

Call for Evidence: Energy Efficiency

Energy Efficiency Deployment Office

8 February 2012

Call for Evidence

Introduction

1. The Climate Change Act 2008 established a legally binding target to reduce the UK's greenhouse gas emissions in 2050 to at least 80% below base year levels^{1,2}. To achieve this, the UK must move towards a more efficient, low carbon and sustainable economy, which will also reduce our future reliance on fossil fuel imports and exposure to higher and more volatile energy prices³.
2. Just like any other resource fundamental to modern society, energy must be used as effectively as possible. At the levels of both the whole economy and the individual, the less spent on meeting demand for energy services, the more finance can be allocated to other priorities. Forthcoming policies such as the Green Deal and Smart Meters will, along with those policies already in place, help achieve this. However, for all sectors of the economy, consumers need to have a clear understanding of how they can participate in improving the country's energy efficiency. Based on their particular technical and energy use characteristics, we consider the key energy efficiency 'sectors' to be domestic, non-domestic buildings, industry, electricity generation, services (not including buildings), and transport.
3. The potential social, economic and environmental benefits of increasing the UK's energy efficiency are significant. The new Energy Efficiency Deployment Office (EEDO) has been set the challenge of finding effective ways to achieve this potential, building on those energy efficiency policies that are already in place or are being implemented.

¹ Climate Change Act 2008, <http://www.legislation.gov.uk/ukpga/2008/27/contents>

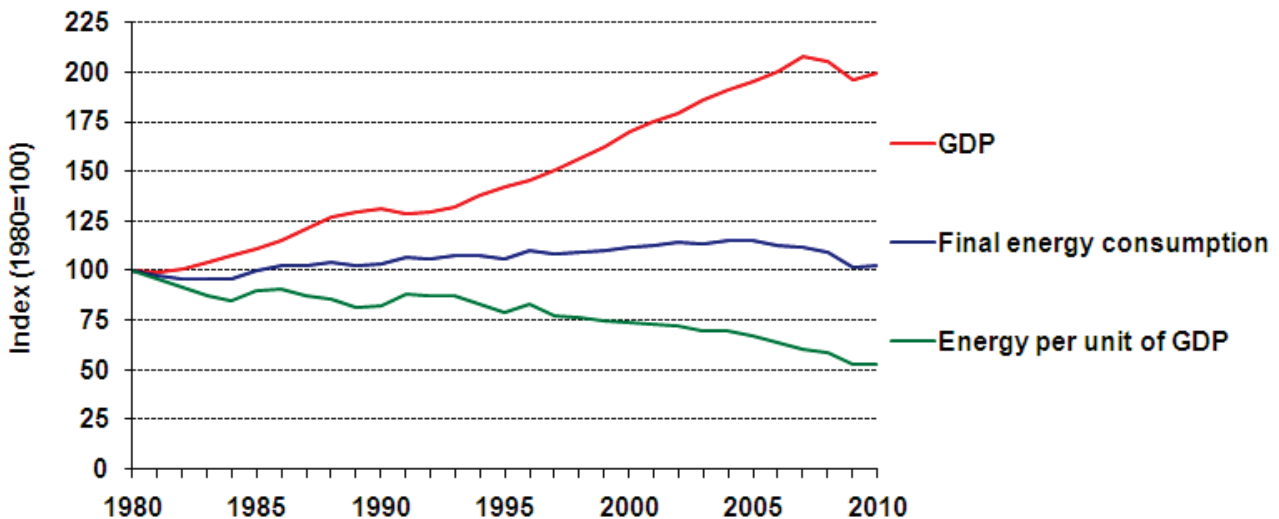
² Scotland's statutory emission reduction targets are set under the Climate Change (Scotland) Act 2009, <http://www.scotland.gov.uk/Topics/Environment/climatechange/scotlands-action/climatechangeact>

³ The Carbon Plan: Delivering our low carbon future, December 2011, http://www.decc.gov.uk/en/content/cms/tackling/carbon_plan/carbon_plan.aspx

The potential for energy efficiency

- The UK has already invested much in energy efficiency, as demonstrated in the substantial reduction in energy intensity shown in Figure 1.

Figure 1: Final energy consumption^{4,5}, GDP and energy intensity (GDP per unit of energy consumed).



- Figure 1 shows that following the recent recession, final energy consumption is at a similar level in 2010 as in 1980 and that over the same period GDP has doubled, so that energy intensity (energy per unit of GDP) has halved.
- Nevertheless, existing evidence does point to significant further cost-effective potential for energy efficiency throughout the UK economy. For example, the recent Green Deal impact assessment⁶ indicates that there are many cost-effective energy efficiency measures to further reduce carbon emissions in the domestic and non-domestic sectors (See Figure 2 below).

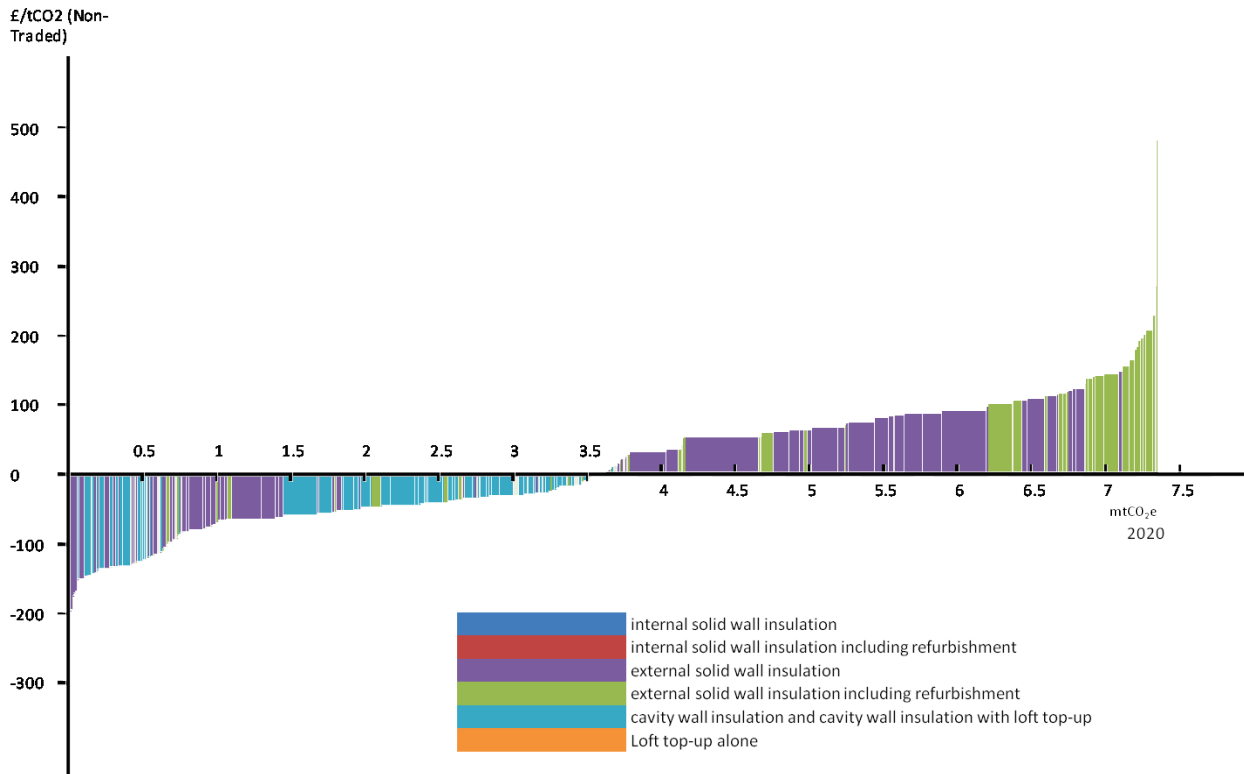
⁴ Energy consumption data has been weather corrected from 2002 onwards.

⁵ Excludes energy used for non-energy purposes (e.g. lubricants)

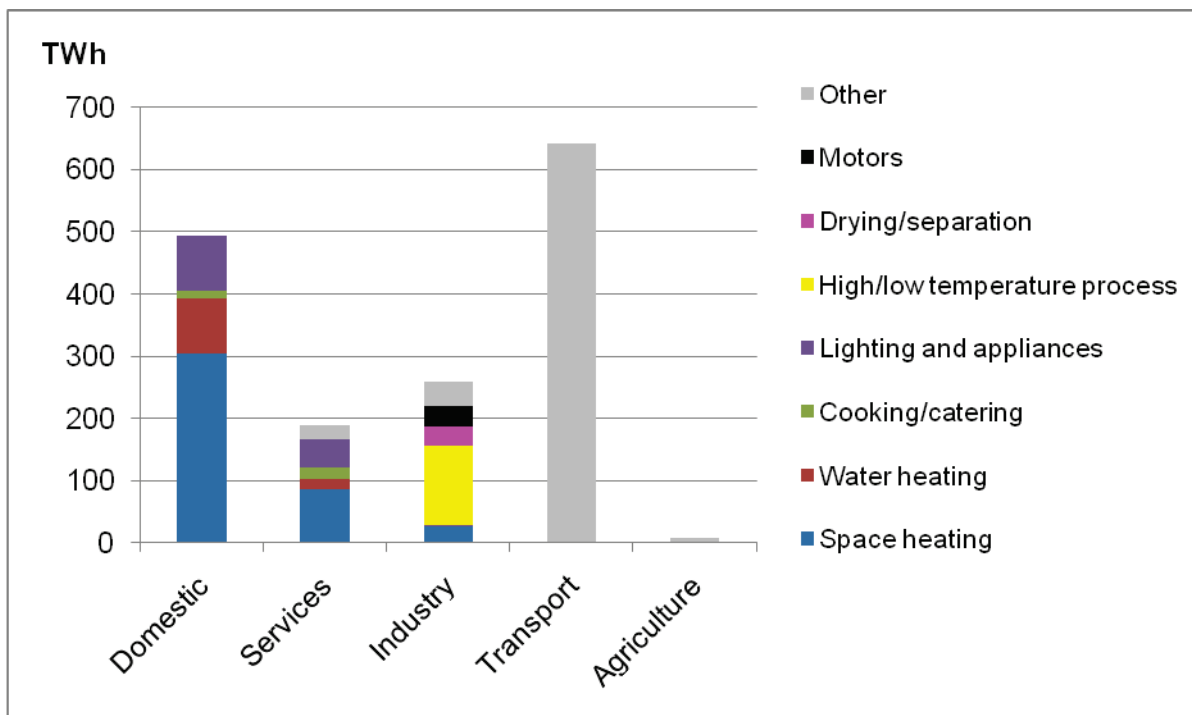
⁶ Green Deal Impact Assessment, DECC, November 2011,

http://www.decc.gov.uk/en/content/cms/consultations/green_deal/green_deal.aspx

Figure 2: Marginal abatement costs for major insulation measures in UK dwellings in 2020, after assumed learning by doing and increased fossil fuel prices



7. Figure 3 covers 90 per cent of final energy used in the UK, highlighting the tasks for which most energy is used. The transport sector has the highest energy use (40%), followed by the domestic sector (31%). Industry and services account for 16% and 12% respectively. Space and water heating account for 33 per cent of energy use but in the domestic sector these account for almost 80 per cent of total energy use. This evidence sets into context where potential energy savings could be made whether through technical improvement or behaviour change.

Figure 3: Final Energy Consumption by sector and application⁷: 2009

Source: *Energy Consumption in the UK*

8. In developing its approach, EEDO will need to understand the magnitude of the potential for further energy efficiency. It will examine where that potential lies and what is cost-effective to undertake. Cost-effective potential might be in areas already covered by Government policy, where barriers such as those described below have impeded progress, or other areas that are not addressed by existing policies.

⁷ <http://www.decc.gov.uk/en/content/cms/statistics/publications/ecuk/ecuk.aspx>. Excludes renewable energy, blast furnace gas, coke oven gas, heat sold and non-energy use.

Barriers to the uptake of energy efficiency measures

9. While the case for greater energy efficiency is strong, there is also evidence that levels of investment in energy efficiency are lower than would be expected given its potential benefits. An effective strategy will need to address these barriers which relate to market failures, behavioural trends and externalities.
10. There are a number of key market failures including:
 - **Lack of trust and access to information:** energy efficiency technology can be complex and consumers are often unaware of the benefits, which are hidden in technical detail, and may not know who would be a suitable adviser on the potential options.
 - **Accessing finance:** consumers and businesses can find it difficult to access finance, and some will face high interest rates that can result in energy efficiency investments no longer being cost-effective for individuals.
 - **Split incentives:** Such financing issues are amplified if those funding the energy efficiency improvements do not see the benefits of their investment, as in the case of the landlord tenant split
11. The way consumers respond to complexity and uncertainty, as demonstrated by behavioural research, can compound the impact of the above market failures. For example, behavioural research underlines the importance of the status quo in making decisions, something that is at odds with the need to be proactive when making an energy efficiency related investment.
12. Hassle and inconvenience resulting from changing behaviour or installing new equipment also act as a barrier to investing in energy efficiency. This hassle factor combined with inertia means that while people may 'want' to be more energy efficient, they often fail to follow through.
13. Even if such barriers could be overcome, the existence of wider social costs and benefits, or externalities, means that society overall would benefit from greater investment in energy efficiency than individual decisions would deliver. This is because these social effects are not fully reflected in the price faced by consumers. Key externalities are:
 - The costs associated with climate change, which are not always reflected in the prices paid for energy, especially outside of the EU Emissions Trading System (which covers electricity generation and heavy industry).
 - The benefits to society of energy security, which can be improved through more efficient energy use.
 - Through greater investment in innovation, the potential for cost-effective energy efficiency improvements is increased for all. However, this benefit is not taken into account at the level of the individual decision maker. Innovation in technology and energy efficiency business models is imperative to having a dynamic energy efficiency market and needs to be encouraged.

The Government's existing energy efficiency policies

14. Any further work needs to be conducted within the context of those mechanisms that are already in place, or are being implemented, and how they align with the barriers that have been identified. Any further action by Government to encourage energy efficiency within the economy will need to account for these existing mechanisms, avoid unnecessary complexity, and comply with the principles of better regulation.
15. The Green Deal is set to be available in late 2012 and will provide the opportunity for consumers to install money saving energy efficiency measures without upfront cost, which will instead be repaid through future energy bills. Further, the Energy Company Obligation (ECO) will subsidise energy efficiency and heating measures for the poorest and most vulnerable householders, and for particularly expensive measures such as solid wall insulation in hard to treat properties.
16. Other energy related policies relevant to both the **domestic** and **non-domestic building** sectors include the informational benefits of Smart Meters, which are due to be rolled out to homes and small businesses in Britain by 2019; Building Regulations, such as those introduced in 2010 (Part L⁸) that improve energy efficiency standards for new homes and buildings by 25%⁹; and the Renewable Heat Incentive (RHI)¹⁰. Energy efficiency in the non-domestic building sector has also benefited from the Salix finance¹¹, which is an interest-free loan scheme for public sector organisations¹², and the CRC Energy Efficiency Scheme¹³.
17. Under the Eco Design and Energy Labelling Directives Government is achieving minimum performance standards for a wide range of energy using products used in households and industry¹⁴. So far, the minimum standards we have already introduced will (by 2020) bring us benefits of 7MtCO₂/year saved and £850M/year off consumer electricity bills.
18. **Industrial** energy efficiency is also incentivised by taxing energy use through the Climate Change Levy (CCL)¹⁵; Climate Change Agreements (CCAs) provide energy intensive industry with a discount from CCL (currently 65%, rising to 90% for electricity in 2013) in return for meeting energy efficiency or emission reduction targets. For some energy intensive industries, the EU-Emissions Trading Scheme¹⁶ can incentivise efficiencies as companies look for ways to reduce their carbon emissions. The EU-ETS also applies to **electricity generation**, setting an

⁸ The Part L equivalent in Scotland in Part J.

⁹ Building regulations, DCLG, <http://communities.gov.uk/planningandbuilding/buildingregulations/>

¹⁰ Renewable Heat Incentive, DECC,

http://www.decc.gov.uk/en/content/cms/meeting_energy/renewable_ener/incentive/incentive.aspx

¹¹ Salix finance, www.salixfinance.co.uk

¹² In addition, Scotland also has its own interest-free loan scheme for the public sector, the Central Energy Efficiency Fund (CEEF), http://www.energy-efficiency.org/ceef/CCC_FirstPage.jsp

¹³ CRC, DECC, http://www.decc.gov.uk/en/content/cms/emissions/crc_efficiency/crc_efficiency.aspx

¹⁴ Products, Defra, <http://www.defra.gov.uk/environment/economy/products-consumers/policy/>

¹⁵ CCL, DECC, <http://www.decc.gov.uk/en/content/cms/emissions/ccas/ccas.aspx>

¹⁶ EU-ETS, DECC, http://www.decc.gov.uk/en/content/cms/emissions/eu_ets/eu_ets.aspx

overall cap on the total emissions allowed from all installations and complementing the drive to be efficient that is already a natural part of the competitive electricity market.

19. As in other sectors, the energy efficiency of **services** can benefit from improved logistics and initiatives such as Government's product policy. Efficiency in the **transport** sector can be increased by improved logistics and driving techniques and, most significantly, continued improvement in vehicle motor efficiency¹⁷.

Electricity Demand Reduction

20. As well as improving overall energy efficiency, achieving a reduction in the levels of electricity used will make an important contribution to achieving our carbon reduction targets in the most cost-effective manner. In the Electricity Market Reform White Paper the Government committed to assess whether there is sufficient support and incentives to make additional improvements in the efficiency of electricity usage and consider whether there is a need for appropriate additional measures. DECC's Electricity Demand Reduction Project is carrying out this commitment and will complete its assessment by summer 2012

¹⁷ OLEV, DfT, <http://www.dft.gov.uk/topics/sustainable/olev/>

The Energy Efficiency Deployment Office

21. We are doing much through these policies, but there is a need to do more if we are to realise the further potential energy efficiency that is available. In the 23 November 2011 Annual Energy Statement¹⁸, the Secretary of State emphasised the importance of improving the UK's energy efficiency, by providing a key contribution in the fight against climate change as well as saving householders and businesses money on fuel bills. EEDO has been set up to tackle this agenda and consists of a central strategy and delivery team alongside the analytical expertise of DECC's climate change economists and consumer insight specialists.
22. EEDO will support the delivery of our existing energy efficiency policies by improving our evidence base and analysis, ensuring effective delivery, and by bringing coherence of the Government's 'offer' to the consumer. EEDO will also develop a far reaching energy efficiency strategy that will identify where there is further energy efficiency potential across the economy and how this might be realised. In doing so, the Office will collaborate closely with other departments, for example on product standards (Defra), low carbon transport (DfT), building regulations (DCLG) and the growth strategy (BIS).
23. EEDO will also work closely with the Devolved Administrations to ensure a UK-wide approach as far as possible, while respecting the devolution settlements. The Scottish and Welsh¹⁹ Governments are represented on EEDO's management board, while the Office will maintain a strong working relationship with Northern Ireland, where the promotion and regulation of energy efficiency is devolved. EEDO will also play a leading role in the negotiation of the EU Energy Efficiency Directive and in the promotion of energy efficiency benefits on the world stage, while ensuring the UK learns from the work of other leading economies on this agenda.

¹⁸Annual Energy Statement, DECC, November 2012,

http://www.decc.gov.uk/en/content/cms/news/aes_2011/aes_2011.aspx

¹⁹ The Welsh Government published its National Energy Efficiency and Saving Plan in March 2011 which sets out the actions that the Welsh Government will take to promote energy efficiency in all sectors:

<http://wales.gov.uk/topics/environmentcountryside/energy/efficiency/efficiencyplan/?lang=en>

Call for evidence questions

24. To support the objectives of EEDO and the development of an energy efficiency strategy by the end of the year, this Call for Evidence asks the following questions:

- a) The UK has become more efficient over time but there is significant additional potential that could be tapped in the sectors of domestic and non-domestic buildings, and industrial, electricity generation, services (excluding buildings), and transport sectors. **Where would you prioritise further Government focus and why? How large is the potential for further energy efficiency gains? Which specific technologies and behavioural measures have the greatest unrealised potential? What are the costs and other constraints on realising that potential?**
- b) Barriers resulting in under-investment in energy efficiency include market failures and financial, organisational and behavioural barriers. **Within the context of the existing and forthcoming UK policy framework, what lessons do you think we can learn from other countries to help us further overcome these barriers?**
- c) Investment in energy efficiency measures and energy service contracts by third party investors is believed to be an important aspect of improving energy efficiency uptake but to date there has been limited uptake in the UK. **Can you provide examples of barriers to further uptake of third party finance solutions and examples of third party finance solutions, internationally or in the UK, that overcome the barriers to further uptake?**
- d) EEDO is commissioning two evidence reviews which will draw on empirical evidence to highlight the effectiveness of interventions designed to influence specific energy-related behaviours²⁰ in both the domestic and non-domestic sectors, including those specific behaviours that result in increased energy efficiency. The reviews will pull out what works in driving improvements in energy efficiency and, for the non-domestic sector in particular, will also cover barriers to action and key organisational factors that promote action to energy efficiency. The reviews will identify any gaps in our knowledge and priorities for future research. **Of what empirical evidence are you aware that looks at the effectiveness of specific interventions relating to energy behaviours in the domestic and non-domestic sectors?**

²⁰ For the purposes of these reviews behaviours includes any actions that lead to improvements in how energy is used and managed within homes and organisations. These behaviours may cover one off decisions such as installing insulation or be part of ongoing operation/maintenance of buildings such as using heating and lighting controls or influencing people's habits. A broad definition of 'behaviours' is taken and cover those that specifically target improvements to energy efficiency such as installing insulation or other behaviours that are not motivated by energy efficiency such as the routine upgrade of appliances or equipment but nevertheless have that effect.

- e) We must ensure that energy customers have a clear understanding of the potential benefits of energy efficiency. **Have you been involved in, or are you aware of, any case studies where energy efficiency benefits have been realised and effectively measured? What were the benefits of these projects and what were the costs, including those of monitoring?**

- f) Energy efficiency is not only about how we consume energy. It is also about producing and converting energy as efficiently as possible; that is, making sure that we get the highest possible amount of energy output from a given fuel input. Examples include the use of higher efficiency boilers, flue heat recovery systems, combined heat and power plants, recovery and use of heat discharged from industrial processes. **Do you have any concrete examples where more efficient processes such as these are saving energy and money? What if anything should DECC do to incentivise such process efficiency?**

- g) **What else should DECC do to deliver permanent, additional reductions in UK electricity demand to enable cost-effective achievement of carbon targets? Why should DECC do this?**

- h) If it were to develop a market incentive measure to achieve permanent reductions in electricity use, Government would need to estimate the counterfactual baseline that any associated efficiency improvements could be measured against. **What methods might be used to achieve this?**

Timing

This Call for Evidence represents EEDO's first step in engaging the wider understanding and knowledge in those sectors where energy efficiency is, or will increasingly become, important and builds upon early work being carried out by EEDO. Responses will help guide our future direction and we would welcome views from all interested parties on the questions set out above.

Issued: 8 February 2012

Respond by: 4 April 2012

Enquires and responses to:

- **By email:** eedostrategy@decc.gsi.gov.uk
- **By post:** John Sartin, Department of Energy and Climate Change, 2nd Floor Area A, 3 Whitehall Place, London, SW1A 2AW
- **By phone:** 0300 068 6096

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The Department will process your personal data in accordance with the DPA and in the majority of circumstances this will mean that your personal data will not be disclosed to third parties.

If you have any comments or complaints about the call for evidence process, please email consultation.coordinator@decc.gsi.gov.uk.

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Department of Energy & Climate Change
3 Whitehall Place
London SW1A 2AW
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