



Technologies with significant potential to contribute to UK carbon reduction targets

Heating Control Upgrades in Existing Housing

Description

Heating controls optimise the operation of energy using elements of a heating system (e.g. boilers and pumps) and allow occupants to set and achieve comfort levels in their homes. This means that sufficient heating and hot water is provided for the least possible energy input. As a minimum for homes, there should be controls to:

- Automatically turn off heating when not required (Time Control)
- Automatically prevent the building getting warmer than it needs to (Temperature Control)
- Avoid overheating rooms that are unoccupied or need lower temperatures (Zone Control)
- Provide enough hot water at a suitable temperature, and no more.

Homes that don't have one or more of these control functions will be able to make cost-effective energy savings through the installation of additional controls. Just fitting the correct heating controls can save up to 17-23% of a home's heating billⁱ. Given that heating and hot water account for 84% of an average home's energy use, and 70% of its carbon emissionsⁱⁱ then these savings are significant, and will be even more pronounced where an older, less efficient boiler is in place. What's more, heating controls allow the occupants to save more energy through behavioural change measures. Put simply, you can't save energy by turning your room thermostat down if you don't have a room thermostat.

The current Building Regulations require that some controls are installed when a boiler is replaced. But waiting until all boilers are replaced, which on current rates will take about twenty years, is missing the huge opportunity for carbon savings from upgrading controls on their own:

- A controls upgrade is a low cost, cost-effective measure.
- Controls will reduce carbon emissions from older boilers in the years before they are replaced.
- Installed controls will reduce the cost of the eventual boiler replacement, and may therefore bring forward the decision on this replacement.

Potential carbon savings

Work carried out by TACMA (The Association of Controls Manufacturers) with the Energy Saving Trust has identified the following:

- Nearly 8m UK homes with a boiler don't have a room thermostat.
- Over 70% don't reach the minimum levels of controls specified in the section above.
- Eight hundred thousand homes with a boiler have no controls at all.

This equates to a potential UK annual carbon saving of 4.3 MtCO₂ⁱⁱⁱ – about the same as the identified potential for loft insulation^{iv} and a significant energy saving opportunity for Government.

A policy approach that stimulated controls upgrades to bring all existing homes up to minimum standards by 2015 (as opposed to waiting for boiler replacements) would prevent about 20 MtCO₂ being released into the atmosphere.

Potential economic benefits

The UK maintains a manufacturing base for quality heating controls that would directly benefit from a policy approach that stimulated heating controls upgrades in existing homes. There would also be benefits to the wider supply chain, particularly to heating installers.

Current economic conditions in the building industry and UK manufacturing are poor, boiler sales in the first quarter of 2009 were down 14% from the equivalent quarter in 2008^v. Replacing a boiler is an expensive measure and therefore it is likely that a 'repair rather than replace' culture will prevail in the short term. Heating controls upgrades in existing homes is a relatively untapped market, with a market value of approximately £3bn. It therefore offers an excellent opportunity for manufacturers and installers, who are experiencing the sharp end of the recession, as well as giving householders a cost effective way to reduce their heating bills.

A clear roadmap for the installation of 'basic' controls in all UK housing would also offer an incentive for research and development by UK controls manufacturers. Having established the energy saving benefits of controls, it would encourage the quicker exploitation of best practice and advanced controls which can make further carbon savings. Speedy exploitation of these technologies would also offer export opportunities for UK manufacturers.

Controls will also form a core technology at the heart of 'smart homes' – offering full interoperability with smart meters and renewable technologies. Focussed Government leadership and support could help UK controls manufacturers become world leaders in these technologies.

Current barriers and solutions

- **Consumer awareness.** Sustainable Energy Ireland state that "achieving control of the heating system is the most important aspect of energy conservation in a house" and provide a €500 grant for heating controls. Yet, in the UK, promotion of controls is almost invisible amongst communications on energy saving.

Heating controls must have a greater prominence in Government communications on home energy saving. A high profile campaign would be a fresh message and a significant step forward.

- **Validation of benefits.** The SAP calculation methodology has acknowledged limitations in assessing the performance of controls^{vi} and has little behavioural information to support it. As a consequence heating programmers secure no benefit under SAP, the impact of some technologies such as thermostatic radiator valves is underestimated, and it is extremely difficult for any advanced control technologies to be included within the calculation methodology at all.

Government must address the suitability of the calculation methodology for current and future control options or be more willing to accept savings figures from other European countries to support the promotion and incentivisation of controls for energy saving.

- **Installer mobilisation.** Installers are the most influential source of advice on heating systems and have a positive attitude towards energy efficiency^{vii}. However, they can be reluctant to promote controls upgrades due to the need for a site survey compared to the relatively low value of the work and the potential not to make a sale.

This could be overcome through greater consumer awareness, more independent validation of the benefits and even supported by a fee paid to accredited installers to provide an advice survey. This could be tied in with the CLG advice package for heating systems and funded out of existing advice

budgets.

- **Financial incentives.** Some controls are eligible as energy saving measures under the Carbon Emissions Reduction Target (CERT.) But there is little activity on controls as the lifetime scores are unattractive (see 'validation of benefits' above) and due to the perceived complexity of controls offerings as outlined.

Increased action to raise consumer awareness would help to address this, but there is also a need for 'bonus' scores for controls to overcome the existing infrastructural issues in the short term. A precedent has been set for this under both CERT and CESP and the importance to overall energy saving of heating controls must justify Government intervention in this respect.

ⁱ Source: Energy Saving Trust and calculations using the EU Ecoboiler model developed for the Energy Using Products Directive.

ⁱⁱ Policy Brief: Improving the energy performance of domestic heating and hot water systems, Defra 2008.

ⁱⁱⁱ Calculated using CERT savings for room thermostat (with boiler interlock) and 6 TRVs in a 3-bed semi.

^{iv} Source: Review of sustainability of existing buildings, CLG November 2006. Identifies potential of 1.2 MtC for loft insulation and 2.1 MtC for cavity wall insulation.

^v Source: Heating and Hot water Industry Council (HHIC).

^{vi} BNDH19, evaluation of heating controls, Market Transformation Programme 2008

^{vii} Source: The UK Domestic Heating Industry – Actors, Networks and Theories, ECI 1996 (Background paper for Lower Carbon Futures)