International Energy Agency

Energy Technology Initiative on

Demand Side Management Technologies and Programmes

Subtask 6&7: Ireland

Home Energy Saving Kits Final Report

Task 24 - Behaviour Change in DSM

Helping the Behaviour Changers

July 2018

Contents

EXECUTIVE SUMMARY

This report provides an overview of the findings of an Irish research project that evaluated user feedback on 'Home Energy Saving Kits'. Particular emphasis was placed on examining the potential of the kits to encourage behaviour change in the home in terms of both everyday energy use behaviours and investment in home energy upgrades. The project was part of Ireland's involvement in the International Energy Agency, Demand Side Management Task 24 Research project (Subtask 6 & 7). Led by Sustainable Energy Authority of Ireland (SEAI), the study was collaborative and action-based involving partners from Codema (Dublin's Energy Agency) and Dublin City Libraries. Home Energy Saving kits are available in various formats in several countries. High loan rates and anecdotal evidence indicates their utility and popularity, however their impact has yet to be formally and comprehensively analysed. The research reported here aims to address this gap.

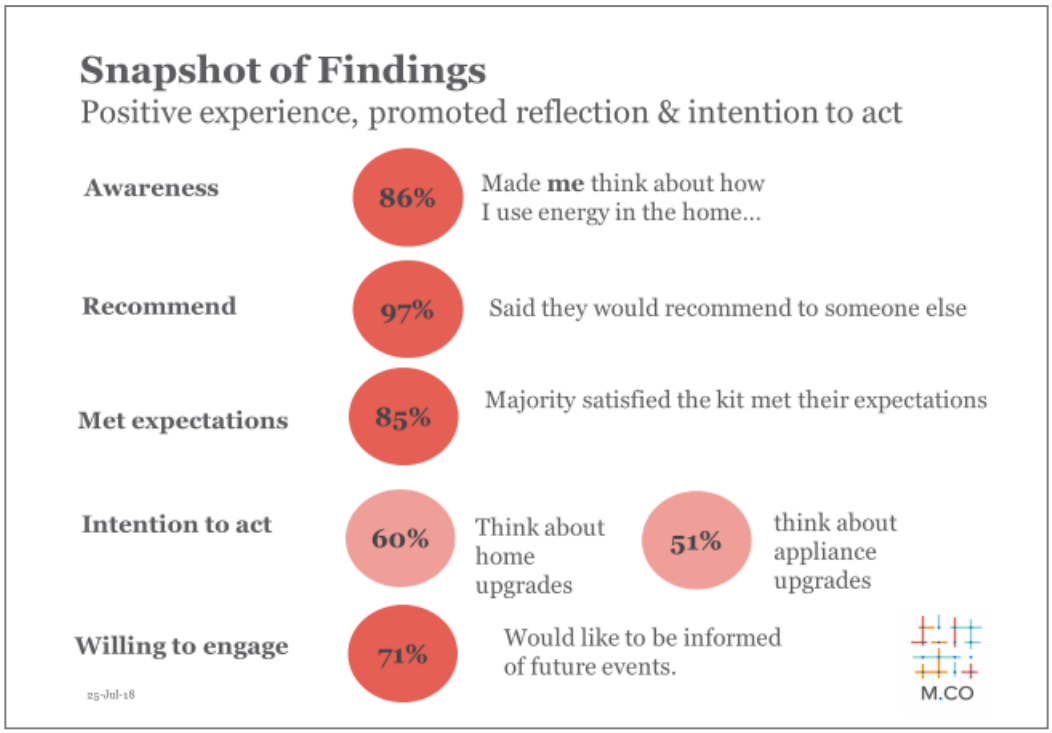
The Irish kit comprises six tools – a *plug-in energy meter*, *thermal leak detector*, *radiator key*, *stop-watch*, *fridge-freezer thermometer* and a *temperature and humidity meter*. Codema had already produced 17 of these kits as a pilot and as part of this research project, a further 67 kits were produced with SEAI's support and made available for loan across all Dublin city libraries. They were also available for loan within two workplaces, two schools and in one of SEAI's Sustainable Energy Communities. A mixed methods approach was employed involving surveys, interviews and focus groups in order to address our research aims which were to, learn what tools had most impact on behaviour; what supports may be necessary to complement the kit; how the kits may be situated in different fora; and how to communicate and engage with householders to maximise participation.

The research revealed that the overwhelming majority of participants had a positive experience of the kits. The kits were found to increase **awareness** of energy use in the home – with 86% of survey respondents stating that it made them '*think about how* [they] *use energy in the home*'. Over half of participants reported **intentions to act** following their experience of borrowing the kit – 60% stated that it made them '*think about home upgrades*' and 51% stated that it made them '*think about appliance upgrades*'. As a longitudinal survey was not carried out, it is not possible to assess whether these intentions were translated into action. However, interviews and focus groups did show anecdotal evidence of some people continuing their behaviour changes and investing in energy upgrades following their engagement with the kit.

The **novelty of the kit** and its range of tools made for an interesting and engaging experience for most users, with 85% stating that the kit met their expectations and 97% stating that they would recommend it to others. The ***thermal leak detector*** was a highlight for the majority of participants. Its ability to '*make visible the invisible*' was particularly attractive – and for the same reason, the ***temperature and humidity meter*** was rated closely behind the *thermal leak detector*. The other kit tools received positive feedback but were not as universally appealing – for example the stopwatch to measure shower water flow was considered more of a niche interest. The *plug-in energy monitor*, while interesting, was time-consuming and technically challenging for many.

A key reason for positive responses to the kit was its ability to **empower** householders to make their own evaluations; either in advance of engaging experts for a formal energy audit or to provide confidence in the opinions of experts already engaged (but not yet formally contracted). In some cases, people were using the kit to validate upgrade work already completed. The diversity of motivations for borrowing the kit led to the identification of **four user personas**. These personas highlight the potential to create tailored kits and campaigns to better meet the diversity of user needs and challenges. For example, there is an opportunity to create a streamlined kit focusing on the *thermal leak detector* and *the temperature and humidity meter* to target those who are already contemplating home energy efficiency upgrades but need a boost of confidence to initiate action. Some participants felt that they could not act upon the insight gained from the kit due to financial barriers and not knowing which actions to prioritise. To address this, a digital tool could be created to integrate findings and to link to SEAI grants and supports that can enable action.

Figure 1 - Snapshot of Findings



BACKGROUND – INTERNATIONAL ENERGY AGENCY DSM TCP PROJECT & TASK 24

The International Energy Agency (IEA) Demand Side Management Energy Efficiency Technology Collaboration Program (DSM TCP) is an international collaboration of 15 countries and 3 sponsors working together to develop and promote opportunities for demand-side management (DSM)[1]. Demand side management is considered '*any programme which communicates with the consumer and either enables them or encourages them to lower or shift [energy] consumption*' (Darby, 2009). It offers solutions to challenges such as load management, energy efficiency and strategic conservation. The work of the DSM TCP is organised through a series of 26 research tasks which look at DSM issues from a variety of technological, political and behavioural perspectives. SEAI began involvement in the programme in late 2015, specifically with Task 24 – 'Behaviour Change in DSM' (Rotmann and Mourik, 2013). The goal of this Task is to '*provide a helicopter overview of best practice approaches to behaviour change interventions and practical, tailored guidelines and tools of how to best design, implement, evaluate and disseminate them in real life*' (Rotmann, 2016: 1).

During Phase 1 of Task 24 (2012 – 2015), a network of over 250 behaviour change experts made an inventory of theories, models and approaches to sustainable household energy consumption, gathering 60 case studies from over 20 countries (see Mourik and Rotmann, 2013). A key lesson arising from this was the need to explore approaches to behaviour change that move beyond dominant technocratic models of understanding. Human-centred approaches offer a more systemic perspective and have the potential to identify novel opportunities for behavioural interventions that place human needs at their heart. Human-centred approaches start with the perspective of energy as an enabler for the delivery of basic needs including warmth, comfort, mobility, safety etc. Reflecting on these insights, Phase II involved countries scoping and selecting priority areas for behaviour change in DSM. One priority area was then selected in each country for further research. In Ireland, '*Home Energy Saving Kits*' were identified as an area warranting further research, in order to examine their potential for promoting behaviour change with respect to everyday energy

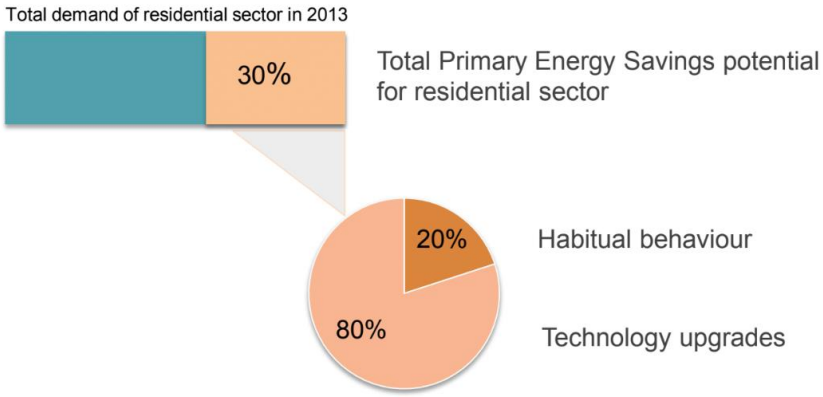
[1] See www.ieadsm.org for further details.

use in the home and investment behaviour. This report outlines the results from the Irish research project led by SEAI in collaboration with key stakeholders, including Codema (Dublin's energy agency) and Dublin City Libraries. It begins with background Review of Policy and Research in Ireland which led to the identification of '*priority areas*' for further research. Next, the Research Aims are outlined followed by the Methodology, Findings and Concluding Remarks.

DSM POLICY AND RESEARCH IN THE IRISH CONTEXT

According to latest figures from the EPA (2018), the residential sector is responsible for 10% of Ireland's greenhouse gas emissions. Considering total final energy demand, the residential sector accounts for 23% - which is the second largest energy demand after the transport sector at 42% (SEAI, 2017). Reducing residential energy consumption is therefore a priority policy action to be pursued in tandem with measures aimed at reducing supply-side emissions. SEAI (2015b) estimates that the total primary energy savings potential for the residential sector is 30%, of which 20% can be derived from habitual behaviour change, and 80% from technology upgrades (See Figure 2 below).

Figure 2 - Energy demand of residential sector and savings potential (SEAI, 2015)



Irish national energy policy has been developed in the context of the significant role played by the EU in determining energy policy in member states. It takes account of European and International climate change objectives and agreements, as well as Irish social, economic and employment priorities. As an over-arching objective, the National Policy Position on Climate Action and Low Carbon Development[2] established the "National Transition Objective" of a low carbon, climate resilient and environmentally sustainable economy by 2050. Ireland has set a national goal of achieving an 80% reduction in carbon dioxide emissions by 2050 (compared to 1990 levels). However, a recent EPA report noted that Ireland is far off target and at best, will only achieve a 1% reduction by 2020 (EPA, 2018). The current Energy White Paper[3] (DCCAE, 2015) acknowledges that a new paradigm is needed based on encouraging and enabling '*active energy citizens'* involving increased community participation in renewable energy generation and more opportunities for engagement in policy making. It notes that a low carbon future will involve *'radically changing our behaviour as citizens, industry and Government'* (DCCAE, 2015: 28). A selection of key DSM instruments in the Irish context are outlined in Table 1. They are grouped according to the common categorisation of communicative, economic or regulatory instruments.

[2] Available from http://kWh.dccae.gov.ie/en-ie/climate-action/publications/Pages/National-Policy-Position.aspx
[3] Available from http://kWh.dccae.gov.ie/en-ie/energy/topics/Energy-Initiatives/energy-policy-framework/white-paper/Pages/White-Paper-on-EnergyPolicy-in-Ireland-.aspx

Table 1 A Selection of key Irish Interventions

DSM Instrument	Selection of key Irish Interventions
Communicative / Social	• Smart metering due 2019 - 2025 • Public awareness campaigns (e.g. advertising around SEAI's grant programmes) • Environmental education e.g. An Taisce Green Schools, SEAI One Big Idea and other school outreach programmes. • Community campaigns and upgrade programmes through SEAI's Better Energy Communities and Sustainable Energy Communities programmes. • Home Energy Saving Kits to empower householders to take action. • Labelling - Building Energy Ratings and appliance energy efficiency ratings.
Economic	• Grant incentives - a range of grant programmes for household energy efficiency upgrades targeted to the householder administered by SEAI; target of 1 million upgrades. • Carbon tax €20 per tonne on carbon dioxide emitted from kerosene, marked gas oil, liquid petroleum gas (LPG), fuel oil and natural gas.
Regulatory	• Energy Labelling directive requiring the display of the energy performance of electrical equipment and the Energy Performance of Buildings directive (EPBD)

SEAI's 'Behavioural Insights on Energy Efficiency in the Residential Sector' report notes that; '*Around 70% of owner occupiers and around 60% of tenants think they can reduce energy use and consider energy efficiency options' (SEAI, 2018:10).* This reveals that the majority of consumers in the residential sector may be willing to invest in energy efficiency if barriers to action are addressed by a combination of policy interventions and supports. High levels of willingness to engage in home energy efficiency upgrades is important as it is estimated that over 1 million homes need improving - with many needing deep retrofits to make them energy efficient. It is therefore necessary to consider interventions that help translate this willingness into action.

REFINING OUR RESEARCH FOCUS – MULTI-STAKEHOLDER WORKSHOPS

As part of the Irish participation in the IEA DSM Task 24 project, three multi-stakeholder workshops were held at various points in the project's evolution. Two were led by Dr. Sea Rotmann, operating agent for Task 24 and one by Dr. Ruth Mourik of Duneworks. These workshops applied two complimentary approaches - The *Collective Impact Approach* and the *Behaviour Changer Framework*[4]. The *Collective Impact Approach* (CIA) was first developed by Kania and Kramer (2011) to aid social entrepreneurs. This approach, aimed at long-term social change, and proposes a collective, rather than an individual approach for solving social problems. It is based on the understanding that no single policy, government department, organization or programme can tackle or solve the increasingly complex social problems we face as a society. The approach calls for multiple organisations or entities from different sectors to abandon their own agenda in favour of a common agenda, shared measurement and alignment of effort. Unlike collaboration or partnership, *Collective Impact* initiatives have centralised infrastructure – known as a backbone organisation – with dedicated staff whose role is to help participating organisations shift from acting alone to acting in concert (Walzer et al., 2016). In this case, SEAI served as the backbone organisation, with research, strategic design and project management support from M.CO[5].

Workshop 1, April 8, 2016

The first workshop focused on collectively identifying some of the key issues in Ireland with a range of participants from the residential sector representing the following personas identified in the Behaviour Changer Framework:

- ***National Expert*** *– represented by Josephine Maguire and Jim Scheer, both SEAI.*
- ***Experts*** *– represented by M.CO and NUI Galway*
- ***Visiting Expert*** *– represented by an academic researcher with energy efficiency and behavioural expertise from University of Sheffield Hallam*
- ***Middle Actor*** *– represented by a manager from SEAI's Sustainable Energy Communities (SEC) programme.*
- ***Provider*** *– representatives from Electric Ireland, REIL and Saint Gobain*
- ***Decision maker*** *– SEAI staff and representatives from the Department of Communications, Climate Change and Energy Action.*
- ***Conscience*** *- represented by member of 'Energy Action' – an Irish charity concerned with providing home insulation services for older people and the disadvantaged.*

The Task 24 '*magic carpet*' ('*Behaviour Changer Framework*') (see Rotmann (2016)) was used at the workshop. This helped visualise the current Irish energy system, including different actors (i.e. the 'behaviour changers' from the different sectors), and their relationships with each other and end-users. The following DSM issues were focal points of discussion:

- Different behavioural practices in commercial / SME sectors in comparison with residential sector where cross-sectoral learning could be beneficial
- Exploring the possibilities afforded by engaging with middle actors (including those linked with SEAI's sustainable energy communities (SEC) programme, and others who influence household retrofit.
- Landlord split-incentive issues in the residential sector.

After more deliberation, the DSM issue that was chosen to have the greatest technological, financial and social opportunities and lowest risks, was '*training of middle actors in SECs'* to act as advisers to homeowners regarding energy efficiency. The risks that were discussed

[4] More detail on Task 24 tools and how they are applied in practice in Cobben (2017): http://kWh.ieadsm.org/wp/files/ST67-NL-ICT-case-study.pdf; Cowan, Sussman and Rotmann (2017): http://kWh.ieadsm.org/wp/files/IEA-DSM-Task-24-Subtask-11_CHS-case-study_FONTS.pdf and Kallsperger and Rotmann (2017): http://kWh.ieadsm.org/wp/files/Task-24_Final-Status-Report_Austria.pdf

[5] M.CO is a Dublin based strategic design and project management company – www.mco.ie

included proving how well a pilot would work; scalability; reliance on volunteers; privacy and trust issues; lack of access to households and delays. Following the workshop, various opportunities linked to '*middle' actors* were explored by SEAI / M.CO, along with the *behaviour changers* involved. Codema, had engaged libraries as '*middle actors',* in order to lend out '*Home Energy Saving (HES) Kits*' that they had designed for householders. These kits contained practical tools to help householders to assess areas of energy use linked with heating, appliances and hot water, along with considering their insulation and thermal envelope. It was felt that the kits could be an appropriate tool for use in SEAI's Sustainable Energy Communities programme, and indeed could be situated within other fora (e.g. schools or offices) to engage a variety of users. As of yet, the impact of such kits had been under-evaluated although high demand for loans from a small number of Dublin city libraries stocking them suggested they were popular. In order to progress the project further, a joint Steering Group was established including **Codema** Dublin's Energy Agency ('*The Providers*' of the kit); **SEAI** ('*The Decision-makers*' from government); **Dublin City Public Libraries** ('*The Middle Actors*' loaning out the kits); **M.CO** and **SECs** ('*The Conscience*' helping with roll-out). The See Change Institute came on board later and support evaluation of Sustainability Energy Community (SEC) use of the kit.

Workshop 2, January 31, 2017

The second workshop focused on refining the research approach for the Home Energy Saving Kits project[6]. This was facilitated by M.CO, and explored through a Design Thinking process. Attendees were divided into groups and were asked to assume one of four user personas. Once assigned a persona, attendees began mapping the Home Energy Saving Kits user journey, taking note of potential pain points and opportunities. They were then asked to act as *behaviour changers*; in order to delve into the particular pain points and investigate responses available to them that could be adopted to address these issues, highlighting any restrictions and other stakeholders that they required to enable this to work by following the Task 24 "magic carpet" exercise. This led to the identification of the following opportunities from an end user perspective:

- Library system has advantages for management of the kits – there is also the possibility to use the marketing around the kits to draw in new library users (creating a 'win-win').
- Benefits to having 'batch' loans for structured communities such as SECs or existing focus groups.
- High percentage of feedback possible through engaging with established communities
- Energy champions in libraries and offices – tap into what's already there

A programme for how the project could be deployed was also developed at this workshop and is contained in Appendix A.

Workshop 3, May 12, 2017

Workshop 3 invited the main behaviour changer collaborators to undertake an informal, interim evaluation of how the pilot was progressing. Here, the main mandates, stakeholders, restrictions and tools of each Behaviour Changer were established along with actions to better improve the evaluation process (Appendix B)

A methodology for adapting the user survey was developed in the workshop using the 'Beyond kWh' survey template and with the assistance of a specific SEC it was agreed that this could be rolled out within a sub set of kit borrowers.

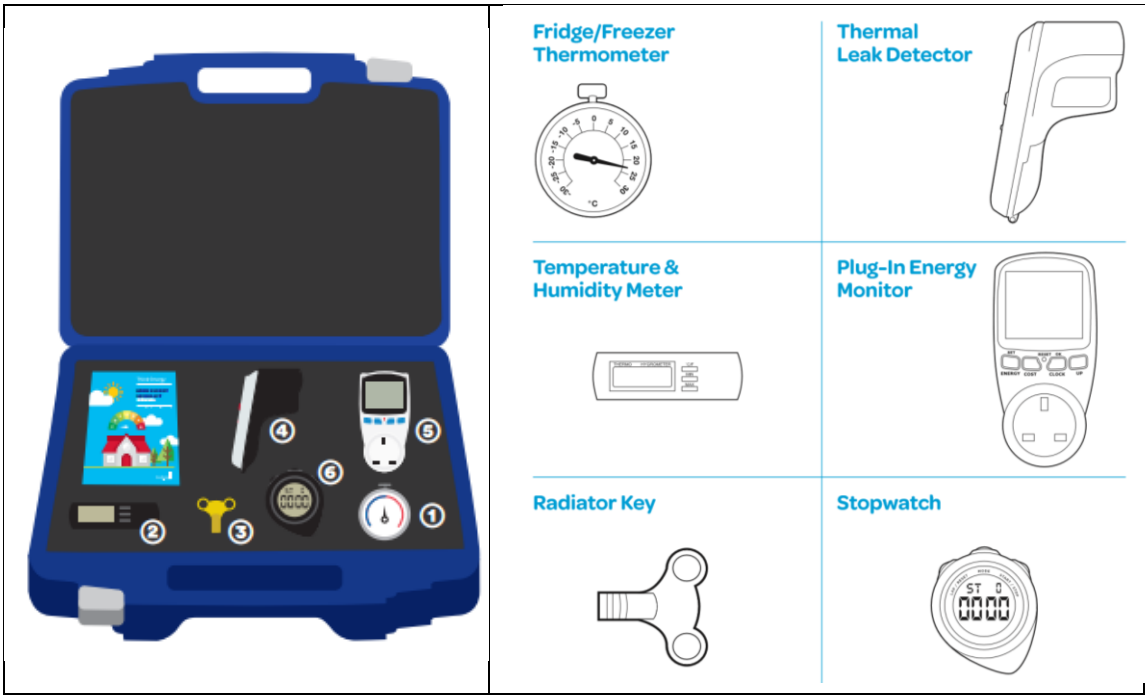
[6] Workshop 2 was attended by the same representatives as Workshop 1, with the addition of a representative from Dublin City Libraries, an SEC and a home improvement contractor. REIL and Electric Ireland were absent.

RESEARCH AIMS

Home Energy Saving Kits

Recognising that householders need guidance on what changes they can make (behavioural or investment based) to reduce their home energy consumption, Codema launched 17 '*Home Energy Saving Kits*' as a pilot project in 2016. The kits were made available to borrow, free of charge for a period of between 2-3 weeks in 10 libraries in branches across Dublin city. It was the first scheme of its kind to be introduced into Ireland and was based on a similar initiative in south Australian libraries. As stated within the Home Energy Saving Kit Manual, the kit contained *'6 practical energy saving tools which will help you conduct your own home energy audit and find the easiest and most important areas to reduce your energy'.* It was intended to serve as a 'first step' / 'spark' to householder action. The tools, illustrated in Figure 3 below, allowed householders to assess areas of energy use linked with heating, electric appliances and hot water, along with considering their home insulation.

Figure 3 - Home Energy Saving Kit & its contents



Some of the tools can be used to immediately remedy a problem – e.g. the fridge/freezer can be adjusted after reading the results from the *fridge/freezer thermometer*, while the radiator key can be used to bleed radiators to improve their efficiency. The majority of the tools however, are focused on providing insights into technical improvements that could be made; whether it means investing in wall insulation if the thermal leak detector highlights draughts or upgrading to energy efficient appliances or a low flow shower head. The kit also comes with the following supporting tools:

- HES instruction manual
- Home Energy Savings Tips (take-away booklet – Appendix C).
- Worksheets to fill in the results.
- Take-away thermostat (included in Appendix D).

Participating libraries reported high levels of demand for the kits, with significant waiting lists to loan them. A short, informal feedback form which yielded 18 responses, indicated positive feedback, however these forms were not intended to scrutinise the impact of the kits in significant detail. Codema and Task 24 partners identified and contacted libraries and programme managers who were involved with similar home energy saving kits internationally including Australia, New Zealand, Canada, Germany and USA. Some of the

programme managers were interviewed about their experience using a questionnaire (see Appendix E for their answers and a table summarising all main programme features, and (Rotmann, 2018) for further details). These projects all reported high levels of interest amongst users but did not include rigorous analysis. Recognising the potential for the kits to act as both a motivator and an enabler for behaviour change in the home in terms of both habitual behaviour and home upgrade activity, it was identified that more research was needed to further explore the impacts of the kits.

The following research aims were identified:

1. **Tools:** To learn what tools have most effect on householder energy behaviour (habitual and investment) and feed into any further plans to develop the kit
2. **Action:** To evaluate the impact of the kit in promoting behaviour change with respect to:
    - Efficiency behaviour – changes to daily energy practices and
    - Investment behaviour – home energy efficiency improvements.
3. **Supports:** To ascertain what additional supports may be necessary to complement the kit.
4. **Setting:** To identify opportunities to use the kits in other fora.
5. **Evaluation:** to pilot processes and procedures to assess the impact of the Home Energy Saving kit.
6. **Engagement:** To pilot various targeted communications channels to householders to maximise participation in and benefits of the initiative.

It was decided to expand the number of kits in circulation and Codema, with funding support from SEAI, produced an additional 67 kits for circulation across 22 Dublin libraries.

METHODOLOGY

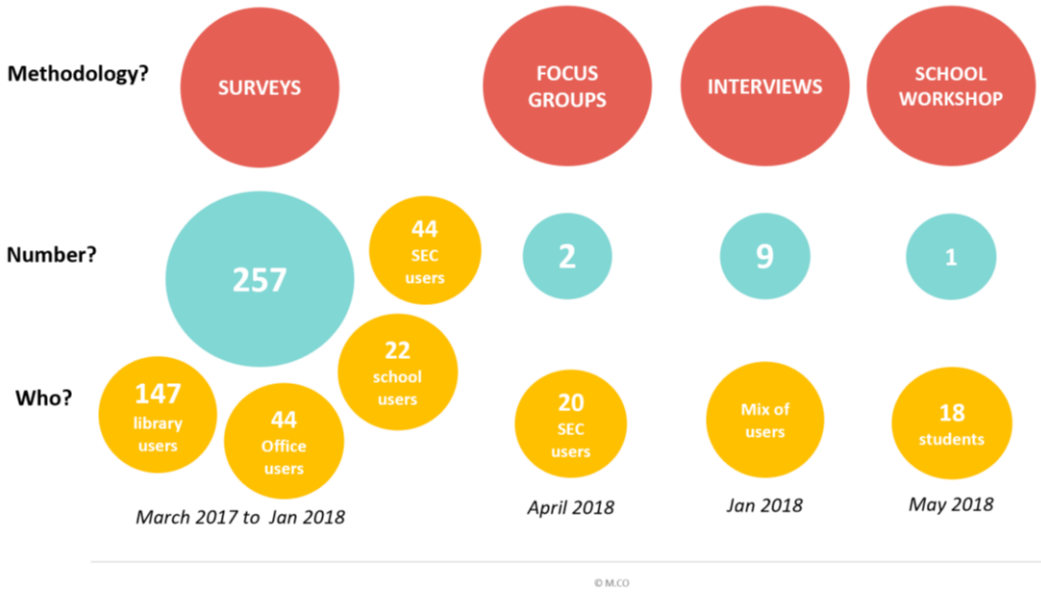
This section outlines the mixed methods approach that was designed through blending qualitative and quantitative research techniques. The aim of this approach was to allow for triangulation across data and to improve the richness of any insight gained. To probe the question linked to the influence of 'setting' and whether and how the kit might be embedded into different fora, it was decided to trial the kit in the following contexts:

1. **Library setting** – users represent a loose '*community*' – bound by place rather than common interest and exposed to library messaging and library staff communications. Kits were made available across 22 libraries in Dublin.
2. **Workplace setting** – users represent a community bound by workplace with an assumed degree of common professional interest – exposed to office-based communications and conversation. Dublin City Council and South Dublin County Council offices were selected for kit trial.
3. **SEAI Sustainable Energy Community (SEC) Group** – community bound by place and common interest in energy issues. Social influence likely to be stronger here through engagement of members in broader SEC activities. SAGE (Shankill Action for a Greener Earth) a new SEAI SEC was selected to trial kits.
4. **School setting** – users representing a younger demographic, and possible route to access and influence householders through their children's use of the kits. Two secondary schools in County Monaghan, Ireland were selected to trial the kits as part of their existing involvement in SEAI's school programmes.

The 'overview survey' (contained within Appendix F) was a key means for gaining a high-level impression of user feedback. This was made available in paper and online format. As an incentive, those who completed it were entered into a draw for a €100 shopping voucher. Overall, 257 of these '*overview surveys*' were completed by users across our key settings. It is important to note that a somewhat modified 'before' and 'after' version was created for the SEC audience which included a set of questions linked to the *'Beyond kWh evaluation'*. The *Beyond kWh evaluation* is a survey method developed by Karlin et al. (2015) which includes

psychometric testing that can be used to collect self-reported data as part of evaluation of behavioural interventions. Dr Sea Rotmann and Dr Daniel Chapman of the SEE Change Institute led the analysis of the Beyond kWh survey, results of which are presented in detail in '*Subtask 9: Irish Case: Helping the Behaviour Changers*' report (Rotmann, 2018). Also, some questions were omitted from the 'overview survey' for school students as they were overly technical. To deepen understanding, interviews were held with a selection of users who had different socio-demographic profiles, trialled the kits in different settings, and who had varying opinions on the kits. Interviewees were identified through our surveys, as respondents were asked if they would be happy to be involved in further research (to which 51% agreed). In addition, two focus groups were held with the SEC group in order to better understand the potential for application of the kits within these community-based settings and to explore group dynamics. A school workshop was also held with one of our participating schools to explore what students and teachers thought of the kit and if and how it might be embedded within school programmes.

Figure 4 – Overview of Methodology for Evaluating the HES Kits



FINDINGS

This section presents the findings from the research. Initially, a profile of users is provided to improve understanding of the audience who were attracted to use the kits. Next, the results are presented structured around our research aims. The results section integrates data yielded across the research methodologies – thus blending quantitative and qualitative evidence. Results from the 'overview survey' focus on those administered to our adult HEK audience (n = 235) i.e. omitting the school survey responses which are contained in the Findings section. Survey results provide a snapshot of user sentiment with respect to the kit, its tools and influence on user action – full results from this survey are included in the Appendix G. Qualitative feedback from interviews and focus groups allows us to triangulate the analysis and further enriches the understanding gained.

Profile of users

The majority of kit borrowers (62%) stated that they were 'employed', while the next highest grouping were classified as 'retired', at 26%. The 'retired' grouping were more highly represented than the national average which is currently 14.5% (CSO, 2017a). This may be because anecdotally, retirees, tend to use libraries more than other demographics and thus would have more awareness of the existence of the kits. Research linked to 'moments of change' (SEAI, 2018) in the lifecycle shows that retirement represents one such change when people may be more receptive to influence. Thus, higher impact may be achieved from campaigns and interventions targeting this cohort. In terms of age groups, there was an even split across the 31-45, 46-60 and 60+ age brackets – each of which comprised c. 30% of our sample.

The only under represented group was the 18-30 bracket, which is to be expected given the limited number of home-owners in this cohort. There was no gender bias in our sample with 50% being male, and 50% being female. Over half of respondents' homes were built before 1978. With respect to house types, most of our respondents had semi-detached or terraced households (66%), which is similar to the proportion of persons who live in semi-detached or terraced households in Dublin (61.6%) (CSO, 2017b). In terms of motivations for borrowing the kit, '*money saving*' was the highest priority with 30% of respondents stating this as a key driver. After this came '*warmth and comfort*' and '*home improvement*' as joint second at 22%. A difference was seen between the SEC borrowers and our library and workplace audience, where 43% of the SEC group were motivated by environmental concern while this was of concern for only 22% of our library respondents. This is to be expected given that the central premise of the SEC group is to become, as far as possible, energy efficient.

Tools

Aim: To learn what tools have most effect on householder energy behaviour (habitual and investment) and to feed into any further plans to develop the kit.

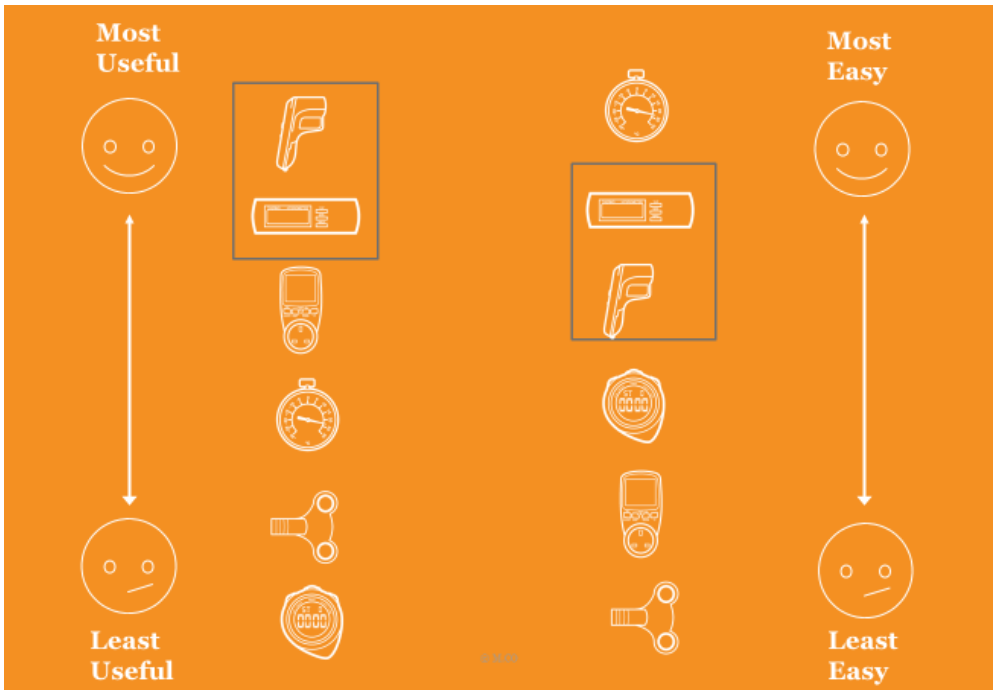
To understand the impact of the tools on behaviour, participants were asked in interviews, focus groups and surveys which tools they found most useful in informing action, and which they found the most easy to use. Figure 5 visualises findings with respect to these questions, while Appendix G elaborates on research findings with graphs from survey results and illustrative qualitative extracts.

Of our survey respondents, 41% ranked the ***thermal leak detector*** as the 'most useful tool', followed closely by the ***temperature and humidity meter*** receiving 31% of survey respondents' votes. These two tools were also considered easy to use, suggesting that they should be prioritised when thinking about potential further kit iterations. The tool that was considered the least useful was the ***stop-watch*** – with its connection to energy use not immediately clear to some and with respondents noting that a viable alternative exists in the

form of their mobile phone timers. The ***radiator key*** was also considered a less useful tool, possibly due to many stating they already had one, or because their radiators were not suited to that type of key. It was also considered technically challenging to use.

Participants found the ***fridge-freezer thermometer*** to be the easiest tool to use, however, it was not ranked as being the most useful. This is possibly due to its application being linked to only one appliance and due to the perception that existing fridge thermometers were accurate, so participants could not see the relevance of this tool. Opinion was divided on the ***plug-in energy monitor***. It proved interesting in some respects, with notable mentions relating to the high levels of energy used by devices on standby and by the kettle. Its key limitations were that it was a time-consuming task, the fact that users cannot access plugs of plumbed electric appliances (such as washing machines and dish washers), and the magnitude of energy use it revealed was considered quite low in terms of overall consumption. Thus, its results did not produce a high financial incentive to act.

Figure 5 – visualisation of user evaluation of each tool's usefulness and impact.



Most useful

TOOL	POSITIVE	NEGATIVE	QUOTES - INTERVIEWS & SURVEYS	USER IDEAS TO IMPROVE
Thermal leak detector 	• Easy • Fun • Instant • Visible	• Time consuming • Not relevant during summer • Challenge prioritising which insulation to invest in first and next steps • Costly to remedy	*It was a very visual and quick indication of heat loss.* *Thermal leak detector of limited use as it was summer when I used it.*	• More direct links to SEAI grants • Need an easier way to integrate results and help users prioritise actions to take.
Temperature and humidity meter 	• Quick, easy & instant • Informative – new knowledge. • Easy to act upon	• Time consuming • Not knowing 'ideal' temperature / humidity as a reference.	*Showed me the home was warmer than I thought and the bedroom over heated.* *Knowing these values, you can directly act to adjust your radiators.*	• Use a device that provides recommendations on temperature/ humidity. • Embedded thermostats – may displace the need for this tool
Plug-in energy monitor 	• Informative and accurate • Learned about standby energy use	• Complicated, time consuming. • Does not fit in all sockets. • Hard to act on the information – some felt the only action was appliance upgrades which they could not finance.	*It was great to show the kids how much electricity items use, so they are now more inclined to turn off things.* *I don't think it will result in a change in my habits as all electricity I use consider necessary.*	• Simplify – make it easy to input costing • Provide advice on which devices to prioritise using the monitor on. • Present average appliance usage for benchmarking.
Fridge/freezer thermometer 	• Easy & quick to set up • Can take immediate action to remedy	• Slow for temperature on thermometer to adjust • Some fridges have thermometers already • Very focused on fridge alone	*Easy to use tool to diagnose issue but equally easy to rectify through adjusting fridge temp. gauge.* *I have a thermometer already built into my fridge.*	• Use digital thermometer for easier reading and faster results. • Add alarm to device when it has finished the reading
Radiator key 	• Easy to use • Fixed/improved radiator performance	• Key type not relevant for all radiators • Felt that technical skills were required to complete the activity. • Leaking water – messy to deal with.	*I knew I had to bleed my radiators, but I had no idea how to do it. The kit explained it in a simple way.* *Bigger job than I want to undertake right now.*	• Query if other kinds of keys could be included to make it relevant for all radiators.
Stopwatch 	• Surprised by how much water used in the shower • Took action to reduce time-spend / volume of water.	• Difficult to use • Not convinced of its relevance • No bag included to capture water • People have stop-watches on phone.	*Having the large stopwatch meant it was easy for the children to use, they felt important.* *Every phone (mobile) has a stop watch of some sort.*	• Clearer instructions for use • Include 'hippo' bag for collecting water.

Least useful

Figure 6 – Summary of Common User Feedback on Each HES Kit Tool

Drawing on focus group and interview findings, where the reasons behind people's opinions of the kit tools were further probed, generalised qualities emerged that users found both positive and negative (depicted in Figure 7). When considering further iterations of the kit and its tools, the positive qualities can be considered "design principles" to draw upon to improve the likelihood of user satisfaction and impact. In summary, it reveals that users' preference is for tools that are easy to use and for tools that produce instant and actionable results. In this sense, the kit was found to be very empowering; providing results that some thought were only possible to achieve by hiring a professional. By contrast, tools that were complex and time consuming (such as the *plug-in energy monitor*, the *stop-watch water flow activity* and the *radiator key*) frustrated some users. Some people were disappointed when results revealed that significant investment was needed to upgrade home insulation as they did not have the financial capabilities to invest and were hoping for an immediate quick fix.

Figure 7 – Positive and negative qualities linked to the HEK tools

Empowerment
I really appreciated the opportunity to try all the tools at home, I also brought it to my parent's house, and will make some changes because of the readings…It is so interesting to be able to do some things for ourselves, rather than hiring professionals to give us this information. Thanks very much!

Frustration at inability to act
We found that we weren't as bad as we thought - there's room for improvement but as we're on a budget there's not an awful lot we can do at the moment. It's a bit of a dilemma because it highlights these things but then you can't make improvements to your house. I was hoping it would make us aware of anything that we could do that was in our power to do without renovating our house.

Aim: To evaluate the impact of the kit in promoting behaviour change with respect to:

- Efficiency behaviour – changes to daily energy practices and
- Investment behaviour – home energy efficiency improvements.

Efficiency Behaviour

Within survey questions, participants were asked: '*since using the kit, I have done, or am thinking about doing*' with respect to a list of behaviour changes linked to everyday energy use practices in the home. A '*yes*', '*no*' or '*N/A*' response was provided. It was found that 80% of survey respondents stated that they were '*being mindful of keeping heat in by closing doors, drawing curtains or using draught excluders*'; 78% were turning off appliances and lights; while another 78% were '*filling the kettle to only the amount required*'. These were the most prevalent behaviours. Interpreting the results, it is possible to infer that improved awareness of heat loss was produced through use of the *thermal leak detector* thus accounting for the high number of people who were attempting to avoid draughts.

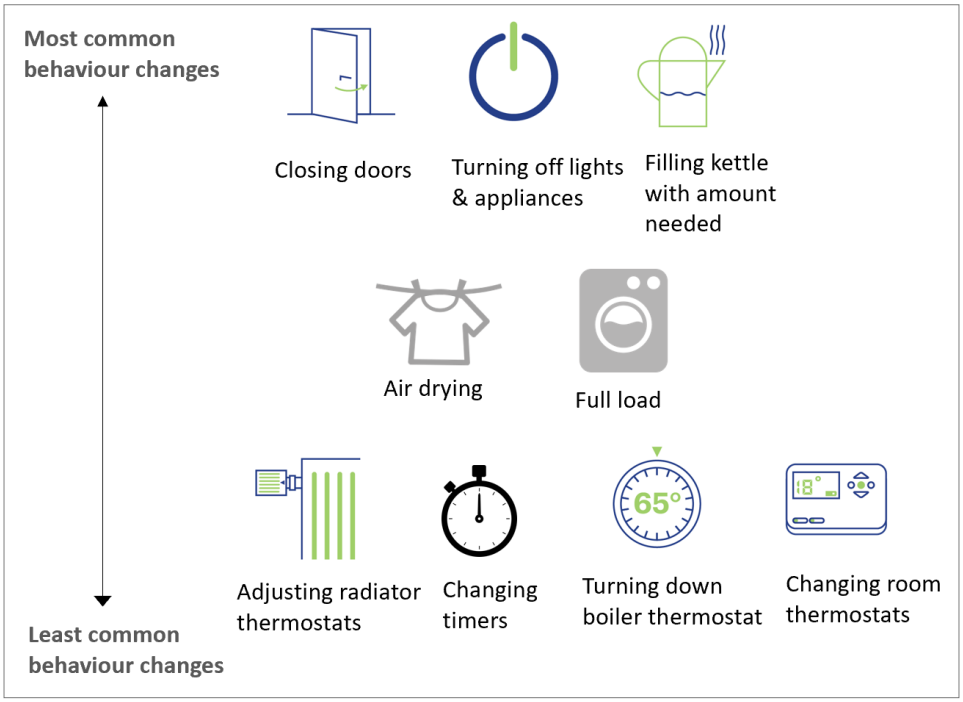
> *"I've since stopped filling the kettle to boil a cup of tea, that's the kind of [behaviour] change – just awareness of what your consumption is"* - Interviewee

The *plug-in energy monitor* was frequently mentioned in interviews and focus groups as being particularly insightful when it came to the kettle's energy consumption which could be why the behaviour of filling the kettle to the amount needed scored highly. It is possible that participants were already undertaking some of these practices prior to using the kit and it may be that the experience further consolidated those behaviours.

> *"My home is a 1960s bungalow detached. It was very interesting to use the kit, just to tell me how much it is letting cold in, without an expensive survey. My hall door is very leaky, I discovered. I bought thermal curtains to help keep in the heat".* Survey respondent.

Interestingly, the practices that were less frequent were those that involved adjusting boilers, radiators, timers and thermostats. Just 40-52% of survey respondents stated that they were carrying out those behaviours since using the kits. It may be that while the *temperature and humidity meter* would have informed people of the temperature across their household, they could have been less certain about how to act upon this, especially if it meant adjusting complex technical settings linked with heating systems. Great savings can be made however by ensuring heating systems are optimised and thus, in future kit iterations, it would be useful to consider how appropriate actions can be encouraged amongst kit users.

Figure 8 – visual of most & least common behaviour changes amongst users



Investment Behaviour

A core dimension of the research was to consider if and how the kit might encourage investment behaviour amongst respondents. As Figure 9 shows, our survey found that 60% of respondents agreed that the *Home Energy Saving Kit* encouraged them to think about home upgrades. When it came to appliance upgrades, the figure was lower at 51%. This might be due to the attention users devoted to the *thermal leak detector*, which was the primary tool that would have diagnosed potential insulation upgrades a household could undertake.

Figure 9 - Survey responses in relation to Investment Behaviour

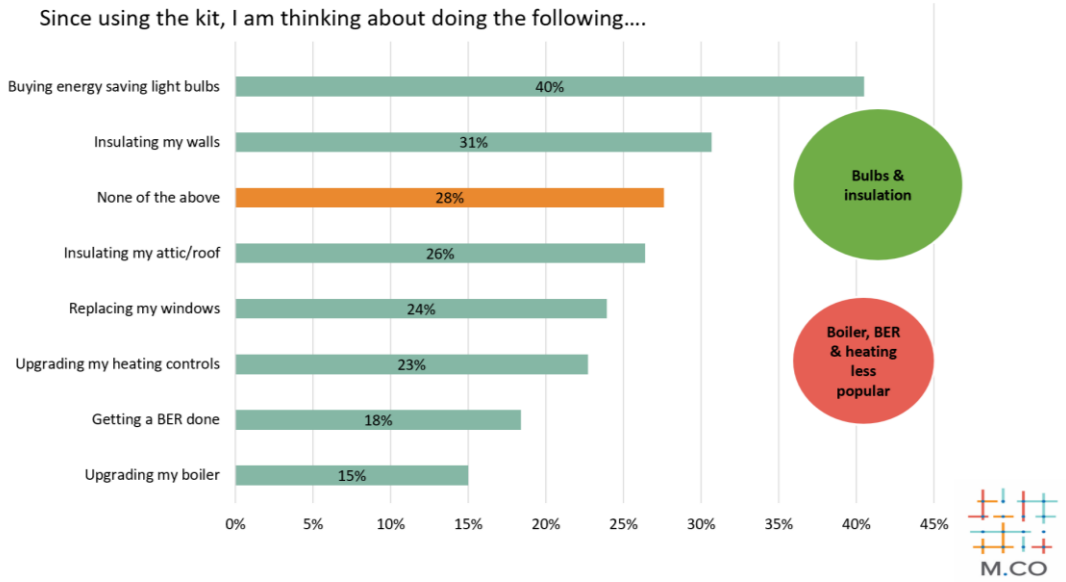
The most commonly cited investment was the intention to buy energy saving lightbulbs. This particular action does not link directly to one of the tools contained within the kit, and it is likely that this may be because it is one of the most normalised and commonly understood courses of action for energy efficiency. Our survey responses showed that 31% said they were thinking about insulating their walls, 26% insulating their attic, and 24% replacing their windows. From our qualitative research findings, it is

> *"Glad I borrowed it [the kit] before I made any decisions re home improvements, it will help to prioritise where I spend money"*- Survey respondent.

clear that the *thermal leak detector* had a strong influence on this outcome.

Our research also revealed that many borrowers were unsure of how to take the next steps regarding investment in home energy efficiency upgrades. A significant opportunity is presented here to translate this 'intention to act' into concrete action by reaching out to those who have borrowed the kit and to support and guide them to taking the first steps. Many suggested that a phone support line would help with this and that awareness needs to be improved of SEAI's home energy efficiency upgrade grants. Figure 10 shows participant responses in relation to their intention to carry out a number of investments. This shows that those actions linked to heating system upgrades were at the lower end of the scale, along with completing a BER. This is not surprising given that these resultant actions may have been difficult to deduce following use of the kit tools. A clearer link could be made between the *temperature and humidity meter* and those actions that can be taken to improve the heating system to maximise this outcome.

Figure 10 – Intended Actions



Setting

Aim: *Setting - t*o identify opportunities to use the kits in other fora.

The kit was trialled within four different settings each representing different kinds of 'communities' bound to varying degrees by common geography or interest. The main insights yielded from each of these settings are noted below.

Library setting

Details: The kits were made available across 22 different libraries in Dublin. Each library had differing loan rates with some libraries reporting very high levels of demand and waiting lists, with others having lower rates over the period of research from March 2017 to January 2018. Libraries were provided with pull up banners to draw visual attention to the kits and staff were trained on how to stock the kit and use it so that they could explain this to users if necessary. In addition, energy efficiency workshops were held in a selection of libraries. These were organised for the general public by Codema and the libraries and it transpired that those libraries in which the workshops were held had higher loan rates.

Reflection – Situating the kits within libraries presents an opportunity to access an extensive audience and can allow for a large-scale roll-out. It also serves as a space for hosting workshops and potentially providing follow-up supports and activities for those who have already borrowed the kit to ensure their interest can be translated into action. The level of staff engagement was found to have an impact on loan rates and thus it is important to put resources towards in-house training. Re-stocking and quality checking the kits is an additional task for staff and must be accounted for in planning.

Workplace setting

Details: 47 people borrowed the kits from Dublin City Council. The kits were promoted in an internal newsletter and loaned by the environmental awareness officer.

Reflection: The original intention was that the kit would be integrated within an existing programme of staff awareness raising but this did not materialise. From interviewing two office workers who borrowed the kit, they had not heard it discussed much in office conversation. Thus, the power of peer influence may not have been fully exploited. Nevertheless, there is opportunity here to build the kits into a formal staff energy awareness programme. As part of this, attention could be drawn to the grants on offer to spark people to take action following use of the kits.

SEAI Sustainable Energy Community (SEC) Group – SAGE

Details: the SAGE (Shankill Action for a Greener Earth) community group loaned the kits out to 44 members of their group. SAGE was set up in 2015 and comprises representatives from local churches, interest groups such as Tidy Towns, as well as local businesses and residents of Shankill (a suburb of Dublin with c. 14,000 residents). Their vision is for Shankill to become a low carbon community. As part of this, they hope to carry out a range of energy upgrades in cross-sectoral premises in Shankill with SEAI's support, along with awareness raising activities.

Reflection: The survey and two focus groups with SAGE revealed overall highly positive responses. Those who borrowed the kit had strong environmental orientations and thus could be considered a more niche segment compared to the more generalised library audience. It was agreed that the tool proved highly useful as a first step for the SEC in engaging the community. Its tangibility was appreciated, and it encouraged them to see the relevance of energy upgrades. Thus, improving buy-in to their SEC plans. Results from the Beyond kWh pre and post-surveys suggest small but positive improvements in motivation for home improvements and saving energy in the home after using the kit, from 26% to 34% (Rotmann and Chapman, 2018). The results suggest that it would be beneficial to make the Home Energy Saving Kit more widely available for other SECs, given that its use sparked interest and engagement amongst SAGE members to become further engaged in the SEC programme. Managing the loan process proved challenging for SAGE and the development of a tracker tool and a higher quantity of kits was suggested to ease the process.

School Setting

Details: Two secondary schools (n=22 students) in Co. Monaghan borrowed the kits as part of their involvement in an SEAI led workshop series. In one school, the kits were managed by the Green Schools Committee and students who were borrowing the kit were from across the school. In the other school, the kit was used by one Transition Year class.

Reflection: Where the kit was situated within the existing Transition Year class, higher rates of use were reported compared to the kit managed by the Green Committee. This could have been due to the effort the Transition Year class teacher put in to encourage the students to complete the task. Overall, the kit was received positively by the teacher and the students (with 80% stating that they 'enjoyed using the kit'). Nevertheless, the challenges identified and the areas for improvement were similar to those voiced by adult participants, Challenges were mainly linked to the multitude of kit tools, complexity of usage, the size and bulk of the kit case (which would not fit in a school-bag) and the time-input required to

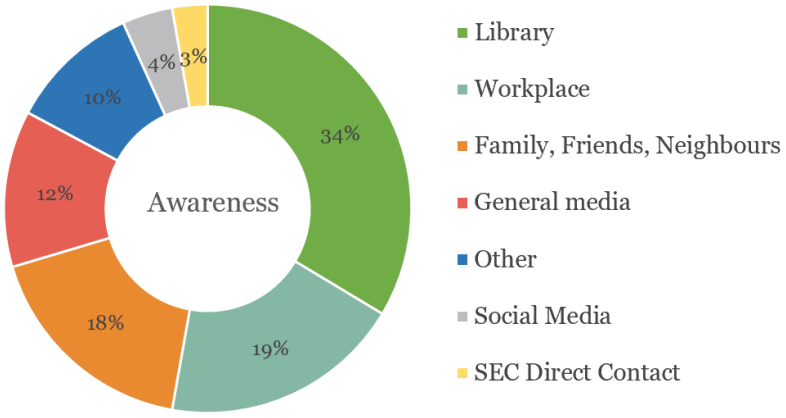
complete activities. Teacher feedback was that a more stripped back version of the kit could be developed along with a tailored course of c. 5 classes, which could be packaged as a dedicated module and embedded with the transition year curriculum. It could touch on broader themes of sustainability, climate change and innovation. Short, clear lesson plans could be developed for teachers to deliver the module. Feedback showed that 59% of students used the kit with someone else in the house with their mother being the most common person (41%). This reveals that by providing the students with the kit, parents can also benefit and be encouraged to act upon the results. Teachers suggested that parents / guardians could be sent a certificate or summary report to sign once students have completed the task.

Engagement – User Personas & insights for engagement

Aim:
To pilot various targeted and consistent communications channels to householders to maximise participation in and benefits of the initiative.

In our survey, participants were asked how they heard about the Home Energy Saving Kit. Feedback showed that 34% heard about them by seeing signage within the libraries. A further 19% heard about the kits through their workplace which would have been via the office circular promoting the kits. Word of mouth via family, friends and neighbours had a powerful influence on borrowing rates accounting for 18%[7]. To promote the kits within libraries across Dublin, Codema placed a number of adverts in local media along with interview slots on radio shows. Survey responses showed that 12% heard about the kits through general media.

Figure 11 - How did our users hear about the HES kit?



Based on interview and focus group research, four key user personas were identified. Each differentiated by their different primary motivators for borrowing the kits. To access each of these personas, tailored avenues of communication and engagement could be employed. The personas, presented in Figure 12 below included; 'verifiers', 'savvy', 'energy saver' and 'enviro-aware'. 'Verifiers' used the Home Energy Saving Kit to verify the quality of energy efficiency upgrades that they had already completed to their house. This was an unanticipated user group. This group could serve as 'influencers' demonstrating to others (friends, family, community members) the benefits of home energy efficiency upgrades through use of the *thermal leak detector.*

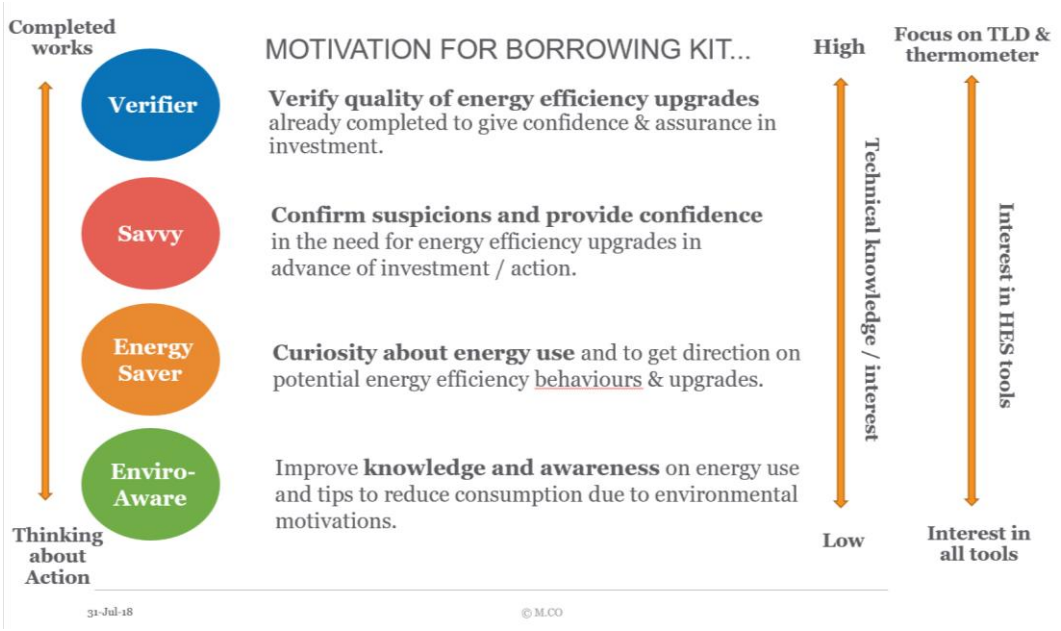
[7] It is possible however that some people within the SAGE SEC ticked this response category as only 3% stated they heard about it via SAGE which does not correspond to the number of SAGE borrowers.

The 'Savvy' persona alludes to those who were technically savvy and had a good idea about their home energy efficiency needs but needed a boost of confidence to follow-through with action. In this sense, the HES kit served as a trigger for them to engage with a contractor and boosted their confidence in the contractor's assessment. If contractors, builders and architects were engaged to promote the HES kit (or indeed the *thermal leak detector* as a singular tool on its own) this could result in higher levels of action amongst this group.

> *"I always thought we were losing warmth through our door and this tool confirmed my suspicions"- 'Savvy' Interviewee.*

Lastly, 'Enviro-aware' and 'energy saver' personas had a wide interest in the range of tools within the kit and did not have as many assumptions or an agenda by comparison to 'savvy' and 'verifier' personas. Their motivations differed – the 'enviro-aware' wanting to understand how they could take action as part of an existing environmental orientation, and the 'energy-saver' being interested in technologies and saving energy.

Figure 12 – HES kit – 4 User Personas



Supports

Aim: to ascertain what additional supports may be necessary to complement the kit.

Through surveys, interviews and focus groups, users often made recommendations for additional supports that could enhance their experience of using the kit and enable them to take greater action. The most common proposals are outlined below:

- **Help-line** – many felt that they had a number of questions following their use of the kits linked to what actions they could take next based on their results. A help-line where they could speak to an independent expert with advice on how to get started upgrading their home and details of SEAI grants was a commonly desired support service.

- **App / digital tool – to integrate results and create 'action plan' –** at the SEC focus group, members suggested developing a customised app that takes the user through a journey – that would demonstrate how to use the kit, process results, provide recommendations and guide users through next steps.

- **Video guides –** while Codema has already developed some video, suggestions included concise 'Show me how' videos to demonstrate: how to use tools, top behaviour changes to make and steps to take to upgrade your home energy efficiency.

CONCLUDING REMARKS

This research set out to evaluate user perceptions of Home Energy Saving Kits and the impact of these kits on household energy behaviour (habitual and investment). It also sought to examine how the kits could be embedded within different fora, pilot channels of user engagement, and to identify potential additional supports. The feedback reveals that the kits were an enjoyable, awareness raising, and motivating experience for users. Motivation to act was reported at 60% regarding home energy efficiency upgrades. Repeat surveying and interviews would assist in evaluating if this interest was translated into action, however such longitudinal analysis was not possible within the constraints of this research.

The research was well supported by the collective impact approach and the Behaviour Changer framework which worked well to ensure all stakeholders were aligned and knew their roles and responsibilities. While the pre-post beyond kWh survey probably needed a higher number of participants to be statistically significant it is considered that Bayesian modelling used for analysis is a good approach to undertake such a survey. The cross-country comparison was also a useful element of the research as it allowed the team to see what other countries had (and hadn't done) and demonstrated that Ireland was leading the pack in terms of ensuring that the kit really works for end users.

A high volume of detailed feedback was received, in particular regarding user perceptions on the utility and ease of use of each tool. Triangular of the quantitative and qualitative data provided an opportunity to present richer insights. For example, that an iteration of the kit could evolve to become more targeted and streamlined to respond to this feedback - one such approach might be to focus on a version of the kit containing just the *thermal leak detector* and the *temperature and humidity meter* given that they were the most appreciated tools and also due to the high number of 'savvy' user personas (who are poised to invest, yet needed convincing). This is just one of a number of potential ways to adapt the kit. Our research did show however that those who used the kits out of general interest (e.g. 'enviro-aware' and 'energy-saver' personas) were attracted by the variety of tools it contained and thus the kit in its current format, does meet their needs. This shows that there is no such thing as a 'standard/normal' user and that a tailored approach to engagement, through the kit and other supports, is needed to motivate and enable people to change their home energy use behaviour and to invest in home energy efficiency upgrades.

To figure out how to maximise impact through home energy saving kits, SEAI and the project team are now reflecting on the research findings and discussing a number of potential ways that the kit could evolve. Attention is being focused on how the kits, or a version of them together with tailored communications methods, could be used to engender interest in household energy saving measures and be used as part of a wider suite of consumer engagement and support to ensure the toolkit effectively aids people to change actual behaviours.

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APPENDICES

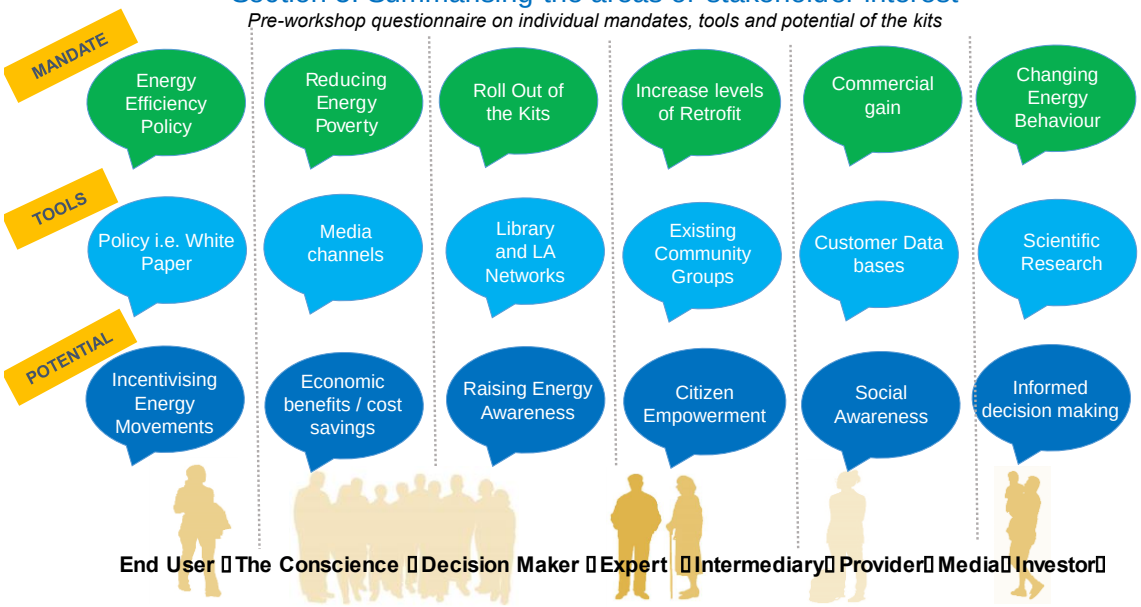
APPENDIX A - WORKSHOP TWO

Strategic Framework for Action – Stakeholder Roadmap

Codema / Libraries	*Librarian training and kit launch*	*Seek energy champions for media campaign*	*Collect feedback and evaluate*	*Wide range of events to generate public interest*	*Sustaining interest and monitoring feedback*
The Provider / Conscience	*Establish contact with partners*	*Training Development*	*Carry out evaluation of the kit*	*Promote kit at national events, through website*	*Support homeowners with advice*
End User / SEC	*Carry out a trial run of kit*	*Consider wider roll out of training*	*Strengthen community links with SEAI and LAs*	*Support data collection and sharing*	*Develop information platforms – IT links*
Intermediary (SEAI)	*Seek to establish an urban SEC of Libraries*	*Energy Health check ups – review 'wizard'*	*Facilitate sharing of BER data for energy baselines*	*Review SEAI domestic guides against kit material*	*Consider video case studies / media platforms*
The Expert	*Support knowledge transfer*	*Share data and other research into initiatives that work*	*Evaluate the Home Energy Kit initiative*	*Data comparison with other initiatives*	*Dissemination through academia, policy, civil society*
Policy makers	*Support SEAI in facilitation role*	*Monitor and review proposals - advocacy*	*Use Ministerial platform where appropriate*	*Identify linkages: SEAI BEU / Healthy Ireland etc*	*Work to improve media visibility of grant funding*

Section 5. Summarising the areas of stakeholder interest

Pre-workshop questionnaire on individual mandates, tools and potential of the kits

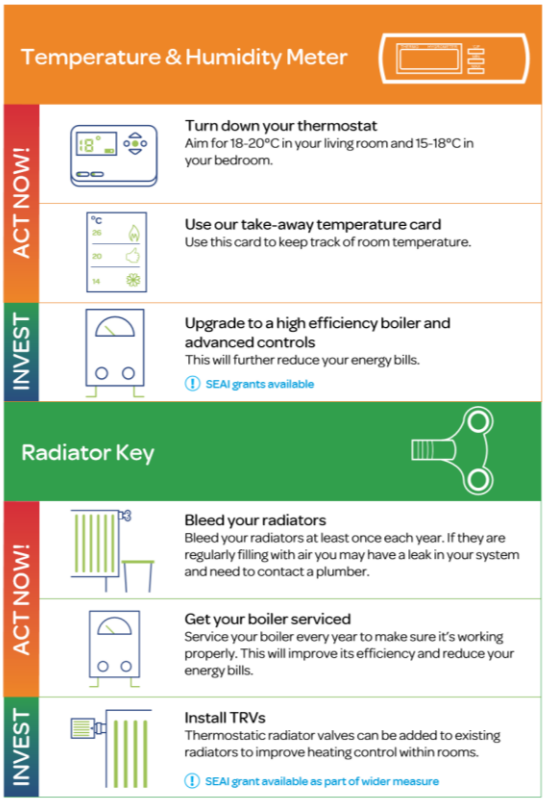


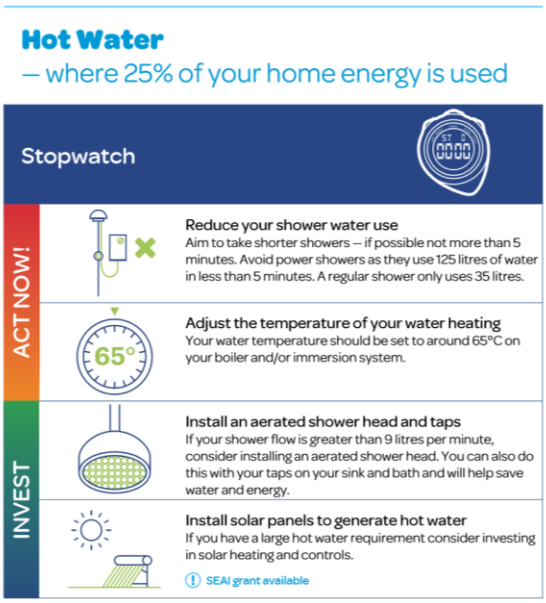
APPENDIX B - WORKSHOP THREE

Table with the various mandates, stakeholders, restrictions and tools of each Behaviour Changer involved

	Decisionmaker (SEAI)	Provider (CODEMA)	Expert (MCO)	Middle Actor (Public Library)	Conscience (SECs)
Mandate	Proof of concept; scalability of pilot; feed into bigger govt targets on EE	Make Dublin more sustainable; proof of concept	Provide expertise and data analysis	Providing information and support	Make his SEC more sustainable
Stakeholders	CODEMA, Minister, SEAI Mgt Committee	Libraries, Dublin City Council, public, SEAI	SEAI CODEMA	Staff, CODEMA, SEAI and Dublin residents	SEAI and SEC members
Restrictions	Minister encouragement and support for further roll-out, must be balanced against need to consider feedback from the pilot before nationwide launch	Resourcing, staff time, being too successful!	Nature of the data, paper collection of surveys	Having to advise on how to use kits; more effort to loan out kits than books	Lack of uptake and interest (especially in summer)
Tools	Funding, Task 24, scale-up, being able to build on political will	Provide and market kits; education, training & support	Understands technology in residential sector	Being trusted advisors to the public; system that supports loaning	The kit and face-to-face contact providing advice

APPENDIX C – TAKE AWAY LEAFLET – CORE CONTENT.





Home Heating

– where 60% of your home energy is used

Thermal Leak Detector

ACT NOW!

Close curtains and doors
Close curtains and doors and use draught excluders.

Use draught stripping
Place around doors and windows. Consider an airtightness test to identify where heat is escaping to help you target priority areas.

INVEST

New Windows/ Doors
If you have single pane or older double glazing, and you have already upgraded your wall insulation, consider replacing your windows.

Home insulation
SEAI provide grants for roof and wall insulation for homes older than 10 years. Consider an upgrade to reduce heat losses.
SEAI grants available

Electrical Devices

– where 15% of your home energy is used

Fridge/ freezer thermometer

ACT NOW!

Adjust temperature
Adjust your fridge temperature to between 3 and 5°C.
Adjust your freezer temperature to between -15 and -18°C.

Defrost your fridge and freezer
Defrost your fridge and freezer at least every 6 months to ensure it runs efficiently. There should be less than 5mm of frost build up.

Plug-in energy monitor

ACT NOW!

Turn off
Switch off devices that are on standby and turn off all lights in areas where they are not needed.

Avoid wastage
Only fill kettles to the quantity you need; run washing machines and dishwashers when you have a full load and choose a low-heat setting.

INVEST

Go for A-rated bulbs and appliances
When replacing lightbulbs and home appliances, make sure they have the highest A-rating possible.

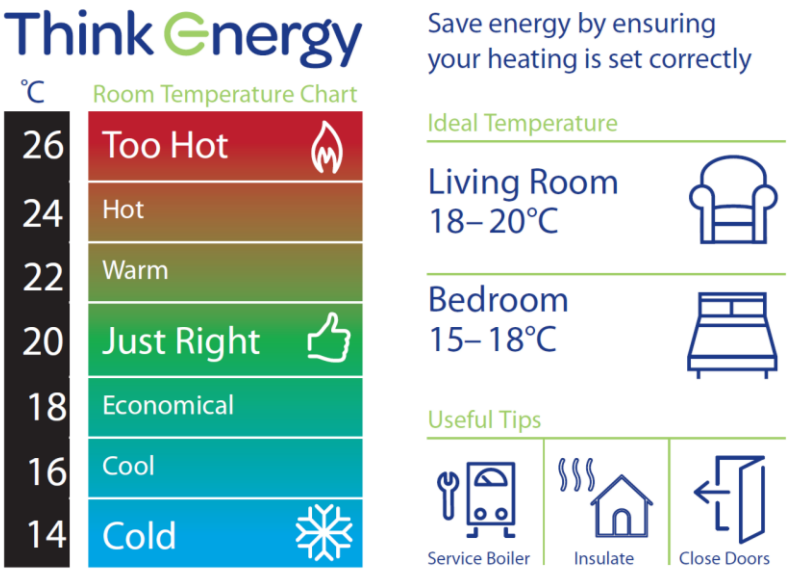
Thinking of Investing?

– SEAI have a range of grants available

	POTENTIAL ACTIONS*	INDICATIVE COSTS & GRANT AID **
ROOF	Attic Floor/ Pitched Roof/ Flat Roof Insulation	Grant €300 · Your input €700 · Total cost €1,000
WALLS	Cavity Wall Insulation	Grant €300 · Your input €400 · Total cost €700
	External Wall Insulation	Grant €3,400 · Your input €6,600 · Total cost €10,000
	Internal Wall Insulation	Grant €1,800 · Your input €5,200 · Total cost €7,000
BOILER AND ADVANCED CONTROLS	High Effiency Boiler & Advanced Controls	Grant €700 · Your input €2,300 · Total cost €3,000
GENERATE	Solar Panels	Grant €1,200 · Your input €4,300 · Total cost €5,500

* Get advice from a qualified contractor about which action is suitable for your home.
** Indicative costs are based on average upgrade costs for a **semi-detached house**. For homes built before 2006 the Sustainable Energy Authority of Ireland (SEAI) provide grants to reduce your costs to upgrade. Go to **www.seai.ie/betterenergyhomes**.

APPENDIX D – TAKE AWAY THERMOSTAT



APPENDIX E – HES KIT CASE STUDY COMPARISON

(Table continued on p.29)

Countries	Organisations	Since when?	Where?	Why?	What's in it?	What for?	How much?	Who funded it?
	South Australia Dept of Prime Minister & Cabinet	2002-03	Most public libraries - have 95% saturation	Help individual households with energy auditing. Provide greater access & availability to communities via libraries	Appliance meter, infrared thermometer, spirit thermometer, compass, stopwatch, guide	Measure stand-by power, temperature of hot water and cold spots in room, room and fridge/freezer temperature, direction of home for passive solar heating, water flow rate from shower, information	$340AUD ($170 are subsidised) ~**€220**	South Australian Government
	ACT Smart	?	Several libraries in ACT	Assess energy and water use to become more efficient and save money	Same as SA	Same as SA	?	Australian Capital Territory Govt
AUSTRALIA	Burnie and Hobard City Councils (TAS)	?	Libraries in Burnie and Hobard CC	?	Same as SA	Same as SA	?	Tasmanian City Councils?
NEW ZEALAND	Auckland City Council	Jul-16	Auckland public libraries		Infrared thermometer, stopwatch, thermometer and hygrometer, power meter, booklet, also a magnifying glass for power meter display which is really small, extension cable for smart plugs	Thermal leak detection, shower flow rate, room temperature and humidity, fridge/freezer temperature, appliance power use, record booklet, instructions and tips	NZD$260 ~€150	Auckland City Council
	Dublin public libraries	Jan-17	Dublin city	Proof of concept, show it worked in changing behaviour, raising energy awareness and education	radiator key, plug-in monitor, thermal leak detector, fridge thermometer, digital thermometer and humidity meter, stopwatch, manual, recording sheet	heating, appliances, insulation, fridge/freezer, thermal envelope, water	~€300?	SEAI, CODEMA
	SECs	May-17	Droghedr	Gateway to get people into SECs and create energy awareness	Same as Dublin	Same as Dublin	Same	Same
IRELAND	Other city councils	Jan-18						
	Edmonton City Council	2016?	Public libraries in Edmonton City	Crux is behaviour change for and in Edmonton City. Major motivation was to give people baseline info to do a full energy audit as part of EnerGuide federal govt evaluation program.	Infrared thermometer (with heat map, very visual); timer for water flow tests; kW meter; battery charger for rechargeable batteries in kit; LED light bulb and infrared thermometer to shine at bulbs and lumen meter. Told people to use IR thermometer on fridge/freezer. Instruction booklet with survey monkey link.	light meter to see their spaces were over- or under-lit (guide said how many lumens they needed for each task); batter charger was for optics, as the municipality is in charge of reducing waste; LED bulb to plug into lamp to show difference with kW meter	CAD$1500 ~€980 (suitcases very expensive)	Alberta Real Estate Foundation and City of Edmonton. Wanted it cause realtors could share it with their clients as they sold and bought homes.
CANADA	Red Deer City	before Edmonton	Red Deer City, Alberta	to save energy and money	Kill-A-Watt meter, infrared thermometer, Power Cost wireless energy monitor	measures how much electricity is used by different devices; checks temperature of surfaces to know which parts of house will benefit from increased weatherproofing and insulation; provides real-time info on energy consumption and cost	?	?
GERMANY	Kemnath Stadtbücherei	?	Public libraries in Kemnath, will be rolled-out across Germany	To reduce energy costs in households	Plug-in meter and extension cord, instruction booklet and energy-saving tips	Measure appliance stand-by power, extension cord for ease of access	?	?
USA	IDAHO Power	2017	Idaho and Orgon	Idaho Power is committed to helping you save energy, save money and live comfortably.	Kill A Watt® power meter, 9 LED bulbs, LED night light, high-efficiency showerhead*, digital thermometer, faucet aerators* (kitchen and bath), shower timer, water flow-rate test bag, teflon tape, how-to guide and videos, instructions and survey	Measure appliance stand-by power, light bulbs to keep, showerhead only for customers with electric water heaters, to check water and fridge/freezer temperatures, to reduce water use, to inform and collect feedback	?	Idaho Power (utility)
	Silicon Valley San Jose	2014?			To keep: 1 LED bulb, 3 faucet aerators, low-flow shower head, outlet gaskets, weather stripping, thread tape and toilet leak detection tablets. To return: Info handbook, pliers, blue tape, Kill-A-Watt power meter, infrared laser thermometer, thermometer for water, special fridge/freezer thermometer, water flow rate bag, leaky faucet and toilet guide, drip gauge		US$79121 for whole program and extra US$6000 for innovate new marketing strategies.	Silicon Valley Energy Watch is a local government partnership between our local utility, PG&E, and the City of San José to provide energy efficiency programs to the County of Santa Clara. The funding for this program comes from California's ratepayers, who pay into the energy efficiency programs managed by investor-owned utilities (IOUs) through a small charge on their electricity and gas bills.
	Sonoma County	Apr-17		has a goal of reducing energy use by providing energy efficiency services to PG&E ratepayers countywide	To keep: 1 LED bulb, 2 faucet aerators, low-flow shower head, outlet gaskets, weather stripping, thread tape and toilet leak detection tablets. To return: Info handbook, pliers, blue tape, Kill-A-Watt power meter, infrared laser thermometer, thermometer for water, special fridge/freezer thermometer, water flow rate bag, plumbing handbook	thread tape for aerators, pliers to help with gaskets, blue tape to protect fixtures, info handbook in several languages	?	The County and City Association of Governments (C/CAG) receives ratepayer dollars from the California Public Utilities Commission (CPUC) to fund the Energy Watch program in partnership with Pacific Gas and Electric (PG&E). The Energy Watch program helps local businesses, governments, non-profits, farms, schools, and residents save energy by providing various incentives for energy efficiency projects.
California	Butte County	?	5 public libraries in Butte County	"measuring devices that will help you lower your utility bills while saving precious resources"	To keep: LED bulbs, faucet aerators, low-flow shower head, outlet gaskets, weather stripping, water nozzle and water leak detection tablets. To return: Kill-A-Watt power meter, thermal leak detector, special fridge/freezer thermometer, water flow rate bag	To measure and reduce energy and water use	?	PG&E

Countries	Organisations	How many kits?	Who else?	Who is targeted?	How successful?	What data was collected?	Where is idea from?	Other
AUSTRALIA	South Australia Dept of Prime Minister & Cabinet	181 toolkits in 133 public libraries and 1279 total borrows	South Australia's 'Energy Partner' organisations incl. social and environmental orgs	Households in metropolitan and rural South Australia	Very, in terms of saturation and borrowing rates. Good feedback from library managers, positive comments from borrowers. Also the programme all others followed.	Not much. Some testimonials, very minor surveys, no household energy use data. Currently doing an online survey but feedback is very low, even with energy-saving packs offered in exchange.	It is theirs.	Free energy training and education is available to staff and volunteers to help organisations support their clients. This is facilitated via the Energy Partners Program and Is customized based on the audience.
	ACT Smart	?	?	?	?	?	SA	
	Burnie and Hobard City Councils (TAS)	?	?	?	?	?	SA	
NEW ZEALAND	Auckland City Council	Initially 15, then 30, now 55!	Trained library staff, talked through tools and to make sure they checked they were working correctly on returns. Staff asked people to return feedback forms.	All housholds, owners and tenants although kit is a little skewed towards owners.	Very long waiting list, 473 already loaned out in 6 months, 130 people on the list. Much more interest in winter than summer. Didn't really need to promote it.	Quick feedback form, how easy it was to use and 3 actions they took because of it. Free light bulbs if filled out - not many (11% return rate). Got contact details for about 30 for future interviews	Australian programmes	Auckland has low carbon plan, this was one idea that came out of goal of 40% carbon reduction by 2040. Have another 10 kits which will be loaned to Eco Matters Enviro Trust and Habitat for Humanity. Also thinking about school resource. Created kits so there was opportunity for change, if needed. Foam inserts in suitcase and foils in manual for different page inserts
IRELAND	Dublin public libraries	30+	CODEMA, Task 24, MCO, SEAI, Dublin libraries, SECs	Residential households in Dublin	Very long waiting list, a lot of interest, Minister really likes it, lots of publicity, further roll-out in other cities and SECs. Waiting for data analysis	Initial library survey ~200 responses plus focus groups and 'beyond kWh' pre and post surveys (~30)	Australian programmes	Summer loans were much lower, also not that easy to motivate SECs to loan kits out from Aidan.
	SECs	4?	Same	SEC households in Droghedr	Didn't work out so well, especially in summer	Need to check	Dublin programme	Results still outstanding
	Other city councils							
CANADA	Edmonton City Council	30 kits. Kits were made by summer students, the secure custom suitcases were a bit of a challenge and very expensive. Made it very light and as small as possible.	Alberta Real Estate Foundation but not really involved. Sustainability coordinator from public school who also got a kit. Although there is no system for loaning resources to teachers.	Residential home owners, not tenants. Green Home guide is more for substantial retrofits, Living guide is more appealing to tenants as more lifestyle and behaviour-based. Split incentive issues with landlords always an issue.	Extremely long waiting list - 300 holds placed on them. Needed second batch of kits as libraries didn't want to have such long holds on them. Social media publicity was strong – 100000 followers just from City. 5 big media stories written about it. Then just grew from word-of-mouth as no more publicity was needed.	Got survey monkey in instruction booklet but no one has followed link and filled it out yet. Was meant to be "gateway audit light" to get people to sign up to full audit programmef. 40 have signed up but no one has done it at time of interview	Red Deer City did it, they saw it, borrowed their kit through inter-municipal library loan, looked at tools and built off of that. Summer students did review and found number of municipalities in Australia who they built upon too.	Called the suitcase "James Bond-esque" and that you "could carry a gun in it". Little bit of trepidation of loaning out something so expensive at the beginning, once they talked to higher ups they became more comfortable. Pretty low risk seeing someone else paid for it and had legal agreement that they always would have a couple of backup cases for them. Instruction booklet could have used more time with entering results from IR thermometer to show what it means. If this is what you saw, this is what it means and what you can do about it.
	Red Deer City	?	?	Residential households in Red Deer City	?	Doesn't say anything about survey being included in the toolkit	?	Mentioned by Edmonton Programme Manager
GERMANY	Kemnath Stadtbücherei		Umweltbundesamt and No-Energy-Stiftung	German households	?	?	?	
USA	IDAHO Power	Many - one for each residential customer	?	Residential IDAHO Power customers	?	Survey in kit but not sure what response rate is	Unclear	The difference here is that each residential customer of the utility gets a kit sent and they can keep parts of it. It is a free service. No public libraries are involved (though they were with the original Kill-A-Watt loan)
California	Silicon Valley San Jose		City of Cupertino, San Jose Public Library district (24 branches).	residents of County of Santa Clara, incl. City of San José.	Based on check-out numbers and simple calculations, they assume energy savings. It works really well having the toolkits in the libraries, and continually training the library staff so they are educated and engaged. It's also very helpful to set up booths in the library branches every so often to increase awareness and checkout numbers.	PREVIOUSLY: Yes. We had a worksheet for the residents to see how much water and electricity they were saving, as well as a survey card that the residents could turn in when they returned the kit. PRESENTLY: No. We stopped collecting this data because the residents completed the information incorrectly. The only data we currently collect is how many checkouts each library branch has per quarter. We have been considering including another physical survey or a link to an online survey, but this has not happened yet.	Silicon Valley Energy Watch (SVEW) SVEW awarded a grant to the City of Cupertino who used the funds to start a toolkit program in their city. SVEW felt that the program was a great idea and decided to copy the program in the rest of the libraries throughout the County.	The biggest challenge we face with the toolkit program is community awareness. In order to increase the awareness, we are going to be trying several unique marketing campaigns. 1. We will have a 30-second informational video that will run on the screens in our local California Department of Motor Vehicles (DMV). The screens show what number is being called, so patrons have to look at the screens while they wait. We will run it in one DMV office to gauge the success, and then we will consider expanding depending on budget and success. 2. Through an existing partnership with the San Jose Sharks, a professional hockey team, we will run advertisements in the arena during the Sharks games in the month of February (6 home games.) This partnership could extend beyond the arena, as we would be allowed to use the ads (which feature Sharks players) on buses, light rail stations, Facebook, etc. 3. We are also translating our marketing and informational materials into several other languages that are popular within our County (Spanish, Vietnamese, and Chinese.) Also "Green Ninja" programme with schools in collaboration with CommUniverCity San José. Trying to build science curriculum to inspire students to be more sustainable.
	Sonoma County	Initially 31 libraries, in future would first launch it in one to pilot administrative and implementation issues first.	San Mateo County Energy Watch (SMCEW), which is a Local Government Partnership (LGP) between the City/County Association of Governments of San Mateo County (C/CAG) and Pacific Gas and Electric Company (PG&E). City libraries and envt NGOs. All signed MOUs.	residents with little or no knowledge of residential energy use or energy efficiency. For any type of residence, incl. RV, Apartment and Single Home.	partnership with local library worked really well; libraries focus on providing as many resources as possible for residents thus enhancing their services with the kits.	Are measuring number of check-outs and number of take-home items that were kept. Too difficult to measure if energy savings resulted from it but remain open to tracking energy saving metrics in the future.	From City of San Jose	SMCEW will continue to leverage these connections with local governments, non-profit organizations, businesses, schools, and farms to encourage participation in energy efficiency and water conservation programs. Learned they should have piloted it first. Needed to train library staff better how to check out and restock the kits. Maybe fewer items in the kits. Most popular items: LEds, showerheads, faucet aerators. More items means it's harder for library staff to restock. The kit handbook is designed to not only provide a basic education about home energy and water use, as well as residential energy and water efficiency strategies, but also to promote the utilization of County-wide programs for energy efficiency, water conservation, waste reduction, and active transportation. Many local residents are also members of the local business community, so one goal of this kit is to promote the utilization of small- and medium-sized business energy efficiency incentive program that is also managed by SMCEW (i.e., the Regional Direct Install program).
	Butte County	Probably 5?	North Valley Energy Watch, PG&E, Richard Heath & Associates	Residents of Butte County	?	No information on any surveys as part of kit	Probably the original SA pilot, as told by PG&E Programme Manager	

Table showing summary of what is contained in different kits in different programmes (in bold: tools to keep, others to return in the kit)

Tools	Reason	Australia	Ireland	NZ	Canada	Germany	USA Idaho	USA California	USA Ohio
Infrared thermometer	*Thermal comfort*	X	X	X	X		X	X	
Spirit thermometer	*Thermal comfort*	X					X	X	
Hygrometer	*Thermal comfort*		X	X					
Weatherstripping	*Thermal comfort*							X	
Radiator key	*Thermal comfort*		X						
Compass	*Passive solar*	X							
Stopwatch	*Hot water use*	X	X	X	X		X		
Water flow rate bag	*Hot water use*						X	X	
Low-flow shower head	*Hot water use*						X	X	X
Faucet aerators	*Water use*						X	X	X
Outlet gaskets	*Water use*							X	
Toilet leak detection dye	*Water use*							X	
LED bulbs	*Light use*				X		X	X	X
Pipe wrap	*Maintenance*								X
Safety plugs	*Appliance power use*								X
Lumen meter	*Light use*				X				
Kill-A-Watt ®	*Appliance power use*						X	X	
Other power meter	*Appliance power use*	X	X	X	X	X			
Fridge/Freezer Thermometer	*Appliance power use*		X		X		X	X	
Extension cord	*Support*			X		X			
Battery charger	*Support*				X				
Thread tape	*Support*						X	X	
Pliers	*Support*							X	
Magnifying glass	*Support*			X					
Handbook	*Support*	X	X	X	X	X	X	X	
Data recording sheet	*Data*		X					X	
Feedback survey	*Data*		X		X		X	X	

Home Energy Saving Kit Survey

Background

* 1. How did you hear about the kit?

- [ ] Library
- [ ] Workplace
- [ ] General media i.e. newspaper, TV or radio
- [ ] Social Media
- [ ] Family, friends or neighbours
- [ ] Other (please specify below)

* 2. What was your main reason for borrowing the Home Energy Saving Kit?*(tick one)*

- ( ) To save money on my energy bills
- ( ) To find ways to make my home warmer and more cosy
- ( ) Because I'm concerned about environmental issues
- ( ) I'm interested in making improvements to my home
- ( ) I'm interested in new technologies
- ( ) Other (please specify below)

* 3. I borrowed the kit through my...

- ( ) Library
- ( ) Workplace
- ( ) Sustainable Energy Community Group
- ( ) Other (please specify below)

* 4. If you borrowed your kit from a library, which branch was it?*(enter the branch name below)*

* 5. How easy was it to use each tool in the Home Energy Saving Kit?

	Very Easy	Easy	Neither easy nor difficult	Difficult	Very Difficult	Does not apply
Temperature and humidity meter	○	○	○	○	○	○
Thermal leak detector	○	○	○	○	○	○
Radiator key	○	○	○	○	○	○
Stopwatch	○	○	○	○	○	○
Fridge / freezer thermometer	○	○	○	○	○	○
Plug-in energy monitor	○	○	○	○	○	○
The instruction manual	○	○	○	○	○	○

* 6. Please rank the tools in the kit in order of how USEFUL they were? By useful, we mean that it gave information that can help you save energy *(1 = most useful, 6 = least useful)*

⋮⋮	Temperature and humidity meter	☐ N/A
⋮⋮	Thermal leak detector	☐ N/A
⋮⋮	Radiator key	☐ N/A
⋮⋮	Stopwatch	☐ N/A
⋮⋮	Fridge / freezer thermometer	☐ N/A
⋮⋮	Plug-in energy monitor	☐ N/A

* 7. Please explain why you chose the tool you ranked *'most useful'* in Question 6 above.

* 8. Please explain why you chose the tool you ranked *'least useful'* in Question 6 above.

* 9. Do you agree or disagree with the following?
Overall the Home Energy Saving Kit:

	Agree	Disagree	Neither Agree / Disagree
Met my expectations	○	○	○
Made me think about how I use energy in the home	○	○	○
Made my family think about how they use energy in the home	○	○	○
Encouraged us to think about replacing appliances to reduce energy use	○	○	○
Encouraged us to think about upgrading our home (e.g. additional insulation, new boiler, etc) to reduce energy use	○	○	○

* 10. Overall, if you found that the experience of borrowing the kit made you change to your daily energy use, could you rank the impact of the following: *(where 1 = most impact and 5 = least impact)*

⠿ ▲▼	The instruction manual and kit tools	☐ N/A
⠿ ▲▼	The accompanying 'Guide to Home Energy Savings' from my library	☐ N/A
⠿ ▲▼	The 'Take Home Booklet' within the kit	☐ N/A
⠿ ▲▼	Information sessions on the toolkit held in the library or elsewhere	☐ N/A
⠿ ▲▼	The overall experience - it's hard to choose	☐ N/A

* 11. Since using the kit, I have done, or am thinking about doing the following *(tick yes, no or does not apply for each one)*

	Yes	No	N/A
Changing the timer on the hot water / heating to control when it comes on / goes off	○	○	○
Changing room or radiator thermostats to lower room heating levels	○	○	○
Turning down the boiler thermostat setting	○	○	○
Being mindful of keeping heat in by closing doors, drawing curtains or using draught excluders	○	○	○
Turning lights off when leaving a room	○	○	○
Switching appliances off rather than leaving them on standby	○	○	○
Using full, not partial loads for dishwasher / washing machine	○	○	○
Using the right appliance settings to save energy i.e. eco cycles, reduced temperature washes, adjusting fridge temperature	○	○	○
Reducing the amount of water heated in the kettle to what's needed	○	○	○
Air drying clothes where possible instead of tumble drying	○	○	○

Other (please specify below)

* 12. Since using the kit I am thinking about doing the following *(tick all that apply)*

- ☐ Buying energy saving light bulbs
- ☐ Insulating my attic / roof
- ☐ Insulating my walls
- ☐ Upgrading my boiler
- ☐ Upgrading my heating controls
- ☐ Getting a Building Energy Rating (BER) done
- ☐ Replacing my windows
- ☐ None of the above

13. Would you recommend the Home Energy Saving Kit to others?

- Yes
- No

14. Would you recommend making any changes to the kit?

15. Is there anything else that you would like to tell us about your experience of borrowing and using the kit?

* 16. Are you

- Male

* 17. Please tick which of the following age ranges applies

- 18-30
- 31-45
- 46-60
- 60+

* 18. Please tick which of the following applies to you

- Student
- Employed
- Unemployed
- Retired
- Other

* 19. When was your home built?

- After 2006
- 1994-2006
- 1979-1993
- 1950-1978
- Before 1950
- Don't know

* 20. What type of home do you live in?

- Bungalow
- Detached house
- Semi-detached house
- Terrace / end of terrace
- Apartment

* 21. Do you want to give us your contact details so that you can be entered into one of our **regular draws for a €100 One4All voucher**?

- Yes
- No

22. If you borrowed your kit from a library, which branch was it?*(tick one from the list below)*

- ○ Ballyfermot
- ○ Ballymun
- ○ Cabra
- ○ Central (ILAC) Library
- ○ Charleville Mall
- ○ Coolock
- ○ Dolphins Barn
- ○ Donaghmede
- ○ Drumcondra
- ○ Finglas
- ○ Inchicore
- ○ Kevin Street
- ○ Marino
- ○ Mobile Library
- ○ Pearse Street
- ○ Pembroke
- ○ Phibsborough
- ○ Raheny
- ○ Rathmines
- ○ Ringsend
- ○ Staff Library - Civic Offices
- ○ Terenure
- ○ Walkinstown

Snapshot of Findings

Positive experience, promoted reflection & intention to act

Awareness — 86% — Made **me** think about how I use energy in the home…

Recommend — 97% — Said they would recommend to someone else

Met expectations — 85% — Majority satisfied the kit met their expectations

Intention to act — 60% Think about home upgrades; 51% think about appliance upgrades

Willing to engage — 71% — Would like to be informed of future events.

27-Jul-18

M.CO

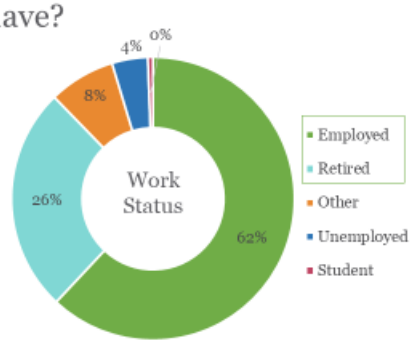
Work Status

What background do our users have?

Employed – most highly represented group

Retired – more highly represented than national average (28% v's 14.5% respectively)

Other – may include 'carers' / homemakers – slightly under-represented group compared with national ave of 13 %



- Comparison with library user profile?
- SAGE & workplace initiatives influencing our profile?
- Perhaps these users are more inclined / able to complete surveys.

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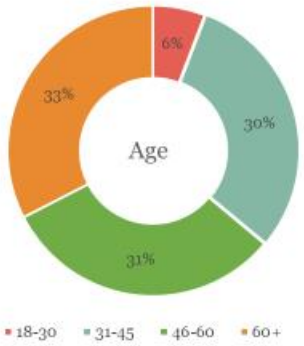
Age & Gender

What's the demographic mix?

No gender bias – kit is appealing beyond the male technophile stereotype.

Even spread across age groups

18-30 age group under-represented



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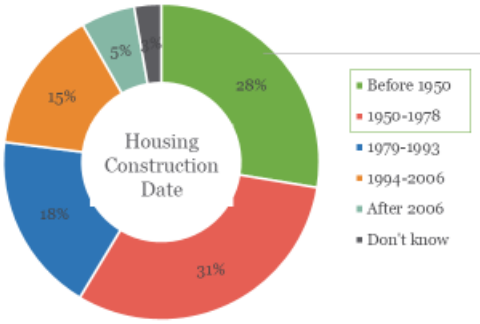
Home

When were our users' homes built?



Over half of our users homes were were built before 1978

Just 20% built after 1994

How does this compare with national statistics?

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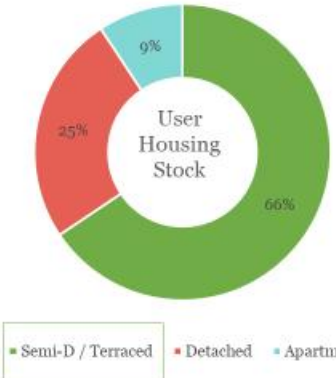
Home

What kind of home do our respondents have?

Most of our users have semi-detached / terraced homes:



National statistics show a higher proportion of detached / semi-detached homes

House profile possibly due to the urban location

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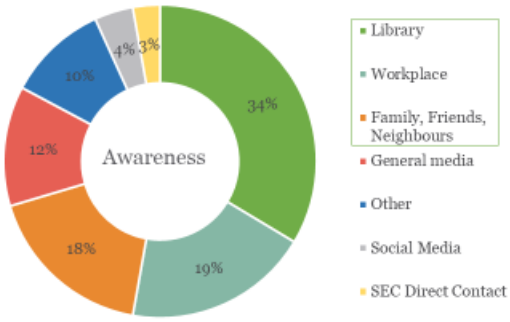
Awareness

How are people hearing about the kits?



Library – visibility of displays & staff promotions

Workplace – matches the percentage of people who loaned via the workplace.

Word of mouth – word of mouth amongst family, friends and neighbours

- *Importance of social influence – this can't be controlled but is only achieved through something that is genuinely useful and innovative.*
- *More info on Codema on media?*

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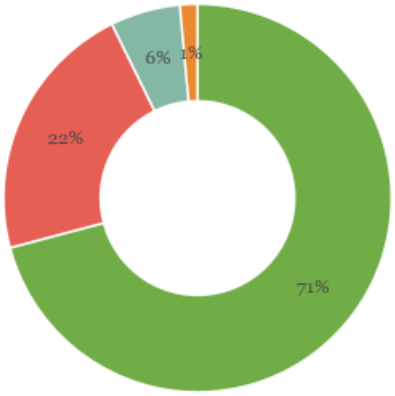
Access

Where are our respondents borrowing the kit?



Library & Workplace were most common.

This breakdown reflects the high number of survey completion rates in workplace and SEC settings, rather than the total number of kits borrowed.

27-Jul-18

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Motivations

What is the main reason people are borrowing the kit?

1. 'Money saving' was the primary motivation. **30%**

2. 'Warmth' & 'home improvement' came joint second, each received 22%. **22%** **22%**

3. 'Environmental concern' was a lower priority **18%**

This prioritisation reflects other research (e.g. SEAI 2018) where environmental motivators are secondary to comfort and cost.

27-Jul-18

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Connected Thought.
Creative Action.

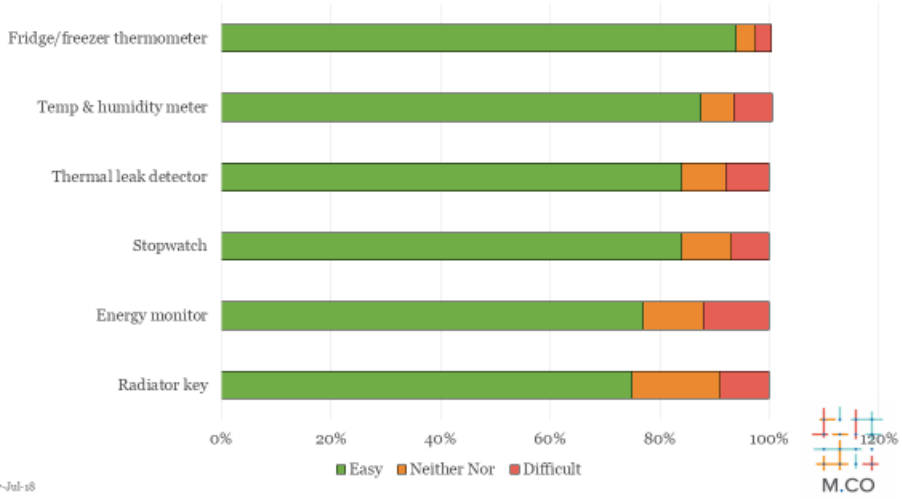
EVALUATION OF KIT

18 27-Jul-18

Tools

How easy are the tools to use?

More than 70% of tools were rated as 'very easy' / 'easy' (combined in graph)



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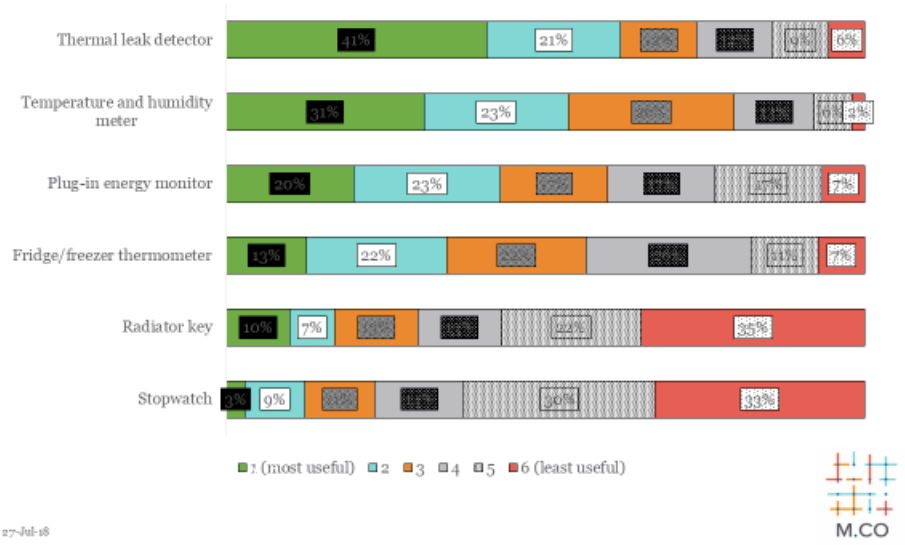
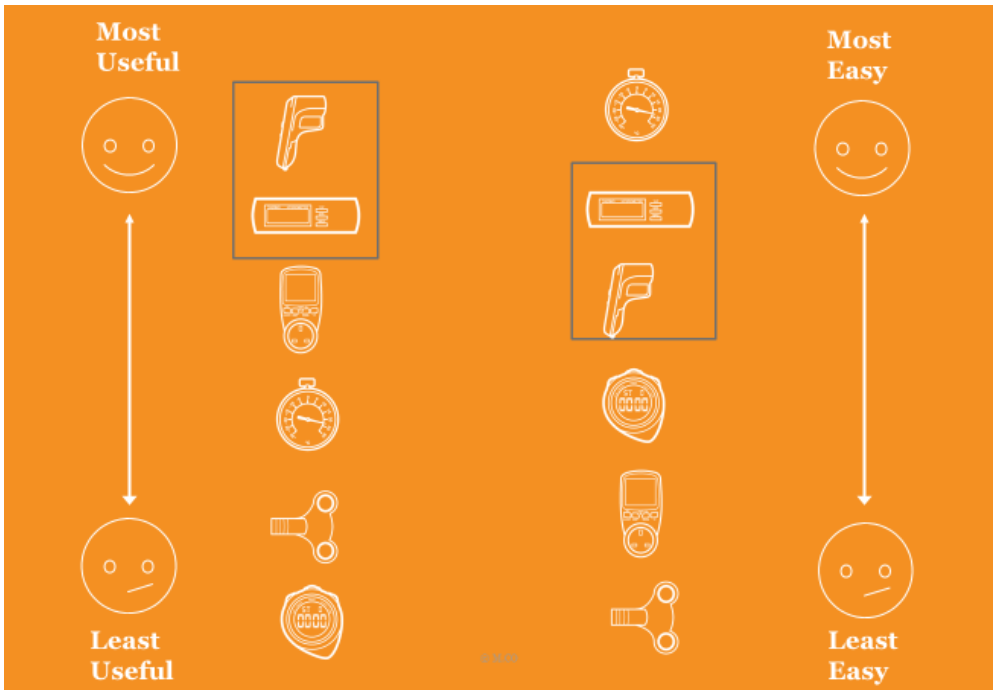
Tools

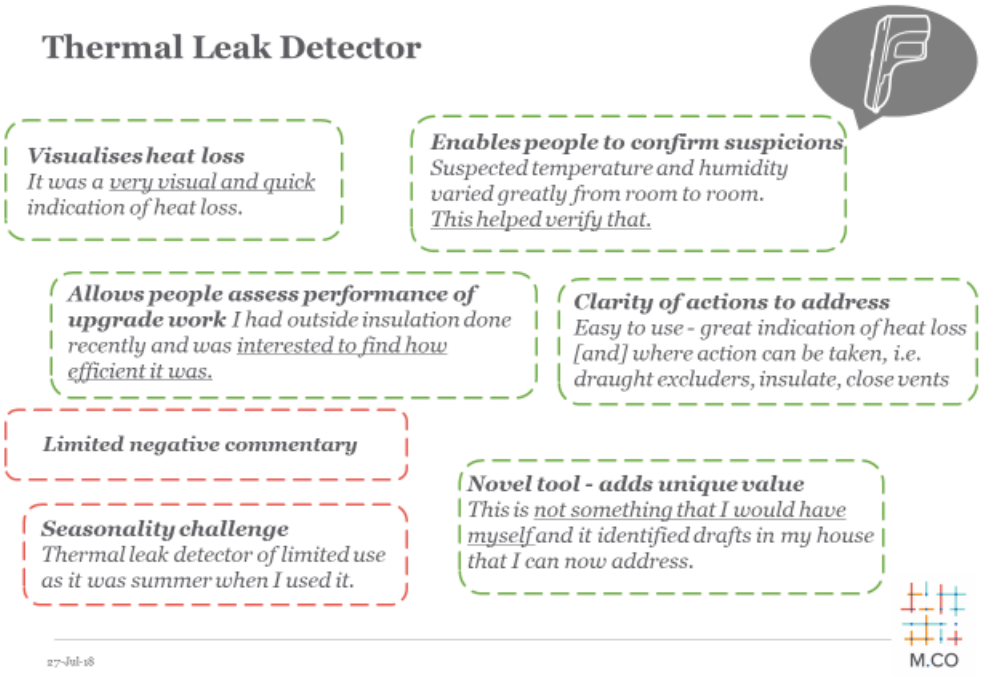
How useful were the tools to use?





Evaluation of tools

Thermal Leak Detector



Temperature and Humidity Meter

Makes temperature visible
"showed me home was warmer than I thought and bedroom over heated".

Informs action:

Adjusting temperatures
Knowing these values, you can directly act to adjust your radiators temperatures for instance or ....

Changing everyday practices
...be careful of your everyday lifestyle (natural ventilation, opening your window when your finished with your shower, when you cook...)

Useful for those with no thermostats
I have no thermostat on my heating controls, so this was the first time I saw how warm my room really were.

Limited negative commentary

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Fridge / Freezer Thermometer

Quick win / quick fix
Quick win - Easy to use tool to diagnose issue but equally easy to rectify through adjusting fridge temp. gauge.

Informs of correct temperature
It showed me the fridge wasn't cool enough...I always wondered what is the best temp for fridge.

Easy to adjust setting
This thermometer allowed me to disclose that there was an issue with my fridge/freezer buttons and settings. I was then able to re-set my appliance with the correct temperatures.

Already have
As I have a thermometer already built into my fridge.

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Electricity Meter

Family education, enabling action
It was great to show the kids how much electricity items use, so they are now more inclined to turn off things.

Challenging to act upon results
...I don't think it will result in a change in my habits as all electricity I use consider necessary.

Educating on energy use in standby mode
Showed the cost of having appliances plugged in on standby.

Complex and time-consuming
This was the unit I most looked forward to using but found it difficult and complex to decipher what energy was being used and the significance of that. Felt I was doing a maths exam. Kwh are difficult to understand. Would have been easier if present with energy cost

Informative & surprising results
- It's very helpful to get a sense of how much energy they different appliances use - especially as it isn't what you would expect.
- I've [since] stopped filling the kettle to boil a cup of tea, that's the kind fo behaviour [change], just awareness of what your consumption is".

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Radiator Key

Simple to use
Its something simple that can make an immediate difference....I knew I had to bleed my radiators, but I had no idea how to do it. The kit explained it in a simple way.

Novel tool for some
Lots of radiators to work on. Rarely if ever done before... easy to see if it worked or not.

Some already possess key
I already have 3 radiator keys. Also a screwdriver is handier on some modern rods.

Perceived as too technical / risky
[I] don't like trying to adjust radiators – I prefer to leave this to plumber.

Fiddly to use and have used before myself with it being non effective.

Time consuming
Bigger job than I want to undertake right now.

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Stop Watch

Child friendly tool
Having the large stopwatch meant it was easy for the children to use, they felt important

Already have timer on phone
Every phone (mobile) has a stop watch of some sort or can be downloaded for free.

Difficulty acting on information
Limited ability to adjust shower flow

Complicated to use
I found it complicated to use.

Some knew flow rate
I was already aware of the flow rate of the shower.

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Connected Thought.
Creative Action.

IMPACT

Reflection

Does the kit encourage people to think about their energy use?

Yes. the kit encouraged reflection amongst the majority of users

Made **me** think about how I use energy in the home...

86%

Made **my family** think about how we use energy in the home..

58%

How can we improve family engagement?
Include specific activities for kids to make it engaging for them? / develop school programme linkage.

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Action

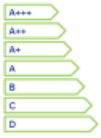
Does the experience promote long-term investment behaviour?

Over half our respondents said yes, it encouraged them to think about...

Home upgrades

60% Agree

15% Disagree



Appliance upgrades

51% Agree

22% Disagree

Translating intentions into action?
Tracking longitudinal changes?

27-Jul-18

"I can't remember if there was any direct calls to action to go on to a website or anything..." – Interviewee quote.

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Action

Does the experience promote everyday behaviour change?

Most common

Awareness was raised of heat loss and optimal settings for appliances.

Less impact on behaviours related to heating systems.

Least common

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General

Spill-over
I really appreciated the opportunity to try all the tools at home, I also brought it to my parents house, and will make some changes because of the readings. It is the most useful item I've borrowed in the library in a while! It is so interesting to be able to do some things for ourselves, rather than hiring professionals to give us this information. Thanks very much!

Information & motivation
It felt very trans-formative. There was lots of eye-opening information in it, and it changed the way I use my apartment.

Family engagement
The kids enjoyed the thermal lead detector and started asking more questions about energy/ heat loss. The colour changes make it fun.

New knowledge
Like a large proportion of people, I thought I was well informed on approaches to saving energy. Yes I have to admit I have learned a lot. Thank you.

Frist step before survey
My home is a 1960s bungalow detached. It was very interesting to sue the kit, just to tell me how much it is letting cold in, without an expensive survey. My hall door is very leaky, I discovered. I bought thermal curtains to help keep in the heat.

Trouble taking action
We talked about it and we found that we weren't as bad as we thought, there's room for improvement but as we're on a budget there's not an awful lot we can do at the moment. It's a bit of a dilemma because it highlights these things but then you can't make improvements to your house. I was hoping it would make us aware of anything that we could do that was in our power to do without renovating our house.

Holistic
Yes it was positive a positive experience. It was good, everything is made for one purpose and you need to test everything.

The kit is very user friendly.

Confirmed we are on the right track

27-Jul-18

APPENDIX H – INTERVIEW GUIDE

Communications:
How did you hear about the kit?
Motivations:
What was the main reason you decided to take it out? (i.e. what you were hoping to achieve).
Save money, home improvement, environment, cosy, interested new tech.
Overall impression:
You said the kit [met / did not meet] your expectations; Can you explain your answer?
Did you recommend it to anyone else?
Tools:
Strengths: Which tool did you find the most useful? Why?
Weaknesses: Which tool did you find the least useful? Why?
Information: Did you find the information booklets accompanying the kit useful? Which ones; Why?
Any surprises? Any useful insights / knowledge gained that you weren't expecting through participating in the process?
Kit modifications: Based on your feedback above, what changes would you make to the kit?
What would you remove? (info / tools).
What would you add? (info /tools)
Action:
Overall: Did the experience give you an idea of what actions you could take to improve your home energy efficiency? If not, why not?
Energy-use practices: Are you trying to save energy more now since loaning the kits?
Did you make any changes to how you use energy in the home since borrowing the kit (e.g. closing doors; adjusting thermostats; switching off)? What? Why/Why not?
Are you the only person in your household making these changes or has it impacted how the whole home uses energy?
Investment: Have you, or do you plan to invest in any home energy efficiency upgrades (appliances / insulation)?
If yes, what? How far are you along in the process?
If no, why not? Any stumbling blocks?
Were you aware of SEAI grants?
Supports / embedding kits
After your experience, what one thing would help empower you to take further action (e.g. whether its investment / behaviour change)?
Library users: Do you think it would be useful to have the kits placed in a different context (e.g. work place; community group; educational setting?)
Office / SEC users: how did the fact that the kit was part of a wider community / office initiative influence your experience and the extent of action you took?

INTERVIEWS

HOME ENERGY SAVINGS KIT
M.CO Summary of Findings for Codema

1 1-Aug-18

OVERVIEW

1-Aug-18

Connected Thought.
Creative Action.

EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

BACKGROUND & FINDINGS

- As part of SEAI's involvement in the IEA DSM Task 24 project, the Home Energy Savings Kits were identified as an area requiring further research to evaluate impacts on behaviour change amongst those borrowing the kit.
- From 2017-2018, further kits were developed and rolled out in libraries across Dublin and each borrower was requested to complete a survey with their feedback on the kit.
- To compliment and further probe feedback received from 200 user surveys, Codema commissioned M.CO to carry out qualitative interviews with a sample of users.
- **9 individuals** were interviewed at end 2017 / start 2018.
- **4 personas** were developed from the interviews: 1) verifier, 2) savvy, 3) energy saver, 4) enviro-aware. These were created by synthesising motivations across users and creating generalised personas to reflect our audience.
- This reveals the **diverse motivations and experiences** of users of the kit, providing insight on how to frame, communicate and tailor the kits in different contexts going forward.

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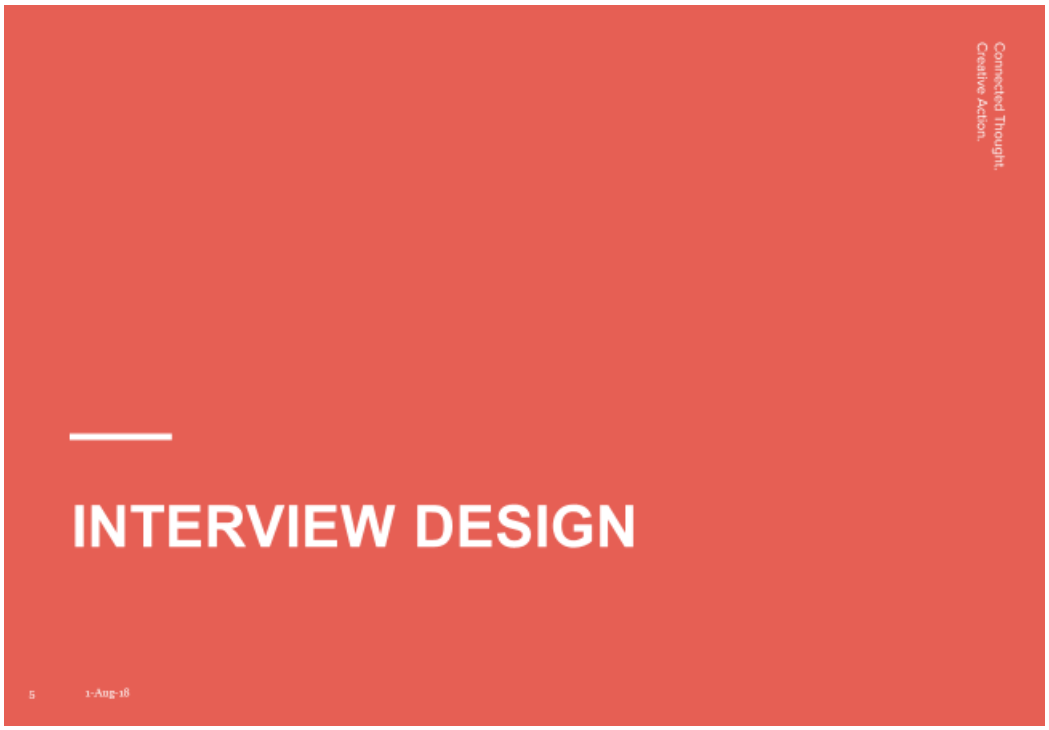
Connected Thought.
Creative Action.
INTERVIEW DESIGN
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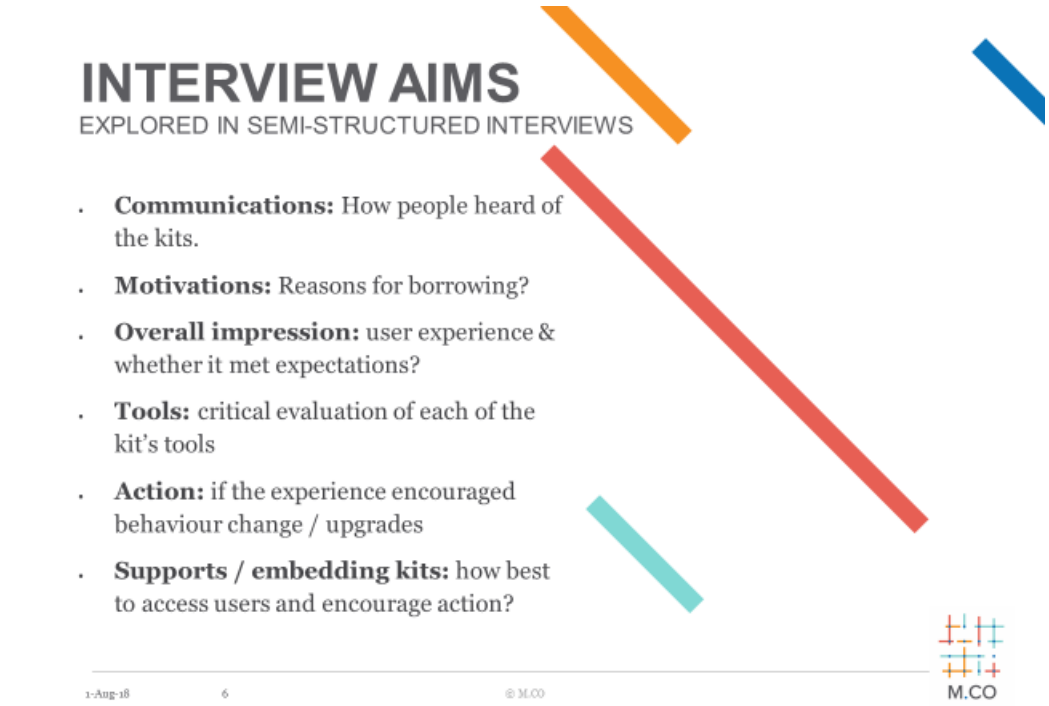
INTERVIEW AIMS
EXPLORED IN SEMI-STRUCTURED INTERVIEWS
. Communications: How people heard of the kits.
. Motivations: Reasons for borrowing?
. Overall impression: user experience & whether it met expectations?
. Tools: critical evaluation of each of the kit's tools
. Action: if the experience encouraged behaviour change / upgrades
. Supports / embedding kits: how best to access users and encourage action?
1-Aug-18
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SAMPLING STRATEGY

ACCESSING INTERVIEWEES

Interviewees were accessed via the library survey as respondents had an option to state if they were happy to complete a 'follow-up' interview.

It was decided to sample a cross-section of respondents including different age groups, different loan settings and perceptions of the kit. Interviewees were selected to represent the following characteristics:

Library setting

- Age 60+
- Age 46-60
- Age 31-45

Workplace setting

- Mixed Age

Other

- One individual who stated kit "did not meet my expectations"
- One individual who stated intention was to invest in upgrades

Connected Thought. Creative Action.

KEY FINDINGS & USER PERSONAS

SNAPSHOT OF FINDINGS (1)

LINKED TO INTERVIEW AIMS

Communications

- Many had seen advertisements in the library for the kits. Two respondents mentioned radio adverts while one had seen mention in the staff newspaper.

Motivations

- Interviewees tended to be very **interested** in either: **a) technology in general, b) environment, or c) home upgrades**. Indeed, as our personas show, the kit was used by many who had already begun their journey to take energy efficiency action.

Overall impression

- The majority of interviewees were highly positive about the kits. Key reasons for this positive response included:
  - **Novelty:** the novelty of the kit itself – there is nothing else like it out there.
  - **Empowerment:** How the kit empowers you to make your own evaluations either in advance of expert help, or as a complement to validate external opinions
  - **Eclectic:** The eclectic nature of the kit's contents which means there is something to interest anyone.
  - **Thermal Leak Detector:** This was often the focus in interviews and mentioned as a highlight – it seemed to be the most impactful and exciting aspect of the kit.

SNAPSHOT OF FINDINGS (2)

LINKED TO INTERVIEW AIMS

Tools

- Perceptions on individual tools were very similar to those reported in our survey findings (document previously circulated). The thermal leak detector proved most popular, followed by the humidity and temperature meter and fridge/freezer thermometer. The electricity monitor was considered quite technical and together with the radiator key had less universal appeal.

Supports

- The majority of interviewees **recommended** the kit to others. Many suggested further **emphasis on follow-up** and **support** for householders to upgrade their homes following use of the kit.

Actions

- The kit was considered to focus more on energy efficiency investment rather than everyday energy behaviour changes – this may be due to the tendency for users to focus their attention on the thermal leak detector.
- Many already exhibited a certain degree of energy awareness, revealed by their interest in the first instance to borrow the kit.

USER PERSONAS

MOTIVATION FOR BORROWING KIT...

1. Verifier — Verify quality of energy efficiency upgrades already completed.

2. Savvy — Confirm suspicions and provide confidence in the need for energy efficiency upgrades in advance of investment / action.

3. Energy Saver — Curiosity about energy use and to get direction on potential energy efficiency behaviours & upgrades.

4. Enviro-Aware — Improve knowledge and awareness on energy use due to environmental motivations.

VERIFIER

- **Motivation:** verify quality of energy efficiency upgrades already completed.
- **Benefits:** justification of investment and peace of mind that it is creating an impact.
- **User experience:** more targeted focus amongst these users on the thermal leak detector and focusing on different aspects of the building fabric.

"It showed there had been an impact and I was very happy with it".

I had outside insulation done recently and was interested to find how efficient it was.

[It shows that you] "didn't waste money in your investments, they were sensible things to do"

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SAVVY

- **Motivation:** Confirm suspicions and provide confidence in need for energy efficiency upgrades in advance of investment / action
- **Benefits**: confidence and motivation to act and trust in ultimate recommendation by contractor.
- **User experience:** positive about the experience and felt the tools gave them accurate direction on fabric upgrade needs.

"It showed me the key areas where I can improve insulation and the benefits of improving glazing and draught proofing".

"Borrowing the kit confirmed it [need for upgrades], rather than encouraged it"

"I was going to get the house redone so I wanted to see what it was like before I had it done".

ENERGY SAVER

- **Motivation:** Curiosity about energy use and to get direction on potential energy efficiency behaviours & upgrades
- **Benefits:** kit provides range of tools to give insight on how they should prioritise behavior changes and plan for changes ahead
- **User experience:** overall positive experience and potential for repeat users. These people tended to be starting / mid-way on their energy efficiency journeys. They were interested in the contents of the kit as a whole.

"my wife reminds me not to use too much water in the kettle now ever since"

Why did you borrow kit?

"Just to see first of all which items were consuming electricity, secondly, was curious about heat leakage in the house"

"that was something we discovered – the plan is to get a new fridge"

ENVIRO-AWARE

- **Motivations:** Improve knowledge and awareness on energy use due to environmental motivations.
- **Benefits:** General awareness raising and focus on everyday behavior change.
- **User experience:** in both cases users were not interested in fabric upgrades and thus felt the benefit of the kit was somewhat limited for them. They had hoped for more advise on behavior change with one person anticipating "smarter" devices that calculate monetary impacts of changing energy using practices.

"I was interested in what it might tell us about our heat and energy....interested in conserving energy use".

"A lot of what you are recommending I am doing already but it was interesting being able to check temperatures etc. and consider how to save money by lowering them

Why did you borrow the kit?

"basically, it was energy saving and money saving – I'm fairly green minded!".

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INTERVIEW SNAPSHOTS

INTERVIEW 1 SUMMARY

Verifier

- Male
- 60+
- Retired
- Semi-D, Pre 1950's
- Lives with wife.

Heard about kit via radio
- Noted that he heard something on the radio but couldn't remember what channel.

Motivation – to verify if recent insulation upgrades were working
- *"I had my house insulated a year and a half before so was interested to see how it was working"*

Benefit – proved impact, justified expenditure
- *"Showed there had been an impact and I was very happy with it".*
- *"I was fascinated that such a kit was available to the public, it would be pretty expensive to buy it was very well put together.*
- TLD – very useful *"a lot of people wouldn't know the existence of such an item".*

Action – limited
- Commented that didn't learn anything new as such but was focused on the insulation.
- *"I'd maybe borrow it again with more of an investigative angle – next time I'd be more clued up"* – response to query on if they'd changed how they use energy in the home since borrowing kit.

Changes to kit – include follow up.
- Number to call for follow up advise.
- Information leaflet on how to choose the best products – to say shop around for products and contractors – lack of regulation.

Challenges – humidity meter hard to understand & fridge-freezer not necessary
- *"I don't have enough information on humidity to begin with".*
- Noted that its hard to know if its high or low.
- Suggested to just let people know what the best temperature is for a fridge as most have digital temperature readers.

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INTERVIEW 2 SUMMARY

Verifier

- Male
- 60+
- Retired
- Semi-D, Pre 1950's
- Lives with wife.

Heard about kit in library
- "it was well advertised, Rathmines are good at that"

Motivation – to verify if recent insulation upgrades were working and if they had anything else to do.
- *"we did various things [roof, double glazing, sealed doors)...we were hoping to see if we had left anything out"*

Benefit - Reassurance – noted that more relevant for those at start of their journey.
- *"its an excellent kit, but its more aimed for the beginning of your pathway"*
- *"we thought we might get a little bit extra, but it was reassuring ... all the work we'd done was working rather than it telling us that there was something big that we hadn't done.*
- Noted that even still they were glad they rented it as it showed they *"didn't waste money in your investments, they were sensible things to do"*

Action – was not borrowing kit with intention to learn about behaviour changes
- Commented that didn't learn anything new as was focused on verifying quality of work
- Any additional upgrades *"would cost a lot and the energy savings wouldn't justify it"*
- *"we're already very careful about the energy we use in the home"*

Changes to kit – supermarket stands & support line
- Number to call for follow up advise.
- Stands in supermarkets.

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INTERVIEW 3 SUMMARY

Heard about kit via internal DCC Comms
- "First Post", DCC internal magazine.
- Did not know if other colleagues borrowed kit and could not recall workplace campaign.

Motivation – to use kit to personally assess house before getting upgrades completed.
- *"I was going to get the house redone so I wanted to see what it was like before I had it done".*
- Interviewee was an electrician so had technical background.
- Had been planning on upgrades for the house as they *"were throwing money into it and couldn't keep the house warm".*

Benefit – confirmed need for retrofit & provided confidence in recommended upgrades
- *"Borrowing the kit confirmed it [need for upgrades], rather than encouraged it"*
- Stated that the TLD revealed the attic was too warm, and that the floor was too cold.
- *"I had been talking to contractor and they were suggesting underfloor [insulation] but I wasn't particularly convinced about that until I saw the cold spots [with thermal leak detector].*

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Savvy

- Male
- 46-60
- Workplace
- Lives with wife & kids
- 195-1978 Detached house

Challenges – weather & electricity meter
- Seasonality: *"it was unseasonably warm, [so] the thermal indicator [thermal leak detector], didn't show a huge difference".*
- Electricity monitor "weakest one in the kit" – difficulty accessing plugs and taking readings.

Awareness – generally raised
- *"In a general way it made you think more about electricity rather than specific action"*

Action - had planned retrofit anyway, but learned about water flow.
"In a general way it made you think more about electricity rather than specific action"

Impact - *"I said it to a few people that it was well worth doing and very interesting to see"*

Ideas *"very interesting to use, well set up, easy to read and to follow the instructions".*

INTERVIEW 4 SUMMARY

Heard about kit via library promotions
- Noted the banners and advertising in Terenure library.

Motivation – to confirm suspicions before retrofit.
- Wanted to see priority areas before getting insulation. *"see the different areas where there were weaknesses".*

Benefit – gave direction....
- *"It showed me the key areas where I can improve insulation and the benefits of improving glazing and draught proofing".*

Challenges – seasonality, Fridge Freezer thermometer & electricity meter.
- Summer when took kit out so temperature wouldn't vary much anway.
- *"Fridge-freezer thermometer was telling me it was too warm but it was definitely cold enough"*
- *"I didn't really use the instructions – I found it was too much work to input the values".*

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Savvy

- Male
- 31-45
- Employed
- 1979-1993, semi-detached
- Lives with partner

Awareness – insulation & water use
- *"it did get me thinking about he volume of water...staggering when you think about it, you can really see how much is lost".*

Action – plans window upgrades.
- Had subsequently gotten insulation but next action is to do windows.
- Confirmed that windows need to be upgraded – *"you can see how bad they area".*
- Noted kit was *"more about the structure"* rather than behaviour changes.

Changes to kit – Next steps & costings.
- *"more information on next steps – where can I go...costs etc,*

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INTERVIEW 5 SUMMARY

Enviro-Aware

- Female
- 46-60
- Pearse Street Library
- 1900 terraced house
- Lives with sister
- **Note – spoke to both residents.**

Heard about kit via library promotions

- Her sister works in the library and that's how she heard about it.

Motivation – general interest in environmental action.

- *"I was interested in what it might tell us about our heat and energy....interested in conserving energy use".*
- General intrigue motivated the loan rather than wanting to implement specific actions.

Benefit – overall experience & TLD.

- *"I didn't really have expectations but I'd say it was a positive experience".*
- TLD was most positively rated – showed specific areas where insulation needed (e.g. windows, N. facing walls) – noted that *"I live in an old house so I wasn't surprised [by the results]".*

Challenges – some tools tricky to use & not very relevant.

- Fridge-freezer thermometer was least valuable – *"I forgot about it so I'd say that was the least interesting".*

Awareness – general awareness

- Stated that "there were no surprises"
- *"it just confirmed my suspicions but even still it was a worthwhile experience".*
- *"resolved argument with my sister about mobile phones – she thought they were using lots of energy".*

Action – affordability is big hurdle to upgrading insulation

- *"I've been studying what we could do for a long while, but we can't afford to do anything about it anyway...wouldn't qualify for the grants, and you have to pay up front anyway".*

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INTERVIEW 6 SUMMARY

Enviro-Aware

- Female
- 31-45
- Employed
- Semi-detached
- Pre 1950
- In survey had noted that "experience had not met expectations"

Heard about kit via village fair

- Was at fair in Phibsborough in summer 2017 and saw an information stand

Motivation – energy, money & environmental

- In response to query why she loaned kit – *"Basically, it was energy saving and money saving – I'm fairly green minded!".*

Challenges – did not feel kit met expectations wanted more instant easily understandable costs & advice

- User had been expecting kit to be "smarter" stated that "*it was fairly basic and didn't tell me much- the thing for the fridge didn't seem to work, there was a thermal thing for the wall but because it was summer it didn't work.*
- **Desire for easy to follow, costed steps to change you behaviour** – *"I wanted it to give me a clear answer like if you put something on to a tap, it would show that it used up 5 gallons of water and cost x amount".*

Awareness / Action – Frustrated

- Had purchased house 1.5 years ago and fully renovated, insulation and new windows.
- Thought the kit would provide advice on behaviour changes and new smart technologies for the home. Expected 'Nest' type technologies and a way to programme in costs and savings.

- *I was excited by the concept and was waiting for ever and when I got it, it didn't fulfil my excitement.*

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INTERVIEW 7 SUMMARY

Energy Saver

- Male
- 32-45
- Employed
- Pre 1950, Semi-D
- Lives with partner & young kids.
- In survey noted that were planning to take action.
- Note: had borrowed kit twice!

Heard about kit via library

- Noted that "*the people in Raheny library are brilliant*"...however batteries were flat the second time he loaned kit.

Motivation – general interest & to assess stove temperature

- Person had borrowed kit twice
- Firstly, was generally interested and keen to make his home v energy efficient - designer so was very interested / educated about product design.
- Knew about grants and had investigated them before loaning kit.
- Second time, he got kit out specifically to use the thermometer to test that their new stove wasn't burning too hot.

Benefit – specific actions could be taken.

- Fridge showed different temperatures throughout – "*that was something we discovered – "the plan is to get a new fridge*"
- TLD- "*useful and its sort of fun to use*"
- Noted that workbook was valuable.
- Learnt that the "house is quite porous" (as humidity outside and inside wasn't that different).

Action – was very focused on specific tools.

- "*Can't remember if there were any direct calls to action*".
- Said might get it out again to use the electricity monitor as didn't properly use it – "*I didn't have the time to fully appreciate everything we could do*" – although noted "*to do every one in your house it just wasn't feasible...it could have been a bit more automated*".
- Affordability is a challenge to insulation.

Changes – focus on behaviour change and costs

- Kit was more about cutting down draughts and getting insulated
- Include costs (eg. Costs to boil kettle vs immersion, costs to upgrade etc(.

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INTERVIEW 8 SUMMARY

Energy Saver

- Male
- Retired
- 1979-1993, terraced.
- Lives with wife
- Small town house

Heard about in the library

- Wife spotted it there and drew his attention to it.

Motivation – general interest in insulation and energy use

- "*Just to see first of all which items were consuming electricity, secondly, was curious about heat leakage in the house*"

Benefit - general interest

- In relation to motivation above, stated "*It certainly answered those questions for you*".
- Learned about distributing food in fridge to optimise efficiency (i.e. avoid leaving spaces empty and to protect from the sides of fridge) .
- Leaflets were v good – "*user friendly" and didn't require any technical knowledge*" ... "*visually attractive.*

Action – small changes to electricity use

- Noted that energy used to boil *kettle "was the most striking one... I've [since] stopped filling the kettle to boil a cup of tea, that's the kind fo behaviour [change], just awareness of what your consumption is".*
- "*my wife reminds me not to use too much water in the kettle now ever since*"
- Stated that it showed the front door is major problem, but believed there wasn't much that could be done to address it.
- Did not talk of the possibility of insulation as felt that they had already done enough.

Changes – reduce kit size

- Kit is bulky
- Wider promotion

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INTERVIEW 9 SUMMARY

Energy Saver

- Male
- 30-45
- Renter
- Apartment
- Note: poor English.

Heard about newspaper
- Couldn't recall which publication.

Motivation – general curiosity
- *"curiosity and how the kit could help me reduce energy use"*

Benefit – overall learning
- *"it was a positive experience" It was good, everything is made for one purpose and you need to test everything"*

Action
- "thermal leak detector, it showed my windows were really bad. I can't change them though as I'm renting the apartment – there's nothing you can do the landlord is a company"
- *Doesn't need to change behaviour – "no because I do these things anyway, so I didn't do anything else".*

Changes – couldn't think of any

Challenges –
- Not all items were relevant – e.g. radiator key wasn't used as doesn't have radiators
- No interest in shower flow so didn't use stop watch.

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Connected Thought. Creative Action.

CONCLUDING THOUGHTS

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CONCLUDING THOUGHTS

- Interviews revealed a diversity of perspectives and motivations and points to the potential for creating tailored kits for different audiences.
- Interesting and unexpected insight was gained regarding the use of kits to verify the quality of work completed ('verifier' persona) and to provide confirmation / direction to those about to get upgrade work done ('savvy'). These users were focused on the tools that looked at household fabric and temperature.
- 'Enviro-aware' and 'energy saver' personas had more wide interest in the range of tools within the kit as they started from a more open standpoint regarding what actions they could take. Some felt a slight lack of direction around everyday behaviour changes they could take to reduce energy use.
- A potential next step would be to map the various touch-points across the user journey for each of the personas and how they could be accessed and encouraged to borrow the kits.
- These interview findings will be incorporated within SEAI's final report as part of their involvement in the IEA DSM Task 24 project. The report will draw further conclusions on the research synthesising feedback from interviews, surveys and focus groups.

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