOC ENACT toolkit.

EVALOC
EVALUATING LOW CARBON COMMUNITIES

For further information please contact:

Professor Rajat Gupta
Low Carbon Building Group
Oxford Brookes University
Headington Campus, Gipsy Lane
Oxford OX3 0BP

Phone: (+44) 1865 484049
Fax: (+44) 1865 483928
E-mail: rgupta@brookes.ac.uk

www.evaloc.org.uk

The EVALOC project seeks to assess, explain and communicate the changes in energy use due to community activities within six selected case study projects under the Department of Energy and Climate Change's (DECC) Low Carbon Communities Challenge (LCCC) initiative, a government-supported initiative to transform the way communities use and produce energy, and build new ways of supporting more sustainable living.

Research Councils UK Energy For a Low Carbon Future
Grant Reference: RES-628-25-0012

EVALOC is a four-year multi-disciplinary project worth £1.14 million funded by the UK Research Council's (RCUK) Energy Programme. The Energy Programme is a RCUK cross council initiative supported by EPSRC, ESRC, NERC, BBSRC and STFC.

OXFORD BROOKES UNIVERSITY

Environmental *Change* Institute
eci UNIVERSITY OF OXFORD