



PROMOTING HIGHLY EFFICIENT ELECTRICAL APPLIANCES

AMDEATM
The Association of Manufacturers
of Domestic Appliances

INTRODUCTION



Rising energy bills are high on the political agenda. Cutting energy use not only helps households reduce bills it is also a highly cost effective way for government to meet carbon targets. To date energy efficiency policy has concentrated almost exclusively on how we can better insulate our homes.

But what about the stuff that we use inside the house? On average each of us has 41 domestic appliances, all consuming electricity. Global Action Plan wanted to discover whether government could help households cut bills more cost effectively by helping all of us to buy the most efficient appliances in the first place.

We commissioned the reputable think tank IPPR to undertake the research, and worked in partnership with AMDEA and BSH Ltd to secure the data that we needed.

Our conclusion from this research is stark and simple. There is currently a black hole in government energy efficiency policy as no national initiatives are in place to boost the sale of energy efficient appliances. Despite this black hole government is assuming more efficient appliances will cut energy bills in the future, which we feel is doubtful.

If government did have a policy in this area it could have a significant carbon saving impact. It would reduce bills, it would place more control in the hands of the consumer, and it would be more cost effective than some of the existing initiatives.

Our message is simple. Government needs to explore this policy gap rapidly and help all of us live more energy efficient lives.

Trewin Restorick
CEO Global Action Plan

The report has been jointly funded by AMDEA and BSH Appliances Ltd. AMDEA is the Association of Manufacturers of Domestic Appliances, the UK trade association for the manufacturers of small and large domestic appliances. The report builds on AMDEA's Time to Change initiative which encourages the replacement of energy-hungry large domestic appliances across Europe. BSH Home Appliances Ltd is a subsidiary company of the BSH Bosch und Siemens Hausgeräte GmbH, a group with worldwide operations, which posts annual sales in the year 2013 in excess of 10 billion euros.



CONTENTS

Executive Summary	4
1. Reducing energy demand: an approach to reducing emissions that puts bill payers first	7
2. The opportunity of efficient electrical appliances	8
2.1 ELECTRICAL APPLIANCES IN THE UK	8
2.2 THE UK LAGS BEHIND EUROPE ON APPLIANCE EFFICIENCY	11
2.3 THE OPPORTUNITY TO REDUCE COSTS WITH EFFICIENT APPLIANCES	13
3. Problems with existing policy on electrical appliances	15
3.1 THE CENTRAL IMPORTANCE OF EXISTING EFFICIENT APPLIANCES POLICY	15
3.2 THE FALTERING PERFORMANCE OF PRODUCTS POLICY	16
3.3 THE NEED FOR A UK-SPECIFIC POLICY APPROACH ON HIGH EFFICIENCY APPLIANCES	18
4. A financial incentive for highly efficient appliances	20
4.1 EFFICIENT APPLIANCES AND THE CAPACITY MARKET	20
4.2 UK AND INTERNATIONAL EXAMPLES OF FINANCIAL INCENTIVES ON EFFICIENT APPLIANCES	21
4.3 THE COST OF A FINANCIAL INCENTIVE FOR EFFICIENT APPLIANCES	24
5. Conclusion	28
References	29
Appendix 1: Examples of targeted financial incentives on efficient appliances implemented around the World	32
Appendix 2: Results of analysis into the cost effectiveness of a financial incentive on fridge freezers and washing machines in 2011	36

EXECUTIVE SUMMARY

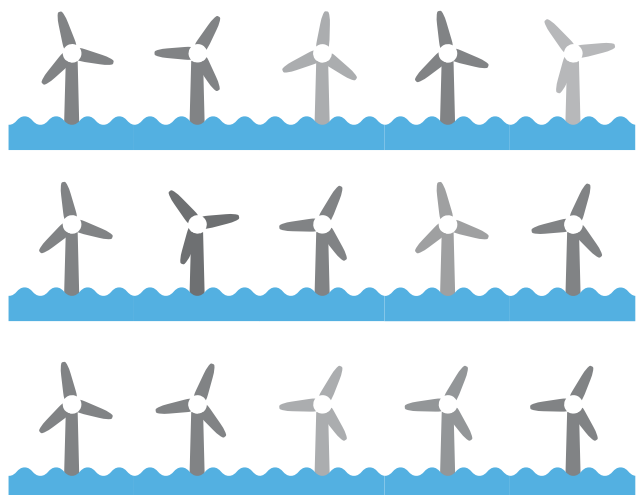
Concerns about the affordability of energy have risen to the top of the political agenda. Policy makers must adapt to this new environment by focusing more of their efforts on reducing demand for energy because this could substantially reduce costs. This should include encouraging consumers to purchase highly efficient electrical appliances, which is the subject of this report.

Consumers in the UK spend £8 billion a year, or around £300 per household, powering their appliances. Part of the reason for these costs being high is that UK consumers purchase inefficient appliance models. This report shows:

- the average level of efficiency for a selection of widely used white goods¹ bought across the EU increased by 7 % from 2005 to 2010, with the average amount of electricity consumed by each appliance reducing from 265kWh per year to 246kWh. But over the same period there was no improvement in the efficiency of the appliances brought in the UK, with the average amount of electricity consumed by each appliance remaining at an average of 265kWh per year.
- in 2011, the most efficient cooling appliances (those with an efficiency rating of A+ to A+++)² contributed towards 87% of sales in Germany. But in the UK these same appliances made up just 30% of sales in the same year. The market share of these appliances was also substantially higher in Italy (79 %), Spain (76%), Netherlands (70%) and France (58 %) (GAP 2013).

If UK consumers purchase highly efficient electrical appliances, the result will be substantial energy savings and large cost benefits. A major study carried out for the Government found that electricity demand could be reduced by 26.3 TWh a year by 2030 if consumers purchase the most efficient appliances (McKinsey & Co 2012). This is equivalent to the amount of electricity generated in a year by one and a quarter nuclear power stations at the scale of the planned development at Hinkley Point C, 24 individual combined cycle gas turbine plants, or almost 1,500 individual offshore wind turbines.

equivalent to
1500
wind turbines



¹ Including cooling appliances, like fridge freezers, and wet appliances, like dishwashers

Achieving these savings would result in the following cost benefits to bill payers:

- by directly reducing consumers' electricity usage, uptake of efficient appliances could reduce bills by a total of around £2 billion per year, or £75 per household, in 2030;
- Additional cost savings would be achieved by reducing the amount of investment that is required in low carbon generation in order to decarbonise electricity supply. These savings could total as much as £1.8 billion a year, or £24 per household, in 2030.

As it stands, existing policy will not deliver the energy and bill savings that are available from efficient electrical appliances. The Government currently projects that 'Products Policy', which covers EU regulations stipulating that all sold appliances must meet a minimum level of efficiency and display a label detailing their energy efficiency performance, will deliver annual householder bill savings of £158 by 2020. But delays in the implementation of the policy and a reduction in new appliance purchases caused by the economic recession means the amount of savings achieved could be as much as 40 % below this projection (Green Alliance 2012). As a result:

- Bills are set to be £63 higher in 2020 than the Government currently projects due to the under-performance of existing policy on electrical appliances.



To ensure that future consumer energy bills are in line with its projections the Government should take action to encourage consumers to purchase highly efficient electrical appliances.

The Government has accepted there is a case for financially incentivising consumers to purchase highly efficient appliances and it plans to do so while incentivising other ways to reduce electricity demand through the Capacity Market, which is being implemented as part of the wide-ranging Electricity Market Reforms. The hope is that the Capacity Market will enable providers of demand reduction to compete against fossil fuel power generators in auctions for contracts to provide electricity capacity. However, the Government recognises this approach may not be effective at realising the full extent of demand reduction that is possible and so is piloting it first. In addition, the market will not be fully operational until 2018, which means earlier opportunities to reduce bills through efficient appliances will be missed.

This report looks at alternative forms of financial incentive, targeted specifically at promoting efficient appliances, which the Government could implement. It shows:

- Obliging the largest energy suppliers to deliver energy savings by encouraging consumers to purchase efficient appliances has been a very effective approach in the past in the UK. From 2002 to 2005, when fridge freezers were promoted through the Energy Efficiency Commitment (EEC) obligation, 4.5 million sales of the appliances were brought forward compared to the existing market trends. The energy suppliers achieved these outcomes by working in partnership with appliance retailers, who would promote efficient models through a combination of special offers, such as discounts, and targeted in-store marketing strategies.
- Countries around the World have trialled a variety of approaches for promoting efficient appliances. This includes: in France, since 2005, consumers have been rewarded with credits, directly deducted from their personal tax payments, if they purchase efficient appliance models; in the US, from 2009 to 2012, consumers received cash rebates from the Government if they purchased an efficient appliance; in Brazil, low income consumers, who were the least able to afford a new appliance, were offered a free energy efficiency appliance as a replacement for an old model from 2008 to 2010; and finally, in South Korea consumers accrue 'points' every time they purchase an efficient appliance, which entitles them to money off a variety of products and services.

Financially incentivising consumers to purchase efficient appliances will incur a cost to government. The evidence is encouraging because it suggests the cost of doing so has been over-estimated in the past:

- The amount energy suppliers spent promoting fridge freezers under EEC could have been just £7 per product, while the Government estimated it would be £36, an over-estimate by a factor of five. The amount energy suppliers spent promoting washing machines under the second Energy Efficiency Commitment could have been just £3 per product, while the Government estimated it would be £10.

If similar costs could be achieved today, this report shows that a new financial incentive promoting highly efficient electrical appliances would be substantially more cost effective at delivering consumer bill savings and cutting carbon emission than the existing energy efficiency policy, the Energy Company Obligation.

I. REDUCING ENERGY DEMAND: AN APPROACH TO REDUCING EMISSIONS THAT PUTS BILL PAYERS FIRST

The cost of energy has become a central issue within political debates. This is not that surprising since energy bills have risen substantially in recent years. From 2003 to 2013 the proportion of household income spent on gas and electricity increased from 1.8 % to 3.1 % and businesses have experienced similarly dramatic increases (ONS 2013).

In response to this new environment, the Government will need to demonstrate it has effective strategies in place to offset rising wholesale energy costs that it projects will occur over coming years. Moreover, it will need to demonstrate how policies that are funded through energy bills are designed cost effectively and in a way that prioritises the needs of bill payers.

As it stands, in relation to electricity decarbonisation policies, bill payers may question whether the far-reaching Electricity Market Reforms (EMR), which were adopted by the Government through the 2013 Energy Act, represent a good deal. The main beneficiaries of the reforms are set to be multi-national utilities, often backed by foreign governments, and financial institutions, which will be able to sign contracts guaranteeing them attractive returns for investments they make in new low carbon generation. Consumers and businesses meanwhile will face the costs of these contracts through increases in their energy bills. The total cost of low carbon generation subsidies is set to rise substantially, to £7.6 billion a year in 2020, with further rises likely in the 2020s. It is by no means clear that bill payers will accept having to meet these costs.

To avoid a backlash against decarbonisation policies on the basis of cost, policy makers must adopt a new approach. A change in focus is required so that policies to reduce demand for electricity receive at least as much, if not more, attention than policies to encourage low carbon electricity generation.

An overriding reason to reduce demand for electricity is that if less is used, less carbon is released into the atmosphere. However, it is the twin benefits in terms of lower costs for consumers that make it such an attractive approach.

First, if consumers use less electricity, i.e. their demand falls, not only do they pollute less, they also pay lower bills. Second, if consumers en masse use less electricity, fewer low-carbon power stations need building, which means fewer subsidy costs must be passed on to bills.

This report looks at the potential for the Government to reduce electricity demand, and therefore reduce costs to consumers, by incentivising the purchase of highly efficient electrical appliances. The energy bill savings that could be achieved by this approach are demonstrated to be substantial.

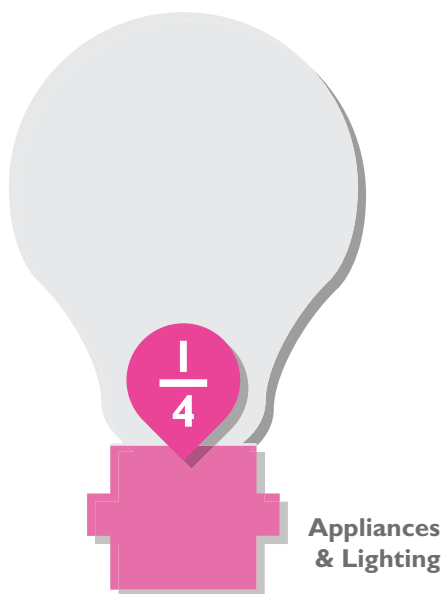
Chapter 2 of the report illustrates the scale of cost reductions possible if consumers were to buy more efficient appliances. Chapter 3 explains how current policy is failing to grasp this potential, leaving consumers with higher bills in the future than the Government currently projects. Chapter 4 looks at different models of financial incentive that could be used to promote uptake of efficient appliances, demonstrating that these could be expected to be as cost effective as existing energy efficiency policies. The findings of the report are then drawn together in a conclusion.

2. THE OPPORTUNITY OF EFFICIENT ELECTRICAL APPLIANCES

Households in the UK own large numbers of electrical appliances. The energy requirement of these appliances is substantial, resulting in large costs for households and the UK as a whole. Compared to other European countries the energy efficiency of appliances in the UK is very low and this chapter shows that if consumers were to buy more efficient appliances the energy and resultant bill savings would be substantial.

2.1 ELECTRICAL APPLIANCES IN THE UK

UK'S TOTAL ELECTRICITY CONSUMPTION



Government data suggests that households owned around 1.3 billion appliances in 2012³. This is an increase of 240% since 1970, when around 380 million appliances were in use (DECC 2013a). The average household currently owns around 41 electrical appliances, not including lighting, which is up from around a dozen in the 1970s (EST 2012).

Taken together, household electrical appliances are responsible for a substantial portion of the UK's total electricity needs. In 2012, around 215 terawatt hours of electricity were consumed across the UK. Domestic electricity consumption was responsible for 77.6 terawatt hours of this, with domestic lights and appliances consuming 52 terawatt hours. This is about a quarter (24%) of the UK's total electricity consumption (see Figure 1).

³ Including lighting, cold appliances, wet appliances, consumer electronics, home computing and cooking appliances.

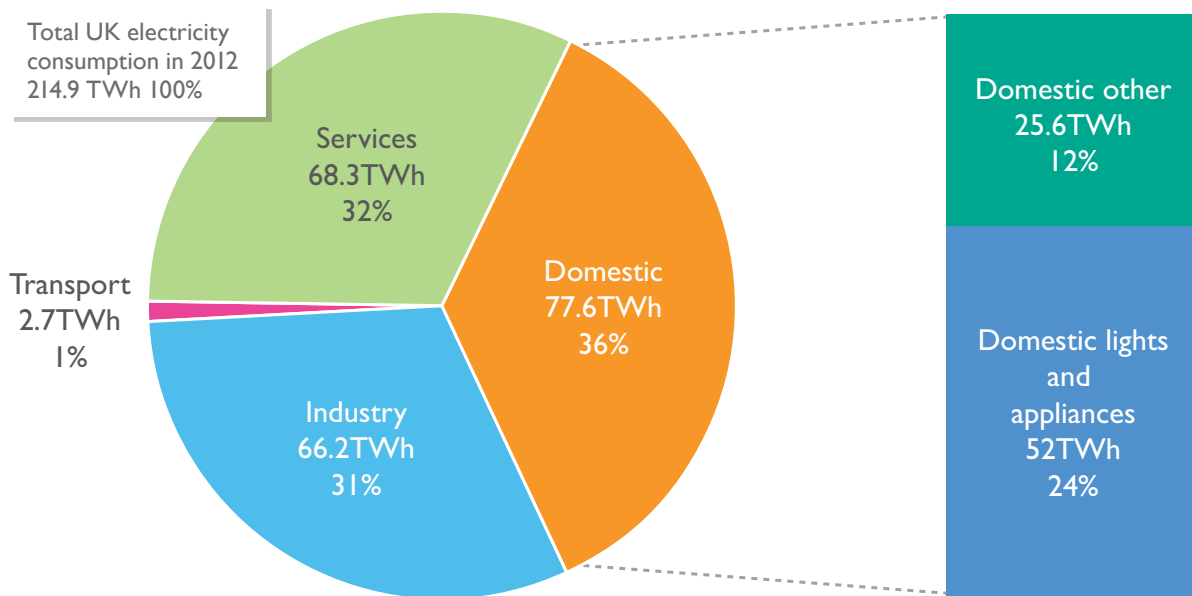


Figure 1: UK Electricity consumption in 2012 (DECC 2013a), all in terawatt hours

The costs incurred by powering domestic appliances are significant. According to government figures, currently, across the UK as a whole, households spend around £8 billion a year running their appliances⁴, or around £300 per household⁵. The amount individual households spend is very variable, potentially reaching as much as £850 solely on appliances per year (EST 2012).

Indeed, electricity consumption from household appliances is increasing, while total energy consumption by households is decreasing. The total amount of energy consumed by households fell by 12 % from 1990 to 2012, while consumption by household electric appliances rose by 18 %, from 71TWh to 84TWh, over the same period⁶. This rise appears to be largely accounted for by growth in the use of consumer electronics and home computing (see Figure 2). Over the specified time period the amount of electricity consumed by consumer electronics rose by 9TWh and the amount by home computing rose by 6TWh. One factor underpinning this trend of increasing consumption may be the degree to which these products are left on or on standby (EST 2012).

⁴ Based on the UK average electricity price of 15.44p/kWh (DECC 2013b)

⁵ Based on the current number of households of 27.135 million (DECC 2013a)

⁶ NB, this statistic and the figures cited in Table 1 below are derived by government from a different dataset to those used to derive the figures in Figure 1 above, which accounts for the small differences in consumption recorded in 2012

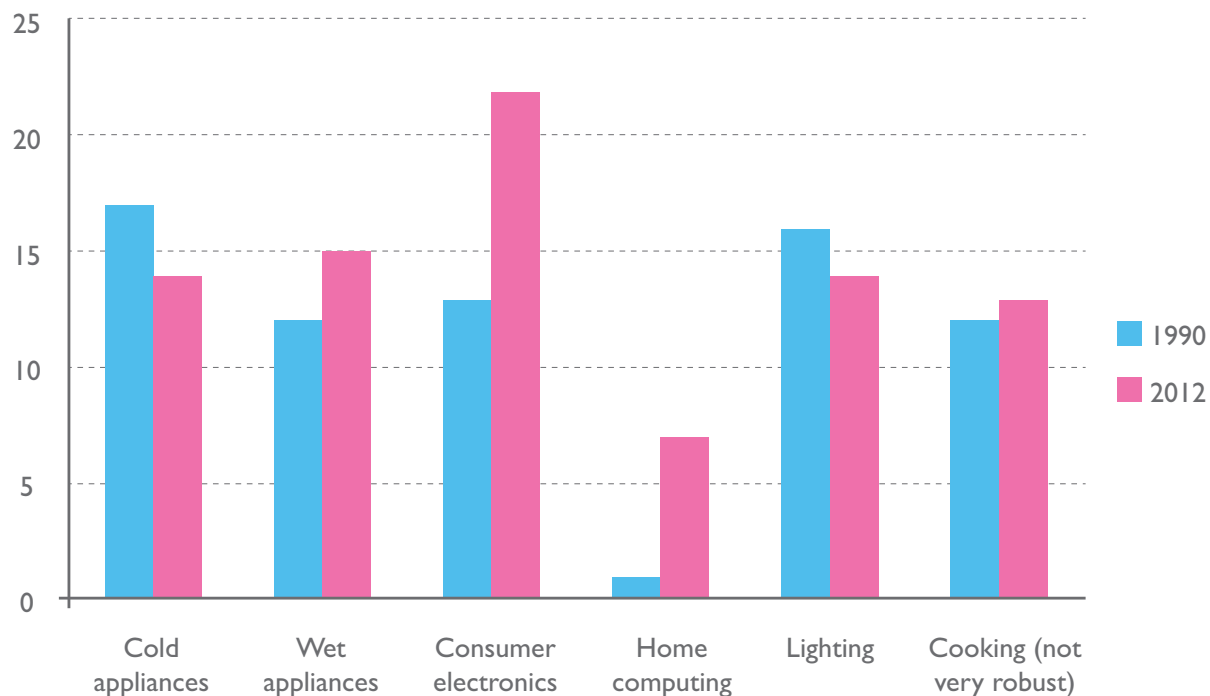


Figure 2. Changes in domestic electricity usage, 1990 to 2012, all figures in TWh (DECC 2013a). (Based on a different data set to Chart 1 above. See footnote 3 for explanation.)

The downward trend in overall domestic energy use from 1990 to 2012 is largely attributable to the success of policy aimed at increasing the thermal efficiency of houses (OFGEM 2013). Similar benefits from energy efficiency can be seen in relation to electrical appliances.

According to the Government, the total amount of electricity consumed by cold appliances reduced from 1990 to 2012 by 3TWh. This is despite the total number of cold appliances in use having increased by 9.4 million (from 31.9 million in 1990 to 41.2 million in 2012). This outcome has been possible due to a 57 % increase in the efficiency of cold appliances bought over the period (see Table I), thus demonstrating the potential for efficiency to deliver absolute energy savings across a background of product growth.

Electrical appliance	Efficiency improvement from 1990 to 2012
Chest Freezer	66%
Fridge-freezer	50%
Refrigerator	56%
Upright freezer	86%

Table I: Efficiency gains in new cold appliances bought in the UK, 1990 to 2012 (DECC 2013a)

2.2 THE UK LAGS BEHIND EUROPE ON APPLIANCE EFFICIENCY

The key to reducing energy consumption by appliances, against the upward trend in appliance ownership, is for consumers to buy more efficient models. In this regard, it is clear that there is scope for UK consumers to go much further. Indeed, the UK is falling substantially behind other EU countries on uptake of efficient appliances.

Analysing the efficiency of appliances being bought and used in the UK is challenging because the Government does not collate or monitor these statistics. This hinders the design of effective policy and has wider implications, which are discussed in the next chapter. Nonetheless, insights into the UK appliance market can be gleaned from information that has been made public by consultancy GFK, which monitors electrical appliance markets globally.

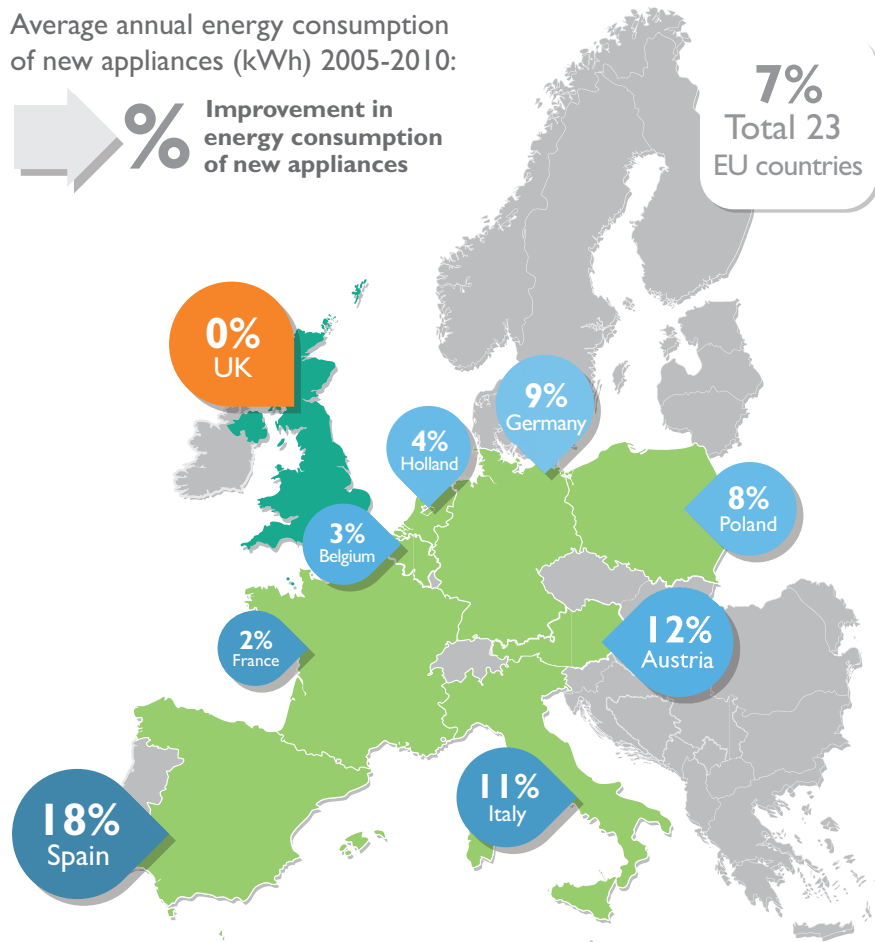
GFK's data paints a stark picture about the poor efficiency of appliances in the UK. In 2010 the UK performed very poorly compared to other EU countries when comparing the average efficiency of a selection of new appliances that were bought (including chest freezers, fridge freezers, refrigerators, upright freezers, washing machines, washer dryers, dishwashers) (Eckl 2011). The average energy consumption of these new appliances in the UK was 265 kilowatt-hours per year, or 7.7 % more than the EU-wide average of 246 kWh (see Table 2). According to GFK's data, of the nine individual country results illustrated, only Spain performed worse, with an average efficiency of 268 kilowatt-hours per year.

The most striking element of GFK's findings relates to how the efficiency of appliances bought across the EU has changed over time. The evidence suggests that there was no demonstrable improvement in the average efficiency of appliances bought in the UK between 2005 and 2010⁷. Over this time period the UK is the worst performer of those countries illustrated and compares very poorly against the EU-wide average efficiency improvement of 7 %. Notably, the three best performing countries, Spain, Austria and Italy, which achieved efficiency improvements of 18 %, 12 % and 11 % respectively, all had financial incentives in place to boost consumer uptake of efficient appliance models.

⁷ GFK have explained that while there has been an increase in the efficiency of wet appliances, like washing machines, bought in the UK, similar to what has been seen with cooling appliances, these improvements have been offset by a tendency of consumers' to buy bigger wet appliances. The efficiency per kg of load may be improving, but the total energy use per appliance is still tending to rise. In-use efficiency is therefore subject to end-user loading practices.

	Average annual energy consumption of new appliances (kWh)		Efficiency improvement
	2005	2010	
Spain	328	268	18%
Austria	255	225	12%
Italy	282	252	11%
Germany	237	215	9%
Poland	264	242	8%
Netherlands	242	232	4%
Belgium	242	236	3%
France	261	255	2%
UK	265	265	0%
Total 23c EU	265	246	7%

Table 2 Energy consumption of new appliances bought across the EU (Eckl 2011)



More recent data from GfK, reported by Global Action Plan, suggests that the UK continues to lag behind other EU countries. In 2011, the most efficient cooling appliances (those with an efficiency rating of A+ to A+++) contributed towards 87% of sales in Germany (GAP 2013). In the UK these same appliances made up just 30% of sales in the same year. The market share of these appliances was also substantially higher in Italy (79%), Spain (76%), Netherlands (70%) and France (58%) (see Figure 3).

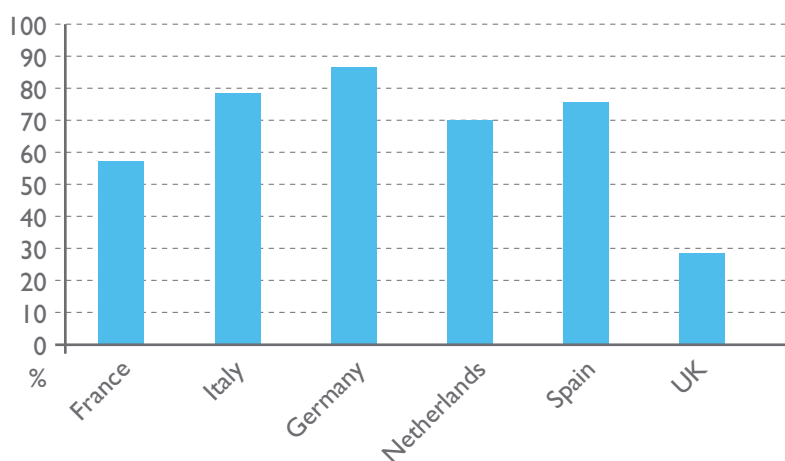


Figure 3: the market share of cold appliances rated A+ or above in six European countries in 2011

2.3 THE OPPORTUNITY TO REDUCE COSTS WITH EFFICIENT APPLIANCES

UK consumers are not buying efficient electrical appliances and yet there are substantial energy savings and economic benefits available if they were to do so.

A major recent government study (McKinsey 2012) to establish the scale of reductions in electricity demand that could be achieved across the economy found that there was potential to reduce total electricity demand in 2030 by a staggering 36%, or 146 terawatt hours, against a baseline scenario. Notably, electrical appliances and consumer electronics were found to offer the greatest area for potential savings in the residential sector, followed by building shell improvements and then switching from incandescent bulbs to compact fluorescent lamps (CFLs). McKinsey estimate that electricity demand could be reduced by 26.3TWh in 2030 if consumers bought the most efficient electrical appliance models and high efficiency consumer electronics, which is 18% of the total savings achievable by 2030. This is equivalent to the amount of electricity generated in a year by one and a quarter nuclear power stations at the scale of the planned development at Hinkley Point C, 24 individual combined cycle gas turbine plants, and almost 1,500 individual offshore wind turbines⁸.

If the full amount of energy savings through efficient appliances and electronics were achieved, the result would be substantial cost savings for bill payers.

⁸ Calculation assumptions. Nuclear: capacity = 3.2GW (equivalent to Hinkley Point C), load factor 70.8%; CCGT: capacity = 400MW; load factor = 30.4%; offshore wind: capacity = 6MW; load factor = 33.7% (DUKES 2013).

First, consumers would require less electricity to power their appliances, and therefore their bills would be lower. At current prices, the potential energy savings from efficient electrical appliances and electronics estimated to be possible by McKinsey would result in bill savings of just under £2 billion in 2030⁹. This equates to around £75 per year per household¹⁰.

Second, consumers would benefit because less investment in new low carbon generation would need to be financed through their energy bills. To approximate the cost savings this would produce, we can draw on the evidence of schemes in the US, highlighted by the Green Alliance (Cary & Benton 2012)¹¹, which shows that investing to reduce electricity demand can result in a net saving of £70/MWh by reducing the requirement for low carbon generation. Reducing demand by 26.3TWh in 2030, in line with McKinsey's projections, could therefore result in annual savings of £1.84 billion, or an annual saving per household of around £24¹².

The overall energy savings that would result if consumers bought high efficiency appliances are substantial. Moreover, there would be additional economic gains. These occur because a reduction in spending on energy would enable consumers to spend more on other products and services, resulting in two key benefits:

- **Trade balance:** The majority of energy consumed in the UK is imported: 47 % of gas and 87 % of coal consumed in 2012 came from abroad (DECC 2013c). In the second quarter of 2013, the UK's net import dependency for total energy usage was 51.4 % (DECC and National Statistics 2013). By contrast, across the economy net imports were just 2.2 %. As a result, money saved from bills due to energy efficiency, and spent instead on other products and services, could improve the UK's balance of trade, leading to an expansion of net exports and an increased GDP.
- **VAT revenues:** Spending on products and services other than energy will produce higher VAT revenues for government than the equivalent amount of spending on energy. This is because VAT on energy is 5 %, while VAT on most items is 20 %.

This chapter has shown the substantial energy cost savings that could be achieved if consumers purchase highly efficient appliances. Policy has an important role to play in promoting uptake of efficient appliance models but is falling short and not delivering on the potential that exists. The reasons for this under-performance are the subject of the following chapter.

⁹ Based on the UK average electricity price of 15.44p/kWh (DECC 2013b)

¹⁰ Based on the current number of households of 27.135 million (DECC 2013a)

¹¹ Assume typical low carbon generation costs of £100/MWh and cost of delivering demand reduction, including by promoting uptake of efficient appliances, of £30/MWh.

¹² Assumes low carbon subsidy costs are passed on to all electricity users in proportion to their electricity usage. Calculation based on current domestic electricity consumption at 36% of UK total consumption, and total number of households at 27.135 million (DECC 2013a).

3. PROBLEMS WITH EXISTING POLICY ON ELECTRICAL APPLIANCES

Widespread uptake of efficient electrical appliances would produce substantial benefits for bill payers and the economy at large. However, the evidence outlined in this chapter suggests that current policy on efficient appliances is not delivering in line with expectations. As a result, future household bills and carbon emissions are likely to be higher than government currently predicts unless remedial action is taken.

3.1 THE CENTRAL IMPORTANCE OF EXISTING EFFICIENT APPLIANCES POLICY

There are currently two policies in place, captured under the heading of 'Products Policy', which set out to improve the efficiency of electrical appliances bought by consumers in the UK. Both policies are EU regulations, the implementation of which is overseen in the UK by the Department for Energy and Rural Affairs (Defra) through the 'Energy using products' programme¹³. The regulations are:

- The 2009 EU Framework Directive for the Ecodesign of energy using products which stipulates legally binding minimum standards for the environmental performance of energy related products available on the market (EC 2009)
- The 2010 EU Framework Directive on energy labelling (EC 2010) which mandates for comparable energy efficiency ratings to be supplied on energy-related products in order to encourage consumers to choose more energy efficient products.

The government is relying on Products Policy to deliver substantial reductions in energy bills, carbon emissions and electricity demand.

Every year the Department of Energy and Climate Change (DECC) publishes a report that sets out the projected impact of energy policies on bills. This is a key publication for the DECC as it underpins government claims that the net impact of energy policies will be to reduce bills up to 2020 and beyond. This is achieved because the total cost of policies that are funded through bills is more than compensated for by bill reductions that some policies, including Products Policy, are expected to deliver.

The DECC's estimate of the impact of policies on domestic bills in 2020 is reproduced as Figure 4 below. It shows that Products Policy, by increasing the efficiency of consumers' appliances, is projected to deliver domestic bill savings of £158 a year in 2020. This is greater than the savings associated with any other policy.

¹³ Previously called the 'Market Transformation Programme'

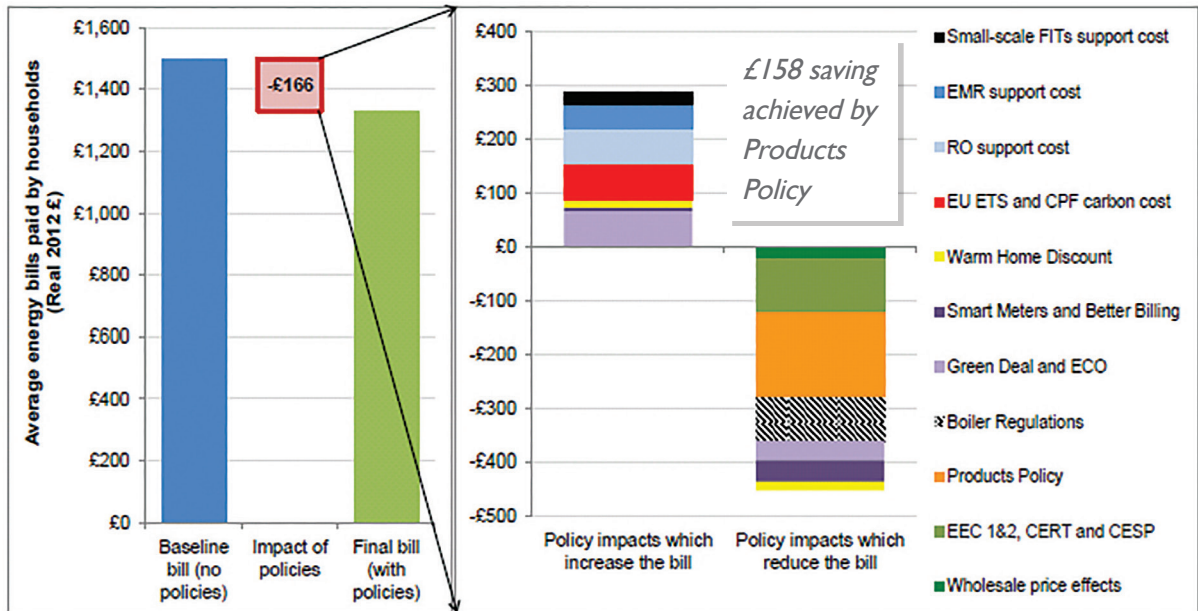


Figure 4: Projected impacts of government policies on energy bills in 2020 by the Department of Energy and Climate Change. Reproduced from (DECC 2012a).

Products Policy is also expected to deliver substantial carbon emission reductions. Across the domestic, commercial and industrial sectors the policy is projected to deliver 51 % of all carbon emission savings expected from policies that focus on the demand side of the energy system (Green Alliance 2012). By 2020 this amounts to carbon reductions of 14.8Mt per year.

The final benefit the Government expects from Products Policy is a reduction in electricity demand. The Government believes there is 4.3TWh of savings available from domestic appliances in 2030, once the impact of current policies is taken into account (DECC 2013d). However, since Products Policy is not performing in line with expectations, as the evidence below illustrates, the Government’s estimate for the impact of current policies is likely to be very optimistic.

3.2 THE FALTERING PERFORMANCE OF PRODUCTS POLICY

To project the current and future impact of Products Policy the Government relies on policy impact assessments that were carried out when regulations relating to specific products were introduced. Actual consumer uptake of appliances, which would enable government to ascertain whether assumptions contained in the impact assessment are proving to be correct, is not monitored.

Given the substantial contribution that Products Policy is expected to make to both energy affordability and carbon reduction objectives, it is surprising that the Government does not monitor how well the policy is performing. This would seem vital for ensuring that policy objectives are being achieved. Indeed,

for two consecutive years the Committee on Climate Change has reported to parliament that the absence of monitoring of the appliance market restricts them from analysing progress towards meeting the UK's legally binding carbon budgets (CCC 2012 & CCC 2013). Worryingly, the evidence suggests the impacts from Products Policy are not keeping up with the government's projections.

There are three main reasons why the impact of Products Policy is likely to be lower than the Government currently projects.

First, the implementation of the EU Ecodesign Directive has been slow. Regulations for different products were due to be implemented in two tranches. The Directive was introduced in 2009 but by 2012 only 13 out of 25 products in the first tranche of eligible products had regulations applied to them. No regulations for the second tranche were currently in place (Green Alliance 2012).

Second, the predicted impact of Products Policy is based on assumptions about replacement rates for appliances that do not factor in the effects of the recent economic downturn (ibid.). In fact, it is likely that the effect of the economic downturn on appliance replacement rates has been substantial. For example, the CCC reported that from 2008 to 2009 total cold and wet appliance sales had declined by 8 %, which is likely to have been caused at least in part by the onset of the financial crisis in 2008 and resulting recession (CCC 2010).

Third, the energy labelling system has been widely criticised because it has not adapted effectively to ongoing improvements in the efficiency of appliances (see for example ECOFYS 2014). Ideally the rating system would have been regularly recalibrated so that the most efficient products on the market would always be A-rated, as this would be simple for consumers to understand. Instead, the system has not been recalibrated and new ratings of A+, A++, and A+++ have been introduced as the efficiency of new models has increased. This has created a confusing environment for consumers. For example, all fridge freezers that are sold must now achieve an A+ rating, while the most efficient models achieve an A+++ rating. As a result consumers can mistake A+ rated fridge freezers as being highest rated models for efficiency, when in fact there are more efficient models on the market.

Green Alliance has conducted a detailed examination of the Government's impact assessments for Products Policy and estimated the cumulative impact of the factors cited above (Green Alliance 2012). They calculate that carbon savings from Products Policy could be around 40 % lower than forecast in 2020, which would be the equivalent of around 6MtCO₂ per year.

The shortfall in carbon savings from Products Policy will be accompanied an equivalent shortfall in energy savings and bill savings. If the domestic bill savings from Products Policy are 40 % lower than what is currently projected for 2020, then the policy will reduce bills by just under £95, instead of the £158 the government claims. Put another way, the under-performance of Products Policy means that domestic energy bills could be £63 higher in 2020 than the DECC currently projects.

3.3 THE NEED FOR A UK-SPECIFIC POLICY APPROACH ON HIGH EFFICIENCY APPLIANCES

Products Policy is being relied upon to deliver large savings on domestic bills, carbon emissions and electricity demand but the policy is substantially under-delivering. The government will have to do more on efficient appliances if it is to make up for this shortfall and ensure that bills and carbon emissions are reduced in line with its projections.

A key problem with the current policy approach is that it is entirely designed and implemented at the EU level. Of course, the Government can and should push for EU policy to be ambitious, including higher minimum standards under the EU ECO design directive. However, as argued by Defra (Defra 2009), since new standards need to be agreed among all member states are unlikely to be ideal for the UK context. As was outlined in the previous section, additional problems arise from relying too heavily on EU policy because policy design and implementation at this level can be slow and protracted.

In making the case for UK specific appliance policies, Defra set out a useful framework for thinking about appliance policy design (Defra 2009). They explained that since a range of different products will always exist on the market, there is a need for policy to influence product efficiency at all levels. This includes:

- Removing the least energy efficient products from the market;
- Driving top ranking products to reach new levels of efficiency;
- Improving the average energy efficiency of all products.

Going further than the EU on minimum product efficiency standards would be challenging for the UK as it may well fall foul of competition law and the Government could be accused of gold-plating. However, the UK could do more to promote uptake of high efficiency appliances, as it has in the past through energy efficiency obligations that have been placed on the biggest energy companies (see next chapter for more detail). Indeed, in addition to the poor performance of the EU labelling directive, as explained above, factors that are specific to the UK make a focus on high efficiency appliances important.

First, the full scale of potential savings from electrical appliances, as identified by McKinsey in the Government study discussed in Chapter 2, are based on an assessment of what would happen if all consumers bought the most efficient electrical appliances. A policy framework that is focused primarily on removing the least efficient appliance models from the market, as is currently the case, will not deliver the full extent of savings that are possible.

Second, the Committee on Climate Change has set indicator targets for uptake of highly efficient electrical appliances (CCC 2010), which are important benchmarks for measuring the UK's progress towards meeting its legally binding emission reduction targets. The targets are:

- 58% of the wet stock in use rated A+ or better by 2022;
- 45% of cold appliances in use rated A++ or better by 2022.

The most recent data on the electrical appliance market, from 2010, showed that the penetration of both efficient cold and wet appliances was substantially lower than the trajectory to achieve the indicator targets. In 2010 wet appliances rated A+ or above achieved a market share of just 8.3 %. Most striking is that cold appliances rated A++ or better achieved a market share of not even 1% (CCC 2011).

The absence of monitoring of the appliance market and analysis of the in-use stock as well as the lack of UK policy to promote efficient appliance uptake means that the Committee's indicator targets in this area are effectively being ignored.

This chapter has shown how the Government is over-estimating the beneficial impact that current policy on appliances will have on electricity demand and bills. There is need for a renewed policy focus on promoting efficient appliances, with a particular focus placed on the most efficient models. A financial incentive on efficient appliances is a promising policy option for promoting uptake and is the subject of the next chapter.

4. A FINANCIAL INCENTIVE FOR HIGHLY EFFICIENT APPLIANCES

Substantial energy cost savings could be achieved if consumers bought more efficient appliances but current policy is failing to capture these benefits. In this chapter we look at how more could be done to promote uptake of efficient appliance models, including considering the potential of the Government's proposed Capacity Market and looking at UK and international evidence on alternative policy options. We conclude by illustrating how a targeted financial incentive on efficient appliances is likely to compare favourably on cost effectiveness with an existing energy efficiency policy, the Energy Company Obligation.

4.1 EFFICIENT APPLIANCES AND THE CAPACITY MARKET

The Government has acknowledged that electricity demand can be substantially reduced and identified efficient domestic electrical appliances as one of four priority sectors in which it believes large reductions could be achieved (DECC 2013d). Significantly, the Government has also accepted that there is an economic case for financially incentivising the delivery of reductions in electricity demand. It intends to do so through the Capacity Market, which is being introduced as part of the Electricity Market Reforms.

The Capacity Market will enable different technologies to compete in auctions for contracts to provide electricity capacity. The initial intention for the market was to ensure security of electricity supply by encouraging investment in fossil fuel generation capacity, which is required as backup to variable renewable energy generation but becomes less financially attractive as deployment of renewables increases. As the concept for the market developed providers of 'demand side response' services were included as potential capacity providers (DECC2013e) and only recently did the Government decide to also incentivise demand reduction through this mechanism (DECC 2014).

It is encouraging that the Government has accepted there is a case for financially incentivising electricity demand reduction and the market approach it is pursuing has some advantages. In particular, it could enable the cheapest electricity savings to be identified and delivered before more expensive savings. However, it is not clear that the Capacity Market will be effective at delivering the full extent of savings that are possible.

An overarching concern is that if the priority is placed on supporting fossil fuel capacity, the Capacity Market design will not be optimal for delivering demand reduction. More specifically, if the market rewards capacity providers only at times of peak demand this could undervalue the cost benefits of permanently reducing electricity demand. The Green Alliance has shown that it would be possible to create a market mechanism specifically designed for reducing demand, which could overcome these issues (Green Alliance 2012). Indeed, the Government recognises it will be challenging to incentivise demand reduction through the Capacity Market and so is piloting the approach first to explore whether it is feasible.

An additional issue is that the earliest electricity savings could be delivered through the Capacity Market is 2018, which means that opportunities to reduce consumers' bills in the interim will be lost. Given the shortfall in bill savings being delivered by Products Policy, as discussed in the previous chapter, there is a strong case for taking action now to encourage uptake of highly efficient appliance models. Indeed, this is a low risk option for government. If pilots that are to be carried out demonstrate that the Capacity Market can be effective at incentivising demand reduction, a targeted policy on appliances introduced earlier could simply be dropped.

4.2 UK AND INTERNATIONAL EXAMPLES OF FINANCIAL INCENTIVES ON EFFICIENT APPLIANCES

There are different ways in which the Government could drive consumer uptake of highly efficient appliances. To be effective one key factor that will need to be addressed is how UK consumers tend to prioritise spending less up-front capital on an appliance over choosing an appliance with low lifetime running costs. The evidence suggests this a key reason why UK consumers opt for more inefficient models when making purchasing decisions (see for example Defra 2009a).

Potential policy options available to the Government include doing more to ensure that consumers understand the running costs of appliances through the provision of effective information. Another option is to improve the financing options that are available for purchasing efficient appliances. The Government could also work with manufacturers and retailers to better understand the barriers to uptake of efficient appliances in the UK market, including comparing the cost of appliance models in the UK with other European countries to identify and understand any substantial differences.

One policy approach that has been effective in the past in the UK and in countries around the World is the introduction of some form of targeted financial incentive linked to the purchase of efficient models.

Effectiveness of past UK policy

Efficient appliances were previously promoted in the UK through energy efficiency obligations that were placed on the biggest energy suppliers. The current energy efficiency obligation, the Energy Company Obligation, which has been in place since 2012, does not cover electrical appliances.

Supplier energy efficiency obligations involve the participating companies being set carbon emission reductions targets that they must achieve by delivering efficiency improvements to people's homes. From 1998 to 2012, when appliances were counted as eligible measures under subsequent obligations, the participating companies worked with appliance retailers to incentivise uptake of efficient models. Retailers would promote uptake through a combination of special offers, such as discounts on products, and targeted in-store marketing strategies, and would be paid by the suppliers for the sales they were able to deliver. Evidence shows that these schemes were very successful, not only at driving uptake of efficient models, but also at achieving long-lasting transformations towards higher efficiency standards within electrical appliance markets.

The most comprehensive evaluation of the impact the supplier obligations had on appliance uptake was carried out in relation to the first Energy Efficiency Commitment obligation (EECI), which ran from 2002 to 2005 (Lees 2006). A-rated fridge freezers were the main type of appliance to be supported under EECI. Figure 5 is taken from the evaluation and demonstrates that there was a very high level of growth in the market share of A-rated fridge freezers bought over the period. A-rated wet appliances were also eligible under the scheme and the evaluation shows that uptake of these products also saw strong growth.

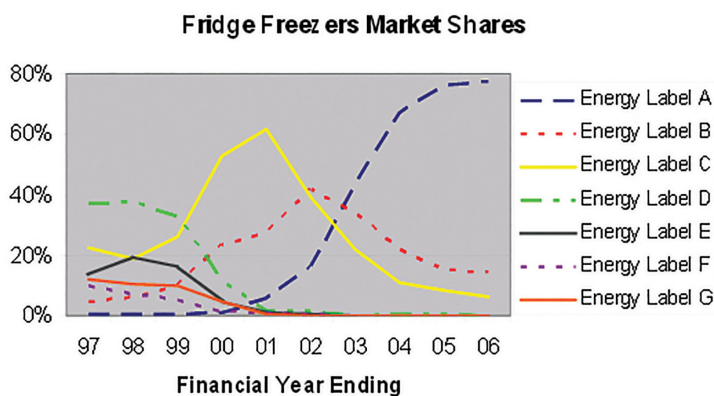


Figure 5: Development of the total cold appliance market by energy rating, from 1996 to end of September 2005. Reproduced from Lees 2006:34.

According to the evaluation, the market penetration of A-rated fridge freezers would have been 33 % by 2005 if existing market trends had continued, as shown in Figure 6. In the end the market penetration by 2005 was twice this figure. Indeed, if the existing market trends had continued it would have taken until 2012 to get to the same market penetration of these products as occurred by the end of EECI. Compared to the expected rate of penetration, 4.5 million sales of fridge-freezers were advanced during EECI.

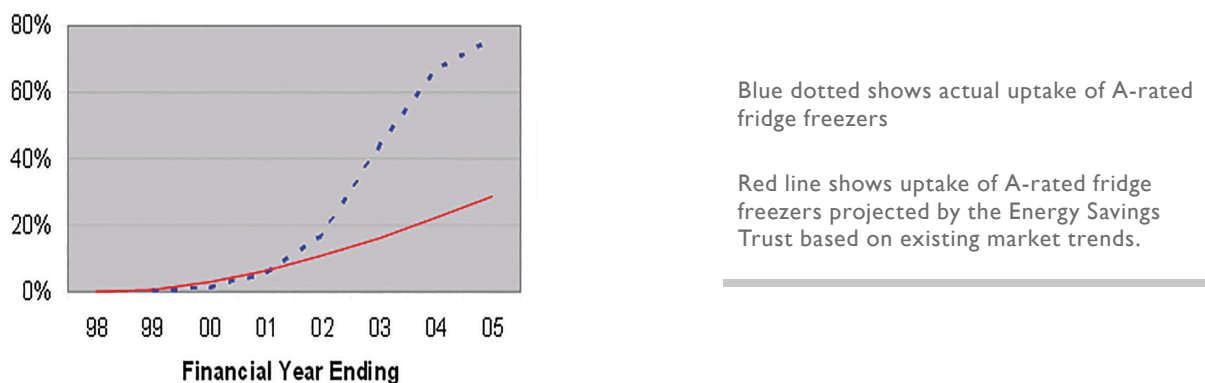


Figure 6: Uptake of A-rated fridge freezers during EECI compared to projected rate of uptake. Reproduced from E Lees 2006:44.

The increased levels of uptake observed in high efficiency fridge freezers from 2002 to 2005 cannot entirely be attributed to EECI. Other policies, in particular the introduction of energy labelling, will also have had a beneficial effect, although to what extent is unclear. Nonetheless, the EECI evaluation concludes that the dramatic increase in uptake of efficient appliances must have been largely the result of the inclusion of these appliances as an eligible measure under the policy.

One reason for the success of EECI was that, as increased volumes of the eligible appliances were sold, the cost of the products came down. The cost of A-rated fridge freezers was estimated to have reduced by 16 % under EECI. In the case of washing machines, efficient models were actually cheaper than less efficient models by the end of EECI (Lees 2006). These cost reductions will have helped encourage consumers to purchase highly efficient appliances when replacing their existing models.

Supplier energy efficiency obligations are clearly effective at driving uptake of efficient appliances but there are drawbacks to this approach. One drawback is that the cost of the schemes tends to be very unclear. Another is that suppliers have previously exploited loopholes to limit the amount of activity they have been required to undertake¹⁴.

International examples of alternative policy approaches

Other forms of financial incentive on efficient appliances have been employed in countries around the World (CEM 2013). A useful, initial categorisation of these schemes is between incentives that are introduced ‘upstream’ and ‘downstream’. Upstream incentives are those that are given to manufacturers or retailers to encourage production and sale of more efficient models, similar to how the supplier obligations have been implemented in the UK. Downstream incentives, on the other hand, target consumers directly. An advantage of upstream incentives is that they are less complex to administer than downstream incentives. An advantage of downstream incentives is that they send a strong and visible signal to consumers about the objectives of government policy. They also allow for a greater degree of flexibility than upstream incentives, for example by enabling support to be accurately targeted at a specific population, such as low-income households.

There are four broad types of ‘downstream’ financial incentive that have been employed in other countries (a detailed account of international policy approaches is given in Appendix 1):

- The first model involves consumers being offered credits, directly deducted from their personal tax payments, if they purchase efficient appliance models. To receive the credits a consumer has to provide proof of purchase to a governing body, for example the equivalent of HMRC, which would then administer the credit. This type of scheme has been in place in France since 2005, with consumers receiving credits if they purchase high efficiency boilers, heat pumps and glazing. A similar but smaller scale scheme existed in Italy from 2007 to 2010, with consumers receiving credits for upgrading their fridges and freezers to more efficient models.
- An alternative approach is for grants or subsidies to be offered to consumers to encourage them to buy efficient appliance models. This policy option has been implemented in various forms in

¹⁴ IPPR has recently advocated abandoning obligations on suppliers as a way for delivering thermal energy efficiency improvements in buildings, in favour of an approach that is rooted in local areas and with different delivery organisations, such as local authorities, playing a leading role (Platt et al. 2013). However, this new delivery approach has been designed to overcome specific challenges that exist with getting support to fuel poor homes and creating demand for building efficiency improvements. The same logic does not apply to the promotion of efficient appliances and a supplier obligation remains a promising approach for achieving this outcome.

different countries. For example in Holland from 2000 to 2003, and in the US from 2009 to 2012, where consumers received cash rebates if they bought an efficient appliance model. The rebate was provided by an administrative body upon presentation by the consumer of proof of purchase. An alternative model currently in place in China involves consumers receiving a voucher in advance of a purchase that they can put towards the cost of a new appliance.

- If a targeted consumer group cannot afford to buy a new appliance, one incentive approach commonly used is for efficient models to be made available as a free replacement for older models. This approach was employed in Brazil from 2008-2010 with electricity distribution companies in charge of carrying out the replacements. A comparable scheme existed from the late 1990s to 2002 in the UK called the FridgeSavers scheme. This scheme targeted low income households and reached 250,000 households over its lifetime.
- The final 'downstream' model used to incentivise uptake of efficient appliances is for consumers to receive points (sometimes called 'ECO points') every time they purchase an efficient model. These points can then be exchanged for various incentives. For example in South Korea consumers accrue points on a 'carbon cashbag' card, which enables them to receive money off products and services including public transport, utility bills and tickets to cultural events. A similar scheme in place in Japan from 2009 to 2011 enabled consumers to earn points that could be traded for discounts on other efficient appliances.

In some instances, financial incentives on efficient appliances are only made available to consumers if they dispose of an old appliance at the same time as they buy a new model. This ensures that inefficient models are taken out of use.

4.3 THE COST OF A FINANCIAL INCENTIVE FOR EFFICIENT APPLIANCES

If the Government were to introduce a financial incentive on efficient appliances this could be expected to drive uptake but would incur a cost. Determining this cost is challenging because the Government does not monitor the UK's appliance markets or the stock that is in-use. The task is also complicated because the Government has never monitored the cost to the energy suppliers of delivering their energy efficiency obligations. Nonetheless, the evidence that is available is encouraging because it suggests that the Government has over-estimated the cost of its policies in the past.

The evaluation of EECI, cited earlier in this chapter, is the only detailed analysis that has been published on the cost to the suppliers of delivering their energy efficiency obligations. The study concluded that the Government had over-estimated the cost of incentivising uptake of efficient appliances in two ways (Lees 2006):

- I. The total cost per efficient cold appliance measure delivered through the EECI period was estimated to be £25 lower than the £45 the Government had projected;

2. The amount the Government expected suppliers to contribute towards fridge freezers was estimated to have been over by a factor of 5. The Government expected suppliers to spend £36¹⁵ per cold appliance whereas the evaluation put the cost at just £7, as shown in Table 3.

	Defra estimate	Evaluation estimate	Ratio evaluation estimate to Defra
Cost to suppliers of incentivising uptake of cold appliances	36	7	0.20

Table 3: The over-estimation by government of the cost to suppliers of incentivising uptake of efficient appliances under EECI according to an independent evaluation. Lees 2006.

Evidence from an energy supplier also suggests that the cost of promoting efficient appliances has previously been over-estimated. It has been claimed that the supplier was able to incentivise uptake of wet appliances at a cost of around £3 per measure (GAP 2013). During the period of the second Energy Efficiency Commitment (EEC2), from 2005 to 2008, Government had assumed that the suppliers would spend £10 encouraging people to take up efficient wet appliances, so the actual cost of delivery may have been just over a quarter of the Government's estimate.

There are limits to the degree that cost estimates of past policies can inform us about the likely cost of any new financial incentive. This is because, for example, the cost of energy and the cost differential between higher and lower efficiency appliances will have changed substantially (the cost differential between the most and least efficient appliances can be substantial, with some A+++ fridge freezers currently selling for up to £1200, whereas A+ rated models can sell for as little as £200). Nonetheless, the evidence on past policies can provide a useful benchmark for assessing the potential cost effectiveness of a new scheme.

Global Action Plan has provided IPPR with evidence on uptake of A rated and A+++ rated fridge freezers and washing machines in 2011, and the energy usage associated with these different appliances. We have used this evidence to compare the potential cost effectiveness of an efficient appliance financial incentive implemented in 2011 with the Energy Company Obligation (ECO) energy efficiency policy as it currently stands¹⁶. To do so we have analysed the cost effectiveness of different levels of financial incentive, if they were sufficient to prompt a consumer to purchase an A+++ rated rather than an A rated appliance. The calculations take account of 'free riders', which refers to consumers who would have bought an A+++ rated efficient appliance without the financial incentive being in place (workings detailed in Appendix 2).

¹⁵ This is the figure for households who were categorised as being in the 'non-priority group' under EECI, which comprised of all households not included in the 'priority group'. The 'priority group' was comprised of households on low incomes or in receipt of various benefits. The evaluation shows that the government over-estimated the cost to suppliers of promoting appliances among priority group households by a similar ratio as it did for non-priority group households.

¹⁶ The Government is currently consulting on changes to the ECO. An impact assessment with details off the proposed changes can be found at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/286926/The_Future_of_the_Energy_Company_Obligation_Assessment_of_Impacts.pdf

In the original impact assessment for the ECO¹⁷, the Government projected that lifetime carbon savings achieved via the Carbon Emissions Reduction Obligation (CERO) sub-target would cost £79 per tonne, and via the Carbon Saving Communities Obligation (CSCO) sub-target would cost £58 per tonne (DECC 2013d). In addition it was projected that suppliers would spend 18.7p delivering £1 of lifetime bill savings to eligible low income households via the Affordable Warmth (AW) sub-target.

Table 4 shows how much could have been spent incentivising uptake of appliances in 2011 to match the cost effectiveness of ECO in terms of delivering carbon and bill savings. It shows that as much as £122 could have been spent on fridge freezers and almost £19 on washing machines to match the carbon saving cost effectiveness of ECO CERO. To match the bill saving cost effectiveness of ECO AW, £71 could have been spent on fridge freezers and £18 on washing machines. These figures are substantially more than the low cost estimates for incentivising uptake of efficient appliances under previous supplier obligations, as was discussed above.

All figures in £	To match CERO £/tonne carbon saved	To match CSCO £/tonne carbon saved	To match AW £/£ in bill saving	Low cost estimates for previous policies ¹⁸
Incentive cost per measure on fridge freezers	122	89	71	8
Incentive cost per measure on washing machines	19	14	17	3

Table 4. Cost per appliance to incentivise a similar saving in carbon for numerous previous schemes

Table 5 illustrates another approach for comparing the potential cost of a new incentive on appliances with the cost effectiveness of ECO. It shows how, in 2011, using the low cost estimates for promoting appliances under past supplier obligations in the UK, it would have cost £5 to achieve a tonne of lifetime carbon savings by promoting fridge freezers, and £12 for washing machines. Both figures are far lower than the £58 per tonne of lifetime savings achieved by ECO CSCO, and the £79 per tonne by ECO CERO. The cost of achieving a pound of lifetime bill savings would have been 2 pence for fridge freezers and 3 pence for washing machines, using the low cost estimates for past policies. This is substantially lower than the 19 pence cost achieved by ECO AW. However, it should be noted that ECO CSCO and AW target low income and fuel poor households, whereas the appliance incentive model we have considered would apply to all households.

¹⁷ xxxx Updated impact assessment. To be found at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/286926/The_Future_of_the_Energy_Company_Obligation_Assessment_of_Impacts.pdf

¹⁸ Price Inflation applied, based on government GDP deflator figures: <https://www.gov.uk/government/publications/gdp-deflators-at-market-prices-and-money-gdp-march-2013>

	Government projection for ECO CERO	Government projection for ECO CSCO	Government projection for ECO AW	Fridge freezers (based on low estimate for past policy cost, i.e. £8.20)	Washing machines (based on low estimate for past policy cost, i.e. £3)
£/lifetime CO ₂ saving	79	58	-	5	12
£/lifetime £ saving	-	-	0.19	0.02	0.03

Table 5: Cost effectiveness of ECO sub-targets compared to a financial incentive on fridge freezers and washing machines, implemented in 2011, based on low cost estimates for previous incentive policies

The Government has accepted there is case for financially incentivising uptake of efficient appliances but it is not clear that its preferred method for doing so, the Capacity Market, will be effective. In addition the Capacity Market will not be fully operational until 2018, meaning immediate opportunities for bringing down bills will not be captured. This chapter has shown that there are a number of alternative policy options, shown to be effective in the UK and abroad, that the Government could consider implementing, and that these could be expected to compare favourably on costs with the Energy Company Obligation energy efficiency policy.

5. CONCLUSION

Energy affordability has risen to become a central political issue and consumers are looking to policy makers for action to stem rising costs. Policy makers must respond to this new environment by ensuring that energy and climate change policies are designed to deliver outcomes at least cost to bill payers. This should include taking action to encourage uptake of highly efficient electrical appliances, which has been the focus of this report.

The first reason to encourage uptake of efficient appliances is that reducing demand for electricity is the best way to keep costs down while delivering reductions in carbon emissions from power production. A major study carried out for the Government calculated that electricity demand could be reduced by 26.3TWh a year by 2030, or a 6.4 % reduction against a baseline scenario of 411TWh, if all consumers bought the most efficient electrical appliances. This report has quantified these benefits in terms of energy costs. At current prices the result would be direct householder bill savings from reduced electricity usage totalling £2 billion per year, or £75 per household. The additional cost savings achieved by reducing the requirement for investment in new low carbon generation could total as much as £1.8 billion a year, or £24 per household.

The second argument for encouraging uptake of highly efficient appliances is that there is a shortfall in the outcomes that current policy on appliances is expected to deliver. The Government expects Products Policy, which covers minimum efficiency standards and energy efficiency labelling, to deliver £158 in savings off the average consumer bill by 2020. But evidence suggests there will be a 40 % shortfall in the savings achieved by the policy by 2020, leaving consumers' bills £63 higher than the Government currently projects. Action on efficient appliances is therefore required as a remedial step to keep consumer's bills in line with the projections.

The Government has acknowledged that there is a case for financially incentivising uptake of efficient appliances and intends to do so through the Capacity Market that is currently in development. However, there are drawbacks with this approach. In particular, it is not clear that the market will be the most effective way to deliver absolute reductions in electricity demand. In addition the market will not be fully operational until 2018, which means earlier opportunities for achieving bills savings will be lost.

The Government should consider implementing an alternative financial incentive model while the effectiveness of the Capacity Market is being established. This report has shown a variety of approaches that have been used effectively in the past in the UK and around the World. An incentive that specifically sets out to promote uptake of efficient appliances could be expected to compare favourably with the Energy Company Obligation energy efficiency policy on cost effectiveness for achieving both carbon emission reduction and bill savings.

Consumers are looking to policy makers for help with their rising energy costs. Encouraging consumers to purchase highly efficient appliances is an appropriate an effective response that Government should take.

REFERENCES

Cary R. & Benton D. (2012), Green Alliance, 'Creating a market for electricity savings - Paying for energy efficiency through the Energy Bill', London <http://www.green-alliance.org.uk/uploadedFiles/Publications/reports/Creating%20a%20Market%20for%20Electricity%20Savings.pdf>

Clean Energy Ministerial [CEM] (2013), 'A Global Review of Incentive Programs To Accelerate Energy-efficiency Appliances and Equipment', Berkeley, California. <http://www.superefficient.org/en/Resources/~media/Files/SEAD%20Incentives%20Reports/Global%20Financial%20Incentives%20Report/SEAD%20Incentives%20Report%20-%20Experience%20of%20FI%20Across%20the%20World%20-%20Final.pdf>

Committee on Climate Change [CCC] (2010), 'Meeting Carbon Budgets – ensuring a low-carbon recovery (2nd progress report)', London. http://archive.theccc.org.uk/aws2/0610/CCC-Progress-Report-web-version_3.pdf

Committee on Climate Change [CCC] (2011), 'Meeting Carbon Budgets – ensuring a low-carbon recovery (2nd progress report)', London. http://www.theccc.org.uk/wp-content/uploads/2011/06/CCC-Progress-Report_Interactive_3.pdf

Committee on Climate Change [CCC] (2012), 'Meeting Carbon Budgets – 2012 Progress Report to Parliament', London. http://www.theccc.org.uk/wp-content/uploads/2012/06/1585_CCC_Progress-Rep-2012_bookmarked_1_KD.pdf

Committee on Climate Change [CCC] (2013), 'Meeting Carbon Budgets – 2013 Progress Report to Parliament', London. http://www.theccc.org.uk/wp-content/uploads/2013/06/CCC-Prog-Rep-Book_singles_web_1.pdf

Department for Environment, Food and Rural Affairs [Defra] (2009), 'Saving Energy Through Better Products and Appliances – A report on analysis, aims and indicative standards for energy efficient products 2009-2030', London. <http://archive.defra.gov.uk/environment/economy/documents/energy-products-1209.pdf>

Department of Energy and Climate Change [DECC] (2012a) 'Estimated impacts of energy and climate change policies on energy prices and bills 2012', London. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/172923/130326_-_Price_and_Bill_Impacts_Report_Final.pdf

Department of Energy and Climate Change [DECC] (2012b) 'Final Stage Impact Assessment for the Green Deal and Energy Company Obligation', London. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/42984/5533-final-stage-impact-assessment-for-the-green-deal-a.pdf

Department of Energy and Climate Change [DECC] (2013a) 'Energy Consumption in the UK - All data tables Terawatt hours 2013 update', London https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/265666/all_ecuk_data_tables_in_terawatt_hours.xlsx

Department of Energy and Climate Change [DECC] (2013b) 'Quarterly Energy Prices December 2013', London https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/267320/qep_december_2013.pdf

Department of Energy and Climate Change [DECC] (2013c) Final Project Report: An investigation of the effect of EPC ratings on house prices, London. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/207196/20130613_-_Hedonic_Pricing_study_-_DECC_template__2_.pdf

Department of Energy and Climate Change [DECC] (2013d), 'Final Impact Assessment: Electricity Demand Reduction – Amendment to Capacity Market Clauses', London. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/246126/Impact_Assessment_for_Electricity_Demand_Reduction_Policy_Options_FINAL.pdf

Department of Energy and Climate Change [DECC] (2013e), 'Electricity Market Reform: Capacity Market – Detailed Design Proposals', London. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/209280/15398_TSO_Cm_8637_DECC_Electricity_Market_Reform_web_optimised.pdf

Department of Energy and Climate Change [DECC] (2013f), 'Quarterly domestic energy switching statistics', London. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/267354/qep271.xls

Department of Energy and Climate Change [DECC] (2014), 'DECC Electricity Demand Reduction Pilot', London. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/285761/edr_factsheet.pdf

Department of Energy and Climate Change [DECC] and National Statistics (2013) Energy Trends: September 2013, Newport: Office for National Statistics. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/244715/et_sep_13.PDF

Eckl, A. (2011), 'At the doorstep of the new EU Label – How much further can White Goods cut down on the energy bills?', [Presentation] Copenhagen, 24th-26th May 2011.

Ecofys (2012), 'First findings and recommendations Evaluation of the Energy Labelling Directive and specific aspects of the Ecodesign Directive ENER/C3/2012-523', Utrecht. http://www.energylabevaluation.eu/tmce/First_findings_revised_7_February_2014.pdf

Energy Saving Trust [EST] (2012) 'Powering the nation - household electricity-using habits revealed', London. <http://www.energysavingtrust.org.uk/content/download/77884/934627/version/1/file/Powering+the+nation+report+CO332.pdf>

European Council [EC] (2009), 'Directive 2009/125/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products', <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:285:0010:0035:EN:PDF>

European Council [EC] (2010), 'Directive 2010/30/EU of the European Parliament and of the Council of 19 May 2010 on the indication by labelling and standard product information of the consumption of energy and other resources by energy-related products', <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2010:153:0001:0012:EN:PDF>

Global Action Plan [GAP] (2013) 'Watts in the Kitchen - The role efficient appliances can play in reducing our energy needs', London <http://www.globalactionplan.org.uk/download-watts-in-the-kitchen-report>

Green Alliance (2012), 'Cutting Britain's energy bill Green Alliance policy insight - making the most of product efficiency standards', London. www.green-alliance.org.uk/uploadedFiles/Publications/reports/Cutting_Britain's_energy_bill_web.pdf

Platt R, Aldridge J, Washan, P & Price D (2013) 'Help To Heat: A Solution To The Affordability Crisis In Energy', London: IPPR. http://www.ippr.org/images/media/files/publication/2013/11/Help-to-heat_Nov2013_11562.pdf

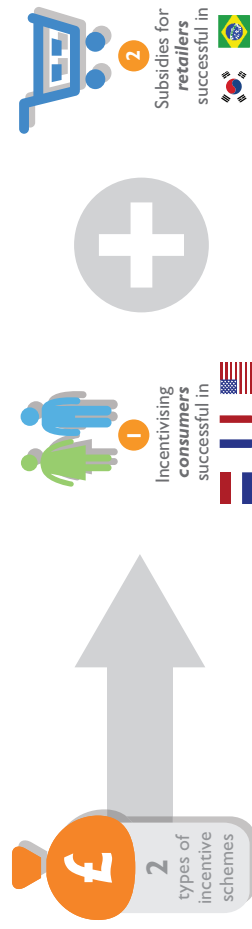
Lees, Dr. E. W. (2009), 'Report to Defra "Evaluation of the Energy Efficiency Commitment 2002-05"', London. http://s3.amazonaws.com/zanran_storage/www.defra.gov.uk/ContentPages/4280164.pdf

McKinsey & Co (2012) 'Capturing the full electricity efficiency potential of the UK', report for DECC to accompany the Electricity Demand Reduction: Consultation on options to encourage permanent reductions in electricity... https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/66564/7035-capturing-full-elec-eff-potential-edr.pdf

Office for National Statistics [ONS] (2013a) 'Economic Review, November 2013', November 2013, Newport. http://www.ons.gov.uk/ons/dcp171766_333999.pdf

Office of Gas and Electricity Markets [OFGEM] (2013) 'Electricity and Gas Supply Market Indicators | Ofgem', Ofgem. [Online] Available from: <https://www.ofgem.gov.uk/gas/retail-market/monitoring-data-and-statistics/electricity-and-gas-supply-market-indicators> [Accessed 14 March 2014]

APPENDIX I: EXAMPLES OF TARGETED FINANCIAL INCENTIVES ON EFFICIENT APPLIANCES IMPLEMENTED AROUND THE WORLD



Type of scheme	Country, name of scheme, year	Description	Result
Tax Credit	France French Tax Credit Scheme 2005 - Present	Since 2005, France has had a tax credit scheme that allows personal income tax credits to be claimed for the purchase of efficient boilers, heat pumps, and windows.	In 2009, more than 1.5 million French households benefited from the scheme, at a cost of 2.6 billion euros to the government.
Tax credit and Replacement	Italy Italian Income Tax Credit Scheme 2007 - 2010	Tax credit scheme available to consumers that bought A+ or A++ refrigerators or freezers, while verifying the disposal of the old appliance. Tax credit was deducted from income tax once proof of purchase and proof of disposal was sent. Consumers received a 20 % reduction in the product price, up to a maximum of €200.	In the first 9 months, 67% of sales of the targeted appliances were A+ or A++. The market share of A+ and A++ labelled appliances increased by 28% compared to 2006. An estimated energy saving of 43.6GWh (9.6 ktoe) was calculated to have been achieved in the first nine months and CO ₂ reductions of 27.7 kilo tonnes. Between 2005 and 2010 in Italy, the average new appliance's annual energy consumption dropped 11% points to 255 KWh per year. The costs for the government in the first nine months of 2007 were estimated to be between €90 million and €130 million

Subsidy	<p>Netherlands Energy Premium Regulation (EPR) - 2000 – 2003</p>	<p>Within 6 weeks of making a purchase, consumers would be eligible for a cash rebate on appliances with an 'A' efficiency rating (€50) or higher A+/A++ (€100).</p>	<p>During the scheme, the market share of A+ rated fridges and fridge-freezers increased by 23 % and A rated by 52 %.</p> <p>Energy savings of at least 300 GWh/year were achieved.</p> <p>Believed to have achieved a permanent transformation of the appliance market by promoting A-labelled products.</p>
Subsidy	<p>US State Energy-Efficient Appliance Rebate Program ("Cash for Appliances") 2009 - 2012</p>	<p>Consumers received a cash rebate per efficient appliance varying between \$25-\$800, with the amount dependent on different states funding allocation.</p>	<p>The results in California provide a useful case study of the effectiveness of the scheme. Consumers cashed in a total of 178,190 rebates, receiving \$35.2 million. 56 million kilowatt-hours per year were saved from the result of scheme, equivalent to powering 1,000 homes in the US.</p> <p>The cost of the programme was \$300 million, which was allocated nationally from the federal stimulus package: American Recovery and Reinvestment Act. The budget was managed on a state level at a ratio of roughly \$1 per person in each state.</p>
Subsidy	<p>China Grants for the purchase of energy saving refrigerators 2012 - Present</p>	<p>The 12th Five Year Plan (FYP) launched a financial incentive programme offering grants for the purchase of energy saving refrigerators (and other appliances) with vouchers worth up to ¥70-¥400 (\$12-\$65) depending on the product size. Grants in the latest scheme only equal less than 10% of the appliance sales price.</p>	<p>Energy savings that can be attributed to this scheme are unclear. Numerous other efficiency measures and obligations also came into effect with the previous 11th FYP 2005-2010 aimed at reducing energy intensity by 20% up to 2010.</p> <p>The total cost of the grants was ¥26.5 billion (~€3.3 billion).</p> <p>Some challenges experienced with the scheme include that consumers lacked information about the labelling system, the benefits of energy efficient appliances (e.g. payback time), and the grant scheme.</p>
Subsidy and Replacement	<p>UK FridgeSavers Late 1990's - 2002</p>	<p>Fridge scrappage scheme for low income houses. Funded by suppliers through UK's Energy Efficiency Standards of Performance (EESoP) the forerunner to EECI. Run by Lothian and Edinburgh Environmental Partnership (LEEP) now Changeworks on behalf of electricity companies</p>	<p>250,000 houses were reached and provided with a new energy efficient fridge for only £25 or a fridge freezer for £50.</p>
Subsidy and Replacement	<p>UK Boiler Scrappage Scheme 2010</p>	<p>Consumers would receive a rebate of up to £400 rebate (with a full purchase price of ~£2500) when replacing old 'G-rated' boilers.</p> <p>All available funds were allocated within 3 months.</p>	<p>133,976 vouchers were issued. Of these 118,618 (88.5%) were successfully claimed (the rest were out of time or not matching the criteria set out in the scheme).</p>

Subsidy and Replacement	<p>Spain Plan Renove Electrodomesticos (PRE) 2006 - Present</p>	<p>Consumers were provided with a subsidy of €75-€105 towards an efficient appliance purchase at point of sale, only when replacing an old appliance. Retailers received €5 per sale to cover admin and removal of old appliance.</p>	<p>3 million appliances were distributed, generating energy savings of 2,238GWh by the end of 2010 – enough to power 4%/0.5m Spanish households. It was estimated that in 2010 the number of replacements was about 490,000 electric appliances; which would achieve energy savings of 685.59 GWh and 552,000 t CO₂ emissions.</p>
Subsidy and Replacement	<p>Scotland Landlord Green Appliance Scheme Dec 2013 - Present</p>	<p>Offers private landlords rebates of up to £500 on the replacement of a Fridge freezer, Freezer, Fridge, Washing machine and Dishwasher. Conditional on the landlord having completed a Green Deal Advice Report (with up to £150 off the market price) and installed any prescribed loft and cavity insulation if required in the report (unless such insulation is impracticable to implement).</p>	<p>No results data yet.</p>
Replacement	<p>Brazil Utilities' Refrigerator replacement programme 2008-2010</p>	<p>45 electricity distribution companies participated in the programme, replacing more than 380,000 refrigerators to save almost 190,000 MWh/year. Peak electricity demand was reduced by more than 23,000 kW.</p>	<p>In a case study sited in the Northeast region the energy savings from refrigerator replacement achieved 81% reduction in refrigerator electricity consumption. Preliminary data from two case studies in the Southeast region show a reduction of 75% and 70%. Energy saved in total electricity consumption for low-income households: Average total monthly consumption among a sample of customers of one utility fell from 167 kWh to 94 kWh after the replacement programme (a reduction of 44%).</p>
Eco-points	<p>Japan Eco-Point System 2009 to 2011</p>	<p>Consumers earned Eco-Points by buying air conditioners (ACs), refrigerators, and televisions. The points, worth ¥1 each, could then be exchanged for: coupons and prepaid cards, HE products, or products that promoted regional economies.</p>	<p>While the scheme was in placed the share of shipped products with the highest efficiency ratings increased from 20% to 96% for ACs, from 30% to 98% for refrigerators, and from about 84% to 99% for televisions. Estimates are that this resulted in a savings of 2.7 million tons of (CO₂) per year. The total budget for the project amounted to ¥693 billion (\$8.7 billion).</p>
Eco-points	<p>South Korea "Carbon Cashbag" program 2008 - Present</p>	<p>Consumers who purchase low-carbon products get carbon credits from manufacturers, retailers, or banks. These are stored on a Carbon Cashbag card and can be used for discounts on public transportation, basic utilities charges, purchases of other efficient appliances, or tickets to cultural events. Voluntary program (companies taking part benefit from low advertising fees).</p>	<p>As of October 2011, 33 companies had been participating in the program with 18 products, 333 sub-products. As of October 2010 a total of 1.5 million households, about 8.8% of all households in Korea, were registered in one of the consumer rewards program. However, participation rates for many regions were below 5%.</p>

INTERNATIONAL EXAMPLES OF TARGETED FINANCIAL INCENTIVES ON EFFICIENT ELECTRICAL APPLIANCES. SOURCES:

Netherlands: http://www.bigee.net/en/policy/guide/appliances/policy_examples/11/;

Spain: www.come-on-labels.eu/download/case-study-renove-plan;

Italy: http://www.bigee.net/en/policy/guide/appliances/policy_examples/13/x; http://ec.europa.eu/taxation_customs/resources/documents/taxation/gen_info/economic_analysis/economic_studies/study_costs_benefits_bio_en.pdf;

France: <http://www.superefficient.org/en/Resources/~media/Files/SEAD%20Incentives%20Reports/Global%20Financial%20Incentives%20Report/SEAD%20Incentives%20Report%20-%20Experience%20of%20FI%20Across%20the%20World%20-%20Final.pdf#page=2&zoom=70,0,67>; http://www.developpement-durable.gouv.fr/IMG/pdf/110619_PNAEE.pdf;

US: http://www1.eere.energy.gov/recovery/appliance_rebate_program.html; <http://www.greenbiz.com/blog/2010/07/21/did-cash-appliances-program-work?page=0%2C0>; http://www.cash4appliances.org/consumers/Summary_of_rebate_results.pdf;

Scotland: <http://www.energysavingtrust.org.uk/scotland/Organisations/Technology/Free-resources-for-housing-professionals/Landlord-Green-Appliance-scheme-Phase-2>;

Brazil: http://www.bigee.net/en/policy/guide/appliances/policy_examples/8/, http://www.sinerconsult.com.br/livros/Draft_Paper_0391.pdf;

Japan: <http://www.superefficient.org/en/Resources/~media/Files/SEAD%20Incentives%20Reports/Global%20Financial%20Incentives%20Report/SEAD%20Incentives%20Report%20-%20Experience%20of%20FI%20Across%20the%20World%20-%20Final.pdf>, http://www.meti.go.jp/english/press/data/20100713_01.html;

South Korea: <http://www.superefficient.org/en/Resources/~media/Files/SEAD%20Incentives%20Reports/Global%20Financial%20Incentives%20Report/SEAD%20Incentives%20Report%20-%20Experience%20of%20FI%20Across%20the%20World%20-%20Final.pdf>; <http://eetd.lbl.gov/sites/all/files/lbnl-6219e.pdf> ;

China: <http://www.bigee.net/en/policy/guide/appliances/package/16/>;

UK: Boiler scrappage <http://www.energysavingtrust.org.uk/Heating-and-hot-water/Replacing-your-boiler/Boiler-Scrappage-Scheme>, **Fridgesavers:** <http://www.changeworks.org.uk/projects/energy-project-archive/314/#8>

APPENDIX 2: RESULTS OF ANALYSIS INTO THE COST EFFECTIVENESS OF A FINANCIAL INCENTIVE ON FRIDGE FREEZERS AND WASHING MACHINES IN 2011

FRIDGE FREEZERS:

Evidence provided by Global Action Plan.

- 2011 average usage:
 - A rated: 368kWh/yr
 - A+++ rated: 149kWh/yr
- Sales of A rated products:
 - 79% of all fridge freezer sales
 - 769,880 units
- Total sales of fridge freezers:
 - 974,531 units
- Lifetime savings: (lifetime assumed as 15 years)
 - £361,654,969 energy savings
 - 1,501,450 tonnes of CO₂e

Analysis includes an allowance for ‘freerider’ costs, which refers to the cost of providing the incentive to consumers who would have bought the most efficient appliance without an incentive being in place. This has been done by applying the cost of an incentive across all sales of fridge freezers, not just the sales of A rated models.

	Potential cost per appliance to encourage someone to choose A+++ above A	Total costs of incentive (unit costs applied across all stock sold in 2011 to include free riders)	£ spent per £ of lifetime energy bill savings	£/tonne lifetime CO ₂ savings
Low cost estimates for incentivising appliance uptake under supplier obligations	£8.20	8.2*974,531 = £7,991,154	£7,991,154/361,654,969 = £0.02	7,991,154/1,501,450= £5.32
ECO AW equivalent	£71	n/a	£0.19	£46
ECO CSCO equivalent	£89	n/a	£0.24	£58.00
ECO CERO equivalent	£122	n/a	£0.33	£79.00

WASHING MACHINES:

Evidence provided by Global Action Plan.

- 2011 average usage:
 - A rated: 231kWh/yr
 - A+++ rated: 170kWh/yr
- Sales of A rated products:
 - 68% of all washing machine sales
 - 1,690,734 units
- Total sales of washing machines:
 - 2,486,374 units
- Lifetime savings: (lifetime assumed as 10 years)
 - £221,224,090 energy savings
 - 612,290 tonnes of CO₂e

Analysis includes an allowance for ‘freerider’ costs, which refers to the cost of providing the incentive to consumers who would have bought the most efficient appliance without an incentive being in place. This has been done by applying the cost of an incentive across all sales of washing machines, not just the sales of A rated models.

	Potential cost per appliance to encourage someone to choose A+++ above A	Total costs of incentive (unit costs applied across all stock sold in 2011 to include free riders)	£ spent per £ of lifetime energy bill savings	£/tonne lifetime CO ₂ savings
Low cost estimates for incentivising appliance uptake under supplier obligations	£3	3*2,486,374 = £7,459,122	7,459,122/221,224,090= £0.03	7,459,122/612,290 = £12.18
ECO AW equivalent	£17	n/a	£0.19	£69
ECO CSCO equivalent	£14	n/a	£0.16	£58.00
ECO CERO equivalent	£19	n/a	£0.21	£79.00



www.globalactionplan.org.uk

t: 020 7420 4444

e: info@globalactionplan.org.uk

9 -13 Kean Street, London WC2B 4AY



[@globalactplan](https://twitter.com/globalactplan)



www.facebook.com/globalactionplan



<http://www.linkedin.com/company/global-action-plan>



<http://www.youtube.com/user/GlobalActionPlanUK>

AMDEATM

The Association of Manufacturers
of Domestic Appliances