

27 January 2017

# **Energy Saving Trust submission: The Future of Heat: Domestic Buildings**

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Energy Saving Trust is pleased to respond to the Business, Energy and Industrial Strategy (BEIS) consultation on domestic boiler standards.

Energy Saving Trust is the leading, impartial sustainable energy organisation. We work on behalf of governments and businesses across the UK providing services in the area of data, assurance, grant and loan administration, consumer engagement and advice.

For BEIS the Energy Saving Trust delivers the telephone-based Energy Saving Advice Service in England and Wales. We also undertake other research and awareness-raising work for the department on a project-by-project basis. Prior to the coalition government, for over 15 years, the Energy Saving Trust ran national energy advice services as a grant-funded organisation.

In Scotland the Energy Saving Trust is a principal delivery partner of the Scottish Government for home energy efficiency. We run comprehensive local and national advice and support programmes.

Public engagement on energy is at the heart of our work. In total each year the Energy Saving Trust handles just under half a million energy efficiency advice calls on behalf of UK and Scottish governments. Energy Saving Trust has a unique relationship with the public around energy saving and renewable energy and our response reflects that.

## Key points

- We strongly support the revision of minimum boiler standards and believe that a standard of 92% ErP is appropriate.
- We believe that introducing an equivalent minimum standard for hot water in combi boilers could be an effective way to deliver further efficiency gains and should be explored further.
- We strongly support requiring functional timers and thermostats to be installed as they give householders greater control over their heating. We also support mandating weather compensation as it can offer benefits to consumers and reduce inefficiencies.
- The private rented sector has some of the highest levels of fuel poverty of all sectors in England and the social housing sector accommodates some of the most vulnerable and at risk members of society. As such we strongly believe that these tenants should be able to benefit from any additional minimum standards that are introduced.
- Householders often do not make best use of the heating controls in their homes, as such it is vital that high quality advice and guidance is available. The recommendations of the Each Homes Counts (Bonfield) Review will help build up an effective framework to ensure this.

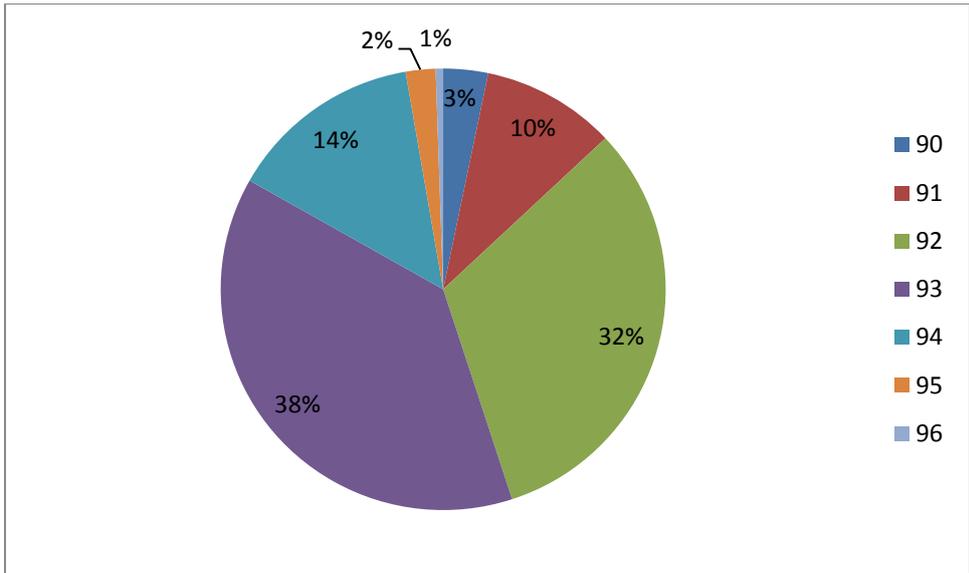
### 1. Is a three month coming into force period sufficient?

No response.

### 2a. Do you agree the minimum standard for domestic boilers in England should be changed to 92% ErP?

Yes.

Energy Saving Trust runs an Endorsed Products Scheme that includes information on 369 boilers across all major manufacturers. The list includes system boilers, combination boilers and heat only/regular boilers, with the two former categories making up the bulk of entries. 87% of the boilers on the Endorsed Products list already comply with the proposed requirement, as shown in the graph below. Whilst this Endorsed Products scheme is not fully representative of the market and would tend to be skewed towards better performing models it does show that an efficiency of 92% ErP is very much achievable technically and commercially. As such we believe that a 92% ErP efficiency standard is appropriate.



**2b. If not, what ErP rating is appropriate for each fuel type, and are there risks?**

No response.

**2c. What can be done to further improve the efficiency of a boiler beyond 92% ErP and what are the technical and cost implications for the industry and the consumer?**

We believe that a minimum efficiency requirement for hot water heating should be explored for combination ‘combi’ boilers. With the large-scale adoption of combi boilers in Great Britain avoiding any potential loopholes and ensuring consistency is important.

The current requirements only relate to space heating. In light of the “stretch” proposal to set PFGHRs as one of the options we instead think that a hot water minimum efficiency requirement could be an interesting alternative. As with the current minimum heating requirements we believe that the hot water requirement should be open to be met in whichever way is most cost effective. This ensures a technologically neutral approach and would drive up overall performance of combination boilers. Whilst a minimum efficiency requirement similar to the 92% ErP requirement is not applicable due to different system sizes and load profiles, setting an ‘A’ rating as a minimum could be an appropriate alternative. This is in line with (but more ambitious than) the approach being taken as part of the Ecodesign regulation for space heaters and combination heaters.

Boilers can achieve higher space heating efficiency values from the addition of further heating system components such as solar thermal and controls, as a combined system - covered by the ‘package’ energy label as specified in Regulation 811/2013. There is scope for improved awareness raising and education on best practice in this area, both among installers and consumers; the [LabelPack A+](#) project is working to achieve this.

Specifying minimum levels for standing losses of storage tanks could also be explored as a means to improve the space heating efficiency of heating system packages.

Further research on what is achievable and appropriate would be needed but we believe that the above is worthy of further investigation.

**3a. Do you agree that functional timers and thermostats should be a mandatory system component when a boiler is installed?**

Yes, we fully support this proposal. As referenced elsewhere in this response, control is a crucial part of ensuring that householders are able to heat their homes effectively.

It is our understanding that current best practice is to install functional timers and thermostats in boilers so this will add little additional burden to installers or manufacturers yet will ensure that all households get a minimum level of control over their system. The consultation document reports that 97% of households have central timers and 77% of households have room thermostats. The English Housing Survey finds similar numbers, reporting that in “homes with gas central heating, 99% had a timer, 85% had at least one room thermostat and 76% had TRVs”<sup>1</sup>. As timers and thermostats are already widespread we believe it is appropriate to set them as mandatory.

**3b. Will increased demand lead manufacturers to diversify designs to make it easier for consumers to find a product that suits their needs?**

No response.

**3c. What would be the advantages and disadvantages of mandating that all relevant heating system components be capable of communicating using an open communication protocol (e.g. OpenTherm)?**

We would refer to the principles outlined in BEIS/Ofgem’s recently closed call for evidence on a smart energy system. In the Energy Saving Trust’s response to this call for evidence<sup>2</sup> we agreed with the principles put forward: interoperability, data privacy, grid security, energy consumption. With regards to this question the issue of interoperability is most relevant. Facilitating interoperability across devices and appliances will be important to enable a competitive market and to prevent consumers being locked into certain manufacturers. We support initiatives that achieve this.

**3d. Do consumers engage effectively with installed timers and thermostats to maximise efficiency?**

No, our experience delivering advice and consumer facing programmes is that consumers do not engage effectively with timers and thermostats. Research we undertook in 2014 found that 52% of people turn their thermostats up when it’s cold outside, 35% turn up their thermostats to heat the room up more quickly and 38% think that leaving the heating on low constantly is more efficient than turning it on and off. As such we believe that as well as physically installing heating controls it is important to offer the advice and guidance to ensure that they are used effectively. We explore this more in response to question 9.

We would also make the general point that consumers do not generally frame things in terms of maximising efficiency. Instead consumers want to have warm, comfortable homes at a reasonable cost, as found in our 2014 Pulse research and in the DECC Rapid Evidence Assessment (REA) of how

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<sup>1</sup> ‘English housing survey 2014: energy report’ – p19 – DCLG. July 2016.

<https://www.gov.uk/government/statistics/english-housing-survey-2014-energy-report>

<sup>2</sup> <http://www.energysavingtrust.org.uk/about-us/our-policy-work>

heating controls affect domestic energy demand<sup>3</sup>. There is a large body of academic literature (e.g.<sup>4,5</sup>) showing that householders are not rational profit/utility maximisers and tend to view energy use very differently to what is predicted by traditional economic theory<sup>6,7</sup>. Framing this question in terms of maximising efficiency is not necessarily the most appropriate metric, instead we believe that householders' perceptions of control, warmth and affordability are arguably better indicators when considering engagement.

**3e. Please provide any additional information to support your answers to questions 3a- 3d. In relation to question 6, what evidence is there to indicate how engaged consumers are, and to what extent does usability present a problem for any consumers, and particularly vulnerable and disabled persons?**

No response.

**4a. Do you agree that weather compensation should be a mandatory system component when a boiler is installed in a domestic building in England?**

Yes, we support the introduction of weather compensators as mandatory system components. We are not aware of the in-situ performance of weather compensators however and believe that undertaking field trials to explore this would be beneficial.

As referred to in response to question 3d, 52% of people turn their thermostats up when it's cold outside. As such weather compensation, if properly understood by householders, should reduce inefficient behaviour of this kind and increase householder comfort.

**4b. Are boiler installers qualified and confident to install weather compensators and set compensation curves?**

No response.

**4c. Please provide evidence to support your answers to questions 4a and 4b. In answering, please consider:**

- **What technical factors have the greatest influence on effectiveness?**
- **The impacts on energy savings and costs of different types of device, e.g. sensor-based or internet-based**

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[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/277552/FINALHow\\_heating\\_controls\\_affect\\_domestic\\_energy\\_demand\\_-\\_A\\_Rapid\\_Evidence\\_Assessment.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/277552/FINALHow_heating_controls_affect_domestic_energy_demand_-_A_Rapid_Evidence_Assessment.pdf)

<sup>4</sup> 'Why do homeowners renovate energy efficiently? Contrasting perspectives and implications for policy' Wilson et al. May 2015. <http://www.sciencedirect.com/science/article/pii/S2214629615000298>

<sup>5</sup> 'Household energy use: Applying behavioural economics to understand consumer decision-making and behaviour' Frederiks et al. January 2015.

<http://www.sciencedirect.com/science/article/pii/S1364032114007990>

<sup>6</sup> 'Energy, the Environment and Behaviour Change: A survey of insights from behavioural economics' Baddeley. 2011. <https://www.repository.cam.ac.uk/handle/1810/242028>

<sup>7</sup> 'Behaviour change and energy use: behavioural insights team paper' Cabinet Office and Behavioural Insights Team. 2011. <https://www.gov.uk/government/publications/behaviour-change-and-energy-use-behavioural-insights-team-paper>

- The significance of different types of boiler burner control
- Specific circumstances in the home that might make a difference

**4d. What alternative solutions can minimise return temperatures in response to variations in heat demand? Please provide technical details of how alternatives might work, alongside details of expected impact on heating system performance, equipment supply and installation labour costs.**

No response.

**5a. Do you agree that Government should explore options to incorporate these additional technologies into minimum standards?**

We would broadly support setting the additional options into minimum standards. Consumer research we undertook with Ipsos Mori in 2016 found that cold draughts and difficulty in heating certain rooms in the house were the second and third most significant home problems respectively, above lack of parking, bad neighbours and distance from local amenities. TRVs and zonal controls can grant homeowners greater control over their home heating and prevent certain rooms being under heated or overheated. As referenced in response to question 3d 35% of people turn up their thermostats to heat the room up more quickly, indicating that that Time Proportional Integral controls (TPIs) or automated optimisation could increase householder comfort. However as indicated in response to question 6b and 9 we are not confident that consumers are well equipped to choose which technology is an appropriate solution for their homes. Effective advice and guidance will therefore be important when considering this option.

**5b. Should the private rented sector be permitted to opt out of more costly policy options, if undertaken?**

No. We do not see the basis on which the private rented sector (PRS) should be exempt and strongly oppose this proposal. The English Housing Survey finds that PRS properties are least likely to have a thermostat<sup>8</sup> or TRVs. DECC's heating controls REA finds that "[...] households living in private rented accommodation are significantly less likely to have a full set of heating controls than owner occupiers, or those in local authority or registered social landlord properties. They are less likely to have room thermostats and less likely to have TRVs fitted to radiators."<sup>9</sup> The PRS has by far the highest proportion of highly energy inefficient homes, as well as the highest rates of fuel poverty. Further, because of the underlying problems with split incentives tenants are rarely able to undertake energy efficiency improvements. Tenants rarely get to choose whether heating controls are installed or not and should not miss out on measures that are standard elsewhere. As stated in the consultation document, exempting the PRS would be "[...] at the cost of delivering less carbon savings and reduced bills savings and control for tenants" (p20). Due to the challenges tenants face there is an even stronger case for the PRS to be targeted than other sectors and there is by no means a case for the PRS to be exempt.

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<sup>8</sup> 'English housing survey 2014: energy report' – p19 – DCLG. July 2016.

<https://www.gov.uk/government/statistics/english-housing-survey-2014-energy-report>

<sup>9</sup> p28

[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/277552/FINALHow\\_heating\\_controls\\_affect\\_domestic\\_energy\\_demand\\_-\\_A\\_Rapid\\_Evidence\\_Assessment.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/277552/FINALHow_heating_controls_affect_domestic_energy_demand_-_A_Rapid_Evidence_Assessment.pdf)

**5c. If an opt out is offered to the private rented sector should a similar opt out be extended to the social rented sector?**

No. We do not think that the social rented sector should be exempt nor should the PRS. We welcome the fact that BEIS is exploring additional requirements to help householders save money and heat their homes more effectively. If BEIS concludes that there are clear benefits to mandating weather compensators and even further 'stretch' options then all tenants, social or private, should not be deprived of these benefits. Minimum requirements are effective in that they do not discriminate and therefore benefit all groups.

**6a. Do installers have sufficient familiarity, training and experience to properly install each of the technologies listed above?**

No response.

**6b. Can installers and consumers make confident decisions regarding which technology is an appropriate solution for a given household?**

No – we believe that more guidance would be useful to improve consumer decision-making and give installers greater confidence in recommending technologies. As indicated in DECC's REA "installers, rather than domestic consumers, frequently make decisions about which central heating controls to install and where to install them". We would point to the work being done taking forward the recommendations of the Bonfield Review for more on this (see response to Question 9).

**6c. Is there evidence to suggest that any of these technologies are incompatible with each other or with any of the technologies mentioned in this consultation?**

No response.

**6d. Do consumers understand how to use TRVs effectively?**

Our experience is that consumers do generally understand how to use TRVs as they are fairly intuitive technologies, however we are not confident that they currently make best use of them.

**6e. Are there other technologies that should be considered on an even footing with those listed above?**

The list of technologies in the consultation document is of course not exhaustive and there are many technologies that could be included now and in the future. We believe that as products are developed in this market there should be an easy and accessible process for them to be included in this list. A field trial with set criteria to evidence energy/financial savings could for instance be used. Other methods may be more appropriate but there should be a way for new products to be added to promote innovation and competition among heating controls and energy saving devices.

**6f. Please provide any evidence in support of your answers to questions 6a-6e. In answering question 6a please consider any practical barriers affecting any of the technologies, and any steps that could be taken to address those barriers**

No response.

**What evidence is there that TPI control can deliver energy savings in English households, and what is the range of energy savings (%) across various property types and circumstances?**

As BEIS will be aware the field trials that the Energy Saving Trust undertook on behalf of DECC in 2010<sup>10</sup> did not find a “[...] significant improvement in the heat efficiency of the heating systems from the operation of TPI controls.” We would however highlight the point made in response to question 5a indicating that householders are not currently making best use of their thermostats. TPIs and optimisation controls could help rectify this by maintaining a comfortable temperature at all times. In addition, householders place a high value on comfort, warmth and control, with these factors often being more important than financial considerations.

**8a. Do the functionalities of automation and optimisation effectively describe the ‘smart’ controls that offer the greatest benefit? Should there be greater focus on remote access?**

No response.

**8b. In what ways could greater uptake of these functionalities promote smart control innovation?**

No response.

**8c. What evidence is there to indicate how long a smart heating control lasts?**

No response.

**9. Is there demand for consumer advice, and how should it be delivered? What more can the industry do to encourage consumer engagement with heating controls and their heating system?**

There is clear demand for consumer advice on home heating systems. The Energy Saving Advice Service received nearly 150,000 calls from households in the last financial year, and at least 40% of these were specifically calling to ask about their heating system. We also know that householders seek advice from many other sources when considering home energy improvements, and so these figures represent a small proportion of the total demand for heating system advice.

Householders look for advice from different sources at different stages in their journey from first thinking about an energy saving improvement to making the change, and eventually getting the maximum benefit. Research carried out for the Energy Saving Trust by Nutshell in December 2015 looked at the information householders require at several stages leading up to making a decision on an energy saving improvement, such as a replacement heating system. The four phases identified, and the key sources of information used, are as follows:

Generally gathering information	TV, other media, leaflets, neighbours’ projects
Initial understanding to inform myself	Google, friends/neighbours
More specific information	Forums, specific websites

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<sup>10</sup> ‘In-situ monitoring of efficiencies of condensing boilers – TPI control project extension’. July 2010. [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/47962/1149-condensing-boilers.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/47962/1149-condensing-boilers.pdf)

Talk to experts	Installers, designers, DIY stores
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This research covered only the decision making process for the householder. We know that advice is also needed at the commissioning stage, where it will inevitably be provided by the installer. Advice may also be required at a later stage, in which case it may be provided by the same installer, if known, or may be considered as a stand-alone energy improvement journey, in which case the table above applies again. For example, a householder with an existing heating control system that they do not understand will go through a similar but usually much quicker process to someone purchasing a new heating controller or heating system.

Given the range of advice sources used by householders at different stages there is a clear risk of confusion and increasing mistrust if inconsistent and contradictory advice is provided.

In terms of advice on choosing new heating systems, and on how to set heating controls, householders rely heavily on system installers for detailed advice. Installers can be very knowledgeable about the technologies they supply and, as visitors to the home, are in an ideal position to give good quality advice tailored to the householder's needs and level of understanding. However, there is a clear risk of lack of impartiality, and potential inconsistency in both level and content of advice given.

For householders to receive appropriate and consistent advice throughout their journey, we believe that two areas need to be addressed:

1. Better control of, and support for, the advice given to householders by installers, manufacturers and other commercial providers
2. More detailed and tailored advice from impartial sources

Point one is largely covered by the recommendations in the Each Home Counts (Bonfield Review) review, specifically the requirement for Quality Mark companies to provide advice to an agreed standard, and the development of an Information Hub that provides approved advice messaging for installers and others to use. However, the review concentrates on the process of home refurbishment and, whilst post commissioning advice is included in the scope, there is a risk that this phase of the householder's journey is given less consideration than the design, purchase and installation phases. This is a particular concern regarding appropriate advice on the use of heating controls, which has been identified in this consultation as a key issue.

Energy Saving Trust is currently working with BEIS and industry stakeholders on the implementation of the advice and guidance recommendations of the Each Home Counts and part of our proposals will be a range of materials focusing on heating controls at handover and beyond.

Point two is also covered to some extent in the Each Home Counts recommendations. The development of a Data Warehouse could assist an impartial remote advice service to make more appropriate recommendations on both heating system upgrades and on use of the existing heating controls, using centrally stored information on the house's existing heating system, controls, heating requirements and current energy use patterns. The Information Hub could also help in ensuring that

advice given is consistent and accurate whatever the level of information available on the existing heating system.

As highlighted in various points in this submission many consumers do not make best use of the existing heating controls in their homes. As such future remote advice services should be designed to include tailored heating control advice as a significant element alongside advice on physical improvement options, regulations and support schemes. Provided installer advice is sufficiently supported and controlled, the two advice sources can effectively reinforce each other, leading to an increasing pool of householders enabled to control their heating efficiently and effectively.

Finally, we would highlight that the roll out of smart meters provides significant opportunities to encourage consumers to engage with their heating controls and their heating systems. If these opportunities are to be realised in full it will be important that consumers understand what the information presented on their in home display (IHD) unit means, how to use it and how to adapt their behaviours as a result. Over recent years the Energy Saving Trust, with funding from the Scottish Government has been developing a smart meter advice tool, SMAP, which uses smart meter data to inform personalised energy advice. It was developed to make use of metering data received from smart-type secondary meters installed in a small number of pilot homes in Scotland. Further development work is now underway to ensure that the tool can access smart meter data via the DCC and use it to inform the advice provided by the Scottish Government funded Home Energy Scotland network of advice centres which currently advise over 90,000 households each year.