23rd March 2016

Submission to the DECC Consultation on the Smart Energy Code

Dear Sir/Madam

Noting that the rational for smart meters set out in the SEC consultation[1] is:

"Smart meters are the next generation of gas and electricity meters. They will offer a range of intelligent functions and provide consumers with more accurate information, bringing an end to estimated billing. Consumers will have near-real time information on their energy consumption *to help them control and manage their energy use, save money and reduce emissions*."

and that one of the objectives set out in the SEC[2] is:

"the third General SEC Objective is to *facilitate Energy Consumers' management of their use of electricity and gas* through the provision to them of appropriate information by means of Smart Metering Systems;"[3]

we would like to draw to propose amending the focus of the SEC to permit the future inclusion of measures that will support the deployment of effective energy savings from building automation and controls systems (BACS) in addition to those from smart meters and in home displays. While smart meters are helpful in supporting energy savings because they present users real time information on their energy consumption, they do not currently go beyond this and enable direct optimised control and scheduling of the principal energy using equipment in people's homes and/or commercial buildings. The resulting energy savings from smart meters are therefore likely to be quite modest, as they do not currently:

a) indicate how people can most effectively save energy
b) make energy using systems more controllable
c) optimise the operation of those energy systems
d) permit the remote control of such systems.

[1] A Consultation on New Smart Energy Code Content and Related Licence Amendments - February 2016 25 February 2016, https://www.gov.uk/government/consultations/a-consultation-on-new-smart-energy-code-content-and-related-licence-amendments
[2] P121 Annex B, Smart Energy Code, 23/9/2013
[3] P121 Annex B, Smart Energy Code, 23/9/2013

recent work conducted by WSE and published on the Leonardo Energy website[4] has shown the dramatic scale of cost-effective energy savings that could be achieved from greater and better use of building automation and control systems for energy management. Across the EU as a whole it is estimated that deployment of better BACS with provision of appropriate support to ensure sufficient service quality could save up to:

- 22% of all building energy consumption
- 150 Mtoe of energy consumption per year
- 419 Mt of annual CO2 emissions
- €162bn per year in energy bills at a cost of ~1.1 euro cent/kWh saved

by 2035. No specific UK assessment has yet been conducted but on a pro-rata basis the UK annual savings potential by 2035 would be of the order of:

- 24 Mtoe of energy consumption per year
- 68 Mt CO2 emissions
- ~£20 billion in energy bills (note this figure needs to be adjusted for actual UK energy prices and hence is extremely approximate)

In households the majority of the savings potential from BACS is associated with optimised control of the heating systems and each heat emitter (e.g. radiators). Modern BACS (see the illustration below) are capable of:

a) independently controlling each heat emitter and thereby letting that emitter be individually programmed according to a typical occupancy profile/need
b) learning the thermal response of each space (i.e. of each heated room) and using this to optimise when the heat is supplied to reach a given programmed set point (so called "optimum start" functionality). The same technique is used to optimise the moment the heating system is deactivated ("optimum stop" functionality)
c) using weather compensation to inform the optimum/start stop functions
d) optimising the operating temperature and run time of the boilers

This enhanced functionality is what produces the energy savings from more optimal control and operation of the heating system and critically through avoiding over-heating spaces at times when there is no demand from occupancy.

Ensuring such functionality is commonplace, and ultimately installed in all buildings, is the key to delivering the major energy savings previously presented. At the EU-average level the benefit cost ratio from a systematic effort to deploy such measures is estimated to be over 9 to 1, which is far in excess of the typical BCRs estimated for smart meters alone (typically 1.3 to 1). However, smart meter roll-out is highly complementary to BACS, and vice versa, as when optimised BACS are in place, the smart meter systems can show the end-users the direct benefits they will attain from using the BACS room set point scheduling capabilities and hence provide a direct informational

[4] *Building Automation: the scope for energy and CO2 savings in the EU*, Waide Strategic Efficiency, 2013 http://www.leonardo-energy.org/white-paper/building-automation-scope-energy-and-co2-savings-eu
Note, this report is a widely quoted reference work on BACS within the EU and has informed the development of the European Commission's draft Ecodesign and Energy labelling Directive work plan among other initiatives.

space and hence will tend to overheat low occupancy spaces, and/or they will not be able to optimise the heating automatically against the weather and room thermal response functions) and hence will experience significantly less benefit from proactive energy management informed by real time consumption data. In addition, an integrated approach to smart meters and smart controls could also facilitate remote programming of building energy systems.

In the future, therefore, it is critical that programmatic actions are considered that will support the deployment of good quality BACS with sufficient functionality to capture the main energy savings opportunities discussed above. Measures are also needed to support the quality of service delivery for the specification and supply of BACS.

Overall, this area constitutes one of the most cost-effective and significant energy savings opportunities available in the UK and hence merits being a priority consideration for public policy.

Suggested amendments to the SEC

We are conscious that the SEC was not initially designed to enable and/or facilitate the deployment of better BACS in the UK's buildings; however, as:

a) the objectives of the smart meter roll-out and energy savings from BACS are broadly aligned
b) the two actions are mutually reinforcing and potentially synergistic, and
c) deployment of better BACS will substantially enhance the magnitude and cost effectiveness of energy savings delivered,

we think it would be appropriate to make a minor amendment to the SEC objectives to make it clearer that the SEC should be governed to *facilitate energy savings in homes through Smart Meters and via the facilitation of smarter energy systems.* Specifically we believe the objectives of the SEC as set out on p 121 of Annex B – the Smart Energy Code, should be amended from the current wording of:

"the third General SEC Objective is to facilitate Energy Consumers' management of their use of electricity and gas through the provision to them of appropriate information by means of Smart Metering Systems"

to

"the third General SEC Objective is to facilitate Energy Consumers' management of their use of electricity and gas through the provision to them of appropriate information by means of Smart Metering Systems and via the facilitation of smarter energy systems"

This broadening of the SEC's terms of reference would enable the SEC governance process to review and consider opportunities to amend the SEC to include support for smarter energy systems and not just smart meters. The case for including BACS within the SEC could then be assessed as a potential logical and synergistic extension to the smart meter roll-out.

Ideally, the rest of the SEC would also be scrutinised to ensure it is consistent with this objective and to ensure that the SEC's governance process would begin to consider evaluating the case for supporting energy savings from BACS including potential future amendments to support the roll-out of BACS in conjunction with smart meters.

The integration of increasing amounts of variable renewables poses challenges for the electricity system, even more so for an island system such as UK. The combination of a building automation system with a heat pump can enable buildings to actively support grids. In times of oversupply, heat can be stored as a buffer. When supply becomes strained, the heat buffer can be used or electricity demand can be reduced or postponed. In a well-insulated and controlled building, the impact of such measures on its occupants will be minimal. The role of the smart meter would be to convey signals from the grid, e.g. to turn off the HP when supply is strained, or to turn it on when there is too much supply; however, for the SEC to be able to address this issue its terms of reference would need to be amended as we have proposed above.

Smart metering in the non-domestic sector

In the same spirit as our previous comments on BACS we believe that the SEC should also evaluate the case for future amendments to support the provision of multiple metering points (i.e. sub-metering) for larger buildings, as this can provide the information necessary to support energy audits, continuous commissioning and re-commissioning and therefore supports good energy management practice. This topic has been discussed in EU energy management fora such as CEN-CENELEC's Sector Forum Energy Management group.

Other actions

The opportunities to achieve energy savings from BACS are not confined to amending the SEC, although this is a potentially important vehicle to support broader deployment. There are several issues of public policy relevance that we believe it would be appropriate to consider to realise the savings potentials from BACS and we would therefore welcome the opportunity to engage in a dialogue with DECC staff to help clarify the issues and opportunities associated with this topic. Should it be of interest, I would be very happy to arrange a follow-up conversation, or meeting to discuss this further. Please don't hesitate to contact me, should you welcome such a dialogue.

With kind regards

Email
Direct or
Mobile:

Email
Phone
Direct