DEPARTMENT OF ENERGY & CLIMATE CHANGE

Estimated impacts of energy and climate change policies on energy prices and bills

July 2010

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Executive Summary

1. Britain is the first country in the world to set legally binding 'carbon budgets', aiming to cut UK emissions by 34% by 2020 and at least 80% by 2050 through investment in energy efficiency and clean energy technologies such as renewables, nuclear and carbon capture and storage.

2. Everyone has a role to play in tackling climate change, from reducing their own emissions to planning for adaptation. The Government is providing a range of support for individuals, communities and businesses to reduce their carbon emissions. Many of the policies (for example the Renewables Obligation) that are reflected in prices and bills are designed to help bring forward the levels of low-carbon energy investment which are required if the UK is to meet its energy needs and make the transition to a low-carbon economy.

3. Compared to the counterfactual scenario in which climate change and energy policies do not have an impact on energy bills, on average, domestic energy bills will be 1% higher in 2020 and non-domestic energy bills, for medium-sized consumers, will be 26% higher as a result of climate change and energy policies.

4. The impact of climate change and energy policies on energy prices is higher than the impact on bills (18% and 33% on gas and electricity prices respectively for domestic consumers and 24% and 43% respectively, for medium-sized non-domestic consumers). The impact on bills is lower as the Government has in place a range of policies to improve energy efficiency, which helps households and businesses reduce energy consumption, lessening the overall bill impact.

5. There will be a variable impact on households owing to differential take up of energy efficiency, renewable heat and micro-generation measures – by 2020 it is estimated that households will see a decrease in bills by an average of approximately 25% if they take up both renewable and insulation measures (compared to a bill with the impact of policies). A greater burden of the increase in bills falls on lower-income households with respect to the share of income spent on energy bills.

6. Sustained higher prices for fossil fuels reduce the cost of some energy and climate change policies, lowering the cost passed onto consumer bills. For example, at an oil price of around $150 per barrel in 2020 and gas price of around 120 pence per therm, climate change and energy policies would have the effect of *reducing* bills in 2020 by around 5% compared to a bill excluding these policies.

Introduction

7. Energy and climate change policies are likely to have a significant impact on consumers across the UK. The impact on households and businesses will be through changes in prices for goods and services and changing patterns of consumption, in particular for energy.

8. This analytical paper sets out DECC's latest assessment of the impact of energy and climate change policies on gas and electricity prices and bills. It updates analysis that was previously published in July 2009.[1] Future updates will be published alongside the Annual Energy Statement.

9. The analysis within this document is not a complete view of the impacts of energy and climate change policies on consumers. Energy and climate change policies are likely to have other costs and benefits that will impact energy consumers outside their electricity and gas bills, for example, through costs of appliances due to changes in energy efficiency standards.

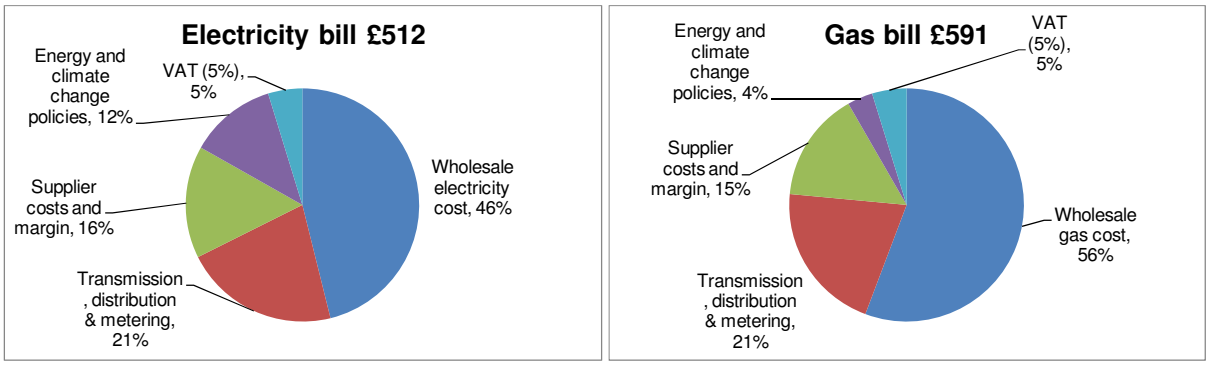
10. The results presented in this document are based on analysis of policies and proposals put forward by the previous Government. Only those policies already in place or that have been planned to a sufficient degree of detail (i.e. with quantified estimates of costs and benefits) have been included in the modelling. Annex A presents the policies assessed in this document and details any changes made to the policies since the last published analysis in July 2009.

Current domestic bills

11. Ofgem's estimate of the average annual domestic gas and electricity bill as of May 2010 is estimated at £620 and £500, respectively.[2] Fossil fuel prices (gas, coal and oil) are the primary drivers of wholesale energy costs, which currently make up over 60% of domestic energy prices.[3] Transmission and distribution costs, supplier costs and margins and a 5% VAT rate are the other main components of the household energy bill. Based on Ofgem's analysis, energy and climate change policies are estimated to represent 7% of the total household energy bill in 2009, excluding the impact of energy efficiency savings.[4] DECC's estimates of the breakdown of an average domestic gas and electricity bill in 2010, as noted in Chart 1, are broadly similar to Ofgem's. Differences are down to different assumptions used.

[1] Analytical Annex to the UK Low Carbon Transition Plan, July 2009. Available online at: http://www.decc.gov.uk/en/content/cms/publications/lc_trans_plan/lc_trans_plan.aspx.
[2] Ofgem; Electricity and Gas Supply Market Report, June 2010. Available at: http://www.ofgem.gov.uk/Markets/RetMkts/ensuppro/Documents1/Electricity%20and%20Gas%20Supply%20Market%20Report%20June%202010.pdf . Ofgem assumes customer bill is for standard tariffs, weighted by payment method and market share. Average figures assume electricity consumption of 4MWh/yr and gas consumption of 16.9MWh/yr
[3] See Annex C table C1 for wholesale price assumptions from 2010 to 2020
[4] Source: Ofgem Updated Household Energy Bills Explained Factsheet, August 2009.
Ofgem's estimate of climate change and energy policies does not account for energy efficiency savings that would reduce the impact of policies as a proportion of bills. In addition for this report Ofgem use higher consumption bands than more recent analysis, this will increase the impact of policies. DECC estimates account for the impact of energy efficiency policies.

Chart 1: Estimated breakdown of an average annual domestic gas and electricity bill in 2010[5]



Source: DECC 2010
Figures in real 2009 prices

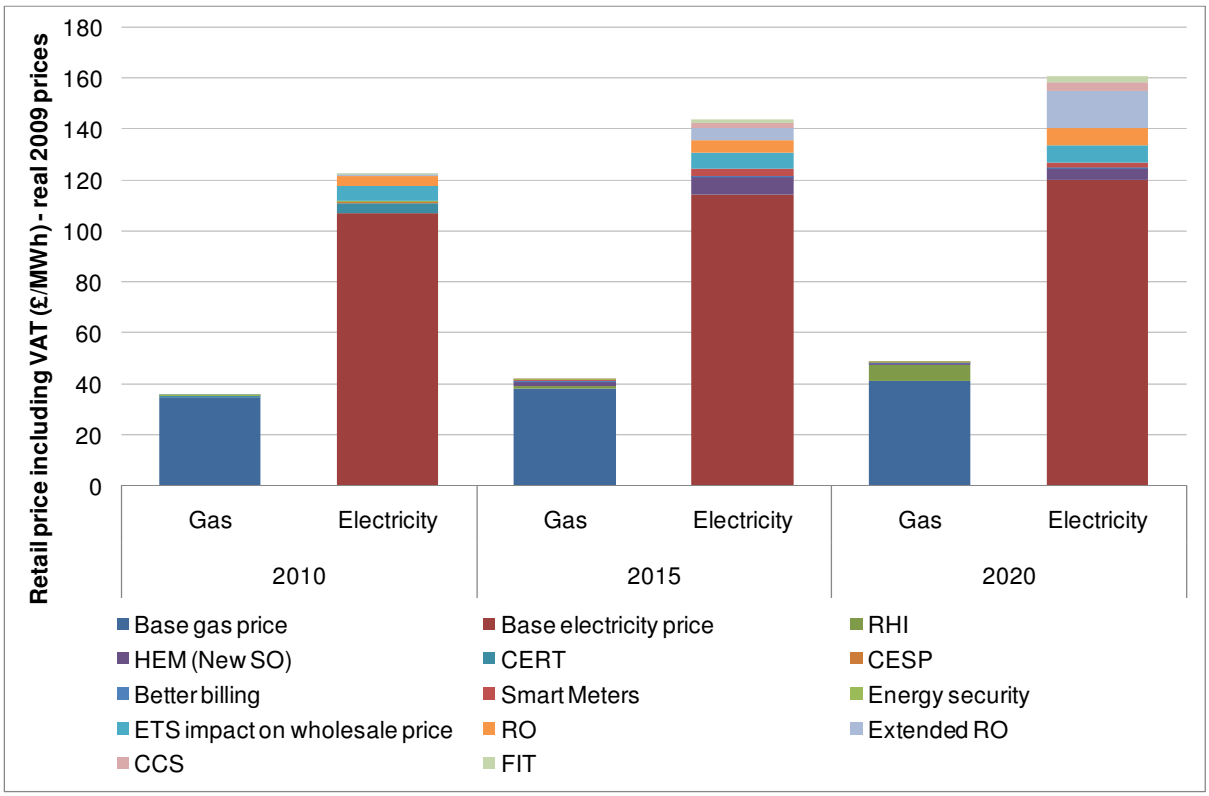
12. The results from DECC analytical modelling are included in the analysis that follows. Details of the main assumptions and definitions can be found in Annex B.

Estimated impacts on average domestic energy prices and bills

13. Chart 2 and Table 1 below illustrate the estimated increase in average domestic retail gas and electricity prices as a result of energy and climate change policies to 2020. "Base prices" (i.e. excluding policies) are projected to increase to 2020, driven by rising wholesale prices which are based on DECC fossil fuel price assumptions and rising transmission, distribution and metering costs as extrapolated from historical trends. The results are based on a fossil fuel price scenario consistent with an oil price of around $80/bbl and gas price of around 69 pence per therm[6] in 2020.

[5]DECC assumes an average consumption of 4.2MWh/yr for electricity and 16.4MWh/yr for gas in 2010; as derived from total consumption estimates published in Digest of United Kingdom Energy Statistics, 2009 and CLG household assumptions.
[6] In real 2009 prices.

Chart 2: Estimated impact of energy and climate change policies on average domestic retail gas and electricity prices (including VAT)



Source: DECC 2010

Table 1: Estimated impact of energy and climate change policies on average domestic gas and electricity prices and an average domestic energy bill (including VAT)

	2010	2015	2020
Price impacts (real 2009 £/MWh and % change)			
Increase in **gas prices** due to policies	1 (4%)	4 (10%)	8 (18%)
Increase in **electricity price** due to policies	15 (14%)	29 (26%)	40 (33%)
Energy bill (gas + electricity) impacts (real 2009 £ and % change)			
Estimated average **energy bill** without policies	£1,060	£1,149	£1,226
Estimated average **energy bill** with policies	£1,103	£1,150	£1,239
Impact of policies on **energy bill**	£42 (4%)	£1 (0%)	£13 (1%)

Source: DECC 2010. Numbers may not add up due to rounding

14. As presented in Table 1, domestic retail gas prices are estimated to be 18% higher and retail electricity prices 33% higher in 2020 due to energy and climate change policies (compared to prices in 2020 without policies).

15. The steady increase over time in the impact of energy and climate change policies on electricity prices is primarily due to the EU Emissions Trading System (EU ETS) and Renewables Obligation (RO). The EU ETS is assumed to impact on electricity prices as generators are assumed to pass on the cost of purchasing carbon allowances onto electricity wholesale prices. The RO is assumed to affect retail prices as the costs of the RO subsidy and grid reinforcement for renewables are assumed to be passed on to end-users of electricity. This analysis does not include any impacts the RO may have on wholesale electricity prices at this stage. However, this impact has been modelled separately by Redpoint, and it is estimated to reduce wholesale electricity prices by an average of around £6/MWh over the period 2010 to 2020.

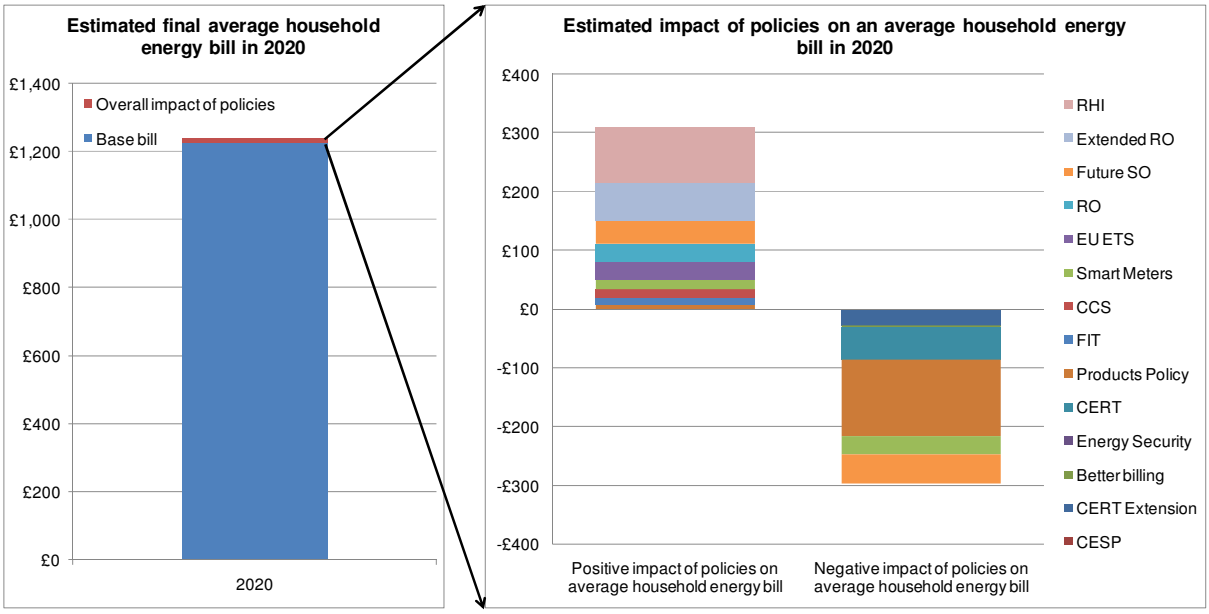
16. Under our current assumptions, the Renewable Heat Incentive (RHI) is estimated have the biggest impact on gas prices. However, the RHI is yet to be finalised. The Coalition Government is committed to meeting its targets on renewables, including through taking action on renewable heat. The new Coalition Administration is reviewing the RHI and has not committed to a particular option at this stage, including on potential funding methods. Our existing analysis assumes that the RHI is funded through a levy on gas bills, which is consistent with previously published DECC analysis rather than indicative of the final decision on the policy. Changes to this assumption could significantly alter the headline impacts. Annex D provides a breakdown of price impacts by policy.

17. The increases in gas and electricity prices accelerate closer to 2020 as the ambition of the policies that are rolled out increases. However, there are a number of policies that already have some impact in 2010 (including the RO, Carbon Emissions Reduction Target (CERT), Feed-in-Tariffs (FiTs) and EU ETS).

18. Table 1 also shows the estimated impact of energy and climate change policies on an average domestic energy (gas plus electricity) bill. In total, policies are estimated to increase the average bill by £13 (1%) compared to a bill in 2020 in the absence of these policies. The breakdown of the energy bill into separate gas and electricity bills shows that the biggest percentage increase comes from the rise in domestic gas bills (See Annex E for further detail).

19. The impact of policies on gas and electricity prices is much greater than the impact on gas and electricity bills. This is because bills are a combination of prices and energy usage, and therefore include the impact of a range of policies which improve energy efficiency by helping households and businesses reduce energy consumption, lessening the overall bill impact. Chart 3 below shows the estimated average bill impact of individual policies in 2020.

Chart 3: Estimated impact of energy and climate change policies on an average domestic energy bill in 2020 (including VAT)



Source: DECC 2010
Figures in real 2009 prices

Estimated impacts on average non-domestic energy prices and bills

20. A different selection of policies has been modelled for the non-domestic compared to the domestic sector, primarily because different policies apply to non-domestic sectors of the economy. The impact on non-domestic bills is also more complex to analyse than domestic bills. This is because of the diversity of energy usage (i.e. greater use of non-metered fuels) and energy prices faced by energy users in the non-domestic sector and different levels of emissions abatement opportunities across sectors. The bills analysis below has been carried out for an illustrative medium-sized non-domestic user of gas and electricity.[7] Looking ahead DECC are intending to expand this analysis to include the impact on energy intensive users.

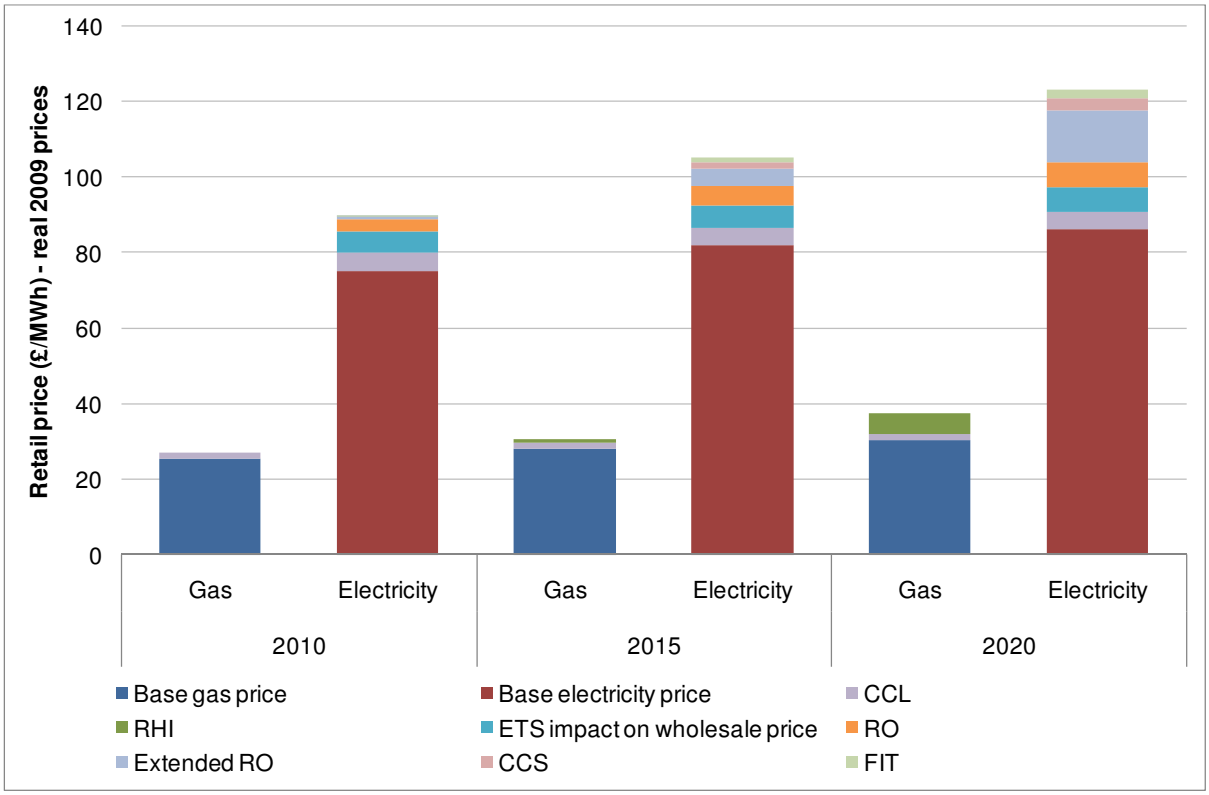
21. Chart 4 and Table 2 illustrate the estimated increase in average non-domestic retail gas and electricity prices due to energy and climate change policies to 2020. As with domestic prices, the increases in base prices (i.e. excluding policies) up to 2020 are due to assumed increases in wholesale prices, transmission, distribution and metering costs.

[7] Non-domestic energy consumers include industry, transport, public administration, commercial and agriculture. A medium-sized gas user is defined by an annual consumption of between 2,778 and 27,777MWh of gas. A medium-sized electricity user is defined by an annual consumption of between 2,000 and 19,999MWh of electricity. The midpoints of these ranges have been used for this analysis.

22. As before, the steady increase in the estimated impact of energy and climate change policies on electricity prices is primarily due to the EU ETS and RO[8], while the RHI is estimated to have the biggest impact on gas prices[9] (see Annex D for a breakdown of impacts by policy).

23. The increases in gas and electricity prices accelerate closer to 2020 as the ambition of the policies that are rolled out increases. However, there are a number of policies that already have an impact in 2010 (including the RO, FiTs and EU ETS).

Chart 4: Estimated impact of energy and climate change policies on average non-domestic retail gas and electricity prices



Source: DECC 2010

[8] This includes the impacts of the RO subsides and the costs of grid reinforcement. This analysis does not include any impacts the RO may have on wholesale electricity prices at this stage. However, this has been modelled separately by Redpoint, and it is estimated to reduce wholesale electricity prices by an average of around £6/MWh over the period 2010 to 2020 under a fossil fuel price scenario consistent with a sustained oil price of around $80/bbl in 2020.

[9] The new Coalition Administration is reviewing the RHI and has not committed to a particular option at this stage, including on potential funding methods. Our existing analysis assumes that the RHI is funded through a levy on gas bills, which is consistent with our previously published work rather than indicative of the final decision we expect.

Table 2: Estimated impact of energy and climate change policies on average non-domestic retail gas and electricity prices and an average medium-sized non-domestic user's energy bill

	2010	2015	2020
Price impacts (real 2009 £/MWh and % change)			
Increase in **gas prices** due to policies	2 (6%)	3 (10%)	7 (24%)
Increase in **electricity price** due to policies	15 (20%)	23 (28%)	37 (43%)
Energy bill (gas + electricity) impacts (real 2009 £000s and % change)			
Estimated average **energy bill** without policies	£1,217	£1,327	£1,410
Estimated average **energy bill** with policies	£1,392	£1,477	£1,778
Impact of policies on **energy bill**	£175 (14%)	£150 (11%)	£368 (26%)

Source: DECC 2010
Numbers may not add up due to rounding

24. As presented in Table 2, average non-domestic retail gas prices are estimated to be 24% higher and retail electricity prices 43% higher in 2020 due to energy and climate change policies (compared to prices in 2020 without policies).

25. Table 2 and Chart 5 also show the estimated impacts of energy and climate change policies on the energy bill for an illustrative user. Overall, energy and climate change policies are expected to increase the average medium-sized non-domestic user's energy bill by £368,000 (26%) compared to a bill in 2020 in the absence of these policies. Annex E provides a breakdown of the impacts on the average gas and electricity bill by each policy.

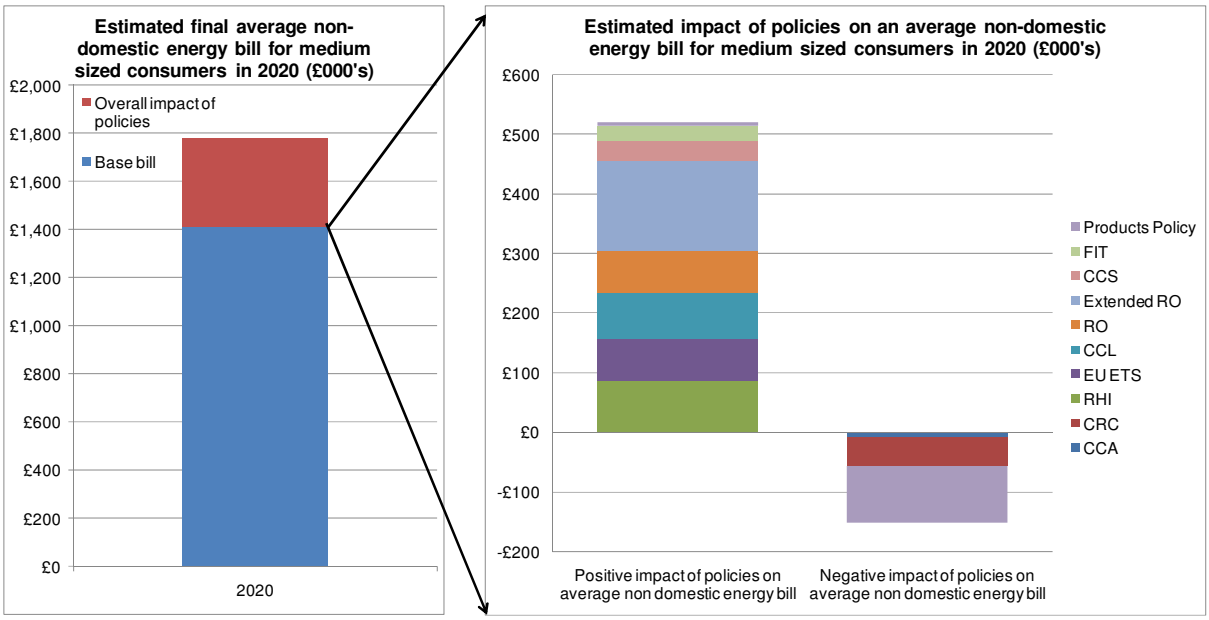
26. The percentage increase in an average bill for the non-domestic sector is higher than the increase in the domestic sector. This arises in part because the baseline gas and electricity prices for non-domestic users are, on average, lower than for domestic users in addition domestic bills include the impact of a wider range of policies which improve energy efficiency. For policies such as FiTs that affect both the domestic and the non domestic sector it is assumed the impact on the retail price of that policy is the same across sectors, as costs are assumed to be spread evenly over total consumption. The estimated price impact will therefore be higher in percentage terms for non-domestic consumers compared to domestic.

27. There are a number of energy efficiency policies for non-domestic consumers which will have an impact on their level of energy consumption and thus reduce their energy bills. The results include the estimated impacts of Products Policy on the energy consumption of domestic and non-domestic consumers. They

also include the impacts of the Carbon Reduction Commitment (CRC) and the Climate Change Agreement (CCA), which only affect non-domestic consumers. Due to data constraints, the analysis does not include the costs of meeting the CCA requirements, only the benefits. The associated savings are spread across all non-domestic consumers. This will therefore underestimate the bill savings for eligible non-domestic users and overestimate the bill savings for ineligible non-domestic users. The CCL analysis is partial in that it only models costs, not associated savings.

28. There will be further reductions in energy consumption due to the roll-out of smart-metering for small and medium enterprises (SMEs). It has not been possible to model the impact of this in the above analysis. However, estimates suggest that an average SME will approximately save 3% on gas bills and 2% on electricity bills by 2020, compared to counterfactual of bill in 2020 without Smart Meters policy. There are also plans to consider cost effective options for SME energy efficiency.

Chart 5: **Estimated impact of energy and climate change policies on an average non-domestic energy bill for a medium sized consumer in 2020**



Source: DECC 2010
Figures in real 2009 prices

Sensitivity analysis of average bill impacts

29. Analysis of price and bill impacts is inherently uncertain and sensitive to underlying assumptions. The primary driver of energy prices and bills is not energy and climate change policies but rather changes in fossil fuel prices (gas, coal and oil), which are the primary drivers of wholesale energy costs and currently make up around 60% of domestic energy prices.

30. Fossil fuel prices also affect the cost of energy and climate change policies. With higher fossil fuel prices, the costs of energy and climate change policies are generally reduced. Higher fossil fuel prices lower the cost of policies such as the RO since the subsidy required to incentivise low-carbon investment is less. Higher fossil fuel prices also lead to higher baseline energy prices more generally and thereby increase the value of any energy savings from energy efficiency policies.

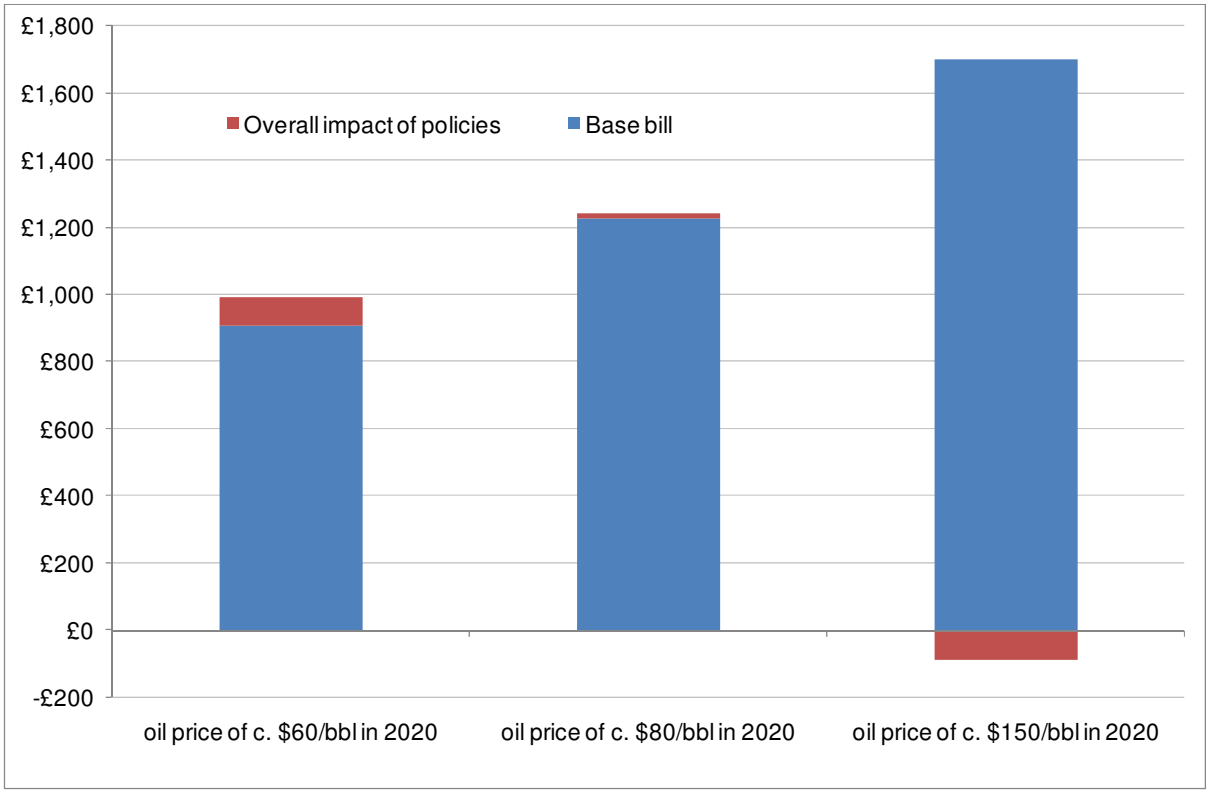
31. The analysis described in the previous sections is based on a scenario where the oil price is around $80/bbl and gas price around 60 pence per therm[10] in 2020. This is an assumption made for analytical purposes rather than a forecast. In order to look at the impact of fossil fuel prices on the estimates and given the high level of uncertainty associated with these assumptions we have looked at two alternative scenarios. In the first, an oil price of around $150/bbl (gas at 120p/therm) in 2020 is assumed and, in the second, an oil price of around $60/bbl (gas at 35p/therm).[11]

32. The higher fossil fuel price scenario used is coupled with a higher European Union Allowance ("carbon price") assumption. This is because gas is relatively more expensive than coal compared with the central and lower fossil fuel price scenarios. As a result, coal generation is relatively more attractive in the higher fossil fuel price scenario, the demand for carbon allowances is higher and hence the carbon price is higher. This leads to a larger absolute impact of the EU ETS on wholesale electricity prices.[12]

33. Chart 6 shows how the overall impact of energy and climate change policies on an average household energy bill changes under the different fossil fuel price scenarios. The effect that higher fossil fuel price assumptions have of reducing the cost of low-carbon investment, combined with the increased monetary value of energy efficiency savings when prices are higher dominate the increased impact of the EU ETS due to higher carbon prices. As such, under higher fossil fuel prices, energy and climate change policies are estimated to actually **reduce** the average household energy bill in 2020 by £87 or 5% (compared to a bill in 2020 without policies). See Annex C for average price and bill impacts of policies based on an oil price in 2020 of $150/bbl and $60/bbl.

[10] Real 2009 prices.
[11] This is based on DECC's fossil fuel price assumptions available at: http://www.decc.gov.uk/assets/decc/statistics/projections/file51365.pdf
[12] For more detail on the drivers of DECC's carbon price assumptions, see http://www.decc.gov.uk/en/content/cms/what_we_do/lc_uk/valuation/valuation.aspx.

Chart 6: Estimated impact of energy and climate change policies on an average domestic energy bill in 2020 under different fossil fuel price scenarios



Source: DECC 2010
Figures in real 2009 prices

Distributional impacts of energy and climate change policies in the domestic sector

34. Looking at the impact of policies on **average** domestic prices and bills masks significant distributional impacts across households. Policies will lead to transfers between different sections of the population. For instance, households will generally only take up the measures included in a particular policy (such as energy efficiency or renewable heat measures) if they are subsidised. Some low income households will be able to access fully subsidised measures whilst other households will be able to buy measures at subsidised prices. These subsidies are funded by all energy consumers (through increased energy bills). Policies that drive energy efficiency, such as CERT, CERT Extension, the Community Energy Saving Programme (CESP) and Future Supplier Obligation (SO) will therefore lead to transfers of benefits from those who do not take up measures but pay for the costs of these policies through their energy bills to those who do take up measures.

35. Households that take up insulation or renewable energy measures will generally have lower energy bills as a result. The benefit from lower energy bills will

typically be larger than the cost to the household of the policy (which is assumed to be spread evenly across all households).

36. To assess the distributional impacts of energy and climate change polices, a model has been developed by the Centre for Sustainable Energy (CSE) supported by DECC which simulates how the impacts on household energy bills are likely to be allocated across the population.[13]

Distributional impacts of policies across income deciles

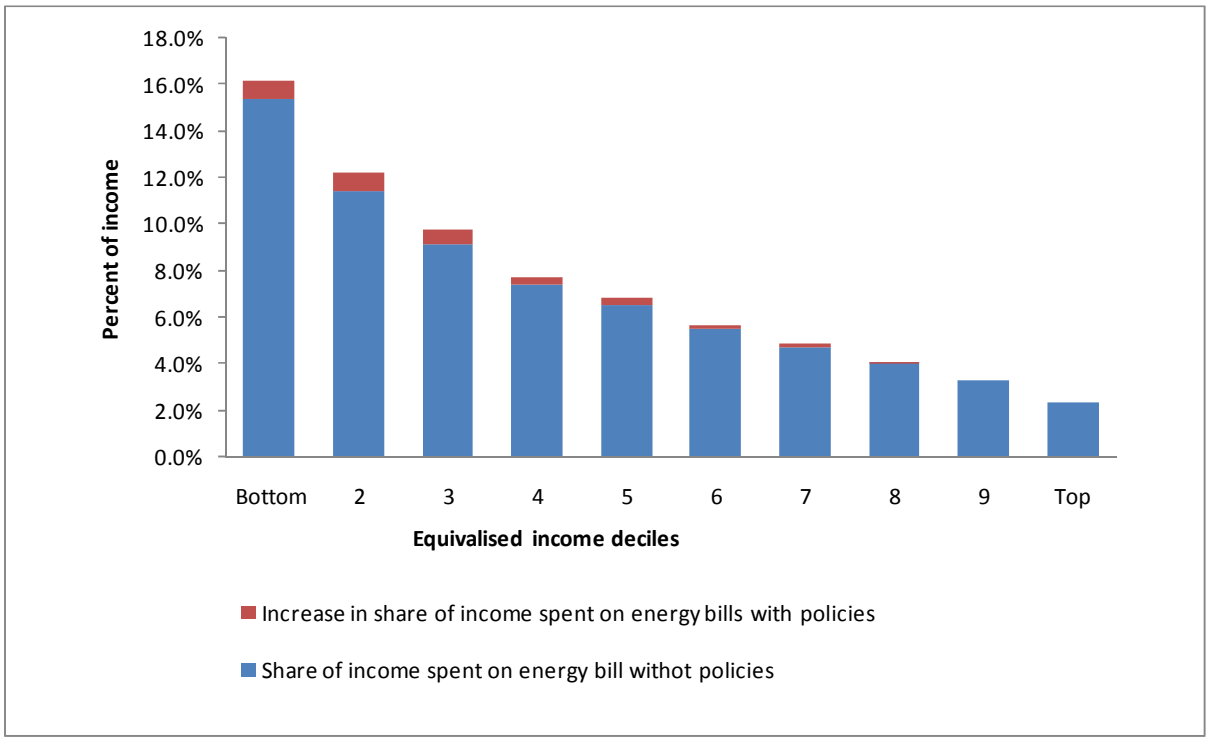
37. When assessing distributional impacts, it is important to look at the increase in the energy bill as a percentage of income, as well as the absolute and percentage increase in the bill. This gives a better idea of the affordability of the impact for households on different incomes[14].

38. As outlined above, the costs of energy policies are passed on by energy suppliers through an increase in the price of energy. Households with higher levels of energy consumption will face a larger bill increase from the same increase in price. People on higher incomes generally consume more energy; they typically live in larger houses which require more heating and have more electrical appliances. High-income households are therefore likely to face a larger absolute increase in their energy bill than low-income households.

39. However, although higher income households may face a higher absolute increase in their bill, this increase is likely to be a much smaller proportion of their income than for lower income households, as demonstrated in Chart 7. Those households in the bottom income decile are estimated to see their expenditure on electricity and gas increase by around 1% of income in 2020 as a result of energy and climate change policies. By contrast, those households in the highest income deciles see a slight fall in energy bill as a proportion of income as it is assumed, under current policies, that they are more likely to take up renewable or insulation measures due to associated up front financial cost of take up.

[13] Centre for Sustainable Energy, Distributional Impacts Model for Policy Scenario Analysis (DIMPSA), 2009
[14] Assessing bill impact in terms of income is one way of considering affordability, another way for instance, is to consider energy bill as a share of total equivalised expenditure.

Chart 7: Energy bill as a percentage of income in 2020, with and without energy and climate change policies



Source: DECC 2010

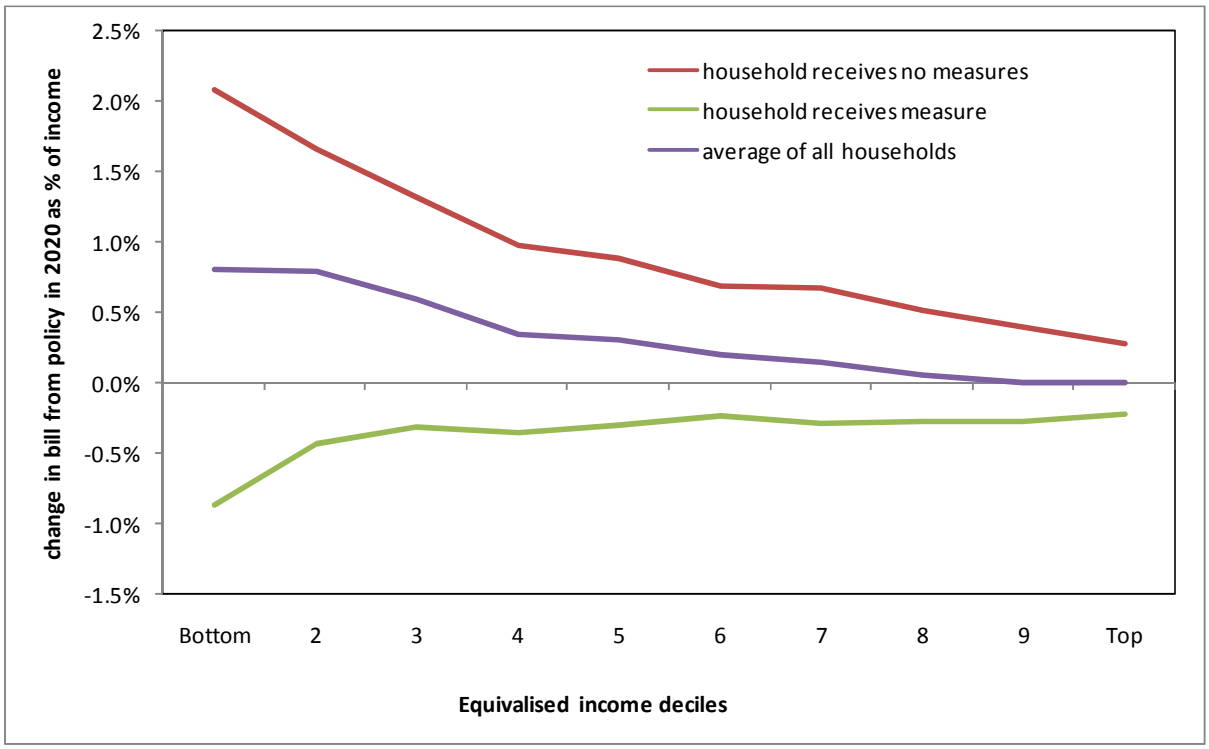
40. There is a significant difference in the impact on energy bills between households that take up insulation and renewable energy measures and those that do not. By 2020 it is estimated that households will see a decrease in bills by an average of approximately 25% if they take up both a renewable energy and insulation measure, if only an insulation measure is taken up bills will fall by 7% on average, compared to the same bill in 2020 had they not taken up measure(s).[15] This takes account of the reduced energy consumption of households that take up such measures but not the upfront financial costs or the benefit from additional payments from policies such as FiTs and the RHI.

41. A greater burden of any increase in bills falls on lower income households with respect to the share of income spent on energy bills. As illustrated in Chart 8, households across the income distribution that receive measures see a decrease in bills compared to their bills without climate change and energy policies. Households that receive insulation *or* renewable measures in the bottom income decile see the largest decrease in bills accounting for just under 1% of their income. However, without measures their bills rise by about 2% of their income.

[15] It should be noted that only a very small proportion of households (just over 1%) are assumed to receive both a renewable energy measure and an insulation measure as a direct result of climate change and energy policies (this does not take into account voluntary take up of measures).

This could potentially include over half of households in the bottom income decile.[16]

Chart 8: Impact of climate change policies for household that take up insulation *or* renewable energy measures



Source: DECC 2010

[16] Insulation and renewable measures include: cavity wall insulation, loft insulation top up, loft insulation full, solid wall insulation, biomass boiler, solar water heating, ground source heat pump, air source heat pump, Gas mCHP, micro wind, small wind and photovoltaic panels. The above analysis shows the average impact on bills across these renewable and insulation measures. In practice, savings on bills will vary depending on which renewable or energy efficiency measure is taken up and the physical characteristics of the household (e.g. size).

Annex A: Policies assessed in this analysis

The results presented in this document are based on analysis of proposals and policies put forward by the previous Government. Only those policies which are already in place or planned to a sufficient degree of detail have been included in the modelling (i.e. with quantified estimates of costs and benefits). The table below sets out the policies analysed and where there have been significant changes in policy design since July 2009 and the analysis of price and bill impacts published alongside the Low Carbon Transition plan (LCTP). Some of these policies and proposals will have to go through the Spending Review process before receiving approval to go ahead.

The LCTP estimated the impact of climate change and energy policies on an average household energy (gas plus electricity) bill in 2020 to be approximately 12% compared with a bill in 2020 without these policies. The updated impact is lower primarily due to a lower impact of the EU ETS due to the fall in DECC estimates of the EUA price, incorporating the effect of the recession and revised estimates of industrial carbon abatement opportunities; a reduction in the RHI subsidy cost in line with the Impact Assessment published in February 2010; increased savings attributed to Products Policy reflecting additional potential from energy using products.

Table A1: Energy and climate change policies included in the analysis

Policy	Notes
Community Energy Saving Programme (CESP)	No changes since July 2009 price and bills analysis
Carbon Emissions Reduction Target (CERT)	The estimated bill impacts of CERT include savings accrued from measures installed as part of EEC1 and EEC2. They also allow for a comfort factor of 15% for insulation measures in the priority group. Bill impacts for CERT and the CERT extension arise from the cost to suppliers of meeting their targets and the reduced energy demand resulting from households receiving measures
CERT Extension	This is a new policy included in the analysis since July 2009. It is due to run between 2011 and 2012 with savings from installed measures expected to accrue in the years following. It therefore replaces the further supplier obligations in these years assumed in place for the July 2009 price and bills analysis. The CERT extension is a 108Mt extension to the CERT supplier target. It includes a super-priority

	group which must receive 15% of this target; professional insulation must receive 68% of the target; and Compact Fluorescent Lights are no longer eligible measures. Analysis allows for a comfort factor of 40% for insulation measures in the super priority group (15% in priority group) and 25% for heating measures in the super priority group (0% for priority group).
Future Supplier Obligation (SO)	There is likely to be a continuation of the CERT extension past 2012, however the detail of what form it will take is still being built up. The numbers used here are based on the Initial Assessment of Impacts published in March 2010.
Better Billing	Since January 2009, suppliers have been required to include on bills or statements comparisons between the energy used in the period covered by the bill or statement and the energy used in the same period in the previous year. This requirement, which was part of the UK's implementation of the Energy Services Directive, was designed to help customers be more aware of their energy consumption, and consequently to use energy more efficiently. The cost/benefit analysis for this policy, published by BERR in August 2007, estimated, on a central case, a total net benefit of £315 million over fifteen years, assuming energy savings of 0.25% persisting over that period
Smart Metering	The Government set out its commitment to the roll-out of smart meters in its coalition programme. In July 2010, the Government published its implementation plan (the Smart Metering Prospectus), which provides an overview of analysis and proposals for implementing the smart metering roll-out to domestic and small non-domestic consumers. The impacts presented in this document refer to the expected price and bill impacts of this set of proposals.
Products Policy	There are a number of EU Implementing Measures (minimum standards and labelling) that have already been agreed by EU Member States covering a range of household and non-domestic products, in order to improve their energy efficiency. For these 11 measures, detailed Impact Assessments have been conducted (between July 2008 and April 2009). The impacts have been

	recently updated, to reflect these IAs. In addition, DEFRA now have estimated impacts available on a second tranche of EU Implementing Measures that are in development led by the EU. The analysis for which is being finalised from the consultation beginning December 2009.
Renewable Heat incentive (RHI)	The powers to introduce the RHI were taken in the Energy Act 2008. The intention to introduce the RHI in April 2011 and broad nature of the scheme were set out in the Renewable Energy Strategy. Detailed proposals were consulted on from 1 February to 26 April 2010. There has been no public update of the policy since the consultation proposals. The underlying subsidy costs of the RHI policy have not changed since the RHI Impact Assessment published in February 2010. However, the estimated bill impacts have fallen by around £10 since that previous publication. This is primarily because the impacts published in February corresponded to the financial year 2020/21, whereas the impacts here relate the calendar year 2020. The proposals which were consulted on this year were the first set of detailed proposals on scheme design, including eligibility and tariffs. The published costs were lower than in the LCTP due to the introduction of tariff banding by technology and size of installation.
Security Measures	This includes the costs recouped through the Ofgem price control process for security upgrades within the gas and electricity networks undertaken as part of the Government's National Security Strategy.
EU Emissions Trading System (EU ETS)	The estimated price and bill impacts of the EU ETS are based on analysis of the impact of the policy on wholesale electricity prices. The results presented assume full cost pass through of the EUA (carbon price) to end use consumers, regardless of whether allowances are allocated free of charge to generators or are purchased from auctions or the secondary carbon market. DECC published updated carbon values (EUA prices) in June 2010. These are lower than those

	used for the price and bills analysis in July 2009 incorporating the effect of the recession and revised estimates of industrial carbon abatement opportunities.
Existing Renewables Obligation (Existing RO)	The existing RO bill impacts are calculated as the subsidy costs of the RO following the Energy White Paper reforms, especially the introduction of technology banding, that were expected to take renewable electricity generation to around 15% of total generation in 2020.
Extended RO	The extended RO bill impacts are calculated as the additional impacts of the extended RO (through subsidy costs and balancing costs pushing up consumer electricity bills) over and above those of the existing RO. The extended RO policy package is expected to take large-scale renewable electricity generation to around 29% of total generation in 2020. The published Impact Assessments for the extended RO with the Renewables Obligation Order 2010 and the Renewable Energy Strategy 2009 included an offsetting impact on consumer electricity bills through lower wholesale prices than would otherwise have come about. The analysis in this report does not include any impacts the RO may have on wholesale electricity prices at this stage. However, this impact has been modelled separately by Redpoint, and it is estimated to reduce wholesale electricity prices by an average of around £6/MWh over the period 2010 to 2020.
Carbon Capture and Storage demonstrations (CCS)	The range of impacts is marginally higher than in the July 2009 analysis because a more detailed analysis of the costs of CCS has resulted in slightly increased estimates and a narrowing of the range. This analysis is consistent with that presented in the Impact Assessment of Coal and Carbon Capture and Storage requirements in 'A framework for the development of clean coal.'
Feed-in-Tariffs (FiTs)	Following the FiTs consultation in July 2009 the final details of the FiT's scheme were announced in February 2010 and the scheme itself was launched in April 2010. The analysis now reflects the final scheme design as announced and published in February.
Climate Change Levy (CCL)	No changes since July 2009 price and bills analysis
Carbon Reduction Commitment (CRC)	The price and bill impacts are consistent with the

	Impact Assessment published in January 2010
Climate Change Agreements (CCA)	Newer data and methodological improvements since July 2009 have led to a reduction in the estimate of non-traded emissions covered by CCAs of around 50%. The analysis assumes that the new CCA scheme goes ahead as planned by the previous Government. CCA agreements are not assumed to be in place after the third carbon budget period.

Annex B: A brief introduction to DECC's modelling and assumptions

The **average energy prices and bills model** produces estimates of the impact of energy and climate change policies on domestic and non-domestic energy consumers. Average in this case means that any price or consumption impact is spread evenly, on a per MWh basis, across all consumers affected by the policy, either domestic, non-domestic or both.

The results for domestic and non-domestic consumers are based on average consumption, as opposed to an 'average' household or business. Results for the non-domestic sector are based on the consumption of a medium-sized fuel user in industry (as defined by Eurostat).[17] Average consumption for households is derived from historical total domestic consumption as published in DECC's Digest of United Kingdom Energy Statistics (DUKES) divided by Communities and Local Government (CLG) estimates of the number of households.

The estimated price without policies is calculated by summing assumptions of the future wholesale price,[18] transmission, distribution and metering costs and an assumed energy supplier cost and margin for each year.[19] The estimated bill without policies is calculated using the estimated energy price without policies, including VAT and multiplying by baseline consumption. Electricity distribution, gas distribution and transmission are all subject to separate Price Controls under Ofgem. This includes a requirement of provision for flooding defences. The electricity Distribution Price Control contains an allowance for flooding across all distribution companies of £112m for the duration of the Price Control (5 years). This impact of which is included in the transmission and distribution cost estimate as a part of the base bill rather than an energy and climate change policy on top of the base bill.

However, in the absence of any firm evidence of differential pass-through to domestic and non-domestic customers, this analysis is based on the assumption that these costs are spread evenly across total energy consumption in the UK.[20] This assumption implies that the non-domestic bill impacts may be overestimated and the domestic bill impacts may be underestimated.

The Centre for Sustainable Energy (CSE) worked with the Department for Energy and Climate Change (DECC) to analyse the distributional impacts of energy and climate change policies on the energy bills of UK consumers.

Microsoft SQL Server Express 2008 provides the platform for **the 'Distributional Impacts Model for Policy and Strategic Analysis'** – DIMPSA. DIMPSA is built

[17] A medium-sized gas user is defined by an annual consumption of between 2,778 and 27,777MWh of gas. A medium-sized electricity user is defined by an annual consumption of between 2,000 and 19,999MWh of electricity. The midpoints of these ranges have been used for this analysis.
[18] For DECC wholesale price projections see: http://www.decc.gov.uk/en/content/cms/statistics/projections/projections.aspx
[19] Transmission, distribution and metering cost projections derived from Ofgem historical data. Supplier cost and Margin projections derived from Ofgem historical data, Electricity and Gas Supply Market Report: http://www.ofgem.gov.uk/Markets/RetMkts/ensuppro/Documents1/QPR%20final%20feb.pdf
[20] We assume that 100% of the costs of the policies borne by the energy suppliers are passed on to consumers.

upon a series of algorithms designed to model the costs and benefits of policy delivery. It is based on the Living Costs and Food (LCF) survey. The LCF does not include detailed information on physical household characteristics, beyond built form, which are important in modelling the impact of energy policies. Data from the 2006 English House Condition Survey (EHCS) was therefore used to generate a predictive model to identify wall type, loft insulation levels and heating system age/communal heating in the LCF dataset.

For the purpose of the model, data from four LCF surveys were combined, (financial years 2004/5, 2005/6, and calendar years 2006 and 2007) generating a sample size of over 20,000 cases. Time- and location-specific fuel price information was used to convert survey expenditure data on household fuels into consumption.

The model then uses a look up table containing a set of fuel prices for 2010 by method of payment, to estimate household energy bill in the baseline year. These prices are based upon DECC figures for average gas and electricity by fuel region in 2009 and SALKENT tables for non metered fuels as of October 2009. The gas and electricity prices have been adjusted to 2010 using information on energy supplier price amendments from Consumer Focus.

The model identifies households in the LCF suitable for renewable energy technologies based on a number of criteria used to constrain the application of measures - variables used include; tenure, built form, central heating type, number of rooms, occupants, age of household representative, rurality and wall type.

The total policy costs passed through to customers are dependent upon what sectors the policy has an impact on. For instance, the Feed-in-Tariff applies to both domestic and business customers; the costs have therefore been split between these two customer groups based on their total annual consumption. In addition, cost is distributed based on the fuel types covered by the policy (i.e. electricity, gas, oil, coal or LPG). The total policy costs are then divided between the relevant fuels according to the weighted number of consumers using each fuel.

Annex C: Wholesale price assumptions and estimated impact of energy and climate change policies on energy prices and bills on domestic and non-domestic consumers, assuming an oil price of around $150/bbl in 2020 and also an oil price of around $60/bbl in 2020

Table C1: Wholesale price assumptions [21]

£/MWh	$60/bbl		$80/bbl		$150/bbl	
Year	**Electricity**	**Gas**	**Electricity**	**Gas**	**Electricity**	**Gas**
2010	37	11	56	20	77	29
2011	36	11	58	21	81	31
2012	38	11	60	21	87	33
2013	37	11	60	21	92	35
2014	38	11	61	22	97	37
2015	38	11	62	22	100	39
2016	38	11	62	22	104	41
2017	38	11	63	22	105	41
2018	38	12	63	23	101	41
2019	38	12	64	23	102	41
2020	38	12	64	23	102	41

Source DECC
Figures in real 2009 prices

[21] Wholesale price assumptions are based on DECC fossil fuel price assumptions ava22ilable at: http://www.decc.gov.uk/assets/decc/statistics/projections/file51365.pdf.
These are different to DECC UEP projections primarily because electricity wholesale prices do not include the price of carbon as the impact of EUETS is measured separately.

Table C2: Estimated impact of energy and climate change policies on average domestic gas and electricity prices and an average domestic energy bill (including VAT), assuming an oil price of around $150/bbl in 2020

	2010	2015	2020
Price impacts (real 2009 £/MWh and % change)			
Increase in **gas prices** due to policies	1 (3%)	4 (7%)	7 (12%)
Increase in **electricity price** due to policies	20 (15%)	33 (22%)	37 (23%)
Energy bill (gas + electricity) impacts (real 2009 £000s and % change)			
Estimated average **energy bill** without policies	£1,307	£1,617	£1,699
Estimated average **energy bill** with policies	£1,356	£1,568	£1,612
Impact of policies on **energy bill**	£50 (4%)	-£49 (-3%)	-£87 (-5%)

Source: DECC 2010
Numbers may not add up due to rounding

Table C3: Estimated impact of energy and climate change policies on average non-domestic retail gas and electricity prices and an average medium-sized non-domestic user's energy bill, assuming an oil price of around $150/bbl in 2020

	2010	2015	2020
Price impacts (real 2009 £/MWh and % change)			
Increase in **gas prices** due to policies	2 (5%)	3 (6%)	7 (14%)
Increase in **electricity price** due to policies	19 (19%)	27 (22%)	34 (27%)
Energy bill (gas + electricity) impacts (real 2009 £000s and % change)			
Estimated average **energy bill** without policies	£1,578	£2,016	£2,097
Estimated average **energy bill** with policies	£1,793	£2,143	£2,380
Impact of policies on **energy bill**	£214 (14%)	£126 (6%)	£283 (13%)

Source: DECC 2010
Numbers may not add up due to rounding

Table C4: Estimated impact of energy and climate change policies on average domestic gas and electricity prices and an average domestic energy bill (including VAT), assuming an oil price of around $60/bbl in 2020

	2010	2015	2020
Price impacts (real 2009 £/MWh and % change)			
Increase in **gas prices** due to policies	1 (5%)	4 (14%)	8 (27%)
Increase in **electricity price** due to policies	13 (15%)	29 (32%)	43 (46%)
Energy bill (gas + electricity) impacts (real 2009 £000s and % change)			
Estimated average **energy bill** without policies	£822	£859	£907
Estimated average **energy bill** with policies	£862	£896	£991
Impact of policies on **energy bill**	£40 (5%)	£37 (4%)	£84 (9%)

Source: DECC 2010
Numbers may not add up due to rounding

Table C5: Estimated impact of energy and climate change policies on average non-domestic retail gas and electricity prices and an average medium-sized non-domestic user's energy bill, assuming an oil price of around $60/bbl in 2020

	2010	2015	2020
Price impacts (real 2009 £/MWh and % change)			
Increase in **gas prices** due to policies	2 (10%)	3 (16%)	8 (41%)
Increase in **electricity price** due to policies	12 (22%)	22 (39%)	39 (66%)
Energy bill (gas + electricity) impacts (real 2009 £000s and % change)			
Estimated average **energy bill** without policies	£874	£904	£942
Estimated average **energy bill** with policies	£1,022	£1,083	£1,374
Impact of policies on **energy bill**	£149 (17%)	£180 (20%)	£431 (46%)

Source: DECC 2010
Numbers may not add up due to rounding

Annex D: Breakdown of estimated impact of energy and climate change policies on average domestic and non-domestic retail gas and electricity prices[22]

Table D1: Estimated impact of energy and climate change policies on average domestic retail gas prices (including VAT)

£/MWh (real 2009 prices)	2010	2015	2020
Estimated average price without policies	35	38	41
Price impact of CERT	1	0	0
Price impact of CESP	0	0	0
Price impact of Future Supplier Obligation	0	2	1
Price impact of Better Billing	0	0	0
Price impact of Smart Metering	0	1	0
Price impact of RHI	0	1	6
Price impact of Security Measures	0	0	0
Estimated average price with policies	36	42	49
Estimated impact of policies	1	4	8
% impact (on baseline)	4%	10%	18%

Source: DECC 2010

[22] Numbers in the tables which follow may not add up due to rounding.

Table D2: Estimated impact of energy and climate change policies on average domestic retail electricity prices (including VAT)

£/MWh (real 2009 prices)	2010	2015	2020
Estimated average price without policies	107	114	120
Price impact of CERT	4	0	0
Price impact of CESP	0	0	0
Price impact of Future Supplier Obligation	0	7	5
Price impact of Better Billing	0	0	0
Price impact of Smart Metering	0	3	2
Price impact of the Existing RO	4	5	7
Price impact of the Extended RO	1	5	14
Price impact of EU ETS impact on wholesale price	6	6	7
Price impact of CCS	0	2	3
Price impact of FiTs	0	1	2
Price impact of Security Measures	0	0	0
Estimated average price with policies	122	144	160
Estimated impact of policies	15	29	40
% impact (on baseline)	14%	26%	33%

Source: DECC 2010

Table D3: Estimated impact of energy and climate change policies on average non-domestic retail gas prices

£/MWh (real 2009 prices)	2010	2015	2020
Estimated average price without policies	26	28	30
Price impact of the CCL	2	2	2
Price impact of RHI	0	1	6
Estimated average price with policies	27	31	38
Estimated impact of policies	2	3	7
% impact (on baseline)	6%	10%	24%

Source: DECC 2010

Table D4: Estimated impact of energy and climate change policies on average non-domestic retail electricity prices

£/MWh (real 2009 prices)	2010	2015	2020
Estimated average price without policies	75	82	86
Price impact of the CCL	5	5	5
Price impact of the Existing RO	3	5	6
Price impact of the Extended RO	1	5	14
Price impact of the EU ETS impact on wholesale prices	6	6	6
Price impact of CCS	0	2	3
Price impact of FiTs	0	1	2
Estimated average price with policies	90	105	123
Estimated impact of policies	15	23	37
% impact (on baseline)	20%	28%	43%

Source: DECC 2010

Annex E: Breakdown of estimated impact of energy and climate change policies on an average domestic and medium-sized non-domestic user's gas and electricity bill

Table E1: Estimated impact of energy and climate change policies on an average domestic gas bill (including VAT)

£(real 2009 prices)	2010	2015	2020
Estimated average bill without policies	582	637	688
Bill impact of CERT	6	-18	-18
Bill impact of CERT Extension	0	-17	-18
Bill impact of CESP	1	0	0
Bill impact of Future Supplier Obligation	0	16	-20
Bill impact of Better Billing	-1	-2	-2
Bill impact of Smart Metering	0	6	-4
Bill impact of RHI	0	18	94
Bill impact of Products Policy	1	9	8
Bill impact of Security Measures	2	1	1
Estimated average bill with policies	591	651	727
Estimated impact of policies	9	14	39
% impact (on baseline)	2%	2%	6%

Source: DECC 2010

Table E2: Estimated impact of energy and climate change policies on an average domestic electricity bill

£(real 2009 prices)	2010	2015	2020
Estimated average bill without policies	478	511	538
Bill impact of CERT	-7	-39	-37
Bill impact of CERT Extension	0	-8	-8
Bill impact of CESP	1	-1	-1
Bill impact of Future Supplier Obligation	0	29	11
Bill impact of Better Billing	-1	-2	-2
Bill impact of Smart Metering	0	3	-9
Bill impact of the Existing RO	16	24	30
Bill impact of the Extended RO	5	21	64
Bill impact of EU ETS impact on wholesale prices	26	28	30
Bill impact of CCS	0	8	15
Bill impact of FiTs	0	6	10
Bill impact of Products Policy	-8	-81	-130
Bill impact of Security Measures	1	0	0
Estimated average bill with policies	512	499	512
Estimated impact of policies	33	-13	-26
% impact (on baseline)	7%	-2%	-5%

Source: DECC 2010

Table E3: Estimated impact of energy and climate change policies on an average medium-sized non-domestic user's gas bill

£000s (real 2009 prices)	2010	2015	2020
Estimated average bill without policies	390	427	462
Bill impact of the CCL	25	25	25
Bill impact of RHI	0	17	86
Bill impact of Products Policy	0	2	5
Bill impact of the CRC	0	-7	-21
Bill impact of the CCAs[23]	-4	-25	-3
Estimated average bill with policies	415	439	554
Estimated impact of policies	25	12	92
% impact (on baseline)	6%	3%	20%

Source: DECC 2010

Table E4: Estimated impact of energy and climate change policies on an average medium-sized non-domestic user's electricity bill

£000s (real 2009 prices)	2010	2015	2020
Estimated average bill without policies	827	900	948
Bill impact of the CCL	52	52	52
Bill impact of the Existing RO	38	55	71
Bill impact of the Extended RO	11	50	150
Bill impact of the EU ETS impact on wholesale prices	61	66	71
Bill impact of CCS	0	18	36
Bill impact of FiTs	1	15	24
Bill impact of Products Policy	-4	-43	-94
Bill impact of the CRC	0	-9	-27
Bill impact of the CCAs	-3	-65	-7
Estimated average bill with policies	981	1,038	1,224
Estimated impact of policies	154	138	276
% impact (on baseline)	19%	15%	29%

Source: DECC 2010

[23] CCA savings in 2015 and 2020 are based on target proposal made to industry in March 2010.

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