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*AECB response to DECC Electricity Demand Reduction Consultation –
on options to encourage permanent reductions in electricity use*

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About the AECB, AECB Members & AECB Local Groups

Learning together, leading by example, lobbying for change

AECB, the Sustainable Building Association, is a network of individuals and companies with a common aim of promoting sustainable building. It brings together builders, architects, designers, manufacturers, housing associations and local authorities, to develop, share and promote best practice in environmentally sustainable building.

Established in 1989 the main aim of the AECB was to increase awareness within the construction industry of the need to respect the environment. The AECB is currently incorporated as a Company Limited by Guarantee with around 1400 members. The organisation holds an annual two-day conference attracts which attracts in the region of 90 members. The conference includes tours, guest speakers, workshops and networking.

The AECB is run by its members and is an independent, not for profit organisation. We promote excellence in design and construction, rather than gimmicks and green accounting tricks. The AECB's standards and advice are founded on a detailed and realistic understanding of the performance of buildings, constructed and refurbished in the real world, for real users.

A network of 22 Local Groups is available nationwide (including Scotland and Wales) to all members of the AECB with regular events being held in a number of venues throughout the country. These meetings, or 'mini conventions', not only provide a forum for discussions with leading experts, but also offer opportunities for networking and a meeting place for socialising with likeminded people.

Groups of AECB members organise events related to the aims of the AECB and, in keeping with the ethos of the Association, these are run by their members as independent, not for profit groups. Although run autonomously, their focus remains on sustainable building and all meetings are open to all AECB members.

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AECB's response, on the face of it, challenges some of the beliefs inherent in 'liberalisation'. But the short window of opportunity we have to ensure affordable investment in low-carbon, secure energy supplies suggests that we should consider all options which would not only make the large reductions in GHG emissions desired by most parties but also reduce costs to consumers and make the energy system more secure and resilient. This is the basis of the AECB's response.

We urge the government to change the way energy companies are licensed to operate, putting an obligation on them inter alia to help deliver energy efficiency measures on consumers' premises, and ensuring that they are required to invest in cost-effective energy efficiency before more expensive new generation. This would not be in the "add on" way that, for example, the Green Deal / ECO has been set up, which does not incentivise the companies with anything other than the threat of fines. (See answer to Q2 and the accompanying note, 'the logic of supplier investment in efficiency' for further explanation, and evidence.)

We do not see why there need be any political concerns over re-regulating electricity supply to consumers. In fact there is a good chance that such a move would be very popular, if it brought with it some stabilisation of energy prices, not to mention a reduction. We suggest that urgent political thought be given to accommodating such a move, given the relative ease with which DECC's ambitions to reduce energy use could be realised if the electricity industry gains financially from investment in more efficient use of electricity - instead of losing from it, as is the case now and would be the case under the schemes proposed in this consultation.

The lower number of tariffs arising from a regulated arrangement, usually just one or two per region (e.g. the West Midlands, and indeed as in The Cooperative's regional tariffs, which are typical £60/year plus 11.3 p/kWh), could be highly popular with consumers. They have been complaining vociferously about the obfuscation and confusion seen in the present system of several hundred tariffs.

Hidden costs and hidden benefits

Your impact assessment notes there would be '**Hidden costs**' to investing in energy efficiency. These are "non-financial costs (including transaction costs) faced by consumers in undertaking electricity demand reduction projects". Of course this is true.

However, what is not addressed other than fleetingly in the assessment, is the potential scale of '**hidden benefits**' or, looked at another way, the hidden costs of business as usual.

You do acknowledge **Security of supply** arising from demand reduction: "an EDR policy should lead to a reduced requirement to import fuels, thus improving security of supply. It may also assist with ensuring strong capacity margins in the short- to medium-term where large volumes of coal plant are being retired due to environmental requirements".

This must surely be a very great benefit. Note that along with improved energy security, demand reduction offers protection from fluctuating commodity prices, including fossil fuels, and a relatively better balance of payments as efficiency can be largely home-grown.

You also acknowledge **Leadership benefits** and **Air quality benefits**, although it is hard to find reference to a reduced cost of decarbonisation, which would surely also be the case.

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The DECC documents however fail to consider the large, and avoidable, increased electricity consumption implicit in the government's published ambitions to electrify heat and transport. It is crucial that DECC re-assesses this ambition, in the light of the direct reversal which this move makes of the potential benefits set out above.

Electricity is too high-grade an energy vector to squander on energy end-uses that could equally or indeed more efficiently and securely be provided (and more easily stored) via other routes. Most heat users can be more effectively supplied directly eg from solar heat (passive and active, the latter including large-scale installations), gas or other CHP, geothermal heat and in the countryside combustible fuel sources (e.g. a £3k condensing LPG boiler with a small solar thermal system to save fuel in summer/spring/autumn emits the same/less CO₂ than a £15-18k ground source heat pump). Heating a swimming pool can use much lower-grade heat than that needed by high-temperature industrial processes such as cement manufacture, and there are large efficiency savings to be made from using the most appropriate quality of energy for each application (more information in AECB report 'Less is More').

It is inadequate, and mistaken, to lump these end uses all together and imagine that 'one decarbonised grid decarbonises all' is the most effective, and cost effective, way to decarbonise, keep costs down, and protect our energy security. There are very serious doubts over the costs and feasibility of this way forward.

If we did proceed with this approach, savings from electricity efficiency measures would be swamped many-fold by increases in non-essential demand for electricity. For every 100 watts saved on lights and appliances, typically much more load, possibly a kilowatt, or 1,000 watts would be added in the form of space and water and process heating and road vehicles. (Although we very much doubt that electric road vehicles will ever compete with the renewable alternative of using "power to gas" technology to turn unwanted intermittent power into storable, portable fuels. This approach would largely obviate the expense of reinforcing the electricity grid by a factor of five or more, buying each car a £5-10k battery bank then on top of this asking all car drivers to accept a range of 150 km rather than 1,000 km, the only expense being the synfuel plants).

If domestic space heating is electric, fitting low-electricity appliances and lights is of debatable value. It reduces the internal heat gains. For 8-10 months per year, most of the electricity saved on appliances must be replaced by electric heat. In a well-insulated house, this heating period drops to 5-7 months; e.g., November to April inclusive, but it still negates half the saving made on lights and appliances.

Affordability of savings

What is the scope for electricity savings? Anything cheaper than new generation, would be cheaper!

Figures for the costs per MWh supplied are variously given as £105 by DECC, and around £80 - £100 by the Green Alliance. However, these appear to be generated costs, not delivered costs. Also the costs cited by DECC are average costs. If one is saving electricity, one must compare the

cost of conserved energy to the long-run marginal cost of new supply, not the average cost of existing supply.

The average costs already compare extremely well with the cost of the enormous negawatt resource available at even £30 / MWh. The resource would be even larger if we were willing to exploit negawatt resources costing of the order of 15 p per delivered kWh, i.e., level with new generation costs.

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It should also be borne in mind that generation is not the only cost for electricity supply, Transmission and distribution losses of 12.2% to low voltage loads reduce the amount of energy that reached the domestic or small commercial end user, and also incurs capital and maintenance costs of its own. Transmission and distribution losses of 12.2% mean that the delivered marginal cost is $£105/0.88 = £119/\text{MWh}$).

Other costs associated with transmission and distribution add more again, typically £30-£40/MWh, meaning that the marginal cost of supplying electricity at a generated cost of £100/MWh to a small 230 V consumer looks to be around £150/MWh (15 p/kWh). This buys a great deal of investment in efficiency measures, as an alternative.

In fact, we have rarely encountered any technologies for more efficient electricity use which have a cost of conserved energy as high as 15 p/kWh. More typically they are around 3 p/kWh, because the expensive ones have not even been investigated yet.

Missed opportunities, particularly in domestic sector

You suggest in your consultation that you are mainly consulting on efficiency investment for commercial and industrial users – despite expecting an increase in electricity use for domestic heating - because you believe that "as a consequence of .. existing policies a large proportion of the technical potential for electricity savings ... is likely to be captured by existing policies."

Few of those working in the construction sector - including most of our members - think that this is remotely the case. It is therefore an error to exclude more concerted action on domestic energy efficiency, both in terms of appliances (for which very little bar the basic EU standards are available) and in terms of fabric and system efficiency for space heating and hot water – a surprising amount of which is already supplied electrically, including many flats and rented offices (although most of these would have a cost effective potential to reduce CO2 emissions by installing non-electric space and water heating).

There is a large potential in the area of heat efficiency which will be untouched by the Green Deal and ECO, both in terms of the possible depth of improvement, and in terms of households that will see no improvements at all. (see for example <http://www.theconstructionindex.co.uk/news/view/green-deal-is-huge-missed-opportunity-says-insulation-firm>, <http://www.katedeselincourt.co.uk/blog/wp-content/uploads/2013/01/Green-Deal-full-references.pdf>,)

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Many dwellings with technical potential for energy efficiency upgrades will be untouched by the Green Deal and ECO as currently planned, for a variety of reasons (some revealed to DECC by research which DECC commissioned) including:

- Measures fail to meet Golden Rule
- Measures meet Golden Rule but savings after finance payments are so marginal that householder is uninterested
- Householder has poor credit rating, reportedly 20-30% of the population may be in this category
- Householder is ineligible for ECO (wrong measures, wrong tenure, wrong neighbourhood, etc.)

Our report *Less Is More* set out in detail several reasons why the Green Deal needs to be re-structured if it is to deal with the collective magnitude of the problem. The current situation comprises not just excessive GHG emissions but a range of hidden social and economic costs including:

- Poor insulation and draughtproofing leading to discomfort, damage to fabric, mould growth
- Often unaffordable space heating costs
- Resulting fuel poverty (a 2011 Welsh assembly report gives this as over 40% in rural areas) and
- 25,000 excess winter deaths per year, a level not seen in countries with colder winters and better-insulated and heated buildings, including Scandinavia, Poland, etc.

As UCL put it “Payback measurement does not consider other values such as improved quality of life for occupants, value added to the property and better health outcomes.”¹

There have been several reports that not only will these schemes fail to achieve most of the technical potential which is out there, but they will lead to a drop in the rate of building upgrade, compared to the years up to the end of 2012. Furthermore, the Green Deal and ECO are only targeting Building Regulations levels of insulation and other energy efficiency. This means barely half the wall insulation customarily used in other European “moderate climate” countries, and generally only tackling a few building elements at a time. This is despite the fact that a higher efficiency level is technically feasible and in some cases straightforward and economic to achieve (for instance, by installing more measures, using higher specifications (eg thicker and/or higher-performance insulation, higher-rated doors and windows, etc). Also in rural oil- and LPG-heated houses that are undergoing major renovation it is worth mounting a full “Passivhaus” retrofit (the high cost of these fuels shortens the pay-back time of such an extensive renovation, even a

¹ <http://www.bartlett.ucl.ac.uk/energy/news/retrofitting-can-cut-carbon-emissions>

marginal cost of £30k, to a worthwhile level, using the Treasury Green Book real interest rates to reflect the value of such projects from a UK viewpoint).

The Technology Strategy Board is currently analysing the findings from their retrofit for the future project in which many achieved much higher savings – and in real life – than are even aimed at in theory by the Green Deal and ECO. Early analysis indicates around 50% reductions in heat demand while still allowing occupants to be far warmer than before: “Done well, deep retrofit transforms the internal conditions in dwellings at the same time as halving overall CO2 emissions”.² Other real-life post-retrofit studies have found similar improvements are feasible.³ It is not altogether surprising; this only amounts to bringing up UK dwellings to the standards of insulation and heating which North Americans and Scandinavians have enjoyed in their homes for the last 50 years or more.

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In relation to new buildings, it is possible to achieve lower energy use than in the current and even the 2016 proposed building regulations, in both domestic and non-domestic buildings, sometimes at little or no extra cost. The measured heat use of new housing is the quantity to improve on, not the theoretical heat usage which has been made meaningless by a combination of imperfect models and a gap between what is supposed to be built and what is really seen to be built on site.

The structure of the proposed 2016 ‘zero carbon’ standard focuses on calculated carbon emissions and not on energy use, meaning that the focus is removed from minimizing energy and especially electricity use. Instead, design attention, client resources and public investment is diverted to spurious ‘offsetting’ e.g. with photovoltaic panels. This is despite the fact that these technologies may represent poor value for money in terms of both energy and carbon saving (some of them appear to reduce GHG emissions at a cost of over £1,500 per tonne of CO2 equivalent) and may well not diminish the peak load on the supply system which is the overriding concern for UK electricity supply up to about 2020.

AECB is surprised that DECC appears unaware of the above, and unaware that there is potential to achieve a great deal more by giving more support to schemes to improve fabric standards in UK buildings.

In summary, and in order of increasing of effectiveness:

Better information, though necessary, is nowhere near sufficient.

2

<http://bob.instituteforsustainability.org.uk/knowledgebank/integratedfindingsreport/outcomes/Pages/6.3-Energy-consumption-and-CO2-emissions.aspx>

3

http://simmondsmills.com/projects/files/IPH_Conference_2012_How_can_EnerPHit_inform_the_UK_Green_Deal.pdf

1) Information includes **Labelling** of buildings, appliances and equipment for their energy use should of course be better; including annual running costs for standardized 'average' use would bring clarity, especially if accompanied by strict legal liability. It also includes useful, practical, intelligible **guidance** on use of buildings and appliances – and more subtly, comprehensible controls on services and appliances.

It is inexcusable not to make the right information available, but on its own it will never be enough.

2) **Standards** for buildings and products can and should be a great deal higher. Mandatory standards are an order of magnitude more effective than voluntary labels. It is an international disgrace that it is possible for manufacturers to sell buildings, appliances and equipment that fall so far short of the current best practice, burdening buyers with the recurrent costs of electricity consumption. Over ten years, these often exceed the appliance purchase price. Commercial freedom should operate within reasonable constraints so that it does not impinge on national and indeed planetary security. Allowing very poor practice disadvantages just those leading-edge businesses that you would wish to assist, via the 'race to the bottom' effect.

Thus we urge DECC to redouble its lobbying efforts within the EU to raise standards, and, if it fails, to follow the lead of countries such as Denmark, which took unilateral action in the past on environmental protection and won against the Commission in the European Court of Justice.

3) **Restructure the energy market** so companies profit from energy efficiency, and incentivise companies to work towards, rather than across, the national and international interest - towards security, reduction of emissions, and research and development of efficient technologies.

Best Regards,

Andy

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Consultation response – question by question

1. DECC would welcome further evidence and analysis to support and increase our understanding of the potential for cost-effective energy efficiency measures, the abatement potential and the cost of abatement.

A brief summary is contained within LESS IS MORE (AECB, Feb. 2012). We would be pleased to consider further work for DECC on request.

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2. Do you have evidence on whether offering a financial incentive is likely to be an effective way of overcoming the barriers that prevent efficiency measures being taken up in non-domestic buildings, bearing in mind the policy measures that already drive energy efficiency in non-domestic buildings.

The best approach to a financial incentive is via the electric utility companies. This needs a bold move to re-regulate the industry, roughly in the manner that it was regulated from privatization up to 1999 (and similar to the model by which water is still regulated in England and Wales), so that such corporate bodies can be given financial incentives to help meet this objective and can deliver the program within their supply area in a manner which is agreed to be fair to consumers and suppliers, as determined by the regulator.

The option of an energy supplier obligation is touched on under industrial processes in your Impact Assessment (“Energy Supplier Obligation for electricity efficiency - a quantity based scheme where there is an obligation or incentive on suppliers to deliver an agreed quantity of demand reduction, which will be priced by the market.”) However AECB urges DECC to go well beyond a quantity-based scheme and simply mandate energy suppliers to invest in demand reduction via efficiency wherever this is cheaper than or the same cost as new generation, incentivising the investment by allowing suppliers to profit from a share of the savings; i.e. shareholders receive larger dividends.

Unless energy company profits are decoupled from volumes sold, and the companies are incentivised by their investors sharing in the savings, such a mechanism fails to overcome many of the barriers and market failures DECC itself has identified (see supplementary note). DECC is already aware that under present policy energy companies are unlikely to be the ‘main champions’ of the kind of quantity-based, non-profit-sharing energy saving obligation already established under the Green Deal/ECO, for exactly this reason, as DECC’s own staff have pointed out.

Charles Phillips recently told a meeting on the Green Deal that DECC does not expect energy companies to be the main drivers of the Green Deal : “Selling less energy is really not such a big incentive for them,” he said, in a tacit admission of the “split incentives” in DECC’s proposed approach.

To deliver this investment expeditiously, we do not want to continue with “split incentives”, with the government and presumably the public wanting one outcome and the electricity suppliers wanting another; i.e., wanting to sell more kWh since (except for one non-profit supplier) they make a margin on each extra kWh. We need to abolish split incentives, in the way in which we have outlined.

For more detail on the rationale for this and the likely benefits, see **Supplementary note for Question 2 - The logic of supplier investment in efficiency – at end of this document**

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3. Do you have evidence on whether offering a financial incentive is likely to be an effective way of overcoming the barriers that prevent efficiency measures being taken up in industrial processes? Explain your point of view.

A highly effective but overlooked route to energy efficiency in industry is to match the type of industry to its most appropriate power source. This may mean relocating heavy industries e.g. moving aluminium smelting to sources of abundant hydropower and away from an established power grid, basically so that such regions - often in developing countries and with weak grids - export ingots of aluminium rather than electricity. Thus industrial policy needs to be integrated with energy policy.

It is fairly unlikely that the UK is an appropriate region for future energy-intensive industry, given its paucity of low-cost renewable energy sources. However, where there is waste heat available, this should be exploited for low-temperature uses, and should provide the necessary energy at very low cost. Incentives could assist with the 'matchmaking' process and if appropriate, with relocation, to overcome the hidden costs of research and take-up.

Even in domestic settings, it is important to match heat use with the most appropriate heat source – for example, solar thermal hot water for washing and dishwashers or CHP heat in preference to electric heat. Recent trends in appliances have unfortunately been in the opposite direction – see response to Q 4 below

4. Should Government consider a product-specific financial incentive in the domestic sector in spite of the risks and limited potential (23% of domestic product untapped potential as set out in Chapter 2)? If so, how can we design an incentive that drives better purchasing or usage, rather than early product replacement?

Again, the best approach is to incentivise the utilities so that they make more money from this than from the majority's current business model of building extremely expensive new power stations and financing the resulting grid reinforcement by National Grid PLC. To make progress on the urgent timescale needed, the companies should be allowed to share with their consumers the savings arising from supplying energy efficiency measures instead of supplying electricity from new power plants

This would be a more proactive and effective approach than the voluntary labeling schemes which are all we have available within the UK, pending introduction of better European standards. Incidentally AECB would welcome publication of more information about the way that 'the UK continues to drive for stronger action on EU standards' and progress to date.

Of particular concern is the increasing use of electricity to heat water for washing machines and dishwashers, when most homes, offices, hotels and restaurants have a cheaper, more storable and lower-carbon source of hot water; e.g., from solar panels or from heat pumps or CHP.

The fact that heat is storable and electricity is not means that there is a natural smoothing of demand, buffered by domestic hot water tanks, with important implications for energy transmission

infrastructure. This is a far wider point than just for washing machines, but the principle is illustrated clearly here.

This trend is so illogical that one AECB member commented that they were “stunned” to find that “every manufacturer has removed the hot water inlet.

“Now I have to use electricity to heat water even though there is a tank full of hot water from the gas boiler. How did they get away with that ?” Fortunately some hot-fill machines are reappearing on the market.

They have large advantages in terms of service standard; there could be a return to the short 30-60 minute washes of 20-25 years ago when less electricity and more water was used.

Early product replacement is beneficial in cases of egregious inefficiency; e.g. replacing plasma screen TVs by LED screens of the same size. Trading in one metre TV screens might save over 500 kWh/year per set. The saving in electricity might be enough to justify premature scrapping of such products via utility rebates to consumers.

This approach is dismissed in your Impact Assessment, partly because of fears of the waste and resource costs of ‘premature’ scrapping. However as the IA is only a high-level, qualitative document it has not analysed this quantitatively – this analysis should be undertaken on a case by case basis, rather than dismissing the entire principle out of hand because of some qualitative anxieties. It ought also to be possible to take a quantitative view of likely ‘deadweight’ – and factor this in. We therefore consider that your wholesale dismissal of scrapping for domestic appliances is premature. It can be beneficial to force the scrapping of “power guzzlers” which effectively burn many times their own weight in coal per year.

As well as the more important moves on standards and incentives suggested above, DECC should support the www.topten.info and www.topten.eu project perhaps by setting up a site www.topten.uk which brings together the other topten resources. The current resources should be translated into English – and possibly Welsh - where not done so already.

5. Would a financial incentive be effective in driving efficient product choices in the non-domestic sector? What evidence is there of this and what are the differences, if any, to the case with domestic products?

Yes but let utilities in each supply region choose their preferred financial incentive(s), with encouragement by the regulator to persuade others in different regions to follow the exact model(s) which prove(s) most effective.

You state (in the IA) that “75-80% of office space is managed by a third party” and that “In many such contracts, the buildings manager has no performance incentives related to saving energy and hence no incentive to pursue this”.

a) there is no reason why this should not be changed, and

b) this suggests there may be a level of standardisation and centralization of office management, which could facilitate easier and more effective communication between energy suppliers seeking to upgrade buildings and building services, and the management companies through whom these upgrades would be delivered – in other words, this apparent obstacle could be turned to our advantage.

6. If a targeted financial incentive for non-domestic buildings were available, which efficiency measures should be a priority for the scheme? What evidence is available to support your view?

All electrical equipment is a priority, with no indication that potential savings are massively greater in one device than others (except that certain industrial processes may be near to the fundamental thermodynamic limits on minimum energy use whereas other uses may have little or no limit or be very far away from the lower limit; e.g. LED TV screens). However, in the very short term, if the looming capacity problems identified by OFGEM are perceived to threaten consumer health and safety, it might be useful to give a slight priority to loads that reduce winter peak power demand, e.g., lighting and catering, over others and especially over those that save baseload power; e.g., refrigerator-freezers and cold stores. Since electric heating also contributes to the peak, it would seem sensible to go slow on subsidy of electric heating a.k.a. heat pumps..

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7. Do you consider a targeted financial incentive an effective way of encouraging higher and additional efficiency in industrial processes? Which efficiency measures should be a priority for the scheme? What evidence is available to support your view?

We are not sure if substantial inducements to industry could count as a subsidy and be restricted by EU competition law, but given the importance and urgency of taking action in this area, it may be worth negotiating or even considering 'testing' this issue in court as other member states have occasionally done on environmental matters.

Please see answer to Q3 re industrial heat.

8a. Should Government consider a targeted financial incentive to support the purchasing of higher energy efficient products? How can the efficiency of such a scheme be maximised?

If the utilities are re-regulated, government does not have to bother with this. It could be left to the regulator and the electricity suppliers to get on with it in each region.

It is not a notable skill of government to design financial incentives which compete successfully with the incentive to sell more electricity that was granted to energy companies by past government action. Perversely, such elaborate targeted intervention could lead to greater government involvement in the day-to-day running of part of the electricity industry than when it was nationalised. A more likely recipe for success is if the entrepreneurial skills of the utilities are directed at energy efficiency takeup instead of sales growth.

8b. Would a voucher or certificate scheme work? If not, what other options should we consider? Please make clear in your response whether you are referring to the domestic or non-domestic sector or both.

No it probably would not. See 7.

DECC could undertake a fact-finding tour to California, e.g, learning from pioneers now experienced in this area for the last 40 years such as Arthur Rosenfeld. Some other states too would be worth visits. DECC might also need to take advice around incentivizing manufacturers as has already happened for TV standby (rather than adopting a consumer led approach which

would be less effective and far slower). Again, regulating the utilities could help this to happen. See other answers and note to Q2 for more information.

9. What restrictions, if any, should there be on which sectors and measures are eligible to participate in a market wide scheme? Please explain.

None. Utilities would supply all sectors of the economy in their region and would be free to promote measures in all of them.

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10. What are your views on the comparative merits and disadvantages of targeted financial incentive schemes and market wide ones? Please explain your response

Re-regulate the utilities and leave it to them as they would have a financial incentive to do what works. See 2, 4, 7, 8.

11. Should Government consider a market wide financial incentive to support further electricity efficiency measures? Please explain.

Re-regulate the utilities and leave it to them as they would have a financial incentive (and hence, under UK company law, a legal duty to their shareholders) to do what works. See 2, 4, 7, 8.

12. What are the key elements of a financial incentive scheme to encourage participation? Including but not limited to payment level, length of payback period, who manages the scheme, whether the level of payment is known upfront or determined through the sale of a certificate. Please provide evidence to support your views and reference relevance to the different sectors as appropriate (domestic buildings and products, non-domestic buildings and products and industrial processes).

See 2, 4, 7, 8. Also note that if investment is directly by the energy suppliers, then the risks and uncertainties of bidding for certificates on an 'energy saving market' could be reduced. On the other hand, it may be that innovation, and participation by small businesses (leading to other economic and social benefits) could be stimulated by creating such a market, so long as the barriers to entry were not too high.

13. Do you have any other views or evidence on the relevance of a financial mechanism not captured by the questions above?

No.

Consultation Question – Chapter 4

14. For businesses, what would be a useful form of information on the efficiency of the products and equipment you purchase, recognising how decisions are taken in your organisation? Would your organisation find it useful for running cost information to be included in product information? Please provide an explanation.

An extension of compulsory energy labeling to business equipment could e.g. tell a small business that four routers on sale locally and equally suitable for their internet connection consume respectively 10, 6, 4 and 2 W all the time, and under a standard PC use pattern consume respectively 120, 95, 58 and 37 kWh/y. Or it could tell them that of eight laser printers on

sale on an internet site, the standby consumption is respectively 2, 3, 6, 7, 8, 13, 14 and 16 W. If translated into cost per year, this would be even more meaningful to business customers.

However, it is not within consumers' remit or power to change the practices of equipment manufacturers. Many of these anyway are not located in the UK but in Korea, Singapore, USA, China, etc, etc. So consumer action would be of very limited benefit, compared to the potential scope for savings.

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We condemn the prevalent notion that it is primarily consumers' responsibility to act to reduce their appliances' standby power usage by finding out about all these numbers. They are busy enough dealing with what they consider are the "essentials" in their busy and sometimes fraught lives, and items such as routers are frequently a "distress" (and therefore unplanned and unbudgeted) purchase anyway when existing equipment fails - for domestic and small commercial customers alike. Under these circumstances, price and immediate availability affect the choice a great deal more than the energy rating.

If all appliances had been regulated by government pressure on manufacturers since 1990, in much the same way that EU-sold TVs have been, standby would not be the huge problem that it now is. Energy suppliers with a financial and indeed statutory incentive to see that customers choose the most efficient products, when combined with the fact that every customer already has a relationship with an energy supplier, might make them better placed to make customers aware in advance that help, even financial help, will be available for them to make a "good" choice when equipment fails.

Legal action on minimum energy efficiency standards or "voluntary" agreements with manufacturers – in reality, meaning the same, as per past initiatives by the Swiss government - - is the only way to ensure that no-one can buy e.g. a router which guzzles 10 W of power all the time and so that all the routers on sale consume 0.1 W maximum at night when the PCs are off but the router is still connected to the exchange (as is now advised by most ISPs). Then business owners can devote their time to running their business, not to something which could be achieved more effectively and with far less expenditure of resources by government action.

15. Is there interest in a dedicated information source on industrial electricity efficiency opportunities?

Yes. One was written by an offshoot of the Rocky Mountain Institute, USA over 20 years ago. Some of the technologies even in there have still to be fully taken up as a result of the general institutional bias towards energy supply.

If energy companies were charged with delivering the efficiency improvements, the information and investment would be reaching an audience whose bottom line was directly impacted by taking up these opportunities. In some cases, the reduction in a business's total electricity bill, secured by the utility investing in negawatts at say 3 p/delivered kWh rather than in new power plants at say 15 p/kWh, could be a way to increase the business's net profits by 50% or 100%. So it would probably receive much more focused attention than from individual small firms or FTSE companies with an array of commercial variables to juggle.

16. What available sources of information could the Hub include that are not covered elsewhere? How could this information be sourced and validated?

17. Are there any other better ways of raising awareness in the industrial sector that the Government should consider? Please provide relevant evidence.

Utility re-regulation would help to resolve this problem. A utility incentivized to pursue the least-cost options would be able to do the sums and provide large payments to the relevant industries.

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18. If organisations need more specific information about electricity use, can the Government intervene helpfully in this space – for example to encourage a higher take up of sub metering?

19. Would a Buyer's Commitment to purchase high-efficiency products be of interest to your business? What aspects make this approach appealing?

Again the premise is that this is primarily consumers' responsibility. It is *not*. We repeat the above point on TVs. Had the government acted 20 years ago to ensure low standby on all domestic commercial and industrial equipment, not just TVs, a UK dwelling would not be consuming 60-100 watts all the time to almost no purpose. Standby per appliance would have been cut to the same level as new TVs; i.e., around 0.1 W. Similarly for equipment in hotels, offices, schools, etc and probably the more specialist devices in hospitals.

20. What kind of recognition would be valuable to your organisation if considering engaging in a Buyer's Commitment? Would a recognised accreditation that you could display externally increase your interest in participating in a Buyer's Commitment?

This risks being a diversion from the key imperative of aligning the financial interests of electricity suppliers and consumers.

21. To what extent do you think efficiency standards in buildings will deliver permanent reductions in electricity demand when implemented?

Yes of course at least some of the reductions will be permanent, especially if the standards are high enough. Shallow improvements to thermal efficiency (Green-Deal style) tend to be completely eaten up in comfort take, but deeper improvements lead to genuine cuts in energy use whilst allowing for increased comfort at the same time – see ref in answer to Q24.

People cannot increase heating and lighting or even major appliances indefinitely, despite creeping aspiration (assuming this is what you are driving at).

In the USA, utilities that were incentivised undertook programs to retrofit buildings and reduce their electricity and gas consumption by 50%, 70% and similar figures. PG&E even organized daylighting courses for architects. There is tremendous untapped potential; AECB would be very pleased to help DECC with more information.

However, higher thermal standards can only deliver energy savings if they are implemented, not just on paper, but on the ground – ie, if they apply to as-built and not just to the design. The performance gap is a very serious issue in British construction, and there are numerous factors contributing to this, all of which should be tackled – see answer to 24 below

On the other hand, if heating is not electrified, this question refers mostly to lights and equipment and HVAC pumps and fans. Here there is a huge potential but it is not all in the hands of architects and

engineers. They cannot specify a 5 W circulating pump for a small building's central heating system if the only pumps on the UK market consume nearer 50 W over a typical duty cycle.

22. Do you have relevant evidence on the effectiveness of standards in driving electricity demand reduction?

Yes. If required by DECC AECB could provide more details. So does the USA. Ask colleagues in the US DOE, or the California Energy Commission, or comparable bodies in Australasia or nowadays China. All of these trading blocs have legislated on minimum energy efficiency standards and there are legal requirements on the US government to regularly introduce new appliance energy efficiency standards, so long as these are cost-effective to society. Similar action in the EU has been noticeable mainly for its absence.

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23. Do you agree with the Government's assessment against minimum efficiency standards for industrial processes? If not, please provide evidence of how mandatory minimum standards for industry could be set and why, and the impact they could be expected to have.

Re-regulate the utilities. If they are rewarded financially for pursuing least-cost options, they will find ways to induce their industrial customers to make strides in this direction.

24. Should Government consider any other policy options aimed at overcoming the barriers that prevent the full uptake of efficiency opportunities in:

- Domestic or non-domestic buildings?
- Domestic or non domestic product choices?
- Industrial processes?

A major barrier to full take up of efficiency opportunities in buildings is the un-level playing field,. For a given capital investment , the 'payback' ends up being much greater for investing in "microgeneration" that attracts a FiT, or consumption of heat or electricity that attracts an RHI payment, than it is for investing in genuine demand reduction (demand for heat or for electricity).

As an illustration, if one decides to install wood heating in an old building then any building insulation measures become uneconomic. One loses the RHI subsidy on the energy one saves . This means that it takes a lot longer for insulation / draughtproofing measures to pay for themselves - they seem uneconomic because of the RHI. A similar effect will be at play with heat pumps.

This is in great part due to the distorting effects of highly selective, and irrational, local and national government policy which prioritises surely-soon-to-be-outdated renewables targets over either carbon targets, or simple cost minimization and energy and network security.

For any project there is likely to be a fairly fixed capital budget. As with RHI payments, feed-in tariffs, without the equivalent reward for energy saving, mean that there can be a proportionally higher return on investment for spending the money on, say, some PV panels, as opposed to making the same investment in fabric efficiency or more efficient services and appliances. This situation is exacerbated by many local authority planning departments' "sustainability" requirements which specify a certain percentage of on-site renewable energy, but tend to say little

or nothing about basic building efficiency, optimizing layouts for daylighting, passive solar gain, etc.⁴

Misunderstanding carbon targets as being about carbon intensity, rather than the critical absolute quantities of net carbon emissions (gross emissions minus sequestration), further distorts policies away from the ultimate goals.

The whole promotion of the “zero carbon” idea has exacerbated this, suggesting that microgeneration as in PV on the roof or wind in the garden is exactly equivalent to demand reduction, despite the very different energy, resource and balance of payments implications of the two. The introduction of an improved fabric energy efficiency standard as part of the 2016 domestic Building Regs is to be welcomed but it would have been better to see the government drive through more rigorous, but entirely achievable, fabric standards such as those of Passivhaus, or close, which represent a likely 70-85% cut in space heat consumption over present “as-built” Part L. The lower the energy demand of a building, the more flexibility and security can be offered without alarming capital or carbon costs.

25. What further evidence exists on the accuracy of these approaches to M&V, and how this varies by types of efficiency intervention? What may be the basis for distinguishing which approaches are most relevant for which efficiency projects?

N/A.

26. For which electricity demand reduction measures and technologies do you believe new policy would most likely be additional? What evidence is available on this?

This is a huge topic. There are tens of thousands of technologies which could contribute to delivering constant, or increased, electricity-related services to consumers while consuming fewer kWh. We would be pleased to consider doing this work for DECC at length on request.

27. Specifically, what evidence is available on the likely additionality of measures in industrial processes and non-domestic buildings?

Additionality is not a useful test. If we hesitate obsessively over each individual measure out of 10,000s, and demand proof that it passes this test, we shall fail to make any significant progress on the mass of overdue cost-effective demand-side measures.

This is almost tantamount to striking out savings of say £4M from a demand-side programme as “objectionable”, because they would allegedly happen anyway, or would penalise some

⁴ Kate de Selincourt and Sofie Pelsmakers, CIBSE journal, in press

customers, if they were paid for by the “rate base” charged to all customers, yet meanwhile foregoing savings of £100 M which would be achieved by all consumers had a full demand-side program gone ahead as quickly as possible.

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28. In the context of a financial incentive scheme, would the flexibility and accuracy of taking a case-by-case approach to additionality justify the administrative burden that this would require? What evidence is available on this?

No – see above.

29. What, if any, is a practical approach to identifying the additionality of projects ex-ante (including measures such as those identified in the main consultation document)? Which types of measures and sectors are suitable for financial incentives and how should the acceptable projects be identified?

Everything is a candidate if it saves electricity at the consumer's premises for less/same cost vs. the marginal cost of delivered electricity from new power stations. By the way, as we highlighted in our covering letter, the costs referred to by DECC are average costs. If one is saving electricity, one needs to compare the cost of conserved energy to the marginal cost of new supply, not the average cost of existing supply.

30. Could coefficients be used to reward projects which are *partly* additional? How should such coefficients be calculated? If so, what are the best practice examples of this approach we should consider further?

No. Additionality largely serves to obfuscate the subject and slow down delivery of an effective and rapid programme. The time for discussing such minutiae was probably 30 years ago, when many US states developed their first least cost planning programs and did indeed have extensive analyses of this, as well as of the so-called “no-losers” test. Given the obvious urgency of climate change now, the UK should get on with delivering what works, not with re-inventing wheels or caviling about details of the base case.

Supplementary note for Q2 on 'Least cost planning for energy suppliers'

In AECB's 2012 report 'Less is More' we point out: "Unlike oil, the potential of energy efficiency cannot be exploited with one grand technological intervention. Energy efficiency consists of a wide range of technologies, and delivering substantial savings involves investment in many different areas at a more local level. This makes the task more complex, seen from "the centre".

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"But unlike exploitation of the oilfield, the benefits are permanent and widely-distributed. We have to look all across the energy supply chain and focus on the fine details of energy consumption, including those 'beyond the meter', where the energy efficiency resource is concentrated."

Utility companies (and governments and local authorities for that matter) have access to much cheaper borrowing than individual customers. While the energy companies take advantage of this borrowing power to finance new generation and transmission, similar cheap borrowing to upgrade the efficiency of energy use has, hitherto, been ruled out. It is hard to see this as rational.

'Least cost planning' is an obligation placed on energy companies in some states in the US . It involves changing the way energy companies are licensed to operate, putting an obligation on them to help their customers save energy, and ensuring the suppliers have incentives to invest in cost-effective energy efficiency before more expensive new generation. But this is not done in the "add on" way that, for example, the Green Deal ECO has been set up (and which does not incentivise the companies with anything other than the threat of fines which stand to be less than the profits they make by selling more kWh).

The AECB believes that the post-1999 UK gas and electricity regulatory model is antithetical to profitable investment in energy efficiency, because the companies lack the correct incentives. The model needs a total overhaul.

The first most important move in all the US states, including California, which induced investor-owned utilities to invest in energy efficiency, was to decouple their profits from their sales. This step ensures that, in principle, regulated utilities do not lose money from diversifying into energy efficiency.

If a regulator then goes further than "decoupling", and allows utilities to keep some of the net profit from selling their customers negawatts, not megawatts - so-called "*shared savings*" - one can expect rapid investment. This happened in California at the peak of least-cost planning, in the early 1990s, when the rules were changed to allow shareholders to keep 15% of the net profits. The pressure towards energy efficiency became overwhelming, because more investment in negawatts now led directly to higher profits for shareholders.

The Californian Public Utilities Commission recently summarised the progress of this policy:

"[The] investor-owned utilities recently reported the results of their 2009 efficiency programs, which show a 10 percent increase in annual savings from a record-breaking 2006-08 program cycle, providing an estimated reduction in CO2 emissions of more than 1.5 million tonnes for that year alone. ...Energy efficiency continued to be the cheapest resource available, costing less than half as much [2.5 p per kWh] as supply-side alternatives."

US lawyer and energy expert Ralph Cavanagh recently suggested that the US's Pacific Gas and Electric Company (which has 5.1M customers, making it the size of a large regional energy company in the UK)

had saved the equivalent of 15,000 megawatts of new generation through its efforts to help customers become more energy efficient. The savings had saved 'many new power plants' from needing to be built.⁵

Ralph Cavanagh believes that it should be for power companies to mobilise this sort of investment – yet too often, governments are looking in all the wrong places: “ A worldwide search is on for affordable low-carbon energy solutions, but looks mostly in the wrong places. We need savvy and credit-worthy institutions capable of choosing among a bewildering array of resource options...

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“ Wherever feasible, those institutions should be displacing other energy resources with efficiency improvements that offer equivalent or better services at lower cost. Recent candidates for this demanding role include national and local governments, venture capitalists, investment bankers, software engineers and information technologists. All can contribute, but none come close to replacing properly motivated and financially robust electric utilities.”⁶

As explained in 'Less is More', the interest paid all hinges on business risk “which goes right down as regulation and statutory powers go up”. In the UK, water companies can borrow cheaply since they have statutory powers giving investors confidence their money will be repaid (with interest more typical of government than corporate bonds; e.g. Severn Trent recently issued some index-linked bonds paying just over 1%/year)). Energy networks can do this too.

That's why some of the USA including its largest state, California, apparently has no plan to move away from the regulatory model of the last 100 years. California tried deregulation in 1996-2003 and returned to regulation after they found de-regulation increased prices.

Market failures and barriers to uptake

Many of the perceived 'market failures' and 'barriers to uptake' identified in the Impact Assessment accompanying the DECC consultation could be tackled via regulation of the electricity companies and imposing a requirement on them to invest in demand reduction wherever this comes at lower cost per MW than new/replacement generation-and-transmission. (see covering letter for note about real costs)

(One could even require efficiency wherever it was cheaper than 'new or replacement generation-and-transmission that was as secure, indigenous and low carbon as is demand reduction – though admittedly this might be a trickier metric to define).

Thus - You cite: **Split incentives** – “there are challenges wherever there is a split between the party responsible for making up-front investments in equipment, versus the one using this equipment” If the energy supply company is both investing in the equipment and profiting from the savings, there is less of a split.

You cite: **Imperfect Information** – “organisations and households are not specialists in electricity efficiency products or the efficiency of products and appliances and would need to apply time and

⁵ <http://www.pgecurrents.com/2011/10/27/earley-proud-to-inherit-pge%E2%80%99s-environmental-leadership-legacy/>

⁶ <http://newenergycities.org/competitive-electricity-reinvestment-the-energy-efficiency-imperative>

resources to become a specialist, which would potentially erode any financial benefit that more efficient products could provide.”

Requiring energy suppliers to seek and deliver energy efficiency for their customers would save the need for the customers to become specialists – as you rightly suggest, it is unreasonable to expect this to work well especially given the very poor mandatory EU labelling system which you insist we are stuck with.

Rather than creating a separate cadre of “energy efficiency specialists” who – presumably –would have to be sought, appointed and remunerated by customers, rather as Green Deal Advisors are supposed to be, Energy Suppliers would earn their own remuneration from becoming energy efficiency specialists, and of course one or other energy company already has a relationship with every household and every business in the land.

You cite: **Bounded Rationality** (“Not front of mind”) – “organisations and households make decisions about energy efficiency alongside a wide range of other criteria, often with limited time for decision making. Given the amount of information which has to be processed and the number of issues to be considered, it is not unusual for decision-makers to revert to rule-of-thumb behaviour or to make decisions taking into account only a few critical parameters. This means that energy efficiency, which is not a front of mind issue, may often be disregarded, even where the decision-maker could have made cost savings by taking this into account.”

A business, especially in light industry and services, has much more than energy use affecting its bottom line and often other factors will be much more critical (whether easier or harder to impact). A household does not exist to make a profit at all.

By contrast, an energy company’s ‘rationality’ is a lot less ‘bounded’ by non-energy-related matters, so they are much better placed to seek energy efficiency savings.

You state: **R&D benefits**; “innovation to improve the electricity efficiency of products or develop new electricity saving products is likely to be underprovided in the market because innovators will not capture the full benefits of their innovation.” Energy companies seeking to purchase energy efficiency measures would represent a well-resourced and well-informed market for innovation like this.

You cite: **Hurdle rate/ payback period**’ pointing out that “analysis undertaken with McKinsey identified that investors were looking for very short payback periods of around 2 years, ruling out even highly cost-effective energy efficiency investment, much of which pays back in 3-5.”

Setting aside what you might feel this says about business priorities, (and this disparity between society/public sector and private investors/consumers is not new; it has been known about for 40 years and more), we merely point out that investing in new transmission and generation plant does not pay back for a great deal longer than two or even five years, so in this context, energy efficiency shows a fast, not a slow, return, even if the energy company only enjoys a share of the savings.

Again, you state under **‘Evidence of Cost-effective Abatement Potential’** that

“The McKinsey model was calibrated to DECC’s October 2011 projections and assesses the potential for electricity demand reduction based on the estimated share of energy consumption at five year intervals. The model assumes that the capital costs are spread over the lifetime of the measures. While this incorporates the financing costs, it does not take into account whether it

would be possible to get such long term financing for measures. This may mean that some measures which appear cost-effective in the McKinsey analysis might be difficult to finance.”

However this of course depends on who is borrowing the money and how their returns are structured. Energy companies, with their secure and predictable markets, can borrow a lot more cheaply than can individual customers, either households or businesses (without the need to subsidise the lending by offering ‘finance for the purchase of electrically efficient products potentially at a preferential rate’ - as is proposed by DECC as one option). Energy efficiency also offers a relatively secure and predictable return – it is reasonably easy to predict a minimum cost for the energy saved, and unpredictable/uncontrollable spikes in energy or fuel prices internationally would increase not decrease the relative returns enjoyed by efficiency measures.

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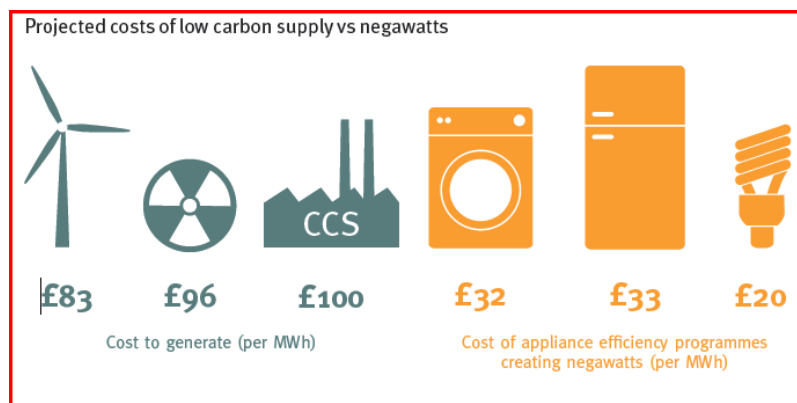
Costs and benefits

Everything should be a candidate for efficiency investment if it saves electricity at the consumer’s premises for less cost than the marginal cost of delivered electricity from new power stations. The costs referred to by DECC are average costs (eg: “Further understanding of the costs of energy efficiency investments is required in order to estimate the share of the 92TWh of outstanding efficiency potential which could be accessed at lower cost than the avoided electricity resource costs, which is in the region of £105/ MWh over the period to 2030”). If one is saving electricity, one needs to compare the cost of conserved energy to the marginal cost of new supply not the average cost of existing supply.

On the subject of direct financial benefits, you state: ‘The majority of the benefits will accrue directly to the firm or household undertaking the energy efficiency measures in the form of lower electricity bills. There may be a wider indirect impact on bills through the impact of the demand reduction on electricity system support costs or on the wholesale price of electricity; this is discussed in further detail below. ‘

If the electricity companies were implementing, and sharing in the benefit from, efficiency investment, then that benefit could accrue more rapidly via lower energy costs for all parties.

Note that ambitions to electrify heat and transport imply very high collective consumer costs for new investment in generation and transmission, regardless of the chosen fuel source for that generation.



Projected costs of low carbon supply vs negawatts

from Green Alliance paper ‘Creating a Market for Electricity Savings’ <http://tinyurl.com/b6ac53k>

Courtesy of Green Alliance

Matthew Spencer, director of the Green Alliance, also argues that the “cheapest first” approach is already being made to work in the US, where a number of states have created a market for electricity savings or "negawatts".

“These programmes really work - they have reduced the number of new power stations that need to be built and have delayed or even prevented grid upgrades. They have saved consumers considerable amounts of money. Appliance replacements and efficiency retrofits in the US avoid electricity consumption at nearly a third of the price of new supply. **They replace an expensive megawatt of electricity which costs perhaps £100, with an avoided megawatt, or negawatt, which only costs £30.**”^{7 8}

Under consideration of ‘extending the capacity market to include permanent demand reduction’, the DECC IA cites the need for ‘**cost and volume constraints**’ on the scheme to ‘manage the impact on customers’ bills and protect security of supply’.

It is not obvious how permanent demand reduction might threaten security of supply or increase the cost to customers – especially if costs of demand reduction were set to be limited to no more than the cost of equivalent generation. It might be worth double-checking that there is a genuine concern here, and that the list has not simply been copied and pasted from the more general consideration for the capacity mechanism.



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⁷ <http://www.businessgreen.com/bg/opinion/2220543/energy-switching-is-dead-long-live-the-market-in-energy-saving>

⁸ This subject is also explored at considerable length in the AECB report “Less is More” published on www.aecb.net