Supporting smart metering innovation to drive energy savings for homes and small businesses

Energy for a Net Zero Society Conference

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Introduction

Smart meter roll out

- Smart meters are replacing traditional gas and electricity meters as part of an essential infrastructure upgrade for Great Britain to create a more reliable, clean and affordable energy system.
- At the end of June 2021, there were **25.2 million smart and advanced meters** in homes and small businesses in Great Britain. Smart meter owners can now see their energy use in near real time and receive accurate bills without submitting meter readings.
- Domestic households receive an In-Home Display (IHD) alongside their smart meter which provides near real-time feedback on their energy consumption. Smaller non-domestic sites are also entitled to timely access to the consumption data from their smart meter.
- The smart meter roll out is being led by the Smart Metering Implementation Programme (SMIP) within the Department for Business, Energy and Industrial Strategy (BEIS).

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Rationale for two innovation Competitions

- Previous evidence showed that more sophisticated and data-driven tools using smart meter data have the potential to further help consumers to save energy and money. However, there was an evidence gap regarding which types of tools, services and features would work best to facilitate this.
- To address this, **BEIS launched two Competitions** for innovators to develop energy management tools and services based on smart meter data.

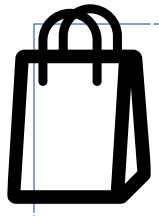
The Non-Domestic Smart Energy Management Innovation Competition (NDSEMIC)	The Smart ENergy Savings Competition (SENS)
• £8.8 million competition which ran from 2018 to 2020. • Focused on non-domestic consumers, including schools and small businesses in the retail and hospitality sector.	• £6.25 million competition. • Started in June 2019 and trials are still ongoing (extended due to pandemic). • Focuses on domestic consumers, helping them to save energy in their homes.

Approach and methodology

The NDSEMIC Competition

About the NDSEMIC Competition

- Prior to the Competition, the existing non-domestic market for energy management tools primarily served larger organisations but there was potential for tools to be developed for smaller organisations.
- The Non-Domestic Smart Energy Management Innovation Competition (NDSEMIC) was funded to start to address this market failure and learn what type of tools and features are effective at driving behaviour change and achieving energy savings.
- The Competition was an **£8.8 million competition which ran from 2018 to 2020**. It was led by SMIP within BEIS.
- The Competition provided grant funding to 'Competition Partners' and supported the **development and piloting of seven innovative energy management tools** and support packages in priority sector **SMEs** and **schools.**

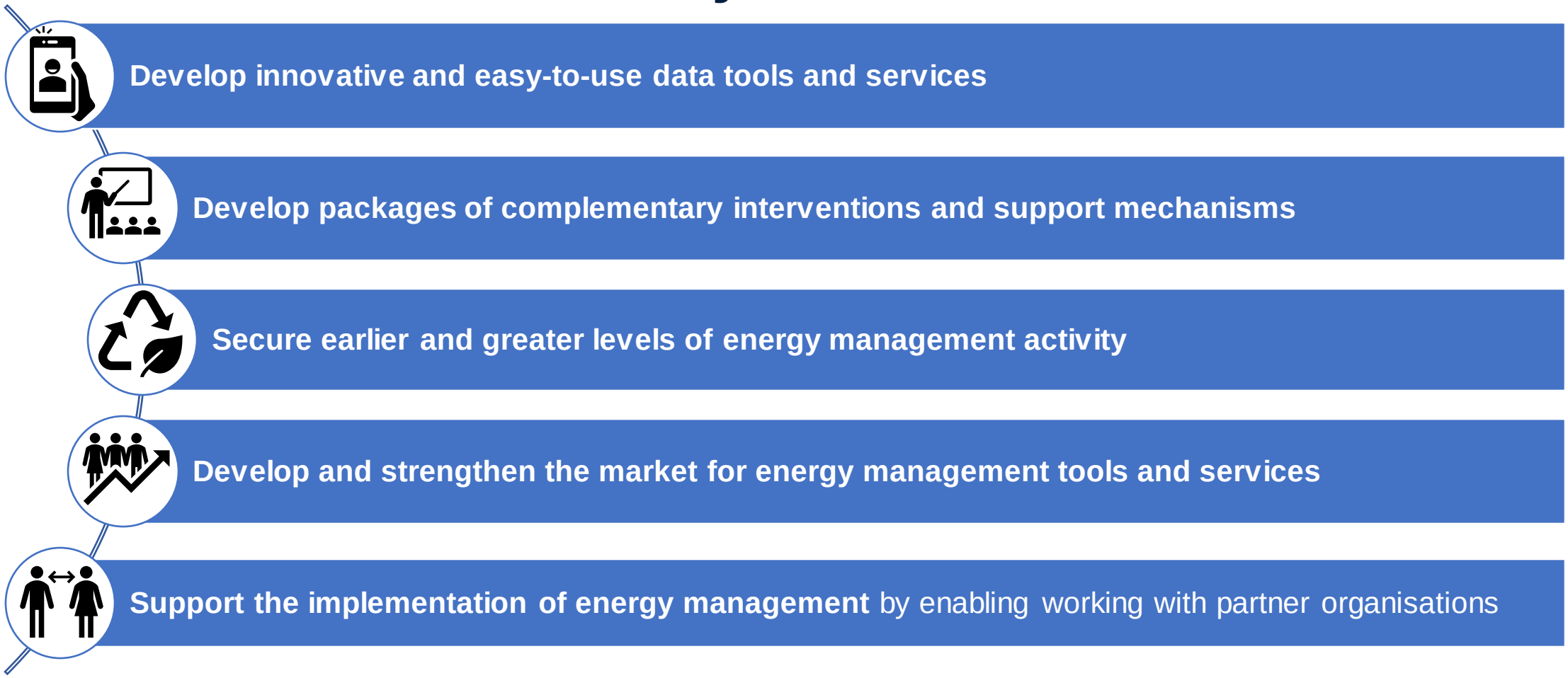


Retail

Hospitality

Schools

Main NDSEMIC Objectives



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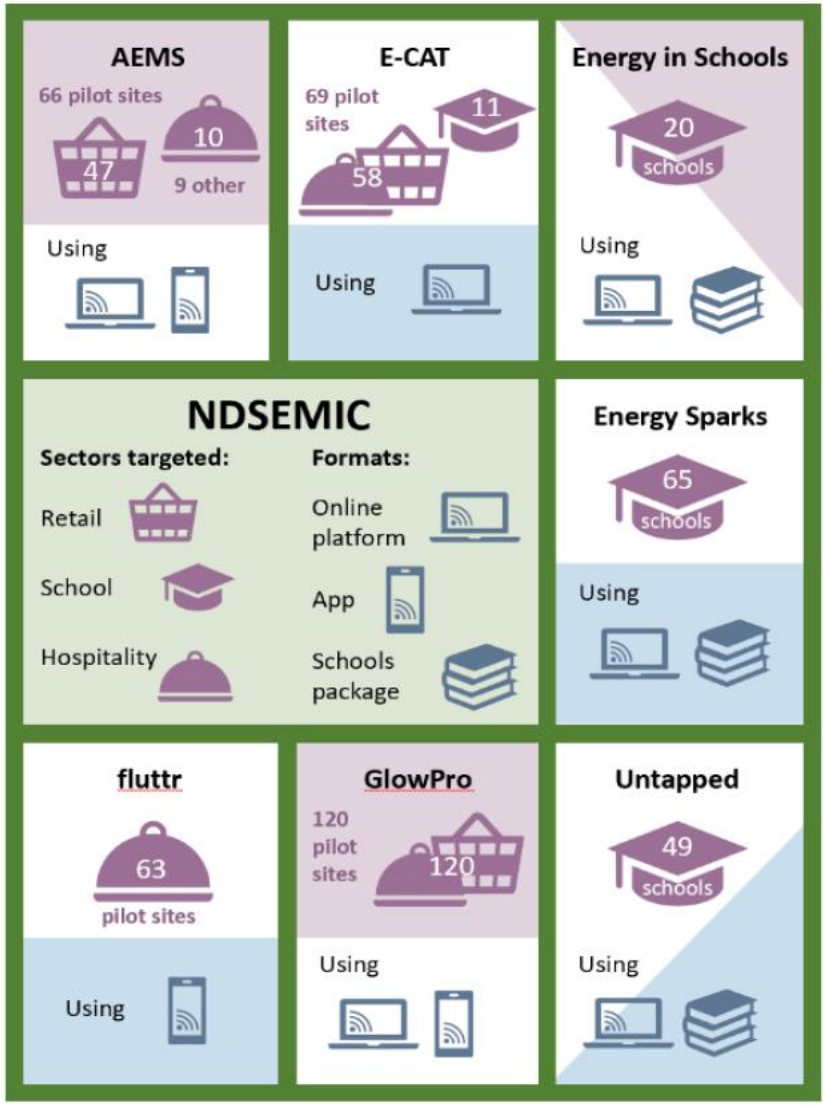
Range of tools piloted

- Overall, nine tools were selected to receive initial development funding (Phase 1).
- Seven of these passed through to the next 'feasibility and initial testing' stage (Phase 2) and they also went through to the final stage of the Competition (Phase 3), during which the innovations were piloted in a real-world setting.
- Four tools were piloted in the small retail and hospitality sectors and four in schools (one tool was piloted in both retail/hospitality and schools).
- The tools piloted included a mix of app-based or desktop based online energy management portals (or both in some cases) as well as some complementary interventions such as educational resources (e.g. lesson plans).



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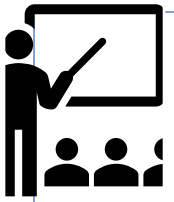
About the Research and Evaluation

- The Competition also had a built in **Research and Evaluation Programme** (REP) led by Ipsos MORI in partnership with the Carbon Trust and representatives from Technopolis and Loughborough University. The REP ran in parallel to the Competition to extract meaningful learnings and support broader market transformation. The REP had two primary strands of activity: evaluation and action research.
- The evaluation strand consisted of an **overall theory-based impact evaluation** and a **separate evaluation for each of the pilot projects.** The evaluation also drew on insights gained through 'action' research delivered as part of the Competition.
- The purpose of the evaluation was to improve the evidence base around the effectiveness of smart energy management products and services within smaller non-domestic organisations. It sought to generate learning on what works in terms of encouraging energy efficient behaviours and key dependencies underpinning further market development of such products.

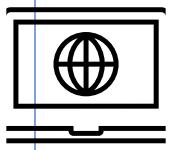
Evaluation – data collection and outputs

Site visits to schools and business premises piloting the tools

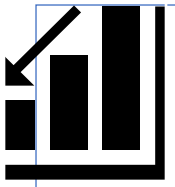
Qualitative telephone interviews with tool users



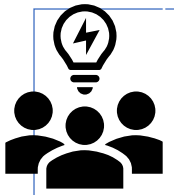
School pupil survey (paper survey for Energy Sparks)



Online surveys pre and post trials



Energy consumption data analysis



Stakeholder interviews with Competition Partners

Following the end of the NDSEMIC Competition, in November 2020, BEIS published various reports and case studies on the GOV.UK website which can be found here: https://www.gov.uk/government/publications/non-domestic-smart-energy-management-innovation-competition-ndsemic-evaluation-findings.

Results

The NDSEMIC Competition

Summary of key NDSEMIC findings

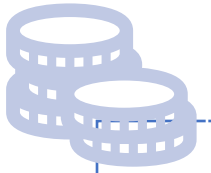
Most tools were successful in engaging and driving behaviour change in at least some of their users. Therefore the evaluation provided evidence that in the right circumstances, with the right features/support, tools can deliver real benefits, including energy savings, to non-domestic consumers.

Four out of seven projects had 'very high' or 'high' confidence of achieving energy savings in some sites (with two/seven 'medium'). In some cases these savings were substantial, reaching 10-20% in some schools and 11% in some SMEs.

Achieving energy savings was dependent upon tools gaining initial customer interest, sustaining that interest and being able to catalyse action and change energy use behaviour.

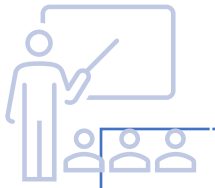
Some market dependencies remain including: how the market responds to the requirements of 'early adopters', the role of partnerships, the extent to which tools may be broadened beyond energy management and possible bundling of services, data access challenges and regulatory drivers.

Key motivators in gaining customer interest



SMEs

- Small retail and hospitality sites were typically motivated to participate in the pilots because they believed the tools would generate potential **cost savings, environmental benefits** and **improved business management.**



Schools

- A **full package of features** proved helpful in engaging schools alongside the basic energy use portal, with **educational resources** particularly important in motivating schools to take up the tools initially.
- Models that **involved pupils** as a users also helped.

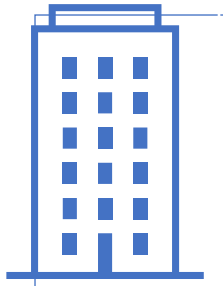
Wider interests

- Where schools had an **existing sustainability "infrastructure"** this also motivated them to take up the tools.
- Similarly **local authority climate emergency declarations** acted as a key driver for schools' interest in some cases.

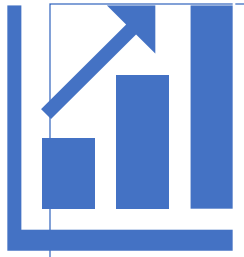
Key tool features across sectors for sustaining customer interest and catalysing action

Insights from across all sectors (retail, hospitality and schools)

Live data at half-hourly or more granular intervals was the most useful feature. This allowed users to understand what equipment and processes used most energy and to make **immediate changes.**



Utility and novelty of energy efficiency insights was crucial to engagement. Tips, benchmarks, budgets, alerts and advice were most effective at enabling change when sufficiently tailored (e.g. to hotels).



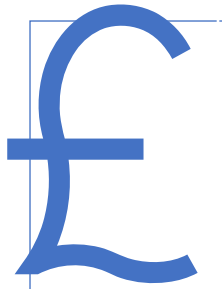
Presenting data in easy-to-understand, relevant formats was key for organisational buy-in and sustained engagement. For example, via differentiated access to dashboards, data presented in non-technical way for pupils e.g. as number of kettles boiled.

Users who received **ongoing support** were more likely to continue engaging with the tool and make energy use changes as a result and this was particularly key for schools. Support was most impactful when offered face-to-face or on the phone.

Key tool features for SMEs in sustaining customer interest and catalysing action

Insights from SMEs in the hospitality and retail sectors

Tools had the most impact where their use or recommendations became **part of routine business practice.**



Longer term users were planning to use tools to help them **make procurement and operational decisions** and to **monitor their energy use and costs.**

Desktop portals were marginally easier to integrate into business operations, though mobile apps offered users who need to be physically on the move (e.g. in hotels) more flexible access. Tools that offered both types were welcomed.

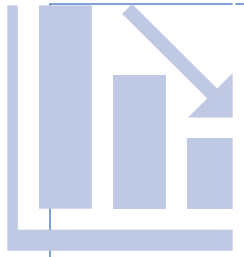
Not everyone needs to use the tools to benefit from them – management can use the tools to identify practices which are then passed down to other staff within the business.

Key tool features for schools in sustaining customer interest and catalysing action

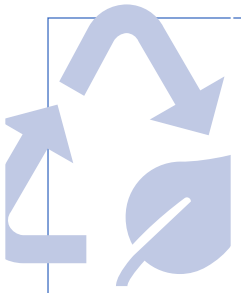
Insights from the schools sector

Tool elements that encourage **'friendly' competition** (both within and between schools) appeared to be highly effective in maintaining engagement amongst pupils e.g. through leader boards on display screens.

Embedding tools within broader sustainability movements in schools motivated them to engage with the tools and carry out energy efficiency actions.



Tailored tool experiences and data presentation for different school users (including pupils) proved more impactful than a single portal, as did ensuring that users were aware of relevant features.



Once engaged, **pupils acted as effective agents of change within schools**, driving behaviour change among other pupils and schools staff. Activities such as 'eco clubs' and pupils acting as Energy Champions helped facilitate this.

Conclusions

Conclusions

- Overall, there is clear evidence that with sufficient engagement from consumers, smart energy management tools can help non-domestic organisations to change their behaviours and save energy.
- Tools were most effective when they appealed sufficiently to users' motivations, provided information in tailored, novel and timely ways and provided easily actionable advice.
- However, the evaluation has also identified dependencies to this occurring. Behaviour change was not universal across sites; where this did not occur, it was either because of disinterest in the tool, a lack of motivation or a feeling that changes in energy use were not possible. Therefore for tools to be successful at market, or when scaled up, they would need to overcome such challenges.
- Wider uptake of tools and market expansion will also be partly dependent on broader cultural shifts within schools and businesses towards carbon emissions reductions, other technological developments, the growth of complementary markets and ongoing policy development aimed at increasing energy efficiency and clean growth.
- When available, findings from the evaluation of the SENS Competition will aim to answer whether these findings will also apply to domestic consumers.

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Thank you

Any questions?