



Department for
Business, Energy
& Industrial Strategy

Non-Domestic Smart Energy Management Innovation Competition

Interim report from NDSEMIC's Research &
Evaluation Programme

August 2019



OGL

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Introduction to this report

The Non-Domestic Smart Energy Management Innovation Competition (NDSEMIC) is an £8.8 million competition being led by the Smart Metering Implementation Programme within the UK Government Department for Business, Energy and Industrial Strategy, running between 2018-2020. It aims to stimulate a non-domestic smart energy services market for smaller non-domestic sites in three priority sectors; hospitality, retail and schools.

NDSEMIC is funding the development of innovations which use smart meter data to provide occupants of smaller non-domestic sites with tailored, actionable insights to help them better manage their energy consumption. Nine projects distributed across the three target sectors were selected to receive initial Phase 1 development funding. Seven Competition Partners have subsequently progressed to the current and final phase of NDSEMIC (February 2019 – January 2020) and are piloting their innovations in a real-world setting.

NDSEMIC's Research and Evaluation Programme (REP) is a two-year programme running alongside the Competition to extract meaningful learnings from the Competition and support broader market transformation. The REP is being led by Ipsos MORI along with Carbon Trust and representatives from Technopolis and Loughborough University.

This is an interim report on the REP's activity, providing an overview of:

- the vision for NDSEMIC, the solutions being developed through it and how benefits are anticipated to be realised at both a programme, sector and project level;
- the role being played by the REP in supporting NDSEMIC in achieving this vision, including through its novel Action Research approach;
- the REP's planned activities during the final phase of NDSEMIC, including how different elements of the market transformation vision of the Competition are being explored and the stakeholder groups anticipated to be engaged in this learning process;
- early learning generated to date through the Competition's activities about how to effectively engage non-domestic customers in smart metering, smart meter data and related solutions and services.

This report is being published in advance of a final report on the Competition (which ends in early 2020) in order to share valuable learning at this interim stage; this includes learning that is likely to be of interest to the smart metering and broader innovation communities around how best to engage non-domestic organisations in smart meter data and its role in driving better energy management through innovative solutions. This interim publication also aims to provide policymakers and others involved in driving forward energy efficiency initiatives within schools and the small hospitality and retail sectors with a view of the ambitions of NDSEMIC during its final phase and the activities it is planning in order to facilitate wider conversations around driving forward the necessary market transformation.

For further information and resources related to NDSEMIC please visit GOV.UK:

www.gov.uk/government/publications/non-domestic-smart-energy-management-innovation-competition

Section 1. Vision for NDSEMIC

This section provides an overview of how BEIS is supporting innovation as a means of maximising the scope for energy savings in smaller sites within three priority non-domestic sectors (hospitality, retail and schools).

Smart meters are being rolled out to homes, small businesses and schools across Great Britain, and are essential for the upgrade of Great Britain's energy grid, delivering a range of consumer benefits and helping to pave the way for new services and technologies and a low-carbon future. NDSEMIC is an £8.8 million competition being funded by the UK Government to leverage the roll-out of smart meters in the non-domestic sector by supporting innovation and stimulating market development, thereby maximising the potential for energy saving. To do this NDSEMIC is developing energy management products and services using smart meter data to help organisations within the three priority sectors to manage their energy consumption better. The aim is to provide small businesses and schools with information on their energy consumption to help them control and manage their energy use, save money and reduce carbon emissions. This should deliver lasting change, with the take-up of such products and services becoming a matter of standard practice. NDSEMIC is being led by the Smart Metering Implementation Programme within the UK Government Department for Business, Energy and Industrial Strategy, running between 2018-2020. The concept for NDSEMIC was borne out of research¹ which highlighted the importance of tailored, easy-to-act upon advice for smaller non-domestic energy users and the potential for innovation to unlock their energy savings potential.

The overarching aims of NDSEMIC are presented in the diagram below:

Figure 1: Key aims of NDSEMIC

Develop **innovative and easy-to-use data tools and services** (such as online platforms, apps and behaviour change interventions) which are **tailored** to the requirements of the target segments, **add value** to smart meter data and **facilitate user engagement**.

Develop **packages of complementary interventions and support mechanisms** (such as advisory and training materials and case studies) tailored to the requirements of the target segments which **drive the uptake and effective use** of data products and services.

Secure **earlier and greater levels of energy management activity** within the key segments, leading to **reduced energy costs and carbon emissions**.

Develop and strengthen the market for energy management products and services for smaller non-domestic consumers by **reducing the barriers to / stimulating the market** for organisations developing solutions.

¹ www.gov.uk/government/publications/smart-metering-in-non-domestic-premises-early-research-findings

In targeting these objectives, NDSEMIC aims to support the broader non-domestic smart metering benefits realisation strategy, through delivery of energy savings benefits (projected to reach £1.44bn² (discounted 2011 prices) over the period 2013 to 2030) as well as enhancing the broader smart offering for smaller non-domestic sites. Such benefits would contribute to wider environmental objectives as set out in the Clean Growth Strategy, as well as support wider Science and Innovation for Climate and Energy (SICE) objectives and the Industrial Strategy.

Pathway to impact: how benefits of NDSEMIC programme will be realised

The logic model³ (see [Figure 2](#)) details the outcomes expected from the Competition over different timeframes; by 2020 at the end of the Competition, and through to 2030. Ultimately achieving this longer-term vision is likely to require the Competition to successfully demonstrate, and encourage engagement in, the benefits to both smaller non-domestic consumers (to drive demand for smart data-enabled solutions and services) and third-party innovators, developers and intermediaries (to supply and facilitate this future market). Section 2 discusses how the REP is supporting the Competition to build an evidence base around what's needed to enable this market transformation to happen (including for example, unlocking access to the data needed to drive such solutions, or the policy and regulatory context needed for viable business models to thrive). Section 2 also presents the stakeholder groups within the current, and envisioned, future market who are being engaged throughout NDSEMIC to support the objective of spreading awareness, interest and momentum in driving this change.

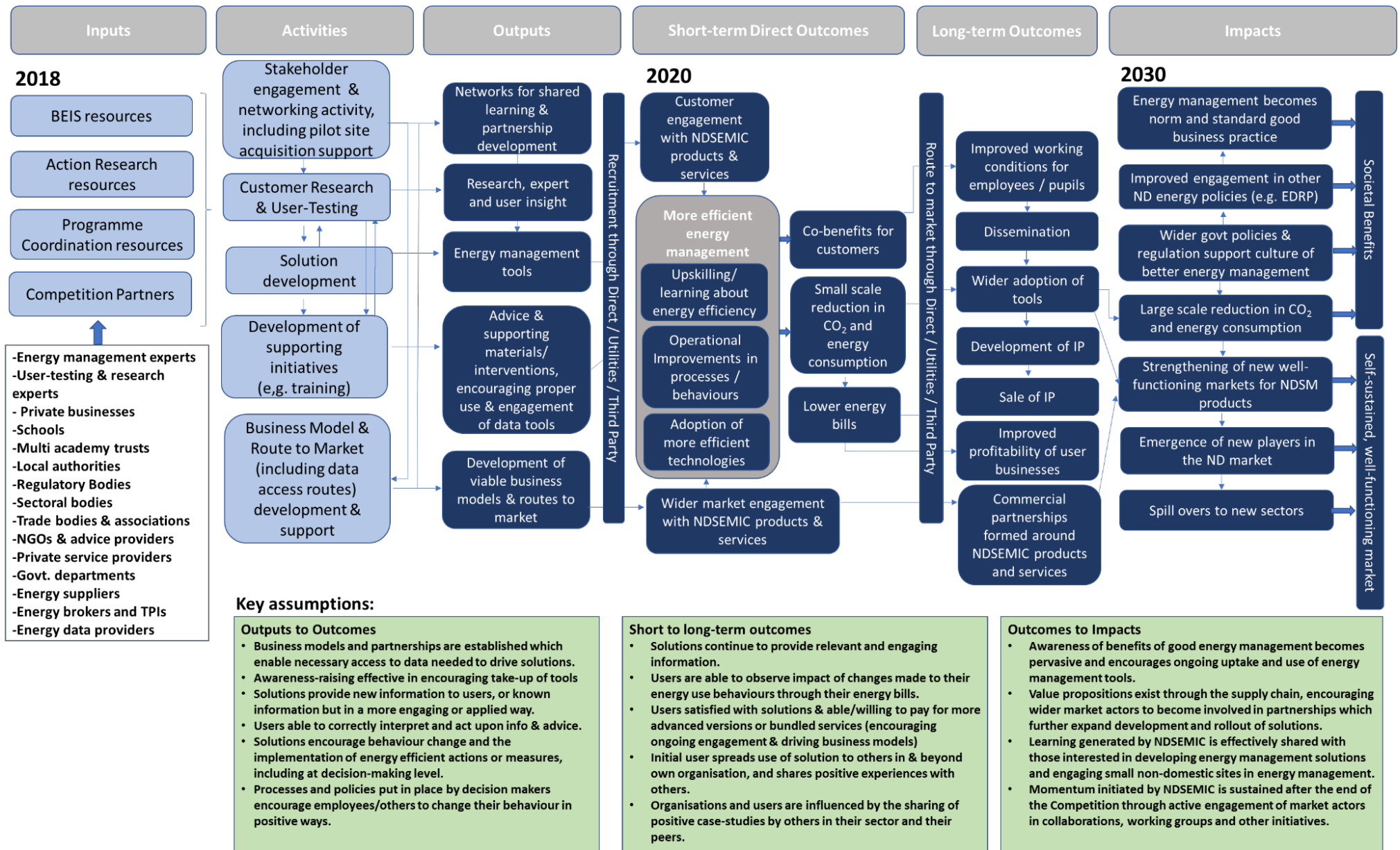
In NDSEMIC's Logic Model:

- The **Inputs** cover the key resources invested into NDSEMIC and the stakeholders and sources of expertise which will feed into it.
- The programme's **Activities** are those designed to address the key needs of Competition Partners, as well as to generate insights on what is required to create and sustain a market for smart-meter enabled solutions.
- The **Outputs** are the key products, information and learning which will be produced as a result of NDSEMIC activities.
- **Outcomes** are the changes which are anticipated to result from the roll-out of these energy management solutions. These are divided into short-term outcomes (expected to be achieved by the end-date of NDSEMIC in Q1 2020) and long-term outcomes (expected to be achieved within ten years of the conclusion of NDSEMIC).
- The **Impacts** are the main benefits NDSEMIC aims to deliver, in support of the overall objective of reducing energy consumption to drive a transition to a low-carbon economy.

² Smart Meter Roll Out Cost Benefit Analysis – Technical Analysis, 2016.

³ A logic model is a visual representation of how a programme's inputs [i.e. resources invested] and activities are expected to result in its target outputs and outcomes and how these are anticipated to ultimately lead to longer-term and larger scale impacts.

Figure 2: NDSEMIC Logic model: Anticipated ways in which outcomes and impacts will be realised



Sector-specific Outcomes and Impacts

Though the vision for the Competition and its impact (as summarised in the logic model in [Figure 2](#)) are common across the targeted sectors, it is likely that short-term outcomes and pathways to impacts will vary across these. A number of additional sector-specific outcomes that are being targeted are set out below.

Additional Outcomes Anticipated for Schools

Educational

- Students develop numeracy skills through engagement with smart meter data.
- Students are empowered to lead action within their schools, including through this use of data and in preparing business cases to influence key decision-makers within the school.

Environmental

- Students and staff become more energy-conscious, with transferrable behaviours to the home-setting.

Wider School Benefits

- Greater engagement in energy data empowers decision-makers within schools, Trusts or Local Authorities to make appropriate choices around the procurement and contracting of energy supplies, including the selection of energy tariffs and potentially more innovative buying approaches (such as collaborative buying 'clubs').

Additional Outcomes Anticipated for Retail and Hospitality sites

- Retail and hospitality staff who influence how and when energy is used at their sites may access information on energy use for the first time, empowering them to take action to drive energy efficiency in their organisation.
- Energy management solutions targeted at property managers, or chain-level representatives, lead to more energy efficient policies being encouraged at sites under this level of governance.
- Landlords / property managers engage tenants on ways of reducing consumption in return for better rates / infrastructure improvements.
- Willingness to pay for effective energy management solutions, with tiered payment models leading to uptake of more intelligent monitoring over time.
- Increased sales driven through improving quality of customer experience and as a result of reputational effects of marketing action to reduce energy use and CO₂ emissions.

Overview of solutions being developed and piloted through NDSEMIC

Each of the Competition’s seven energy management solutions is being developed within a shared understanding of the outcomes and impacts being targeted at the overall NDSEMIC programme-level. However, differences in the solutions and complementary support packages being piloted means that a variety of pathways to overall outcomes are being explored, thus enabling the REP to assess the contexts in which these variations are effective.

- **differences in the target user** (from customer-facing store staff to shopping centre property managers in the retail sector, from business owners to whole team empowerment in the hospitality sector, and from senior management through to classroom teachers and students in the schools sector)
- **differences in the format of intervention being delivered** (including mobile apps, web-based applications, platform solutions with multiple interfaces targeted at different users, the inclusion of support materials such as engagement visits)
- **differences in how behaviour change is being targeted and encouraged** (including elements of top-down target setting, pupil-led action, gamification, benchmarking, encouraging peer-to-peer competition or sharing of learning and impact)
- **differences in how, and through what channels, these energy management solutions are offered to non-domestic customers** (including direct sales to individual end-user sites or higher level decision makers or management levels who take-up solutions on behalf of individual sites, or through sales to third-party partners who may or may not retain the end-customer relationship). These differences in routes to market may in themselves have a relationship with the levels of customer engagement and levels and types of behaviour change encouraged.

Detailed Questions & Answers about each project, including anticipated project-specific benefits and piloting proposals, can be found on NDSEMIC GOV.UK page⁴. A brief overview of the pathways to impact being explored by each of NDSEMIC’s Competition Partners is provided below:

| Key information | Anticipated route to behaviour change | Channels to engage end customer |
|---|--|---|
| <p>AND Tr ‘AEMS’ Online dashboard & mobile application. Aimed at key decision makers in the retail and hospitality sectors</p> | <p>Visualisation and tracking of energy usage and monitoring. Provides tailored energy saving hints and tips and personalised business insights through innovative AI. Functionality to set energy budgets and performance targets and ‘push’ alerts or recommendations to alert to unusual or changing energy activity.</p> | <p>Through direct relationships with end-user sites (including relationships between one-to-many sites), and other types of indirect partnership, such as through suppliers, trade and business associations.</p> |

⁴ www.gov.uk/government/publications/non-domestic-smart-energy-management-innovation-competition

| Key information | Anticipated route to behaviour change | Channels to engage end customer |
|--|--|--|
| <p>Considerate 'Flutter' Mobile application Aimed at key decision makers in the hospitality sector</p> | <p>Visualisation of energy performance and cost. Correlating energy use data with key hospitality metrics. Delivery of energy saving tips tailored to business-type on how to achieve energy, emission and cost saving.</p> | <p>Through direct relationships with end-user sites, and other types of indirect partnerships.</p> |
| <p>Element Energy 'E-CAT: Energy Comparison & Advice Tool' Web application Aimed at key decision makers in the retail, hospitality and schools sectors</p> | <p>Real-time energy data monitoring, performance benchmarked against organisations of a similar type and size, and providing energy saving tips and recommendations tailored to the user's business.</p> | <p>Primarily through partnership with energy suppliers, and potentially via other organisations or targeting users directly.</p> |
| <p>Hildebrand 'GlowPro' Online Application. Aimed at property managers, tenants, store managers and staff in the hospitality and retail sectors, including chain sites and shopping centres</p> | <p>Real-time energy consumption data and alerts, identifying usage increases and inefficiencies, presented through tailored interfaces for users in different roles. Consumption monitoring, billing management, business planning, checklists and customer comfort management.</p> | <p>Through direct relationships with end-user sites and third-party partnerships, such as energy suppliers and shopping centres.</p> |
| <p>Hoare Lea 'Untapped' Online application. Aimed at management, teachers and students in schools of all sizes</p> | <p>Data analysis and visualization software to create real time and historic electricity and gas profiles, including the provision of tips and advice, with interfaces tailored to difference audiences. Provision of 'model' gas and electricity profiles for schools in order to highlight relative performance. Educational resources linked to school curriculums are also provided.</p> | <p>Through direct relationships with end-user sites (including relationships between one-to-many sites).</p> |

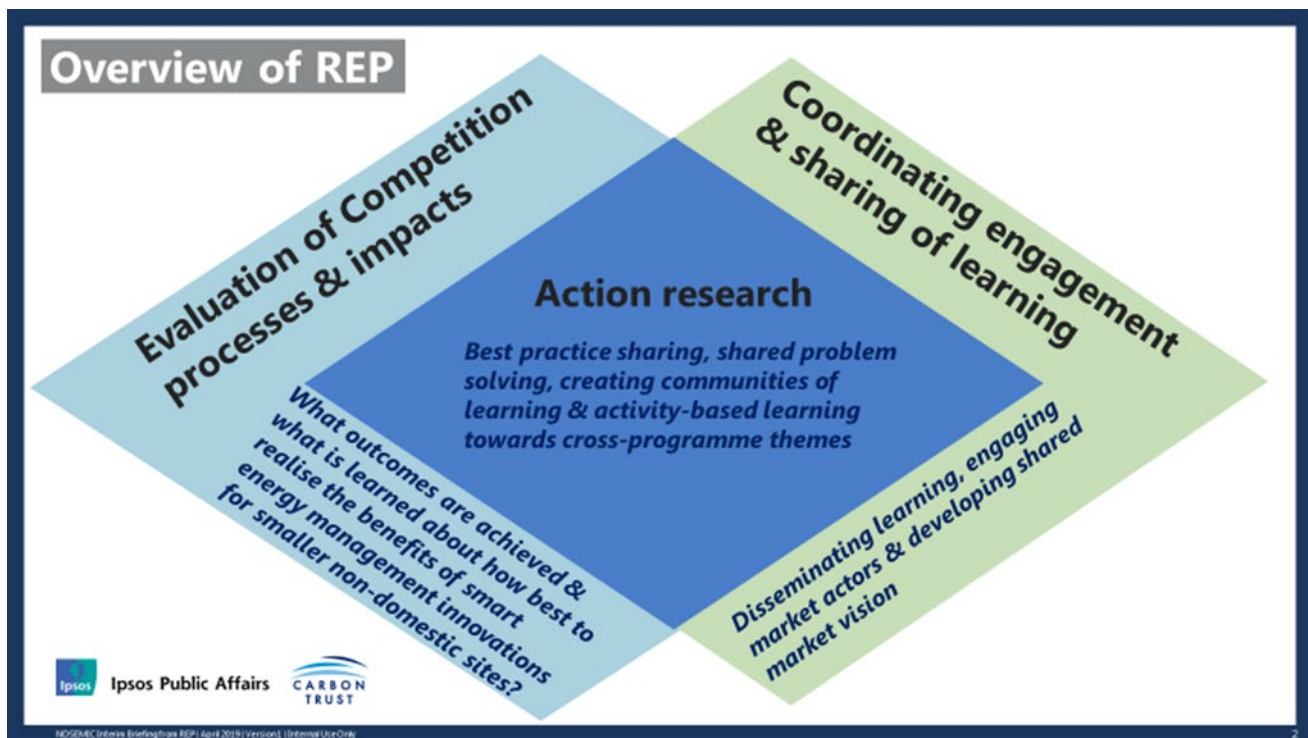
| Key information | Anticipated route to behaviour change | Channels to engage end customer |
|---|---|--|
| <p>Samsung 'Energy in Schools' Energy management and educational portal, micro:bits Aimed at management, teachers and students in primary and secondary schools</p> | <p>Energy dashboards featuring live and historic data, including temperature sensor data mapped in different parts of the school; potential and effective savings from changing energy tariff; an energy cashback feature; tips and advice on minimising energy bills; and a micro:bit device with accompanying lesson plans to teach students 'Internet of Things' coding to engage with energy data and take action.</p> | <p>Through direct relationships with end-user sites and third-party partnerships.</p> |
| <p>Transition Bath / Energy Sparks 'Energy Sparks' Online application Aimed at management, teachers and students in primary and secondary schools</p> | <p>Energy data visualisation dashboards for pupils and for adults, including recent energy use and comparison with historical data and benchmarks, a notification system for unusual consumption levels, energy saving recommendations and tracker, and a gamification element to encourage competition between schools. Educational resources are also provided to guide students and teachers through an energy saving programme.</p> | <p>Through direct relationships with end-user sites, and other types of indirect partnership including Local Authorities and multi-academy trusts.</p> |

Section 2: Overview of NDSEMIC’s Research & Evaluation Programme

This section provides an overview of the activities being undertaken by NDSEMIC’s REP. It details how these activities are being designed and delivered to support the overall vision of NDSEMIC, including efforts to contribute to ongoing market momentum for non-domestic energy management products and services following the end of the programme.

NDSEMIC’s REP has three main strands of activity; Action Research, Coordination and Evaluation. The key aims of each of these strands is summarised in Figure 3 below:

Figure 3: Overview of REP support and objectives



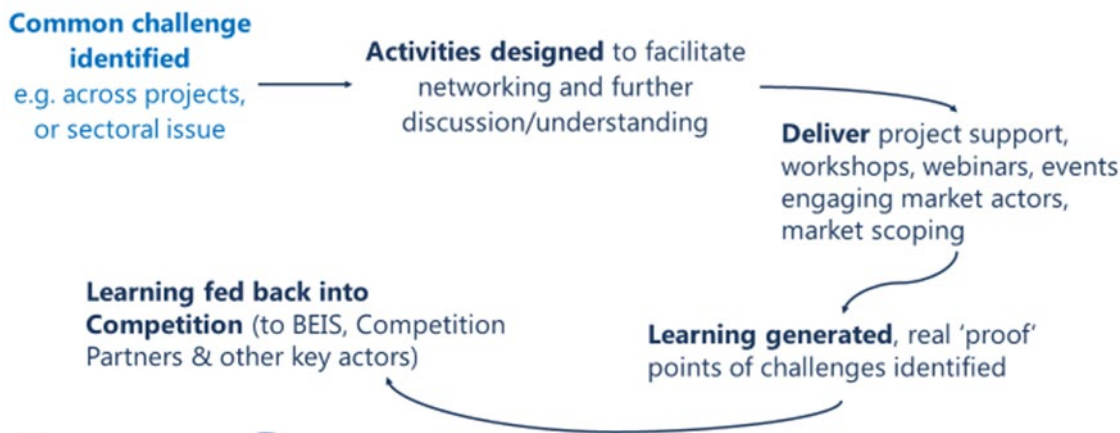
Further detail on the activities delivered so far under each strand, as well as those planned for the final phase of the Competition, is provided in this section of the report. Action Research and Coordination are presented together as through the process of raising awareness of the Competition among key stakeholders, and engaging them in its activities and learning, the REP is also increasingly bringing these stakeholders into the learning process as active participants within Action Research.

Overview of REP Action Research and Coordination activity

Action Research is a reflective and iterative process of shared learning and problem solving. Throughout the Action Research process stakeholders (in this case, often the Competition Partners, or the various policy and sectoral teams within BEIS) are engaged in identifying the key evidence gaps and research needs and are co-producers in developing activities, and

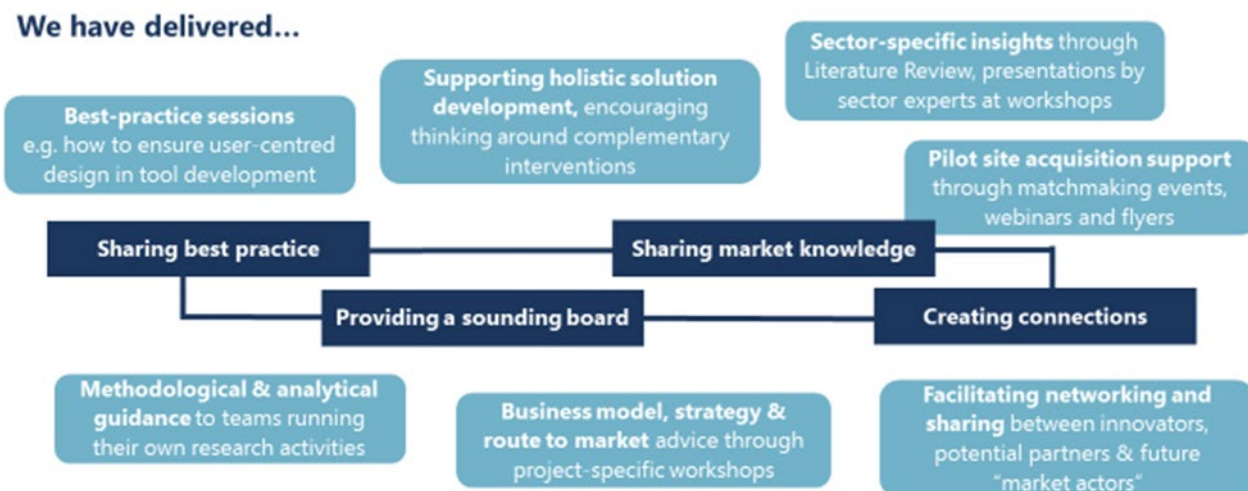
sharing learning, that can help to answer these. The key steps in the Action Research process being followed by the REP are summarised in Figure 4.

Figure 4: Reflective and iterative process of Action Research



Examples of Action Research activities designed and led by the REP so far during NDSEMIC are summarised in Figure 5 below:

Figure 5: Summary of Action Research activities delivered to support project teams



A list of the specific workshops, events and webinars delivered against each of these areas of activity is provided in [Annex 1](#).

Success for NDSEMIC is not, however, simply supporting the funded innovation teams (the Competition Partners) to complete their tool development, testing and piloting phase. NDSEMIC also seeks to create communities of learning around what is required to create and sustain a market for smart meter enabled solutions and services which help deliver value from smart meter data to the small non-domestic market. The REP is therefore also adopting an Action Research approach to identifying challenges related to the programme’s overall vision, and designing activities to support learning against these.

NDSEMIC provides an opportunity to learn about the opportunities and challenges involved in innovating in this space from both a supply-side perspective and in terms of generating consumer demand. The real-world experiences of Competition Partners as they go through the NDSEMIC process offer opportunities for empirical evidence collection and common challenge

identification; whether this be finding out how the energy consumption data required from customers can be accessed and uploaded to the solutions, what the best hooks are for engaging others in developing routes to market or what types of business model are likely to best mobilise a wider 'ecosystem' of actors and drive the intended benefits for end-users. Equally, NDSEMIC offers opportunities to engage those actors envisaged to play a key role in the "future" market that NDSEMIC is trying to create and transform, both in order to create momentum and to involve them in the learning process.

Ultimately, the experiences of the Competition Partners, and the engagement that is being generated through the Competition's various strands of activity with key market actors (energy suppliers, data aggregators, regulators, local government, or third sector - see [Figure 7](#) below), is helping to uncover the necessary conditions for a wider market transformation to be achieved; that is a market where there is both supply and demand for these types of tool, and a market where appropriate policy, regulatory, commercial and operational levers are in place for the market to thrive.

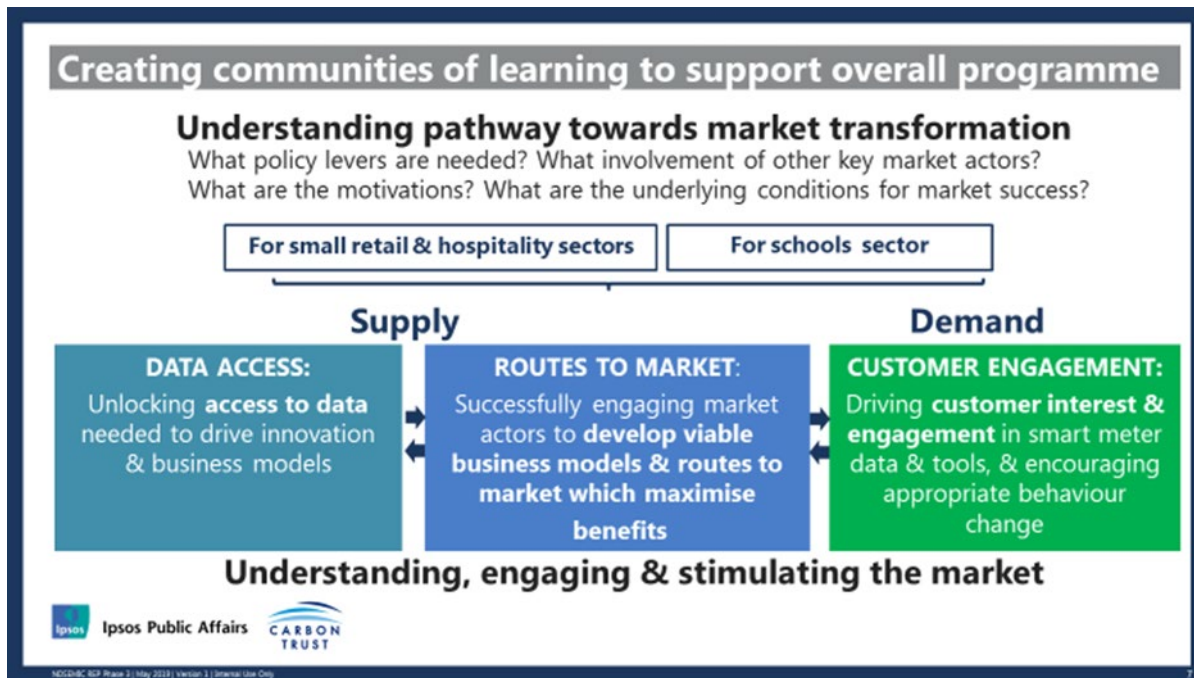
The REP plays a pivotal role in both helping to design and deliver activities that enable the Competition to generate and access this learning, as well as engaging the right market actors in the opportunities and challenges. During Phase 1 the REP's focus was mostly on activities tailored and delivered to individual project teams to address the specific challenges they had at this early stage of development, such as testing of their solutions among target users. This support continued in Phase 2, and the REP had an additional objective of collating insights generated by the Competition Partners and the REP support activities in order to share learnings across the Competition Partners and provide key findings to BEIS and wider stakeholders. During Phase 3, the REP's focus will further evolve to play a more strategic role; focusing on generating communities of learning which identify who, and how, the Competition needs to engage in order to support the ultimate vision of encouraging market transformation.

Given this, during Phase 3 the REP will design, deliver and engage stakeholders internal and external to the Competition on:

- Two 'supply-side' themes: exploring issues related to data access and developing viable businesses models and routes to market which maximise the desired outcomes.
- A 'demand-side' theme: exploring how best to drive customer demand for smart-enabled products and services, including willingness to pay (to support commercial business models).
- Two integrative themes which will draw together the learning across the first three themes and use a theory-of-change based approach⁵ to understand what actors and conditions are needed to drive market transformation, in either the small retail and hospitality business sectors or the schools sector.

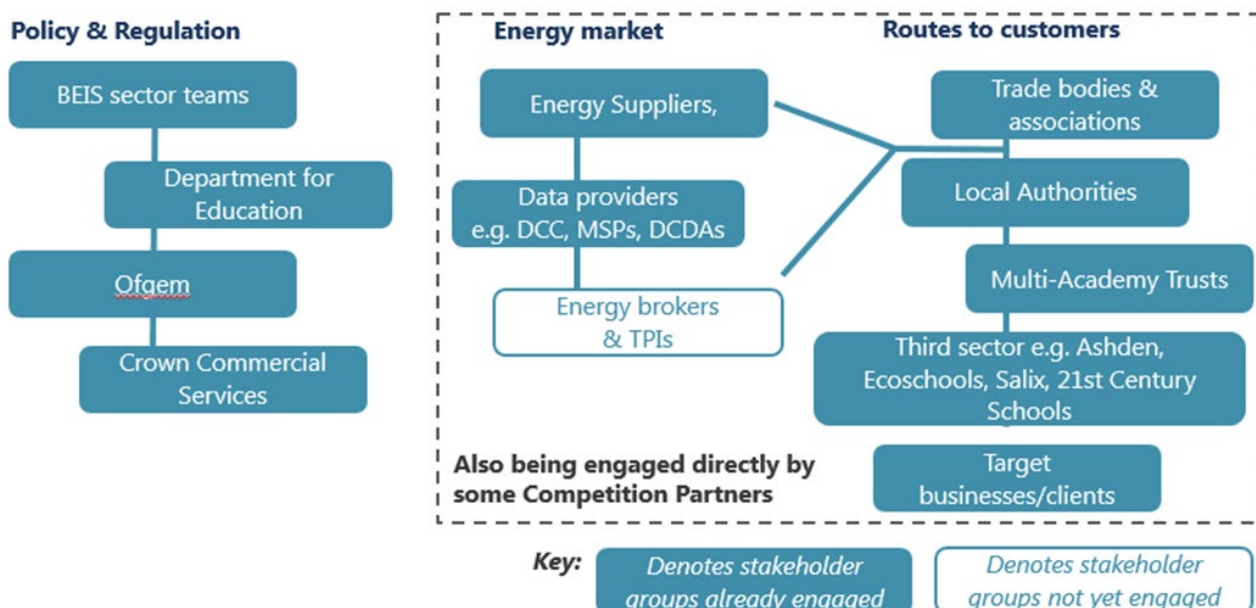
⁵ Whereby evidence is generated to test, understand and develop causal linkages between the outputs and outcomes realised, as documented in a theory of change (such as that shown in Figure 2).

Figure 6: Key areas of focus for the REP in supporting NDSEMIC’s overall market transformation vision



BEIS’ ambition for this Competition is for it to contribute to the creation of the momentum and traction needed to enable this market development to continue after the end of the funding to the current NDSEMIC projects. The scope of interest is therefore broader than NDSEMIC, and indeed broader than the Smart Metering Implementation Programme given there are potential implications and benefits beyond this programme, for example for the Department for Education, those in local government assessing how they can best support learning in classrooms, or for productivity in UK businesses. Figure 7 below sets out some of the key stakeholder groups the REP has started to engage with, and which are also the key groups the REP envisages engaging further during Phase 3. As illustrated, many of these stakeholders are also being engaged directly by Competition Partners as they negotiate routes to reaching non-domestic customer sites for piloting but also longer-term partnership opportunities.

Figure 7: Stakeholders being engaged by REP



Overview of REP Evaluation activity

In addition to actively supporting the projects and the market transformational goals through Action Research and Coordination activities, a separate Evaluation team within the REP are responsible for delivering a series of evaluation activities to ensure meaningful learnings are drawn from NDSEMIC around what types of solution are effective, for which consumers/users and in what circumstances.

Table 1 summarises the evaluation’s approach to gathering and synthesising evidence in relation to four high level evaluation questions.

Table 1: Summary of REP evaluation activity against high level evaluation questions

| Questions | Summary of approach to answering evaluation question |
|---|--|
| <p>Q1 & 2: What are the outcomes of NDSEMIC at a Competition, sector and project-level? Under what circumstances are outcomes achieved?</p> | <p>Contribution Analysis⁶ is being used to guide an overall assessment of NDSEMIC’s outcomes, at a Competition, sector and project level⁷. Evidence gathered from multiple perspectives (including from customers piloting the developed solutions, Competition Partners, non-selected Competition applicants and the Competition’s key stakeholders within BEIS) will be triangulated and synthesised against the theories of change, as well as against alternative pathways to impact in order to draw conclusions on the level of contribution made by NDSEMIC to outcomes observed. At a project-level, the attribution of impact to NDSEMIC will be further informed by before-and-after analysis based on (i) data gathered from customers using the solutions and (ii) energy consumption data for their premises.</p> |
| <p>Q3: What can we learn about the use of smart meter solutions and services to engage with small non-domestic priority sector organisations to help them save energy?</p> | <p>The evaluation of the different funded solutions will identify the specific surrounding circumstances, and the associated roles of different actors, which stand to maximise the realisation of outcomes in different sectors – helping to inform smart meter roll-out policy and how to most effectively engage non-domestic customers in better energy management practices. It will also generate commercial learnings for innovators and the supply chain around the potential for new business models and the likely market demand for new smart meter solutions and services.</p> |
| <p>Q4: How has the design and implementation of NDSEMIC helped or hindered the achievement of desired outcomes?</p> | <p>Process-related feedback will be gathered through in-depth interviews with Competition Partners, non-selected Competition applicants and the Competition’s key stakeholders within BEIS. This will explore, for example, any ways in which the Competition’s sectoral focus, or emphasis on user-testing, has affected the scope, scale or outcomes of the funded projects (compared to what may have happened in the absence of the Competition).</p> |

⁶ Contribution Analysis is a theory-based approach that is suited to the evaluation of complex policies where traditional approaches to defining counterfactuals are not valid and where there are many varied and external influences at play. It can help to revise or confirm a theory of change and provides an iterative process through which evaluators can test this underlying theory, explicitly consider alternative pathways to impact and form an assessment on the likely contribution of an intervention to observed outcomes.

⁷ The outcomes being explored by the evaluation at a Competition and sector level are as presented in the Logic Model (Figure 2) and accompanying narrative in Chapter 1 of this report. The approach to identifying and exploring project-level outcomes is discussed in the next section of this chapter.

REP activity to evaluate the outcomes of NDSEMIC's funded projects

A tailored plan is being created and followed for the evaluation of each project to take account of the different business models being pursued and the varying scales of piloting activity of the seven Competition Partners. While all the project-level impact evaluations will be driven by a bespoke theory of change, some will also include elements of quasi-experimental impact evaluation.

Each project evaluation will involve a range of data collection and analysis strands, commonly including:

- a before-and-after survey to track how key outcomes of interest (such as levels of engagement in energy management, awareness of appropriate energy savings actions, actions to reduce energy use) evolve from a time just before the adoption of the solution, to around 6 – 8 months later.
- observation visits and in-depth qualitative interviews with pilot customers to observe energy use and energy management behaviours in practice, to receive user-led demonstrations of their use of the solution, and to probe further on any influence it has had on their individual role or for their organisation more widely.
- analysis of energy consumption data to inform assessment of changes in energy usage practices made as a result of NDSEMIC.

Synthesis across all these strands of evidence (against the project's theory of change) will enable the evaluation team to assess, at the level of each project, what is effective for prompting behaviour change and energy savings, in what context and for whom and to form a judgement on the extent to which any observed changes in outcomes can be attributed to the NDSEMIC solution.

Where possible, a quasi-experimental approach will be adopted to inform this analysis of contribution. The feasibility of constructing a counterfactual (a group of comparator sites for which similar strands of evaluation activity to those outlined above for pilot sites can also be conducted) has been explored for each project. To date the opportunities for such an approach are limited by a range of factors, including being able to identify suitably similar comparator sites (given the significant variations in key characteristics across non-domestic sites, for example in floor area, equipment type as well as unobservable characteristics such as their pre-existing attitudes to energy management); accessing energy consumption data for comparator sites; and smaller sample sizes for some of the pilots (leading a quasi-experimental approach to have limited validity or reliability). In some cases, impact will be assessed through pre and post measurements at pilot sites, including the collection of evidence around any other changes at these sites over the pilot period that could be related to outcomes (such as building refurbishments, equipment upgrades or changes in occupancy levels). In others, a pipeline approach is being considered where customers starting their piloting of the solutions earlier are compared to those piloting later in the NDSEMIC programme.

The final evaluation report published following the NDSEMIC programme will provide a fuller account of the methodologies tested and ultimately implemented at a project-level.

Section 3: Engaging non-domestic customers in energy data - interim learning

*This section of the report explores key findings from the customer engagement activities undertaken by and on behalf of NDSEMIC Competition Partners to date. This section will cover how best to encourage schools and Small and Medium-sized Enterprises (SMEs) operating in the retail and hospitality sectors to engage with smart metering, smart energy data and energy management solutions. This includes how best to **garner initial interest** in energy management and **encourage uptake** of smart meter enabled solutions, as well as **catalyse energy efficient actions** based on the information provided by such solutions. It will then consider further areas of research and ongoing analysis that will be explored more fully in the final phase of NDSEMIC (February 2019 – February 2020), including how to sustain customer interest over time (which has not yet been rigorously tested).*

Please note, all findings in this section of the report are based on early evidence collected across NDSEMIC, comprising small-scale user testing with existing and potential users and input from expert stakeholders in relevant sectors. More detail on the methodologies used to collect the evidence can be found in [Annex 4](#).

Summary of interim findings from customer engagement activities

Key message hooks that may (based on NDSEMIC's initial user testing) encourage engagement with energy data and smart metering in the target sectors include; highlighting how energy data can help customers to feel in control of their energy use and energy costs, avoid unexpected bills, become more eco-friendly and enhance their reputation and environmental credentials, create a more comfortable learning, operating or working environment, make the lives of management and staff easier, support their business or school to operate more effectively and save money, or help future proof their organisation. Sharing relevant case studies of other similar non-domestic customers benefiting from access to their smart meter data can also be a powerful hook for engagement.

Key actors to engage: The most appropriate message frame to employ will differ depending on the end user in question and the organisational context they operate in. Evidence generated by NDSEMIC to date suggests encouraging engagement among key decision makers is likely to be required to drive action, given their leadership within sites and jurisdiction over investment decisions. Decision makers, such as headteachers, business managers and business owners, can be motivated by message frames relating to cost savings and reputational factors. Non decision-making actors, such as caretakers, supervisors and customer-facing staff can be motivated by ease, and customer-facing staff may require additional incentivisation to engage (e.g. through competition and rewards inspired by gamification). Non decision-making actors, however, can influence decision makers to engage in energy management and adopt energy efficient actions; for example, pressure from staff responsible for facilities or operations who may be motivated to make their own jobs easier. Other actors, such as energy suppliers and brokers, Local Authorities and trade associations also play a role in influencing schools' and SMEs' decision making. These actors are

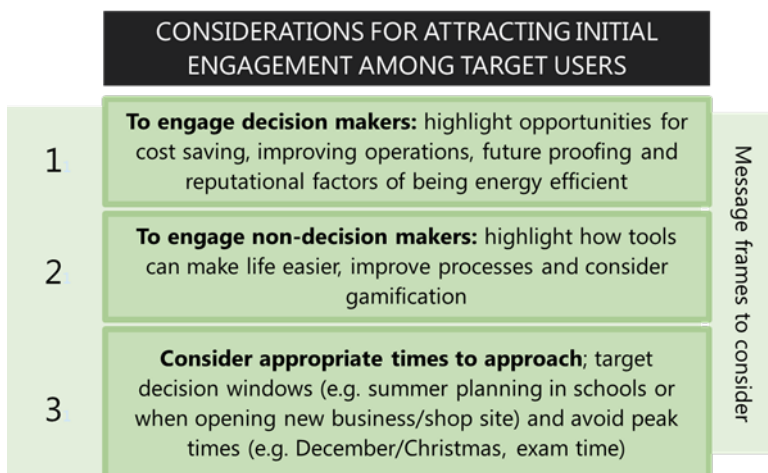
potentially more motivated by message frames related to enhancing their reputation or adding value to the service they may offer their clients or other stakeholders.

Considering the timing of approaches is also important. Targeting decision windows (e.g. school summer planning or when opening new business sites) and avoiding peak or otherwise unsuitable times (e.g. December/Christmas time in retail, weekends in hospitality, exam time in schools) will likely prove more impactful in driving initial engagement.

Key functions to offer within solutions: Functions enabled within energy management solutions need to provide users with both the **motivation** and **capability** to act, as well as provide information and advice at a timely **opportunity** to act⁸. At this early stage of testing, functionalities that have been well received by users in the NDSEMIC programme and show promise in inspiring action include showing; energy consumption and potential savings in pounds and pence but also broken down over time and for specific zones (areas of the shop, school or site), as well as presenting ‘average’ consumption figures against relevant benchmarks or industry relevant metrics (such as per food cover or per person night). Providing budgeting solutions with alert functionality, tailored energy tips and the opportunity to share tips and impacts with other users also has potential to incite action. Linking solution functionality to the responsibilities and routines of users could be a helpful way to boost engagement, for example through linking energy efficient actions to standardised open-up and shut-down procedures.

Additionally, end users involved in testing expressed a desire for tools that are easy to use and visually appealing, and some have found gamification provides motivation to act. Early stage testing has also suggested that complementary support may help further answer user needs. Examples undergoing further development and testing during Phase 3 of NDSEMIC include training materials, printed crib sheets and handover sheets and signposting to financial support.

Figure 8: Summary of considerations for attracting initial engagement in energy management among target users



⁸ Further information on the COM-B model for behaviour change is accessible here: www.behaviourchangewheel.com/about-wheel

Figure 9: Summary of considerations for catalysing energy efficient action among target sectors



1. Key messages hooks to drive engagement in energy data

Reaffirming previous research⁹, initial testing suggests that energy is often not an immediately high priority for schools and small businesses and disengagement is a challenge when trying to gain interest in smart metering and smart enabled solutions and services.

Research conducted across NDSEMIC suggests that framing the benefits of smart energy management solutions to encourage a greater sense of agency around energy use and how information can support better management of organisational priorities can help garner initial interest. These message frames may also be relevant for engaging SMEs with the broader smart meter offering.

⁹ Smart metering in non-domestic premises: early research findings, BEIS, 2017. For more information please see: www.gov.uk/government/publications/smart-metering-in-non-domestic-premises-early-research-findings

Table 2: Summary of message frames

| Message frame | Description |
|--|--|
| <p>“Feeling in control”</p> <p><i>Making energy use and energy spend more understandable and accessible, to help users feel more in control of their usage and spend.</i></p> | <p>Some potential users interviewed reported being ‘surprised’ by energy costs and responded positively to messaging that highlighted how they could be supported through a smart offering to have their energy use and spend made more visible to them. Messaging around displaying energy usage information in more meaningful ways, such as in pounds and pence, in real-time, and at relevant levels of granularity (i.e. by site, or shop) was well received by some target users.</p> |
| <p>“No surprises”</p> <p><i>Reduce operational risks and associated costs. Also linked to being able to track costs and usage.</i></p> | <p>Prospective users interviewed, especially those responsible for operations, responded positively to messaging around the ways in which smart meter enabled solutions could support a reduction in operational risks. Additionally, the ‘no surprises’ message frame can also be linked to being able to track costs and usage, to help avoid unexpected bills.</p> |
| <p>“Making life easier”</p> <p><i>For those in operational and management roles, a simple way to make life easier is by allowing them to understand what’s happening at their site.</i></p> | <p>Concept testing uncovered a desire among some actors for access to data and simple solutions that make their lives easier through increased understanding of sites, especially when they are not present in person. Messaging highlighting how solutions can help with energy use data access and collation and, for example, help diagnose issues with equipment, is likely to resonate. School caretakers and site managers have been shown in user testing to be especially motivated by messaging around improving the ease of maintenance.</p> |
| <p>“Supporting you to operate more effectively”</p> <p><i>Linking better energy management with a more comfortable working environment (highlighting non-energy benefits)</i></p> | <p>Customer, staff and pupil comfort is paramount, so linking the smart offering that supports better energy management and efficiencies with creating a more comfortable operating, working and/or learning environment can help increase interest. This can be a powerful message for those with low engagement in energy (possible smart ‘Rejecters’), by highlighting the non-energy related benefits to be gained from more energy efficient behaviours.</p> |
| <p>“Opportunity for cost savings”</p> <p><i>Highlighting achievable percentage cost savings (potentially case studies) and expressing savings in relevant metrics.</i></p> | <p>Early testing has confirmed that demonstrating to SME owners/bill payers the cost benefit to their business makes them more likely to engage with energy management. Highlighting achievable percentage cost savings, potentially through case studies in relevant sectors, is likely to gain attention. However, this messaging needs to be handled carefully to avoid overstating the potential for cost savings.</p> |
| <p>“Support environmental action and be eco-friendly”</p> <p><i>Appealing to more green-minded individuals, who may be motivated by environmental factors and driven by associated reputational benefits.</i></p> | <p>This appealed to those motivated to reduce waste and lower their carbon footprint, and wish to enhance their organisation’s reputation around environmentally friendly credentials. This messaging frame tends to be strongest where there is a reputational benefit to be gained. Schools were enthusiastic about the idea of badges around energy efficiency, as a source of pride and to act as a recruitment tool for teachers and to attract parents and pupils. Promoting the use of ‘eco-champions’ in schools to engage and empower pupils can also act as an effective hook.</p> |

| Message frame | Description |
|---|--|
| <p>“Supporting growth & future planning”</p> <p><i>How to open new sites that are energy-efficient to help future proof business / school.</i></p> | <p>There is a growing awareness of the importance of being energy efficient, especially when thinking about business expansion in terms of designing and fitting equipment for new sites. Messaging about how to open new sites that are as energy-efficient as possible from the start could help future proof the business or school.</p> |
| <p>“Reputational / value add service”</p> <p><i>Promoting the value of energy management solutions and services to improve the reputation of intermediaries or add value to existing services.</i></p> | <p>In some cases, smart offerings including energy management solutions will not be marketed directly to their end target user, but instead through intermediaries who may be opting to take-up an offering on behalf of others (such as a property manager on behalf of its tenants), or who may be offering a route to market for that product or service (such as an energy supplier providing a promotion to their customer base). When targeting intermediaries such as these message frames which promote the value offered by such solutions for reputation or adding further value to existing services, can be effective.</p> |

2. Key actors to engage in energy data and energy efficiency

While the content of messages is key, both key decision makers and key influencers within organisations may have an effect on action taken towards making energy efficiency changes. Engagement and behaviour change relies on users having both the authority and ability to take action and the interest and motivation to do so.

Schools

Key decision makers in schools

The key decision makers within schools tend to be **headteachers and business managers**, who control the budget and make decisions relating to operations, investments and policies. Saving money in the longer term is likely to be a key driver of action for this user group. However, there may be other decision makers that need to approve or support actions relating to investments; for example, budget for procurement of new equipment may involve **Governors or Local Authorities**, changes to energy tariffs may involve **energy brokers** and waiting for contract renewal windows (which can be as infrequent as every five years). As a result, motivated decision makers such as headteachers may be an important, but not necessarily sufficient, factor for energy efficiency action. It may, therefore, be useful to engage with a number of different key decision makers within schools, in order to gain support outside of the headteacher.

Key influencers in schools

User testing in schools has highlighted that a number of other actors influence decision making and action taken. **Deputy Heads and new teachers** have been hypothesised by experts discussing this sector as key individuals within schools who may be most likely to take new initiatives such as energy efficiency forwards, perhaps motivated by a desire to build their profile within their school.

School building users have more ability than decision makers to take localised actions to save energy through behaviour change, for example a **teacher** controlling the temperature in their classroom, or **pupils** taking simple steps to save energy.

“Having the kids involved with the behavioural stuff will make a difference. The children enjoy having that little bit of power to say ‘Miss, you’ve left that light on’ or ‘Miss, you’ve left that window open’. Making the children energy monitors is definitely helpful.”

Primary school business manager

Site or estate managers or caretakers, while in most cases not responsible or involved in discussions about bills, will have responsibility for managing the site and communicating with building users directly about energy efficiency actions. Actions that these individuals are able to take themselves may be limited by the behaviour of both decision makers (in terms of what equipment or structural changes they can get approved) and energy users (who control actions locally within their classroom / school area). They are likely to have more motivation than agency to ensure others take action.

Additional avenues to influence decision making includes **schools’ local trusted network**. A good customer experience and advocacy from one school has the potential to influence others (e.g. via facilities managers networked with each other). **Exam boards** who, if persuaded to include topics on energy efficiency or use of real energy data, would influence schools to adapt teaching topics.

Other actors with a role in schools

More broadly, actors who may have influence over the decisions the schools take who could be engaged include **Governors, parents, Local Authorities**, and potentially **local charities**. **Parents** have also been identified as a core stakeholder group by Competition Partners as they can place pressure upwards to school management teams, and may be a group with the motivation to encourage change (and sometimes the ability to raise funds to support action).

Retail & hospitality

Key decision makers in retail & hospitality

User testing research conducted by and on behalf of NDSEMIC Competition Partners found that in many small businesses, the **owner or co-owner** is often the sole decision maker and likely to be the primary user of smart meter data and an energy management solution. In larger businesses, a **manager** may have responsibility for paying bills and making procurement decisions, but would usually need the input and approval from the business owner. However, managers are likely to be the primary users of smart meter data and energy management solutions. Decision makers are often reliant on other non-decision makers to take energy-efficient actions.

Owners and managers not involved in the businesses’ core activity (i.e. those in property or operational management, perhaps at a chain headquarters or on behalf of a shopping centre, with no customer-facing remit in their job description) may have more time in the day carved out for energy ‘management’ and be considering actions to take as part of business planning. User research to date suggests these actors may have high motivation to take actions themselves, but be reliant on other staff members to implement other more localised actions.

Key influencers in retail & hospitality

User testing in the retail and hospitality sectors identified a number of actors who may have influence over both decision makers and energy users (and may be the latter themselves). These include:

- **Site managers and other managers**, who may have accountability for energy use and costs but no responsibility for paying for it.
- **Property Managers** are often a bridge between Head Office and sites, so may have agency to make decisions in some cases and, if not, input into decisions.
- In retail, **security staff** may have more oversight of, and contact with, the energy system, and may be able to report on the energy system or appliance faults.
- In hotels, **managers, deputies and leads** in the kitchen and housekeeping are people responsible for energy spend. They can impact decisions on new equipment and energy saving infrastructure.

Other key roles **include front and back of house staff** (such as receptionists, chefs/kitchen workers, cleaners, those working in the stock room, etc.). Their ability to take action to improve the energy efficiency of their roles is likely to be affected by the level of training they have received, access to energy information generated by the solution, and sometimes job requirements (e.g. access to technology while in work). Staff motivation to take action may, however, be limited unless the communication encouraging action comes from the right place within the organisation (peer-to-peer communication is explored later) or unless there is an extra incentive (later in this report the role of gamification as a driver of action is explored).

“To engage staff members, it would be me on their back, they just don’t care, I need to be on their back otherwise they do whatever they feel like”.

Restaurant owner

User engagement suggests that businesses which **rent their properties** may be a harder group to encourage to take action. They may be reluctant to make building upgrades which require higher investments, and some functions may also be controlled by meaning they may not be able to take larger action in some areas.

Other actors with a role in retail & hospitality

Other relevant actors that could play a role in engagement include **trade associations, Continuing Professional Development (CPD) providers, industry publications** and, in some circumstances, **Local Authorities**.

Other influencers applicable to both schools and SMEs

Other third-party actors include **energy providers, energy auditors, and energy brokers**. In many cases these actors will already have a relationship with the end customer and could provide a viable route to market. The relevant hooks to engage this audience (reputation and value-add service, as discussed previously) may be especially relevant for those energy suppliers moving towards selling systems management and services, over just commodities.

More detail on which message hooks can be employed to engage which actors can be found in [Annex 2](#).

3. Designing smart meter offerings to suit the organisational environment

The actors discussed above operate in social environments within their organisations that may facilitate or inhibit them to engage with smart meter data and smart offerings, including an energy management solution. There remain a number of barriers to engagement and action in different organisational contexts; to maximise the value of smart meter data access the offering and solutions need to actively tackle these.

Table 3: Designing solutions to overcome barriers to action in schools

| Barrier | Potential solution (all based on early user testing) |
|--|---|
| <p>Time is a limited resource in schools and NDSEMIC has reaffirmed that energy can become a lower priority when teachers face delivery pressures.</p> | <p>Lesson plans that are easy to implement, closely tied to the curriculum and take limited time to prepare can help teachers (based on limited user testing so far). An educational element that builds energy literacy into classroom teaching may also be a good hook.</p> |
| <p>High turnover of teaching staff between school years may make it more challenging to embed energy efficient behaviours.</p> | <p>Training new teaching staff to try to embed an energy efficient culture may have value in addressing this barrier according to the early evidence base being generated through NDSEMIC.</p> |
| <p>Limited knowledge of energy among key staff; the person expected to action certain tips may not have high energy literacy or ICT skills to do so.</p> | <p>Clear tips with actionable steps within solutions may help to support key staff to make changes.</p> |
| <p>Budget considerations and access to funding; there may be tension between short term facilities management (i.e. fixing the boiler) and a longer-term ethos around sustainability (i.e. buying a new energy efficient boiler).</p> | <p>Varying energy saving tips so that they provide opportunities to drive savings with varying levels of expenditure, including zero-expenditure (e.g. by changing heating control settings) may prevent a school becoming disengaged during a time where no funding to implement higher cost measures is available. Providing signposting within a solution to potential sources of finance for energy efficiency improvements may also support schools.</p> |
| <p>There may be a time window for upgrades, especially for smaller schools.</p> | <p>Tailoring reminders and prompts to appropriate points in business and school cycles may make it more likely that advice lands at appropriate opportunities for action. For example, a school may be best able to consider energy efficiency projects in May once the budget for teaching staff is agreed for the following school year. Energy supply contracts with schools tend to be open for renewal twice a year (in April and October) suggesting that just prior to this may be appropriate timing for advice around energy tariffs, where this is an objective of the solution. Programming the financial year and investment planning cycle of a business customer into an energy management solution may also allow such timing to dictate the provision of advice at opportune times.</p> |

The figure below shows key timings throughout the year to approach or avoid approaching schools based on discussions from a stakeholder shared learning workshop.

Figure 10: Key timings to approach schools

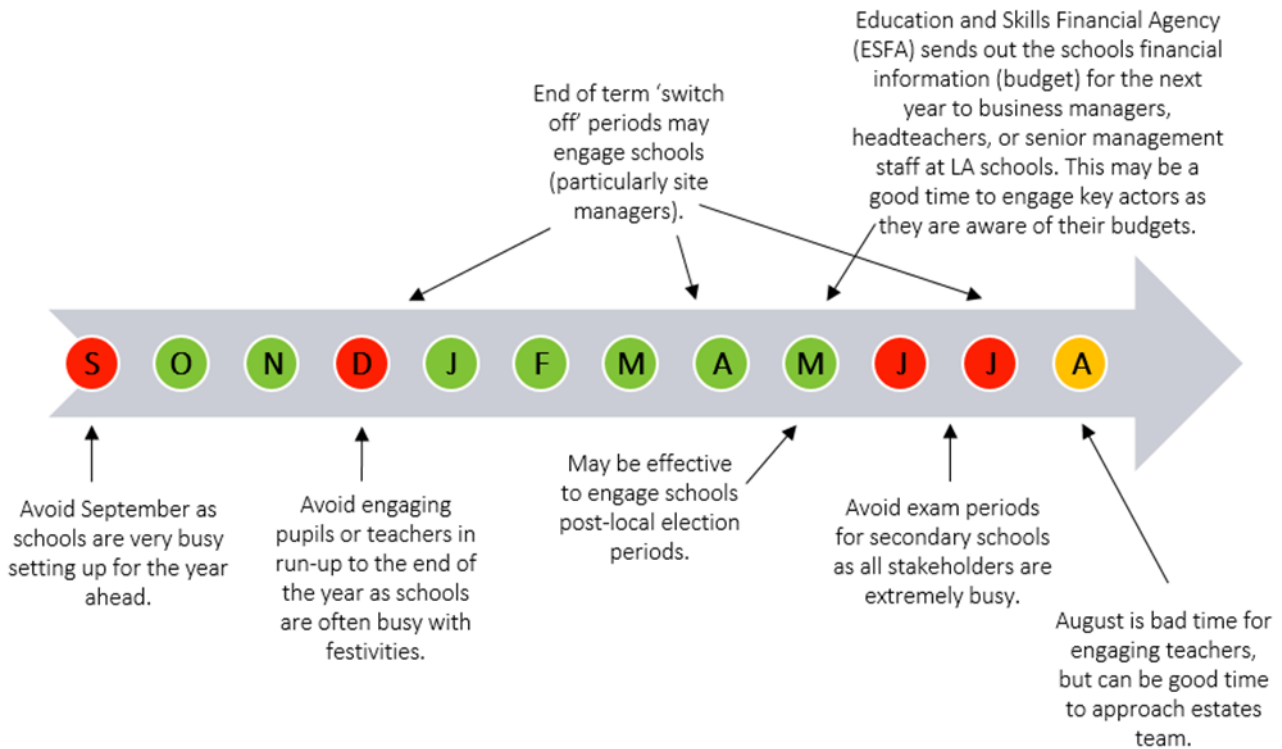


Table 4: Designing smart meter offerings to overcome barriers to action in the retail and hospitality sectors

| Barriers | Potential solution (all based on early user testing) |
|--|--|
| Testing across businesses has confirmed that time is a significant barrier to SME owners. Serving customers and running the business take priority over thinking about energy efficiency. | Concept testing suggested that providing users with a snapshot view of current energy use against targets is a successful way of engaging owners. Smart enabled solutions which are simple and easy to use, and which encourage engagement at business-appropriate times, may help alleviate this. |
| Many retail and hospitality staff are not able to check an app during working hours . | Solutions and services need to be provided in the appropriate format for the nature of the business. |
| While staff may have the ability to action certain energy efficiency tips, they may not have the know-how to take the appropriate action , unless trained. | The smart meter offer, and associated solutions, may consider how to support users to 'act' in the absence of know-how, for example, by providing clear information or easy to follow 'how-to guides'. |
| Many hospitality roles are temporary, shift-based or casual which can make engaging frontline staff in this sector especially difficult. Energy literacy can be 'lost' when staff leave. | Handover manuals and training materials may be a way of ensuring energy efficiency messages are 'embedded' with new staff. |

| Barriers | Potential solution (all based on early user testing) |
|--|---|
| While owners and managers will be motivated by financial savings, frontline staff often lack motivation to act if there is no incentive for them. | Users involved in testing reported that regular meetings between management and staff could be used to reinforce energy messages, and utilising competition / gamification could help close this gap (<i>discussed later in this report</i>). |

Figure 11: Key timings to approach retail & hospitality businesses

| Key times to approach | Key times to avoid |
|--|---|
| When registering a new business | November – December (very busy period for sales/bookings) Peak times of day (e.g. mealtimes in restaurants, Saturdays in retail, weekends in pubs) |
| When opening a new branch | |
| During energy contract renewal | |
| During quieter periods (January for hospitality) | |

4. Key functionalities to encourage engagement and action

Small-scale user testing conducted to date through the NDSEMIC programme has highlighted a range of solution functions and features that support engagement in energy management solutions, and smart meter data, amongst specific roles within schools or SMEs. This section outlines those features that appear, so far, to pique initial interest and which have the potential to catalyse energy efficiency action within these settings and will be subject to further testing throughout the duration of the Competition.

Functionalities which support non-domestic users to understand their energy use

There are some core functionalities that are appealing in testing to date that allow these organisations to build up a profile of their energy use and achieve a base level of understanding necessary to engage with the data and follow specific actions:

- **Energy consumption data presented in pounds and pence:** A preference to see energy use expressed in terms of monetary consumption, rather than in kWh, was expressed by many engaged in the NDSEMIC research to date.
- **Expressing energy consumption and potential savings in sector-relevant ways:** For example, schools involved in testing mentioned wanting to see savings equivalent to teacher salaries or resources bought.
- **Energy consumption over different time periods:** Solutions that provided energy use information split by day, week, month or year, but as in real-time gained positive responses. Those in managerial roles showed interest in understanding energy patterns to help identify inefficiencies and aid planning.

“I don’t need to know that there was a spike yesterday as I can’t do anything about it, afterwards it’s too late so need to know now so I can do something about it.”

Owner, barber shop

The COM-B framework¹⁰ is used to provide a way of thinking about how energy management solutions and services can help to provide users with the:

- **Motivation** to seek to gain a benefit from accessing smart meter data and to take action as a result of engaging with such information through a solution;
- **Capability** to respond to the information provided and pursue the recommended energy saving opportunities; and the,
- **Opportunity** to act on information which is provided at relevant times or in relevant situations given their role and level of responsibility.

Initial lessons learned around specific functionalities that may provide users with the Motivation, Capability and Opportunity to act are explored below.

Solution functions and complementary interventions that can support a ‘Motivation’ to act

- Associating **predicted financial saving** to the adoption of tips and advice.
- A **positive feedback loop** which shows the impact of previous actions taken (ideally in money saved) can help to demonstrate to solution users the good work they have been doing and is hypothesised to encourage continued action.
- **Benchmarking data** may help to motivate action. Being able to compare energy performance to similar businesses or schools helps users to understand what ‘good’ looks like. Leader boards across schools or across business sites was mentioned as something that could be useful and motivational.

“We need to know what is normal - what is ok? We need to know benchmarks.”

Headteacher, primary school

- The ability to **set an energy budget** based on knowledge of usual energy use, **with an alert function** if this is exceeded, was viewed as a convenient way to keep track of costs and feel reassured that operations were as they should be; for example, if appliances were operating unexpectedly.
- To motivate energy-using roles within an organisation, **peer-to-peer communication** may drive action. This could include functionality to **share tips, actions, and impacts** among other users of the solutions. The research suggests this may work well for pupil engagement but there may also be potential for this to engage retail or hospitality staff working across chain sites. Research to date has found front line staff may be more motivated to take action when encouraged to by other front-line staff, and the same is true of pupil-led action.

¹⁰ Further information on the COM-B model for behaviour change is accessible here: www.behaviourchangewheel.com/about-wheel

“We’ve found with our own app that the best way to facilitate behaviour change is peer to peer conversations. When someone who works on a grill writes an article they get more views than the head of marketing – the ability to share and like content is really engaging.”

Head Office manager, restaurant chain

Potential for gamification in retail & hospitality

Encouraging behaviour change among more casual staff at a hospitality or retail site may be achievable through gamification and encouraging competition, such as through a points-based approach which provides perks to staff who make energy savings.

“Fostering a bit of competitive spirit is always good, there would need to be some sort of incentive for the employees to change their behaviour, like money or a night out or something.”

Hospitality chain operations director

Potential for gamification in schools

Gamification approaches also have potential to encourage behaviour change among pupils in schools, fostering competition between classes or between local schools. Testing of one points-based system found most pupils felt the urge to log more activities on the website when seeing the points achieved by schools ahead of them on the leader board.

Setting targets for pupils could encourage them to make energy savings. If the actions of pupils can be associated with progress towards earning badges or points for their school, this may be particularly motivating. Pupils in user testing showed enthusiasm for taking actions when properly engaged; in one school pupils liked having a list of activities they could do to improve their energy efficiency. This may be effective if framed through a responsibility such as being an ‘energy monitor’, through being a leader such as an ‘energy champion’ or through a diagnostic role such as an ‘energy detective’.

“Kids love a challenge. You need a target otherwise you miss out on half the point. If they have a target, they’ll fret about it and find ways to achieve it. You could make it a whole school project with weekly reporting and certificates each term.”

School teacher

Solution functions and complementary interventions that can support the ‘Capability’ to act

- **Diagnostic information** may increase the capability of solution users to enact change. Prospective users fed back that they would value solutions that could help them to uncover possible causes of abnormally high energy usage and provide advice on what the cause may be or how to tackle it. Further support functions that enable organisations to access more detailed and personal guidance can maximise ability to take action. While one route to providing this would be through on-site face-to-face training, a range of other options are being considered by NDSEMIC Competition Partners. This may involve support provided through an **online chat function or video tutorials**. Users fed back that video content would need to be short, and tailored as far as possible to the type of equipment they were using.

- **Energy usage across zones and sites and appliances:** For organisations with large or multiple sites, comparison across sites, different areas (such as different rooms), or at appliance-level was viewed positively in user testing.
- Recommendations which are **relevant to specific user roles** may also help to encourage behaviour change. For example, within a hospitality site, prospective users suggested tips around efficient usage of equipment for kitchen staff or good energy practice or behaviour change policies for shift managers.
- **Energy tips which are tailored based on the user's own consumption data** were well received, and not necessarily expected. Example tips tested with users were especially engaging when expressed as financial savings and linked to specific actions that can be taken.
- **Handover manuals and training materials** may be a way of ensuring energy efficiency know-how is 'embedded' among new staff. Within schools, some Competition Partners are considering how best to encourage the upskilling of energy champions who can disseminate learning across the wider school.
- Users involved in testing have raised **the challenge of knowing who, and how, to contact within the supply chain** after solutions highlight needing equipment upgrades or maintenance. Action may be encouraged by supporting end-users with this process through providing connections to equipment upgrades and maintenance organisations, advice providers or manufacturers and installers. A common barrier is a **lack of funding** to invest in energy efficiency projects – providing links to finance providers may help projects develop or launch.
- Pupils and teachers, or roles such as Assistant Managers within retail and hospitality businesses, could benefit from **receiving support in creating compelling business cases to take to decision-makers**. Providing these actors with the information to present whole life-cycle assessment costs could also help to motivate decision-makers to understand the long-term value in taking action.

Solution functions and complementary interventions that can support the 'Opportunity' to act

- **Linking solution functionality to the responsibilities and routines of users** could be a helpful way to boost engagement. User feedback suggested that, for example, a checklist for the open-up and shut-down procedure provides an explicit energy saving opportunity for whoever is opening or closing the site and is useful for managers in communicating the requirements to staff. Functions that allow users to change their energy management habits to fit their needs and preferred routine or existing governance arrangements may also help encourage engagement. For example, some users fed back that they would welcome using the platform to monitor energy use on a weekly basis as this would allow this process to get incorporated into their management routine going forwards.
- Solutions which provide **alert notifications** linked to these role-based functions and in a timely manner are likely to be successful in driving action. For example, within a school setting, notifications could be triggered near the end of each term which provide reminders to switch-off equipment systems.
- **Reminders to complete recommended actions** and a function to escalate recommended actions to more senior staff, or those in a position to enact them, may

help to drive behaviour change. Users felt that reminders to complete action may help to keep energy usage top of mind for them.

Which features apply to whom depends on the organisational contexts. Certain features appeal to those in managerial roles (who may not be the main users of energy but are responsible for operational processes and bill paying) while other features may be more applicable to those in frontline roles (who are often the main energy users but may have no accountability for costs). Table 5 below summarises which functions may be most appealing to different types of user.

Table 5: Summary of features that may appeal to different user types

| Appealing to owner or energy bill payer | Appealing to staff 'on the go', and likely to have no energy bill paying responsibility |
|--|---|
| Tips / insights showing opportunities for longer term cost savings (e.g. equipment investment opportunities) | Real-time or daily insights, with tips that can be actioned in the moment |
| Graphs illustrating energy use over time, to build profile of energy use | Simple graphs, if any, showing basic cost data |
| Ability to export data | Ability to escalate information shown or tip provided to other staff |
| Site level usage and zoning features, allowing comparisons across areas and sites | A complementary initiative that links action taken to a personal or team incentive |
| Budget tracker | Alerts for unexpected peaks to flag if equipment not working correctly |
| Ability to self-programme checklist function for staff | Functions that tie into daily routines, e.g. open/close checklist function |

5. Hypotheses and areas of ongoing analysis for sustaining customer engagement

During Phase 3 of NDSEMIC, the REP will continue to build the evidence base initiated in Phases 1 and 2. However, during Phase 3 it will also seek to answer broader questions around how the different types of solutions, services, and complementary interventions being developed through NDSEMIC can help *sustain engagement* in energy management over time. The evidence collected in this area so far is limited due to the short amount of time users have been piloting the tools and services. Key areas of interest for further research in Phase 3 are summarised below:

Table 6: Key areas of interest for further research in Phase 3

| Key area of ongoing research | Examples of specific question of interest related to this area |
|---|---|
| <p>How far information provided within a solution can support the user to take desired follow-up actions</p> | <p>What is the optimum quantity, frequency and detail of energy efficiency tips for different user and business types? What is the right balance between focusing recommendations on simpler actions versus more significant upgrades?</p> <p>What type of wider support may be needed in addition to the core solution (for example, 'how-to guides'), and how are these best delivered?</p> |
| <p>How energy management solutions and services can empower users to seek the necessary endorsement to follow recommendations</p> | <p>How can retail and hospitality staff, or pupils, be engaged in energy related information and targets and how can they be supported within their organisations to take recommended actions?</p> |
| <p>How incentive structures can be built-in to organisations to support prioritisation of energy efficiency and encourage a greater sense of opportunity and ownership for appropriate actions to be taken</p> | <p>Is target-setting a more impactful if users set their own targets rather than having them set for them?</p> <p>Is it more effective if gamification is carried out at an individual or team/group level?</p> |

Hypotheses for sustaining customer engagement

It is likely to be important that engagement with smart meter data and energy management solutions can be spread beyond the initial person within an organisation opting to set-up and use the solution given that:

- i) improving an organisation's energy efficiency is likely to depend upon multiple actors changing their collective behaviour rather than resting with one individual, and,
- ii) a key challenge faced by schools and businesses is staff turnover.

Encouraging ongoing engagement in energy management solutions can also be important commercially for the developers of these solutions, particularly where business models rely on users being willing to pay to access more advanced features and functions. Figure 12 below

outlines initial findings around key aspects of solutions which could encourage longer-term engagement. Key aspects of this are also explored in more detail below.

Figure 12: Summary of solution aspects hypothesised to encourage sustained engagement



Solution functionality

- Solutions could have **different user-facing designs for the different target users** within an organisation, as well as considering how functionality can be enhanced as the users’ energy literacy and engagement improves.

“The ideal (solution) would provide high level information for those who don’t have much time, but for those more interested and those with more time the ability to drill down into (the data).”

Hospitality Chain Manager

- Having **set targets** may help to sustain engagement as it gives users a specific reason to monitor the data on a continual basis.

Tips & Recommendations

- Continuing to supply new energy saving tips and advice may sustain interest. The **quantity of tips** received may also be a factor which determines interest in them, which may need to be tailored according to user type in terms of how engaged they are. Tips may also need to account for wider factors beyond business size and type, such as **tenancy/ownership**.
- The timing of tips may sustain interest; for example, towards the end of a shift or the end of the week, or at the end of term within schools so that users can ensure out-of-hours usage will be low by performing ‘**close-down**’ checks. **Changing tips on a seasonal basis** could help sustain engagement.

Accessibility & Delivery

- A hypothesis based on user feedback captured to date is that if a solution is available in **app form** it may be more **easily accessed** by users on-the-go.

“70% of what I do is on my phone, I’m not usually in one place, I work from cafes, in between the two shops, it needs to be on the mobile. As soon as I want to know something I want to know it instantly.”

Small retail business owner

- The ability to **share and showcase** the data has been hypothesised to sustain engagement among the wider business or pupils. This could include displaying data on a screen accessible to all building users (and potentially on multiple screens), facilitating peer-to-peer conversations, a communal account for the solution, and making data printable or exportable.

Data Presentation

- Real time, high frequency data may encourage regular use as it allows users to see the **impact of changes**. Presenting data in a way that highlights savings may also be an effective way of sustaining interest.

“I think if you could see that you were actually freeing up cash each month it would be very motivating to pay attention.”

Hospitality business

- It may also be important for solutions to encourage users to play a **diagnostic role** with data, which may lead them to return to the solution on an ongoing basis as users are encouraged to check in on spikes and trends that they see.
- For schools, presenting data in a **weekly breakdown** of the **targets and amount saved** each week may motivate and sustain action as it allows pupils to see the impact of what they are doing. Presenting the data as an **opportunity** with a **visible goal** may encourage involvement in energy schemes.

Other added value and support

- For engagement to be sustained within organisations, solutions should be **easy for staff to engage with** and should be well maintained to keep them working. For teachers, solutions and lesson plans need to be **clearly linked to curriculums and exam boards and easy to use with no unpredictability**.
- **Support** to staff on how to use the solutions and any associated equipment may be important for sustaining engagement. Current ideas being explored by Competition Partners include the delivery of this support through volunteers or company personnel who can offer on-site support when needed.

6. Summary and next steps

NDSEMIC aims to provide small hospitality and retail businesses and schools with timely, relevant and engaging information on their energy consumption to help them control and manage their energy use, save money and reduce carbon emissions. To achieve this, NDSEMIC is supporting seven innovations that utilise smart meter data and are designed specifically to engage and inspire action among users in these hard-to-reach target sectors. More broadly, NDSEMIC seeks to understand, and create momentum among those who need to be engaged to stimulate a longer-term sustainable market for solutions in this non-domestic space.

The role of the REP, in conducting a concurrent research and evaluation programme, is to extract and share meaningful learnings from the Competition and support learning and action around broader market transformation. The REP has done this, and will continue to do this, through its novel **Action Research** approach, working directly with Competition Partners to test and refine their innovations, as well as bringing together learnings around what is required

to create and sustain a market for smart meter enabled solutions which help deliver value from smart meter data to the small non-domestic market. This approach is extended to the Competition itself; the REP is also adopting an Action Research approach to identifying challenges related to the programme's overall vision, and designing activities to support learning against these.

The **Evaluation** strand of the REP, which is being delivered alongside the Action Research strand, seeks to explore the outcomes of NDSEMIC. It is taking a theory-based approach to guide its overall assessment of whether anticipated outcomes have been achieved; this means exploring under what circumstances and in what contexts, and to what extent the Competition has contributed to the achievement of these outcomes. Evidence gathered from multiple sources is triangulated and synthesised to help develop an understanding of the theory of change for the realisation of relevant outcomes.

Next steps for the REP

In the third and final phase (Phase 3) of NDSEMIC, the **Action Research** strand of the REP will continue its current activities as well as take on a greater strategic role in supporting NDSEMIC to identify who, and how, the programme needs to engage in order to support the ultimate vision of encouraging market transformation. The REP is creating communities of learning and developing sets of activities focused on shared challenge solving, targeted against the core themes of data access, routes to market and customer engagement, and plans to engage a wide range of stakeholders in this task.

The **evaluation strand** of activity will continue to gather and synthesise evidence to assess the outcomes of NDSEMIC, and the circumstances under which these are achieved, as well as how the design and implementation of the Competition has affected these outcomes. A tailored evaluation plan is being followed for the assessment of impact for each of the seven funded solutions, most of which will involve a combination of quantitative and qualitative research and trend analysis of energy consumption data. Synthesis across all these strands of evidence will enable the evaluation team to assess, at the level of each project, what is effective for prompting behaviour change and energy savings, in what context and for whom. Following the completion of Phase 3 of NDSEMIC, a series of final reports from the REP will be published in 2020.

Annexes

Annex 1: Example list of Action Research and Coordination activities delivered

Four REP-led workshops on the following topics:

- **“Complementary Interventions”**: involving BEIS policy stakeholders, Competition Partners and external stakeholders/experts, encouraging learning to be shared around the types of supporting services or resources that may need to accompany NDSEMIC solutions to help drive engagement and behaviour change.
- **“Educational complementary interventions and behaviour change”** – workshop involving BEIS policy stakeholders, Competition Partners and external stakeholders/experts, encouraging learning to be shared around schools’ organisational context and effective ways of engaging school stakeholders.
- **“User-centric Design”** – workshop with Competition Partners to give guidance to on best practice principles, methodologies and analysis techniques for user testing.
- **“Data Access”** – workshop involving Competition Partners, DCC, Ofgem and ESC to understand barriers to achieving access to data in the non-domestic sector.

A number of market awareness and engagement **Webinars**:

- First series on ‘Innovation solutions for energy management in the retail and hospitality sector’ providing an overview of the programme and introduction of Competition Partners to trade bodies and businesses associations.
- Second series on ‘Turning energy data into energy savings: how can your school or business benefit from smart energy management innovations?’ identifying and engaging trial sites for the pilot phase in the retail, hospitality and education sectors.

Two **Local Authority Events** on ‘Innovation solutions for energy management in schools’ targeted at a regional level (one in Manchester, one in Hampshire) with decision makers and Local Authorities to help Competition Partners to identify and engage target schools and stakeholders for trial sites.

One **Matchmaking Event** from across UK government, retail, hospitality, education and energy sectors to provide a preview of the Competition Partners innovations, to facilitate partnerships between Competition Partners and energy suppliers, and to introduce Competition Partners to potential customers and Trade Associations / Sector bodies who can provide a connection to customers.

A number of **presentations and exhibition stands at key sector events**, including the Schools & Academies Show, School Commercialisation, Future of Utilities, National Convenience Show and a HOSPA members event.

Annex 2: Message hooks to engage different actors

Figures A1 and A2 (below) illustrate visually which message hooks can work best for engaging different actors in schools and hospitality or retail businesses with smart energy management solutions and services. The relevant message hooks are shown underneath each actor.

Figure A1. Key message hooks for actors in schools¹¹

| Hooks for key actors within schools | |
|---|---|
| HEADTEACHER | SITE MANAGER / CARETAKER |
| To acquire school badge/certificate/ 'leader board' | Make life easier (info through tool to support procurement, spend analysis, access energy data) |
| To gain access to resources with educational merit (linked to requirement from exam board) | More efficient / better maintained schools/buildings – freeing up their time |
| Make life easier (info through tool to support procurement, spend analysis, access energy data) | Easier to diagnose issues / out of hours use |
| Show money saving opportunities (expressed in equivalent teacher salaries could be valuable) | Tool to help them get recognition within school or externally e.g. for driving savings |
| DEPUTY HEAD | LOCAL AUTHORITIES |
| Green school badge/certificate / 'leader board' | Make life easier (info through tool to support procurement, spend analysis, access energy data) |
| To gain access to resources with educational merit (linked to requirement from exam board) | Show money saving opportunities (expressed in equivalent teacher salaries could be valuable) |
| Tool to help them get recognition within school or externally e.g. for driving savings | |
| TEACHERS | ACADEMY TRUST MANAGER |
| Green school badge/certificate / 'leader board' | Make life easier (info through tool to support procurement, spend analysis, access energy data) |
| To gain access to resources with educational merit (linked to requirement from exam board) | Show money saving opportunities (expressed in equivalent teacher salaries could be valuable) |
| Tool to help them get recognition within school or externally e.g. for driving savings | |
| PUPILS | BUSINESS/FINANCE MANAGER |
| Green school badge/certificate / 'leader board' | Make life easier (info through tool to support procurement, spend analysis, access energy data) |
| To gain access to resources with educational merit (linked to requirement from exam board) | Show money saving opportunities (expressed in equivalent teacher salaries could be valuable) |
| To link with how they use energy at home (including domestic smart meters) | Showing where biggest wins can be made if funds are available to spend |
| PARENTS/GOVERNORS | EXAM BOARDS |
| Green school badge/certificate / 'leader board' | To gain access to resources with educational merit (linked to requirement from exam board) |
| To gain access to resources with educational merit (linked to requirement from exam board) | |
| Show money saving opportunities (expressed in equivalent teacher salaries could be valuable) | SUPPLIERS |
| | Added value offering (e.g. enhanced reputation / service) |

¹¹ Based on NDSEMIC workshop on Educational Materials, held at BEIS, involving BEIS colleagues, Competition Partners and the REP

Figure A2: Key message hooks for actors in retail & hospitality¹²

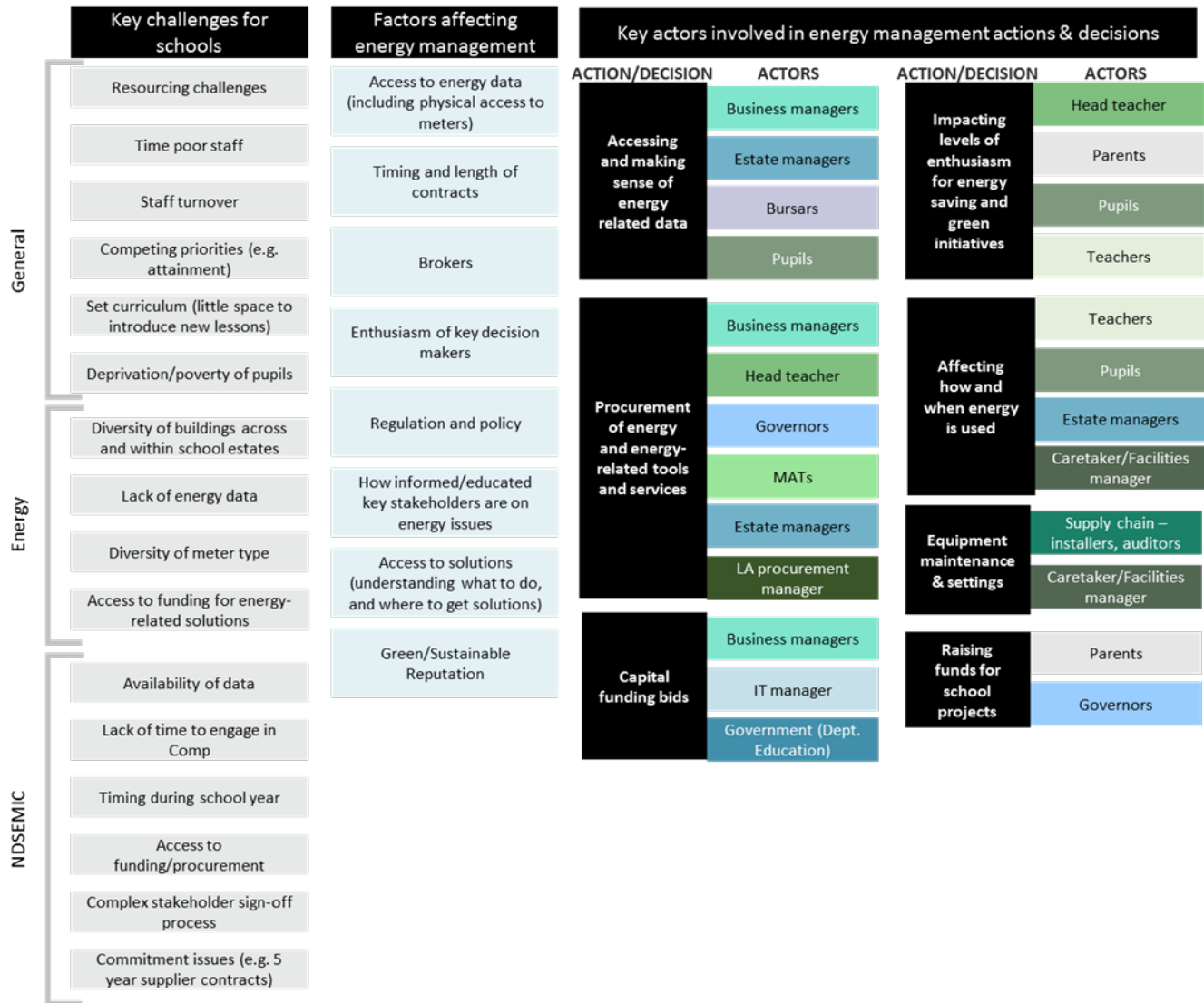
| Hooks for key actors within retail & hospitality | |
|---|---|
| OWNER/MANAGER/DIRECTOR | BUSINESS/FINANCE MANAGER |
| Make life easier (info through tool to support procurement, spend analysis, access energy data) | Make life easier (info through tool to support procurement, spend analysis, access energy data) |
| Show money saving opportunities (expressed in equivalent revenue terms) | Show money saving opportunities (expressed in equivalent revenue terms) |
| Reduce operational risks through faster diagnosis of equipment/process issues (e.g. avoid loss of stock) | Reduce operational risks through faster diagnosis of equipment/process issues (e.g. avoid loss of stock) |
| Increased visibility and control over energy spend, avoid surprises & provide peace of mind (in real time) | Support business growth / capacity planning by taking a long term view of energy efficiency |
| Support environmental action and enhance reputation around CSR | |
| Support business growth / capacity planning by taking a long term view of energy efficiency | |
| Good for business , can lead to increased customer/staff comfort and provide educational resources | |
| | SECURITY STAFF |
| | Reduce operational risks through faster diagnosis of equipment/process issues (e.g. avoid loss of stock) |
| | Can allow you to provide an added value/improved service to clients |
| DEPUTY MANAGER/SUPERVISOR | PROPERTY MANAGER/LANDLORDS |
| Make life easier (info through tool to support procurement, spend analysis, access energy data) | Make life easier (info through tool to support procurement, spend analysis, access energy data) |
| Show money saving opportunities (expressed in equivalent revenue terms) | Show money saving opportunities (expressed in equivalent revenue terms) |
| Reduce operational risks through faster diagnosis of equipment/process issues (e.g. avoid loss of stock) | Reduce operational risks through faster diagnosis of equipment/process issues (e.g. avoid loss of stock) |
| Increased visibility and control over energy spend, avoid surprises & provide peace of mind (in real time) | Increased visibility and control over energy spend, avoid surprises & provide peace of mind (in real time) |
| Support environmental action and enhance reputation around CSR | Support environmental action and enhance reputation around CSR |
| Good for business , can lead to increased customer/staff comfort | Can allow you to provide an added value/improved service to tools end users |
| | Good for business , can lead to increased customer/staff comfort and provide educational resources |
| STAFF/EMPLOYEES | TENANTS |
| Reduce operational risks through faster diagnosis of equipment/process issues (e.g. avoid loss of stock) | Show money saving opportunities (expressed in equivalent revenue terms) |
| Support environmental action and enhance reputation around CSR | Increased visibility and control over energy spend, avoid surprises & provide peace of mind (in real time) |
| Good for business , can lead to increased customer/staff comfort | Reduce operational risks through faster diagnosis of equipment/process issues (e.g. avoid loss of stock) |
| | Support environmental action and enhance reputation around CSR |
| ENERGY SUPPLIER | |
| Can allow you to provide an added value/improved service to non-domestic customer base | |

¹² Based on a synthesis of evidence to date from user testing interviews conducted by Competition Partners and Ipsos MORI, BEIS hosted workshops with colleagues and Competition Partners and evidence presented by Competition Partners in their application forms.

Annex 3: Contextual factors in schools

Figure A3 summarises the organisational context for encouraging better energy management within schools, including the key challenges schools face, the factors affecting their energy management and the role of different actors in decisions associated with energy management.

Figure A3: What World Do Schools Live in?



Source: Summary of discussions at NDSEMIC workshop on schools sector, January 2019

Annex 4: Methodological Notes

The findings presented in this report are based on the early evidence collected to date from Action Research activities carried out by the REP in Phases 1 and 2 and from the Competition Partner's own research activities. This has involved partners from the Research & Evaluation Programme (Ipsos MORI and the Carbon Trust) working closely with individual Competition Partners to design, and in some cases, carry out, user research.

Data collection has primarily been through in-depth interviews and workshops with current and potential users of the solutions as well as with sectoral experts. Participants in a range of different roles and from multiple businesses in each of the three target sectors of schools, retails and hospitality have taken part in these research activities. In addition to these structured research activities, findings have also drawn on more informal feedback provided to Competition Partners from users piloting their solutions.

In Phase 3 of the competition, further in-depth, robust and systematic testing is being carried out across NDSEMIC through wider-scale testing as part of evaluation activities, to help quantify some of the findings presented here. Thus, the insights presented in these reports represent early interim findings based on qualitative insights gathered. However, findings are consistent across evidence sources and can be treated as indicative of user feedback on energy management and related solutions and services.

The current sources of evidence on which these reports are based include:

- **User testing conducted by Competition Partners** – As part of NDSEMIC Phases 1 and 2, Competition Partners undertook user testing with target organisations. This included both preliminary concept testing (testing appetite for energy management solutions and reactions to the idea of the solution, its proposed design and functions, among potential users) as well as, in some cases, short-term user trialling of solutions (feedback from users who had access to the solutions, usually for a period of 1 to 4 weeks). Competition Partners have delivered this through a mix of in-depth interviews, workshops, small-scale surveys and site visits.
- **User testing conducted by Ipsos MORI on behalf of Competition Partners** – Ipsos MORI, as part of the REP, has also conducted user testing interviews on behalf of some of the Competition Partners. This has involved site visits and in-depth interviews with potential and current users.
- **Synthesis reports produced by Competition Partners** – Competition Partners have produced summary reports for each research milestone detailing their research activity and results of user testing.
- **Phase 2 NDSEMIC application forms submitted by each Competition Partner** - These application forms required Partners to summarise the evidence from user testing collected to date. These forms also touch on other sources of evidence Partners have available to them, such as insights gathered from previous research conducted or commissioned by their organisation during the development of similar energy management solutions.
- **REP-led workshops involving BEIS policy stakeholders, Competition Partners, the REP and external stakeholders/experts** (as described in [Annex 1](#)).

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