

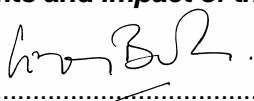
Title: Extending the Carbon Emissions Reduction Target to December 2012 Lead department or agency: Department of Energy and Climate Change Other departments or agencies:	Impact Assessment (IA)
	IA No: DECC0001
	Date: 30/06/2010
	Stage: Final
	Source of intervention: Domestic
	Type of measure: Secondary legislation
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Summary: Intervention and Options

What is the problem under consideration? Why is government intervention necessary? The UK household sector is responsible for some 27% of carbon emissions, yet there are various barriers preventing consumers from buying and installing cost-effective measures which can reduce carbon emissions including a lack of information, gas prices which do not reflect the negative impact of emissions, limited time horizons, access to credit and, in the rented sector, incentive incompatibility. The Carbon Emissions Reduction Target looks to overcome these barriers. It sets electricity and gas suppliers a mandatory household carbon emissions reduction target which they must meet by promoting measures to domestic energy consumers which can be shown to deliver carbon savings through improved energy efficiency, reduced energy demand or increased microgeneration capacity of that property.	
What are the policy objectives and the intended effects? The policy aims to deliver cost effective and equitably distributed carbon and energy savings across Great Britain. It is proposed that suppliers are set a target of 108 million lifetime tonnes of CO2 to be achieved by December 2012 (taking their total target from April 2008 to 293 million lifetime tonnes of CO2 by the end of the period - actual savings reported for carbon budgeting purposes will account for any overlap with other policies as standard procedure). To maximise long term carbon and energy savings it is proposed that suppliers be required to achieve 68% of the carbon savings through insulation measures. For reasons of ensuring equity across income deciles it is also proposed that suppliers meet a proportion of the savings in the households of specified vulnerable groups.	
What policy options have been considered? Please justify preferred option (further details in Evidence Base) The preferred policy takes account of evidence from formal consultation and from suppliers' actions to deliver against their existing CERT targets. It has been considered against a 'no policy' counterfactual as CERT ends in March 2011. In addition, a wide suite of policy variations has been considered. These vary different elements of the policy relative to the central option produced after the consultation document. Different levels of headline target, of insulation minimum and of vulnerable group sizes have been considered, all of which interact. The recommended framework of maintaining a pro rata level of target and introducing an insulation minimum, along with an ongoing Priority Group of more vulnerable households (on certain benefits and/or aged 70 and over) where 40% of savings must be delivered and within a new Super Priority Group (of lowest income pensioner and family households most vulnerable to detriment) where 15% of savings must be delivered is believed to maximise the schemes contribution to long term environmental and social objectives against the short term costs of the scheme which may fall to consumers.	
When will the policy be reviewed to establish its impact and the extent to which the policy objectives have been achieved?	It will be reviewed 06/2013
Are there arrangements in place that will allow a systematic collection of monitoring information for future policy review?	Yes

Ministerial Sign-off For final proposal stage Impact Assessments:

I have read the Impact Assessment and I am satisfied that (a) it represents a fair and reasonable view of the expected costs, benefits and impact of the policy, and (b) the benefits justify the costs.

Signed by the responsible Minister:  Date: 30/6/2010

Summary: Analysis and Evidence

Policy Option 1

Description:

"Preferred option" - Pro rata extension of CERT policy with the introduction of a 68% insulation minimum; removal of CFLs; and a super priority group which must receive 15% of the target.

Price Base Year 2010	PV Base Year 2010	Time Period Years 42	Net Benefit (Present Value (PV)) (£m)		
			Low: 2,427	High: 15,878	Best Estimate: 8,647

COSTS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant Price)	Total Cost (Present Value)
Low	4,569	1.8	0	4,569
High	6,518		0	6,518
Best Estimate	5,503		0	5,503

Description and scale of key monetised costs by 'main affected groups'

Installation Cost to Suppliers: £2,308m (PV)

Installation Cost falling on households/owners/providers: £1,614m (PV)

"Hidden Cost" of measures such as time/hassle costs to householders or owners: £1,581m (PV)

Other key non-monetised costs by 'main affected groups'

BENEFITS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant Price)	Total Benefit (Present Value)
Low	0		408	8,945
High	0		932	20,447
Best Estimate	0		645	14,150

Description and scale of key monetised benefits by 'main affected groups'

Change in energy use: £6,916m (PV)

Change in air quality: £989m (PV)

Increase in Comfort: £3,175m (PV)

Avoided non-traded sector emissions: £2,869m (PV)

Avoided purchase of EU ETS emissions allowances: £202m (PV)

Other key non-monetised benefits by 'main affected groups'

Expected health benefits to those who are fuel poor and receive a measure.

Increased energy security.

Key assumptions/sensitivities/risks

Discount rate (%)

3.5

- Costs and benefits are calculated on the assumption suppliers will seek only to minimise costs of meeting their target, and reflect a prediction of how they may act. The figures given on this IA are to the nearest £m due to the desire to compare figures and does not imply accuracy of prediction to these levels.

- Cost estimates for measures are based on DECC research as actual costs are commercially secret.

- Benefits are valued using projections of future energy and carbon prices as well as projections of electricity grid decarbonisation. They are sensitive to these prices.

- Industry capacity for measures such as cavity wall insulation will play a big role in the total supplier costs of this policy; sensitivities have been conducted to examine this.

Impact on admin burden (AB) (£m):		Impact on policy cost savings (£m):		In scope
New AB: 0.053	AB savings: 0	Net:	Policy cost savings:	No

Enforcement, Implementation and Wider Impacts

What is the geographic coverage of the policy/option?	Great Britain				
From what date will the policy be implemented?	01/08/2010				
Which organisation(s) will enforce the policy?	Ofgem				
What is the annual change in enforcement cost (£m)?	£1.7m				
Does enforcement comply with Hampton principles?	Yes				
Does implementation go beyond minimum EU requirements?	Yes				
What is the CO ₂ equivalent change in greenhouse gas emissions? (Million tonnes CO ₂ equivalent)	Traded: -10.0		Non-traded: -64.2		
Does the proposal have an impact on competition?	No				
What proportion (%) of Total PV costs/benefits is directly attributable to primary legislation, if applicable?	Costs: 100		Benefits: 100		
Annual cost (£m) per organisation (excl. Transition) (Constant Price)	Micro	< 20	Small	Medium	Large
Are any of these organisations exempt?	Yes	Yes	Yes	No	No

Specific Impact Tests: Checklist

Set out in the table below where information on any SITs undertaken as part of the analysis of the policy options can be found in the evidence base. For guidance on how to complete each test, double-click on the link for the guidance provided by the relevant department.

Please note this checklist is not intended to list each and every statutory consideration that departments should take into account when deciding which policy option to follow. It is the responsibility of departments to make sure that their duties are complied with.

Does your policy option/proposal have an impact on...?	Impact	Page ref within IA
Statutory equality duties ¹ Statutory Equality Duties Impact Test guidance	No	29
Economic impacts		
Competition Competition Assessment Impact Test guidance	No	28
Small firms Small Firms Impact Test guidance	No	29
Environmental impacts		
Greenhouse gas assessment Greenhouse Gas Assessment Impact Test guidance	Yes	19
Wider environmental issues Wider Environmental Issues Impact Test guidance	Yes	19
Social impacts		
Health and well-being Health and Well-being Impact Test guidance	Yes	30
Human rights Human Rights Impact Test guidance	No	30
Justice system Justice Impact Test guidance	No	30
Rural proofing Rural Proofing Impact Test guidance	No	30
Sustainable development Sustainable Development Impact Test guidance	Yes	31

¹ Race, disability and gender Impact assessments are statutory requirements for relevant policies. Equality statutory requirements will be expanded 2011, once the Equality Bill comes into force. Statutory equality duties part of the Equality Bill apply to GB only. The Toolkit provides advice on statutory equality duties for public authorities with a remit in Northern Ireland.

Summary: Analysis and Evidence

Policy Option 2

Description:

Post-consultation "central scenario" - Pro rata extension with introduction of a 65% insulation minimum; restriction of CFLs to 5%; and a super priority group which must receive 15% of the target.

Price Base Year 2010	PV Base Year 2010	Time Period Years 42	Net Benefit (Present Value (PV)) (£m)		
			Low: 2,936	High: 15,728	Best Estimate: 8,891

COSTS (£m)	Total Transition (Constant Price) Years	Average Annual (excl. Transition) (Constant Price)	Total Cost (Present Value)
Low	3,580	0	3,580
High	5,607	0	5,607
Best Estimate	4,536	0	4,536

Description and scale of key monetised costs by 'main affected groups'

Installation Cost to Suppliers: £2,033m (PV)

Installation Cost falling on households/owners/providers: £1,441m (PV)

"Hidden Cost" of measures such as time/hassle costs to households and owners: £1,062m (PV)

Other key non-monetised costs by 'main affected groups'

BENEFITS (£m)	Total Transition (Constant Price) Years	Average Annual (excl. Transition) (Constant Price)	Total Benefit (Present Value)
Low	0	389	8,543
High	0	880	19,308
Best Estimate	0	612	13,427

Description and scale of key monetised benefits by 'main affected groups'

Change in energy use: £6,490m (PV)

Change in air quality: £979m (PV)

Increase in Comfort: £3,081m (PV)

Avoided non-traded sector emissions: £2,696m (PV)

Avoided purchase of EU ETS emissions allowances: £180m (PV)

Other key non-monetised benefits by 'main affected groups'

Expected health benefits to those who are fuel poor and receive a measure.

Increased energy security.

Key assumptions/sensitivities/risks

Discount rate (%)

3.5

- Costs and benefits are calculated on the assumption suppliers will seek only to minimise costs of meeting their target, and reflect a prediction of how they may act. The figures given on this IA are to the nearest £m due to the desire to compare figures and does not imply accuracy of prediction to these levels.

- Cost estimates for measures are based on DECC research as actual costs are commercially secret.

- Benefits are valued using projections of future energy and carbon prices as well as projections of electricity grid decarbonisation. They are sensitive to these prices.

- Industry capacity for measures such as cavity wall insulation will play a big role in the total supplier costs of this policy; sensitivities have been conducted to examine this.

Impact on admin burden (AB) (£m):		Impact on policy cost savings (£m):		In scope
New AB: 0.053	AB savings: 0	Net:	Policy cost savings:	No

Enforcement, Implementation and Wider Impacts

What is the geographic coverage of the policy/option?	Great Britain				
From what date will the policy be implemented?	01/08/2010				
Which organisation(s) will enforce the policy?	Ofgem				
What is the annual change in enforcement cost (£m)?	£1.7m				
Does enforcement comply with Hampton principles?	Yes				
Does implementation go beyond minimum EU requirements?	Yes				
What is the CO ₂ equivalent change in greenhouse gas emissions? (Million tonnes CO ₂ equivalent)	Traded: -9.0		Non-traded: -60.2		
Does the proposal have an impact on competition?	No				
What proportion (%) of Total PV costs/benefits is directly attributable to primary legislation, if applicable?	Costs: 100		Benefits: 100		
Annual cost (£m) per organisation (excl. Transition) (Constant Price)	Micro	< 20	Small	Medium	Large
Are any of these organisations exempt?	Yes	Yes	Yes	No	No

Specific Impact Tests: Checklist

Set out in the table below where information on any SITs undertaken as part of the analysis of the policy options can be found in the evidence base. For guidance on how to complete each test, double-click on the link for the guidance provided by the relevant department.

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Does your policy option/proposal have an impact on...?	Impact	Page ref within IA
Statutory equality duties² Statutory Equality Duties Impact Test guidance	No	29
Economic impacts		
Competition Competition Assessment Impact Test guidance	No	28
Small firms Small Firms Impact Test guidance	No	29
Environmental impacts		
Greenhouse gas assessment Greenhouse Gas Assessment Impact Test guidance	Yes	19
Wider environmental issues Wider Environmental Issues Impact Test guidance	Yes	19
Social impacts		
Health and well-being Health and Well-being Impact Test guidance	Yes	30
Human rights Human Rights Impact Test guidance	No	30
Justice system Justice Impact Test guidance	No	30
Rural proofing Rural Proofing Impact Test guidance	No	30
Sustainable development Sustainable Development Impact Test guidance	Yes	31

² Race, disability and gender Impact assessments are statutory requirements for relevant policies. Equality statutory requirements will be expanded 2011, once the Equality Bill comes into force. Statutory equality duties part of the Equality Bill apply to GB only. The Toolkit provides advice on statutory equality duties for public authorities with a remit in Northern Ireland.

Evidence Base (for summary sheets) – Notes

Use this space to set out the relevant references, evidence, analysis and detailed narrative from which you have generated your policy options or proposal. Please fill in **References** section.

References

Include the links to relevant legislation and publications, such as public impact assessment of earlier stages (e.g. Consultation, Final, Enactment).

No.	Legislation or publication
1	Extending the carbon emissions reduction target: draft statutory instrument, the Electricity and Gas (Carbon Emissions Reduction) (Amendment) Order 2010 - contains explanatory notes
2	Consultation Stage Impact Assessment on extending the Carbon Emissions Reduction Target to December 2012
3	www.ofgem.gov.uk/Sustainability/Environment/EnergyEff/Documents1/CERT%20Annual%20report%20v1.pdf - A review of the first year of the Carbon Emissions Reduction Target
4	Extending the Carbon Emissions Reduction Target: Consultation on a CERT framework for the period April 2011 to December 2012
5	www.ofgem.gov.uk/Sustainability/Environment/EnergyEff/CEU/Documents1/certdec09.pdf - CERT Quarter 6
6	http://www.opsi.gov.uk/si/si2008/uksi_20080188_en_1 - Electricity and Gas Order 2008
7	http://www.decc.gov.uk/en/content/cms/what_we_do/consumers/saving_energy/analysis/analysis.aspx - Effect of CERT on fuel poverty report and Ecofys Hidden Cost report

+ Add another row

Evidence Base

Ensure that the information in this section provides clear evidence of the information provided in the summary pages of this form (recommended maximum of 30 pages). Complete the **Annual profile of monetised costs and benefits** (transition and recurring) below over the life of the preferred policy (use the spreadsheet attached if the period is longer than 10 years).

The spreadsheet also contains an emission changes table that you will need to fill in if your measure has an impact on greenhouse gas emissions.

Annual profile costs and benefits - (£m) constant prices

	Y ₀	Y ₁	Y ₂	Y ₃	Y ₄	Y ₅	Y ₆	Y ₇	Y ₈	Y ₉	Y ₁₀	Y ₁₁	Y ₁₂	Y ₁₃	Y ₁₄	Y ₁₅	Y ₁₆	Y ₁₇	Y ₁₈	Y ₁₉	Y ₂₀	Y ₂₁	
Transition costs		2,489	3,319																				
Annual recurring cost																							
Total annual costs		2,489	3,319																				
Transition benefits																							
Annual recurring benefits		0	285	651	638	618	602	588	574	555	537	520	505	485	444	406	406	391	373	366	357	350	
Total annual benefits		0	285	651	638	618	602	588	574	555	537	520	505	485	444	406	406	391	373	366	357	350	

	Y ₂₂	Y ₂₃	Y ₂₄	Y ₂₅	Y ₂₆	Y ₂₇	Y ₂₈	Y ₂₉	Y ₃₀	Y ₃₁	Y ₃₂	Y ₃₃	Y ₃₄	Y ₃₅	Y ₃₆	Y ₃₇	Y ₃₈	Y ₃₉	Y ₄₀	Y ₄₁	Y ₄₂	
Transition costs																						
Annual recurring cost																						
Total annual costs																						
Transition benefits																						
Annual recurring benefits	315	272	266	261	256	250	245	240	234	231	213	192	189	186	183	180	177	174	171	168	168	95
Total annual benefits	315	272	266	261	256	250	245	240	234	231	213	192	189	186	183	180	177	174	171	168	168	95

Evidence Base (for summary sheets)

Order of contents:

- A LEGISLATIVE BASIS**
- B PROBLEM UNDER CONSIDERATION AND RATIONALE FOR INTERVENTION**
- C POLICY OBJECTIVE**
- D OPTIONS CONSIDERED**
- E COSTS AND BENEFITS**
- F COMPETITION ISSUES**
- G SMALL FIRMS' IMPACT**
- H STATUTORY EQUALITY DUTIES**
- J SOCIAL IMPACTS**
- K RURAL PROOFING**
- L SUSTAINABLE DEVELOPMENT**

A LEGISLATIVE BASIS

1. The Electricity Act 1989 and the Gas Act 1986, as amended by the Utilities Act 2000, the Climate Change and Sustainable Energy Act 2006 and the Climate Change Act 2008, contain powers for the Secretary of State, by Order, to impose an obligation on electricity and gas suppliers to achieve carbon emissions reduction targets. The existing legislative basis is set by the Electricity and Gas (Carbon Emissions Reduction) Order 2008 (SI 2008/188)³ as amended by the Electricity and Gas (Carbon Emissions Reduction) (Amendment) Order 2009.

2. This supplier obligation, known as the Carbon Emissions Reduction Target (CERT), applies in England, Scotland and Wales. CERT commenced on 1st April 2008 and concludes on 31st March 2011. It is the third three-year cycle of the household energy supplier obligation, formally known as the Energy Efficiency Commitment. Through the Order, Government sets electricity and gas suppliers who have more than 50,000 domestic customers an overarching household carbon saving obligation. As a market mechanism suppliers are free to choose how they meet this obligation, so long as they promote (e.g. by marketing or through subsidy) measures to a domestic energy user which can be proven to reduce that households carbon footprint through increased energy efficiency, reduced energy consumption or Microgeneration. At least 40% of the carbon saving obligation has to be achieved in a priority group of low income, vulnerable and elderly households.

3. This impact assessment considers the policy framework for an extended CERT framework from April 2011 to December 2012 as given affect by in the Electricity and Gas (Carbon Emissions Reduction) (Amendment) Order 2010.

B PROBLEM UNDER CONSIDERATION AND RATIONALE FOR INTERVENTION

4. Households directly contribute to climate change through the energy used to heat homes and water; indirectly through other resource use including electricity used to power appliances; and through the energy to treat and supply our water.

5. UK households spend £20 billion on energy each year, mostly on electricity and gas, and account for close to 30 per cent of all energy consumed in the UK. This makes the household sector an extremely important route to delivering emission reductions and meeting national targets and Carbon Budgets. Because new homes add less than 1% to the housing stock each year, and are built to tighter regulatory standards, existing homes represent the greatest opportunity for efficiency improvements.

6. By 2050, the UK has committed to have cut its greenhouse gas emissions by 80% overall on 1990 levels. Looking across the options available, that means there is a need to radically reduce demand for energy and decarbonise the energy used in homes almost totally by 2050. Households need to become much more energy efficient and more of our heat and electricity needs to be produced from low carbon sources.

7. The UK's housing stock retains substantial opportunities to improve its efficiency. With space heating accounting for on average, about 60% of household energy demands, there are still millions of GB households yet to take advantage of opportunities to improve their thermal efficiency. At the outset of the CERT extension period it is expected that there will be almost 5.5 million households who have cavity wall space that can technically be filled with insulation; and 7 million technical opportunities for households to receive solid wall insulation as an energy efficiency measure.

8. The 2006 Climate Change Programme, the 2007 Energy Review and 2009 Low Carbon Transition Plan looked at programmes targeting households as well as those targeting other sectors relevant to the Government's climate change and energy objectives. Those reviews considered progress towards targets, options for improving performance, and a large body of evidence on the cost effectiveness of different programmes. The results suggest that household energy programmes, both as a group and individually, were among the most cost effective measures available to reduce UK carbon emissions.

9. Well-functioning markets can deliver economically efficient outcomes. However, Government intervention may be necessary to ensure that markets do function well and to correct market failures. The level of household investment in energy efficiency is lower than might be expected given that it is generally in the interests of households to improve the energy efficiency of their homes as the savings on energy bills can be significant, with energy efficiency improvements such as insulation repaying their installation costs over a

³ www.opsi.gov.uk/si/sis05-02.

short time period. For example, payback periods for cavity wall insulation are currently less than 2 years. This suggests that there are barriers preventing households from making the most economically efficient decisions on these investments.

10. Even economically rational households are often faced with barriers to investing in energy efficiency measures which can be difficult to overcome. Some of these barriers involve real but non-financial costs which decrease the attractiveness of energy efficiency investment for households (for example, hidden costs such as hassle and disruption). There is a well understood and broad suite of genuine market failures and barriers which prevent an efficient take up of available energy efficiency measures as well as constraining the market share of energy efficient products:

- **Information deficiencies:** If economic agents are unaware of the cost effective opportunities that are available to them then the most efficient investments may not be made. Relatively low energy users will often not know that they could save money by taking measures to improve energy efficiency. The problem is further aggravated by the difficulty in gathering the relevant information, which itself can require time and money.
- **Incorrect price signals:** Household decisions on energy consumption fail to take into account the environmental costs associated with energy use. The full costs to society of energy use are not adequately reflected in price, which creates lower than optimal incentive for households to consider the efficient use of energy. (In addition, many energy efficiency measures attract 20% VAT whereas domestic fuel and power attracts 5% VAT, therefore creating a disincentive to save energy).
- **Limited access to capital:** Economic analysis tends to assume perfect capital markets, so that if an injection of capital is required to undertake an investment then it is available. However, in practice this is often not the case. In terms of improvements in energy efficiency it is the less well off that are most capital constrained and therefore may be unable to make the most efficient cost-effective investments and are driven towards goods and services with the lowest up-front costs.
- **Contractual problems:** Problems relating to contractual relationships arise in a number of circumstances. This particularly concerns landlords and tenants. Energy efficiency is often poor in tenanted households. Both tenant and landlord have little incentive to undertake energy efficiency improvements. Similar issues also arise in the supply chain for consumer goods, with installers or retailers acting as proxy customers for manufacturers' goods but who have no direct interest in the energy costs for the end-user.
- **Skills shortfalls:** Companies and households wanting to take up all cost effective measures for improvements would be unable to, at least in the short term, because there are not enough experts, individuals and organisations with the skills and knowledge to advise on and implement measures.
- **Uncertainty:** Many investments and particularly the development and marketing of improved goods and services may be subject to relatively long time lags between the upfront costs and long-term benefits. If there is uncertainty about the realisation of benefits, then decision makers will hesitate to make any irreversible commitments. This can hinder the take up of new efficient technology.

11. These market failures and barriers can also affect the supply of energy efficient goods and services. Correcting market failures and removing barriers to put these incentives in place could lead to a shift towards energy efficiency on both the demand and supply side.

12. In sum, government intervention should be focused around counteracting the market failures discussed above, in order to move toward the optimal uptake of energy efficient measures in the homes for society.

13. The supplier obligation is designed to help overcome these barriers as far as possible⁴ and help consumers take up measures which can reduce the carbon footprint and energy demand of the household sector. It is recognised that some barriers, such as the landlord-tenant split incentive for a rental property and access to capital, are not addressed by CERT and additional policy may be needed to overcome these barriers. CERT is therefore one of a suite of mechanisms acting to promote household energy efficiency.

⁴ The barriers outlined above underpin the analysis assumption that the market will not adjust and the attribution of net benefits each year over the entire appraisal period to the policy

C POLICY OBJECTIVE

14. The primary aims of CERT are to overcome the barriers outlined above to cost-effective, carbon saving investments and in so doing CERT makes a contribution to the UK's legally binding target under the Kyoto protocol to cut greenhouse gas emissions by 12.5% below 1990 levels by 2008-2012 and the Climate Change Act 2008 requirement to cut emissions of green house gas emissions by 80% below 1990 levels by 2050. CERT requires energy suppliers to deliver carbon saving measures to households, each of which has a pre-set lifetime carbon score, until they have reached their overall target score. The CERT extension seeks to extend this score from an overall lifetime carbon dioxide target of 185 MtCO₂ by March 2011 to a target by a further 108MtCO₂ by December 2012, making a total CERT target of 293 MtCO₂. Actual carbon savings will be lower than this due to interaction with other policies and uplifts given to some scores. CERT is estimated to stimulate about £3.2 billion in investment by energy suppliers in promoting low carbon measures, with the CERT extension (April 2011 – December 2012) requiring an additional £2.3 billion (discounted) investment. The exact level of expenditure, however, is a matter for the companies concerned, who try and reach their carbon targets as cost-effectively as possible.

15. The proposals recommended here for a CERT extension would be extremely cost effective. Benefits and objectives include:

- Reduced energy demand) which will moderate wider environmental impacts of energy extraction, production and supply – helping contribute to meeting the UK's security of supply;
- Lower energy bills and/or higher levels of thermal comfort for millions of households who receive subsidised measures as a result of the scheme;
- Reducing the number of people in the UK living in fuel poverty from 2013 onwards;
- Local air quality improvements as a result of reduced fossil fuel use;
- Through promoting investment in established and innovative energy efficiency measures CERT provides further economic benefits by creating employment opportunities in manufacturing and service delivery of these technologies. As an incentive to the promotion of innovative measures, CERT attributes an additional 50% in carbon savings. In order to limit potential loss of carbon savings the uplift is only attributable within a ring fenced percentage of their total target.⁵

D OPTIONS CONSIDERED

CERT extension design options

16. In this Impact Assessment two options are presented, the preferred scenario and the central scenario, measured against a business as usual counterfactual of no policy as CERT finishes in March 2011.

Business as usual counterfactual: No policy

17. The costs and benefits of the options are calculated in comparison to a counterfactual in which no policy is implemented. It does however take account of other policies which have previously been announced which affect domestic household emissions.

18. Costs and benefits for the options are calculated after the removal of any overlap of energy savings with the proposed Renewable Heat Incentives; Smart Meters; and Feed-in Tariffs.

19. Energy prices, comfort value, carbon prices and air quality valuations are assessed using published DECC projections which take into account firm and funded policies and grid decarbonisation.

20. There is no assumed deadweight uptake of measures as it is assumed that those households willing to pay full price for measures would have already taken advantage of subsidies under CERT. It is considered that as the extension period is only 21 months, any fuel price increases during this period would not be large enough to drive material deadweight uptake. However a sensitivity test has been run on this assumption to reflect the possibility that some uptake exists amongst those moving properties, and for specific measures such as glazing which can be demanded for reasons outside improving energy efficiency.

⁵ "An assessment of the UK domestic energy efficiency market" prepared by Element Energy, for EEPH, November 2008 estimated that there are "50,000 people directly involved in energy efficiency products and services and a market size of £6,200 million

Option 1 - Preferred scenario

21. The preferred option for the CERT extension comprises a pro-rata extension of the target of 108MtCO₂ from March 2011 to December 2012. With the following:

- 68% minimum of target to be met through insulation measures;
- 15% minimum of target to be met within a Super Priority Group;
- CFLs no longer eligible for a score.

22. *All minimums and new requirements apply only to the increase in the target of 108MtCO₂ and do not apply retrospectively to the existing CERT target.*

Option 2 – Central scenario

23. The central scenario describes the policy option that was favoured after the consultation stage. That is, a pro rata extension of the target of which 15% must be met within the super priority group; 65% through insulation and dimmable and retail CFLs are allowed up to 5% of the target.

24. The consultation impact assessment details the decision and analysis around changing the target and introducing an insulation minimum and a Super-Priority Group. For that reason this Impact Assessment does not re-examine those decisions.

Previous Supplier Obligations and rationale for extension

25. A large amount of evidence has been accumulated on the supplier obligation, based on experience, evaluation and commissioned research⁶. Evidence suggests that the supplier obligation has delivered greater savings to consumers than the cost to consumers, suppliers and government collectively. An independent evaluation of the April 2005 – March 2008 phase⁷ estimated that stimulated by energy suppliers, over £1.1 billion has been directly invested in energy efficiency in the residential sector. The cost impact of EEC2 on a customer's fuel bill (including VAT) was around £7 per fuel per year and around £5 for the low income group. Householders are receiving ongoing benefits in the form of reduced energy bills and increased comfort with a net present value of £8.2 billion; or alternatively, for every £1 raised from householders, EEC2 will produce £9 in long term benefits. For every £1 raised from the low income group, EEC2 will produce £17 in long term benefits. Excluding deadweight, the life time carbon dioxide savings are nearly 59 million tonnes carbon dioxide from the measures required to meet the EEC2 target; achieved at a net benefit to GB of £53 per ton of carbon dioxide saved (2006 prices).

26. Household energy suppliers are in principle well-placed to deliver carbon dioxide savings from their customers. Suppliers are uniquely placed to provide information about consumers' energy consumption through billing and metering processes and are well placed to inform them about the potential measures on offer. Suppliers can mitigate some of the risks and uncertainties faced by consumers around the value of energy savings and energy prices, and technical risks of measures installed. Additionally, suppliers are able to address financial barriers by providing subsidised measures or finance, and through accessing economies of scale in sourcing measures.

27. An ongoing CERT helps create certainty for the energy efficiency supply chain. The existing CERT is in place to March 2011. However, Energy suppliers are close to meeting their existing CERT obligation. Collectively, by the end of the second year (March 2010) of the three year scheme, suppliers had achieved 80% of the carbon saving obligation and 88% of their Priority Group target by the same point. When factoring in uplifts for some of their innovative activities (which are only scored at the end of the scheme), suppliers are expected to only have some 15% of their target remaining to be achieved in this final year of CERT to March 2011 and some 10% of their Priority Group target. As suppliers tend to meet 25% - 30% of their target annually this means that they are likely to be close to withdraw insulation programmes by autumn 2010 without additional impetus from Government. It is critical that Government drive household energy saving activity in 2010 building on the momentum secured by the scheme to date. Without the extension phase being quickly legislated for, there will be a shortfall in offers for consumers to improve the energy performance of their homes, with a particular absence of offers for the most vulnerable households. This could impact fuel poverty, have a significant impact on the supply chain as it adjusts to a "break" in demand as well as lose momentum in securing consumer demand for the uptake of these measures. Moreover, there would be an opportunity cost of pursuing these carbon savings at a later date. It provides certainty for the supply chain to invest and for suppliers to plan delivery and ultimately ensures that the supply chain increases, rather than contracts, and

⁶ See: <http://www.ofgem.gov.uk/Sustainability/Environment/EnergyEff/Pages/EnergyEff.aspx>

⁷ by Eoin Lees Energy

that households have access to measures which can deliver reductions in energy use and carbon as soon as possible, helping the UK maximise the carbon saving potential of the household sector early, whilst building capacity for future delivery.

28. Government has considered the potential impact of options for an ongoing CERT to December 2012 against a 'no policy' counterfactual as CERT ends in March 2011. It has also considered the costs and benefits of various amendments to this framework against an ongoing straight CERT extension without these amendments.

Summary of preferred CERT extension design

29. The Order will enforce a straight extension to CERT for 21 months from 1st April 2011 to 31st December 2012 at an ambition level pro rata to the existing CERT ambition i.e. an additional carbon saving target of 108 Million lifetime tonnes of CO₂. As a package, the CERT extension will help deliver significant carbon and energy savings; will see a renewed focus on insulation measures; and drive help to those vulnerable households who can least afford energy saving measures. To achieve this, the following amendments will be introduced to the scheme :

- the introduction of a new 'Super' Priority Group at 15% of the target;
- the introduction of an insulation minimum at 68% of the target; and
- the removal of CFLs as eligible measures.

30. It strikes an attractive balance between delivering a large cut in CO₂ emissions, assisting millions of households to benefit from subsidised measures which can deliver deep energy savings while at the same time limiting average energy bill increases to consumers who do not take up measures to an estimated £61 in 2012. In terms of emissions abatement, once assumptions for product overlap and innovation uplifts are factored in, this option is estimated to save 64.2 MtCO₂ over the lifetime of the policy in the non-traded sector (for full discussion of costs and benefits please see section E).

31. It will see Government begin to take a more prescriptive approach, allowing the market to determine how the target is reached, but ensuring that the products on offer from suppliers are the products which consumers and Government want to see installed to maximise long term energy and carbon savings.

32. The headline target will present a serious challenge as suppliers are forced to find consumers willing to take up insulation and other low carbon measures from an ever lower percentage of opportunities, and from those consumers who have been less willing to date (and there is a risk that costs on all consumers could rise if suppliers find they have to increase subsidy in order to get these remaining consumers to take-up insulation). However, the target is well within the available energy saving opportunities remaining and takes account of the existing supply chain capacity.

33. The CERT extension phase will facilitate the transition towards the possibility of a more radical strategy beyond 2012, by demanding escalated investment in core insulation measures as well as encouraging investment in more innovative solutions like solid wall insulation. Moreover, it will demand an equitable distribution across income groups which may see suppliers need to forge partnerships with local delivery agents to maximise the potential of local housing knowledge, laying the ground for ongoing joint work.

34. Through the mandated inclusion of a super priority group, it increases the equity of the scheme by ensuring the most vulnerable households with the highest risk of detriment are offered potential long term solutions to fuel poverty.

Consultation and Implementation Plan

35. In developing proposals for extending CERT, a consultation on the principle of extending CERT was undertaken as part of the Heat and Energy Saving Strategy in early 2009. Stakeholder outreach workshops were undertaken around the country as part of this process. The majority of the 161 respondents on this issue were quite clear that a CERT-type obligation should continue until 2012 because of the certainty that this would deliver.

36. A consultation on a policy framework for the 21 month CERT extension period (April 2011 to December 2012) was published in December 2009. The consultation closed in March 2010 with 102 responses from a range of stakeholders including manufacture and service trade bodies, energy suppliers, local authorities, environmental and consumer groups. DECC led four stakeholder outreach events over the consultation period with the support of the Energy Efficiency Partnership for Homes in London, Manchester, Glasgow and Cardiff, with over 140 stakeholders attending.

37. In order to successfully implement this policy, the Regulator, Ofgem, will continue to be responsible for the administration of CERT including monitoring and enforcement. Specifically, Ofgem will be responsible for:

- Determining each obligated party's carbon emissions reduction obligation
- Determining whether or not to approve suppliers' qualifying action notifications
- Formally approving qualifying actions and 'banking' submissions
- Determining each obligated supplier's compliance with their obligation
- Reporting progress to the Secretary of State annually

38. The procedures that suppliers will follow in order to achieve their carbon dioxide emissions reduction obligations will be set out in Ofgem's Supplier Guidance and Technical Guidance. The existing Guidance can be found on the Ofgem website⁸. A consultation on amended guidance for the CERT extension period will be published by Ofgem shortly, in light of Government proposals. The analysis assumes full compliance with the policy, and that the mechanism for enforcing it (self-reporting on obligations to Ofgem). At least five per cent of professionally installed insulation schemes must be monitored by a suitably qualified person. Furthermore, Ofgem independently monitor a sample of each suppliers schemes in CERT.

39. Experience with CERT and EEC has shown suppliers have always delivered their obligations. A cross-Whitehall project board, on which devolved administrations and the scheme administrator sit, routinely meets so as to review the implementation of the CERT scheme. As part of its remit, it looks to:

- consider and help optimise the current performance of CERT;
- consider, develop and agree policy development;
- identify areas of risk and opportunity in policy implementation;
- facilitate policy coherence.

40. Further information on the responses to consultation can be found in the Formal Government Response to Consultation document published alongside this Impact Assessment.

Extension Design

Balancing environmental ambition and costs

41. A pro rata CERT extension would mean a target (in terms of CERT score) of 108 MtCO₂ lifetime savings delivered from measures installed over the 21 month extension period to December 2012. It would retain a requirement that at least 40% of the target be achieved in a Priority Group of vulnerable households. This target would present a significant contribution to our climate and energy targets. Our assessment is that there are sufficient opportunities to meet a 108MtCO₂ target score as well as a 40% (43.2MtCO₂) Priority Group target. See Annex A, B and C for an analysis of the number of eligible households and anticipated number of energy efficiency opportunities in April 2011.

42. Although more costly than a straight pro rata extension, the preferred option of a 68% insulation minimum delivers a number of additional environmental and social benefits which are considered to significantly outweigh these costs. Notably, it will drive uptake of more expensive and longer lived energy saving measures such as cavity wall insulation which reduce emissions in sectors not covered by the EU emissions trading scheme (non-traded emissions); thereby generating a higher contribution to carbon budget targets. It will also ensure more of the most vulnerable households are assisted, with more households being offered a potential long term solution to fuel poverty.

43. Both a higher and lower level of target were considered as part of the consultation stage against a straight line extension to CERT and presented in the consultation stage impact assessment. A decision to pursue a pro-rata extension was taken at this stage and the amendments in this Impact Assessment are not believed to materially affect the conclusions of this analysis.

Securing equity - Including a 'Super' Priority Group

44. Social fairness is a key concern of any environmental programme. Under CERT ensuring an equitable distribution of measures, especially to those most vulnerable and least able to afford energy saving measures

⁸

<http://www.ofgem.gov.uk/Sustainability/Environment/EnergyEff/InfProjMngrs/Documents1/CERT%20supplier%20guidance.pdf>

is critical. However, one possible implication of obliging additional support is that the costs of the whole scheme, and especially those to energy suppliers, could go up – both from higher search costs to find these customers and from having to offer full subsidy on (higher cost) measures – depending on the energy efficiency opportunities in that group.

45. Setting a sub-group target within the Priority Group (a ‘super Priority group’) on the basis of vulnerability will see longer lived energy saving measures accrue to more of the most vulnerable and low income households at highest risk of detriment, whilst retaining support for the wider benefit groups.⁹ By setting a Super Priority Group (for Pension Credit claimants, Child Tax credit claimants up to a £16,190 income threshold, and some of those on income support or job seekers allowance – details can be found in Annex A section 4) at 15% of the increase in target Government believes that a significant additional number of households on lower incomes and at risk of falling into fuel poverty will be assisted, thereby enhancing CERT’s equitable distribution of benefits¹⁰. The Super Priority Group will guarantee that a minimum number of the most vulnerable households receive measures that allow them to benefit from improved thermal comfort/lower heat and fuel bills. The alternative means of increasing equity would be to increase the scale of the Priority Group. However, as set out in the consultation paper, this is expected to drive higher numbers of more expensive products – given the number of low cost opportunities remaining, and so be a more costly (and ultimately less equitable) option. Equally, it will do no more to ensure that the most vulnerable groups falling within the Priority Group i.e. those on means tested benefits, are targeted.

46. A potential additional cost of setting a Super Priority Group would be from higher supplier search costs from sourcing the same share of carbon savings in a smaller pool of household opportunities. However, the proposed data sharing provisions under the 2008 Pensions Act now being explored may, if successful, generate search cost savings to electricity suppliers for part of the Super Priority Group – some or all of those on Pension Credit.

47. As presented in Annex B, given the number of opportunities remaining in the Super Priority group, a target of 15% of the increase in target (16.2 MtCO₂) is achievable within a 21 month delivery window. Whilst challenging it should encourage suppliers to form partnerships with local authorities and other grassroots organisations in order to more cost effectively source the opportunities. A target of 20% is also considered possible in this analysis, however less cost-effective measures such as flat roof insulation would be required, driving higher supplier costs.

48. In terms of benefits, on the counterfactual basis that no activity is currently happening in these groups under CERT presently, the full value of measures delivered are expected to be accrued to these more vulnerable households. It will therefore reinforce the equitable distribution of benefits under the scheme. Moreover, savings from insulation and heating measures could offer a potentially longer term alleviation from fuel poverty for those homes benefiting.

49. More broadly, the fuel poor are more likely to suffer as a result of living in poorly heated homes. Many studies have found that poorly heated homes can increase the chances and the frequency of both the young and the elderly from suffering from ailments such as asthma, Bronchitis, Pneumonia and Influenza. As a result of these illnesses, such vulnerable householders could require additional emergency assistance and/or hospitalisation. Illness in the young can affect their development and lead to days off school and work for their parents. There is a cost to the economy as a result of the health impacts of cold, damp housing, although it is difficult to quantify this link.

50. By focusing on elderly and young groups on low incomes with a higher than average propensity to be fuel poor, the Super Priority Group target could lead to improved warmth in households which receive measures. Improved warmth in households will improve the comfort of people’s living conditions and may also have an additional positive impact on health.

51. In terms of achievability, suppliers can continue to make use of the existing flexibility option – which provides carbon uplifts for delivering measures to off gas and solid wall properties (see Annex C), within the Super Priority Group, so as to make delivery more cost effective (see equity and fairness section for more information on the flexibility option). These are generally old properties with solid walls which are highly inefficient and costly to heat with low standards of thermal comfort, a large proportion of which are off the gas

⁹ The inclusion of the over 70s in the Priority Group however has taken the focus away from those on a low income (i.e. those on benefits”) Ofgem Annual Report, August 2009.

¹⁰ See the consultation paper for an analysis of the criteria for deriving which benefit groups are supported by the super priority group.

grid. As a significant proportion of these households are also in rural areas, this would also help promote a more equitable scheme in terms of rural activity.

52. A full discussion of the target for the SPG is presented in the following sections.

Driving long term carbon and energy savings in the non-traded sector - Including an insulation minimum

53. The introduction of a minimum target for insulation delivery helps Government deliver against carbon budget commitments, ensuring that carbon emissions outside the EU emissions trading system (non-traded sector emissions) are prioritised under the CERT extension. The advantage to the consumer is that the scheme will be focusing on promoting measures that they demand, and which can help them deliver deep and long lived energy savings. However, it may mean that fewer households in total may benefit from subsidised measures.

54. In practice the preferred option of a 68% minimum at this level would mean no less than a score of 73.4MtCO₂ could be delivered through insulation measures. The level of insulation this requires is within that modelled as being cost effective, and achievable over the timeframe. In administration terms, Ofgem already report on suppliers progress to targets on a quarterly basis, including the number of professional insulations installed.

55. The level of insulation required to be installed to meet this minimum is considered to be deliverable in 21 months. This is evidenced by a paper on the supply chain capacity of the insulation industry provided by the industry in early 2010 in response to the CERT extension consultation (this is commercial in confidence). There are risks (to achievability and costs) to delivering this minimum in a 21 month scheme. However, Government intends to allow the energy suppliers to work towards meeting this minimum as soon as the legislation is in place. This would provide significant additional time for the suppliers to work to meet their targets (expected delivery period expected to be closer to 29 months). This will ameliorate the risks set out, by smoothing delivery and allowing the supply chain to avoid reaching full capacity. Further discussion on risks to the supply chain for insulation measures can be found in Annex C.

56. The insulation minimum will present different energy suppliers with different levels of demand, depending on how far they have utilised professionally installed insulation to date. Those suppliers who have invested proportionally less in insulation in meeting their targets to date, will have further to go in developing and deploying insulation strategies which can meet this target. This is not considered however a reason why such a minimum should not be introduced. Further discussion on the level of the insulation minimum can be found in the following sections.

57. In addition to the insulation minimum, the 5% VAT rate on professionally installed measures should add incentive to the household to take up professionally installed measures.

Removing CFLs as eligible measures

58. The preferred scenario requires Compact Fluorescent Lamps no longer be eligible to score under CERT extension. CERT aims to transform the market for key measures. It has arguably achieved this with a significant increase in the number and type of CFL bulbs supported and with 332 million CFLs creditable to CERT by March 2010 (some 31% of the savings to target to date).

59. Although retaining some scope for CFLs to be supported outside the insulation minimum would deliver cost savings to the suppliers, there is less certainty that these measures will go on to be installed and used, replace less efficient alternatives or that consumers would not already be inclined/required (given the EU phase out of incandescent bulbs) to purchase CFLs anyway.

60. The exclusion of CFLs is expected to lead to the next most cost effective measure – especially DIY loft insulation to be promoted. DIY loft insulation has a useful role to play in the extension period in providing a cost effective means for consumers to top-up their insulation levels. In turn, these can help steer CERT towards non-traded sector emission savings, as more gas saving measures are installed in place of electricity saving CFLs to reach the target. These non-traded emissions savings are a key aim of the policy. Section E includes detail around the costs and benefits of excluding CFLs.

Avoiding Microgeneration double incentives

61. Going forward, Feed In Tariffs (FITs) and the proposed Renewable Heat Incentives (RHI) are by themselves deemed capable of driving significant take up of microgeneration measures. To help avoid double

incentives for carbon savings we already believe will be stimulated we are to remove microgeneration measures as eligible for CERT subsidy over the extension period. All microgeneration uplifts will also be withdrawn so as to minimise the potential for double incentives. This will further ensure that insulation is competitive in the 30% of the scheme outside the insulation minimum. Many vulnerable households are however in homes that are not connected to the mains gas network. Microgeneration measures can offer, especially in conjunction with insulation measures, the most appropriate long term solution to fuel poverty. Equally, without CERT support, vulnerable households, which have less access to upfront capital, risk being unable to afford these measures. We will therefore retain capacity for microgeneration measures to be eligible for promotion to Super Priority Group households.

62. No costs or benefits for Microgeneration measures have been included in this impact assessment as they should be attributed to FITs and RHI. Sensitivity tests can be found in section E around the risk that high uptakes in the SPG occur and around the possibility of removing Microgeneration measures completely.

Increasing the market transformation baseline for energy using products

63. For those product categories which are innovative, CERT awards an additional 50% carbon saving score so that they are more cost effective for suppliers to subsidise to help promote greater levels of market penetration. Suppliers may meet up to 10% of their carbon obligation with market transformation (and demonstration actions¹¹). All uplifts are applied after the caps specified have been met.

64. Alongside the provision of solid wall insulation, real-time display and home energy advice a market transformation action means any other action which will achieve a reduction in carbon emissions but which were not promoted under the 2001 electricity and gas order (so before March 2005). This baseline is being increased under the CERT extension so that products will not qualify for the innovation uplift if promoted under the 2004 Order (so before March 2008). Any new products brought forward which are similar to those promoted previously must satisfy the Regulator that it delivers a carbon emissions reduction of 20% above the standard achieved by that similar action.

¹¹ CERT allows suppliers to receive carbon scores for promoting investment in new technologies through a demonstration route. As demonstration actions do not have a determined carbon emissions reduction, the carbon emissions reduction accredited to a supplier for undertaking these actions are dependent upon the cost of the activity (determined by means of a translation factor set out in article 21 of the Order.

E COSTS AND BENEFITS

Methodology:

65. The analysis of costs and benefits has been conducted as follows:

Step 1: Assuming that suppliers wish to minimise their costs, find the minimum cost selection of measures suppliers can install to meet the above targets, subject to constraints from the supply chain, the housing stock and the legislation.

Step 2: For the selection of measures found (the Illustrative Mix of Measures), calculate the fuel savings which they will provide using fuel saving data and lifetime data used to generate the scores of measures.

Step 3: Using data collated by DECC, find the cost of installing these measures to suppliers and to householders/owners/social housing providers. This assumes a split in costs between groups for measures installed outside the PG.

Step 4: Apply comfort factors and conversion factors to the fuel savings to give comfort increases and carbon savings.

Step 5: Value comfort increases, fuel savings, carbon savings and air quality improvements by applying government price projections.

66. More detail is found on this methodology, including the data and conversion factors in the annexes to this IA.

67. The following costs and benefits are presented for the Illustrative Mix of Measures expected to be installed under CERT as described above. This Mix can be found in annex E for the preferred option and F for the central scenario.

Option 1 – Preferred Scenario

68. The following section contains analysis of the expected costs and benefits of the preferred option for a pro rata extension of CERT with:

- A 108MtCO₂ target score over 21 months to December 2012;
- 68% of that score to be met through professionally installed insulation measures;
- 40% of that score to be met in the Priority Group (PG)
- 15% of that score to be met within the Super-Priority Group (SPG)
- No CFLs

Costs:

69. The major costs of the CERT extension are the one-off costs of installing measures, the “hidden costs” to the household and the running costs of the scheme. The installation cost is divided between energy suppliers and households and social housing providers. The exact split between them depends on the willingness to pay of home owners, social tenants and social housing providers. The less householders and social housing providers are prepared to pay, the higher supplier costs will be and hence the higher impacts on bills will be.

70. Hidden costs are costs that are not considered as part of the general installation of measures and tend to fall on households and social housing providers, for example re-decoration costs and time spent organising and coordinating installations by homeowners which are not included in the cost of installation. They also include the installation of DIY measures. (see Annex H for more details on hidden costs for individual measures).

71. The assumption behind the running cost of the scheme (which includes advertisement, admin and search costs) is the same as previous CERT IAs, an assumed cost per measure which is included in supplier installation costs.

72. Table 1 sets out the installation and hidden costs for suppliers and households (households includes any costs there may be to social tenants and housing providers).

£m NPV 2010	Costs of Preferred Option		Total
	Supplier	Households & SHPs	
Installation Cost	2,308	1,614	3,922
Hidden Cost	0	1,581	1,581
Total	2,308	3,195	5,504

73. Further detail on the installation cost calculation methodology is set out in Annex D.

74. All costs will be covered upfront and thus are incurred in the 21 months to the end of 2012. There is no assumed cost of capital as all costs are instead assumed to be passed directly to consumers through higher bills. As a CERT policy already exists it is assumed that suppliers have already factored installation costs into their prices and as such pass on costs immediately, so not requiring capital expenditure at the expense of investment.

75. Although it is noted that the installed measures, may bring with them some maintenance costs, they have not been quantified as data on maintenance costs, particularly on newer measures is sparse. It would be expected that total costs would be immaterial as compared with installation costs. In addition to this, some measures will have lower maintenance costs than what they are replacing.

76. The administrative burden to suppliers of supplying information to Ofgem is detailed in Annex G and is expected to be around £53,000 per year for the 21 month extension period.

Benefits:

77. The benefits of CERT extension are reduced energy consumption; increased comfort; reduced purchase of EU ETS allowances; reduction of carbon emissions in the non-traded sector; and reduced air pollution.

78. These benefits are expected in part to exist for 42 years up to 2052, which reflects the longest lifetime of the measures installed. The monetisation of these benefits follows the Interdepartmental Analysis Group guidance¹² and is based on the associated energy savings for households receiving measures under the scheme. For more detail on the energy savings assumed for the different measures see annex D.

Benefits of Preferred Option		
(£m PV 2010)		Benefits
Reduction in energy use	<i>total</i>	6,916
Reduction in required purchase of EU ETS emissions rights		202
Reduction in non-traded CO2 emissions	<i>total</i>	2,869
		3,071
Increased Comfort		3,175
Air quality impact		989
Total		14,150

79. The table above shows the benefits expected from the preferred option, generated through the methodology outlined above. Energy and carbon savings are valued at projected prices for fuel types, traded carbon emissions and non-traded price of carbon. Increased comfort is valued at projected energy prices as willingness to pay for increased comfort at those prices indicates their worth to the householder. Air quality impacts are calculated using standard government valuation methodology found in annex I. All of these benefits are sensitive to price projections or in the case of air quality to the amount of coal replaced. These sensitivities are tested further on in this IA and in detail in the following section.

¹² Which can be found at: http://www.decc.gov.uk/en/content/cms/statistics/analysts_group/analysts_group.aspx

Impact on society:

80. Taking into consideration the costs and benefits associated with the scheme, the final impact is a £8,647m benefit for society (discounted into 2010 prices).

81. Annualised over the 42 year appraisal period this gives an annual benefits of £645m and an annual net present benefit of £394m.

Comparison to Consultation:

82. The central option in the consultation stage Impact Assessment was that an insulation minimum be introduced; an SPG target be introduced and that CFLs be removed. This option was given as having an NPV of £8,318m and supplier costs of £2,197m.

83. The higher NPV seen in this impact assessment is largely due to updated DECC projections of energy and carbon prices, which increase the value of future benefits. The higher supplier costs in our preferred option here are driven by the higher predicted uptake of expensive measures such as solid wall insulation in reaching the 68% insulation minimum.

84. Also listed in the consultation was a £52 pass through cost (supplier cost per household per year). This was used as a proxy for bill impacts. The equivalent figure for supplier cost per household in this Impact Assessment is £53 (undiscounted) in the preferred option. In this Impact Assessment it has been possible to undertake a more sophisticated analysis of the impact of supplier costs on bills (see paragraph 95 below).

Cost Effectiveness

85. The analysis carried out on cost-effectiveness is in line with the government's revised approach to carbon valuation [see annex I for a more detailed description].

86. The cost effectiveness indicator (CEI) is calculated for the non-traded sector and traded sector emissions to be the total NPV less the PV of that sectors emission reductions divided by the total emission reductions in that sector. This gives a price per tonne CO₂ emission reduction for each sector. This figure should be compared to the weighted average discounted (WAD) carbon price for that sector.

87. In the traded sector the CEI for the preferred option is -£841 compared with a WAD of £20. This implies that reducing emissions is cost effective in the traded sector. This means that 100% of emissions reductions in the traded sector are expected to be achieved below the EUA price.

88. In the non-traded sector the CEI for the preferred option is -£90 compared with a WAD of £45. This again implies 100% of emissions reductions in the non-traded sector are expected to be achieved below the non-traded price of carbon.

Wider Environmental and Economic Benefits

89. CERT extension will provide further economic benefits through the creation of market opportunities for new or more efficient technologies and by providing certain incentives for demonstration and market transformation.

90. CERT extension will also contribute to improved security of energy supply by reducing total energy demand from the domestic sector. Projected annual savings in 2013 are: 9.93 TWh/year gas; 1.61 TWh/year electricity; 0.79 TWh/year fuel oil; 0.92 TWh/year coal. These savings will decrease over subsequent years as the measures reach the ends of their lifetimes. These figures have been corrected for deadweight and for expected comfort taking. For comparison electricity use in the domestic sector was 117.8 TWh in 2008 [DUKES 2009 data] and gas use 363 TWh.

91. The CERT extension is a key part of the program for the UK to reach its carbon budgets. The contribution of the CERT extension towards carbon budgets is set out in the table below.

(minus is a reduction in emissions)

	2008-2012	2013-2017	2018-2022
Net change in CO ₂ (non-traded) MtCO ₂	-0.975	-11.118	-10.710

92. Over the total appraisal period, the CERT extension is expected to reduce emissions by some 64.2MtCO₂ in the non-traded sector. A further 10.0MtCO₂ will be saved in the traded sector, however as this is a capped sector, the benefits of this will be felt purely through reduced pressure on buying EU ETS allowances, as the emissions would be traded and expected to be released elsewhere.

93. Carbon savings will be at their highest in 2013 as all measures will be installed and functioning. 2.3MtCO₂ of which will come from the non-traded sector in 2013. This equates to just over a 3% cut in household greenhouse gas emissions in 2013.

94. By 2020, it is expected that CERT extension will be providing 2.1MtCO₂ of savings in the non-traded sector.

Bill impacts

95. The CERT Extension will have two separate and distinct impacts on bills for UK households, as described below:

96. Firstly CERT extension will have an impact on bills arising from higher energy prices. As suppliers are expected to pass on their costs to customers through increased energy prices. This impact is only felt during the period of CERT extension (21 months to December 2012). It is assumed that the increased prices will affect all households consuming gas or electricity, whether they have received a measure or not. It will increase bills proportionally. Analysis suggests that this impact will be as follows:

£ 2009 <i>Positive figures indicate an increase</i>	Average estimated bill impact Dual Fuel Home		
	House not receiving measure	Example: Average gas heated house receiving Cavity Wall Insulation*	Total average bill impact across all households
2012	61	-61	51
2013	0	-134	-24
2020	0	-141	-25

*Cavity wall insulation in gas houses is the most common major measure under CERT and is representative of a house which receives a measure.

97. As a result of the policy gas prices¹³ are expected to increase by £1.41 per MWh in 2011 and £1.86 in 2012 as suppliers pass on their installation costs to consumers. These price rises would lead to an average increase in gas bills of £24 in 2011 and £31 in 2012 for the average house not receiving a measure.

98. Likewise, electricity prices are expected to increase by £4.70 per MWh in 2011 and £6.40 in 2012, leading to an average increase in electricity bills of £22 in 2011 and £30 in 2012 for the average house not receiving a measure.

99. Therefore for the average UK house, the costs of higher fuel prices on their annual fuel bills would be £46 in 2011 and £61 in 2012. This is the only effect on houses without measures installed.

100. The average bill impact across all households will be a £51 increase in dual fuel bills in 2012 as higher prices outweigh energy savings. However from 2013 an average bill saving of £24 is expected. This is

¹³ Average price and bill impacts are assessed against a baseline bill which includes the following policies in line with the latest published policy assessments: The Renewable Heat Incentive, further Supplier Obligations, the existing Carbon Emissions Reduction Target, the Community Energy Savings Programme, Better Billing, Smart Metering, Defra-led Products Policies, Renewables Obligation, EU Emissions Trading System, Carbon Capture and Storage and Feed-in-Tariffs.

estimated to continue until 2020, when bill savings start decreasing towards 2052 when there will be no more bill savings. For more detail on annual bill impacts see annex E.

Option 2 – Central Scenario

101. The following section contains analysis of the expected costs and benefits of the central scenario for a pro rata extension of CERT with:

- A 108MtCO₂ target score over 21 months to December 2012;
- 65% of that score to be met through insulation measures;
- 40% of that score to be met in the Priority Group (PG);
- 15% of that score to be met within the Super-Priority Group (SPG);
- Dimmable retail CFLs allowed up to 5% of the target.

102. Costs and benefits follow a similar pattern to the preferred scenario. The table below compares the two options in terms of costs and benefits

<i>£m NPV</i>	Preferred Scenario	Central Scenario
Benefits		
Fuel savings	6,916	6,490
Emissions	3,071	2,876
Air Quality	989	979
Comfort	3,175	3,081
Total	14,150	13,427
Costs		
Suppliers	2,308	2,033
Households	1,614	1,441
Hidden	1,581	1,062
Total	5,504	4,536
NPV	8,647	8,891
<i>Annualised NPV</i>	<i>394</i>	<i>405</i>
Non-traded CO ₂	-64	-60

103. The central scenario has lower costs than the preferred scenario as suppliers are allowed to use cost-effective CFLs, meaning fewer expensive measures such as solid wall insulation are required. These higher costs are partially offset by higher benefits, driven by the removal of CFLs, the benefit of which is discounted to below their “lifetime carbon score” to account for underperformance and under-use. For this reason, and because the higher insulation minimum ensures non-traded CO₂ savings to replace traded sector CO₂ savings, we see 64MtCO₂ saved in the non-traded sector in the preferred scenario, but only 60MtCO₂ in the central scenario. However, NPV is 2% higher in the central scenario. The following sections discuss the rationale for the preferred option despite its lower NPV, and examine the decisions made around SPG target, insulation minimum and CFLs.

104. *The following sections present results of changing the specified parameters of the central scenario and holding all things equal. They therefore should not (unless stated otherwise) be compared directly to the preferred scenario.*

Treatment of CFLs

105. As discussed in section D a policy decision has been made, and was consulted on, to remove CFLs as an eligible measure. The policy reasons behind this decision are that CERT has already transformed this market; there is growing uncertainty around the use of the measures and concerns around additionality owing

to the fact that some 332 million CFLs have already been distributed; and CFLs do not contribute directly towards non-traded sector abatement which is one of the key aims of CERT.

106. Three options were considered regarding CFLs: their unrestricted inclusion; an inclusion of dimmable, retail CFLs up to 5% of the target; and the removal of CFLs as a measure. The table below outlines the impacts of these choices.

<i>NPV £m</i>	Central Scenario - 5% CFLs	No CFLs	Unlimited CFLs
Benefits			
Fuel savings	6,490	7,006	5,059
Emissions	2,876	3,057	2,357
Air Quality	979	972	897
Comfort	3,081	3,156	2,814
Total Benefit	13,427	14,190	11,127
Costs			
Suppliers	2,033	2,667	1,601
Households	1,441	1,690	1,039
Hidden	1,062	1,214	855
Total Cost	4,536	5,571	3,495
NPV	8,891	8,620	7,632
<i>MtCO2 change in:</i>			
Non-traded CO2	-60	-64	-49
<i>% insulation</i>	<i>66</i>	<i>68</i>	<i>65</i>

107. The impact of removing CFLs is a 3% decrease in NPV; benefits increase by 6% as more fuel savings (and therefore carbon savings) are realised. However costs to suppliers are expected to increase by about 30% as higher cost measures are required in place of cheap CFLs.

108. Although costs are much higher without CFLs, the increase in benefits almost offsets this. The removal of CFLs also achieves the aim of increasing non-traded sector emissions savings by some 7%. The removal of CFLs also means that suppliers are expected to focus on other cost-effective measures such as loft insulation. As such, the level of insulation is expected to reach 68% of the target for this reason the introduction of a 68% insulation minimum is not an additional cost once CFLs are removed from the scheme.

Insulation minimum

109. As discussed in section D, the purpose of an insulation minimum is to drive non-traded sector emissions reductions and deep, long-lived energy savings and provide certainty to the supply chain of these industries which are vital to long term transformation towards a low carbon housing stock. The level of the insulation minimum is a balance between the cost-benefit ratio and contribute towards these aims.

110. To test the level of the insulation minimum the central scenario has been adjusted to include a 70%insulation minimum, a 68% insulation minimum and a 60% minimum to gauge the effect on costs and benefits of different levels.

111. As it is expected a minimum of 65% will be unbinding (uptake in central scenario is expected to be 66%), it makes no difference to our analysis to have a minimum of 60%. Below is a table detailing the costs and benefits of increasing the central scenario minimum to a 68% or a 70% minimum:

<i>NPV £m</i>	Central Scenario - 65% insulation	68% insulation	70% insulation
Benefits			
Fuel savings	6,490	6,846	6,423
Emissions	2,876	3,041	2,981
Air Quality	979	985	757
Comfort	3,081	3,164	3,177
Total Benefit	13,427	14,036	13,338
Costs			
Suppliers	2,033	2,170	2,308
Households	1,441	1,577	1,446
Hidden	1,062	1,545	1,273
Total Cost	4,536	5,293	5,027
NPV	8,891	8,743	8,312
<i>MtCO2 change in:</i>			
Traded CO2	-9	-10	-8
Non-traded CO2	-60	-64	-63
<i>% insulation</i>	<i>66</i>	<i>68</i>	<i>70</i>

112. The sensitivities above show the impacts on costs and benefits of varying insulation minimums, with respect to the central scenario which has a predicted uptake of 66% insulation. This assumes that there would be a 5% allowance for CFLs. As the decision to remove CFLs has now been taken, in the new preferred option there is a predicted uptake of insulation measures of 68%. In other words **the insulation minimum is not expected to lead to additional cost to suppliers or NPV** when applied to the preferred scenario.

113. A 70% insulation minimum would however, in going beyond the level of cost-effective uptake even with the removal of CFLs, increase costs to suppliers and decrease NPV. Therefore the level of 68% has been chosen to ensure the desired non-traded sector carbon savings without increasing costs further.

Super Priority Group Target

114. The central scenario and the preferred option require 15% of the target to be achieved in the SPG. The costs and benefits below are for the central scenario if a 10% or 20% target was used instead.

<i>NPV £m</i>	Central Scenario - 15% SPG	10% SPG	20% SPG
Benefits			
Fuel savings	6,490	6,484	6,325
Emissions	2,876	2,944	2,921
Air Quality	979	992	953
Comfort	3,081	2,883	3,297
Total Benefit	13,427	13,304	13,495
Costs			
Suppliers	2,033	2,032	2,440
Households	1,441	1,463	1,544
Hidden	1,062	1,093	1,155
Total Cost	4,536	4,587	5,139
NPV	8,891	8,717	8,357

<i>MtCO2 change in:</i>			
Non-traded CO2	-60	-62	-62

115. Section D outlined the reasons for including a super priority group to address the fairness of installations and to address fuel poverty. The benefits of these are not quantified but are expected to be considerable.

116. A lower 10% target for the SPG would allow suppliers to only marginally decrease their costs as the majority of the measures would still need to be installed within the PG for which the same costs are assumed as in the SPG. As this analysis assumes that suppliers only seek to minimise their own costs, the total costs are expected to increase as suppliers opt for measures with higher hidden costs, such as insulated wallpaper. Household costs are expected to increase slightly as suppliers can focus some measures outside of the SPG and re-distribute installations such that slightly higher costs fall on households than themselves. Benefits also fall slightly as increased comfort falls due to less measures being delivered to those in the SPG who are assumed to have higher comfort factors. The key message is that costs to suppliers are not materially increased by the introduction of a 15% SPG but there are substantial increases in unquantified benefits and equity.

117. A 20% target to the SPG would cost about 20% more to suppliers as less cost-effective measures are required within the SPG, where it is assumed suppliers will have to fully subsidise measures. The increase in costs is not offset by substantial increase in benefits.

Sensitivity Analysis

The costs and benefits listed above are sensitive to many assumption and constraints. An examination of these sensitivities is shown below

118. The costs and benefits listed above are sensitive to many assumptions, constraints and decisions. An examination of these sensitivities is shown below which presents their impact on the central scenario, which is considered representative of the impact they would have on the preferred scenario.

Assumption sensitivities

Carbon and fuel price scenarios

119. The carbon and fuel price scenarios detailed in annex I are a key part of the valuation of benefits. The following tables demonstrates the sensitivity of NPV of the preferred option to fuel price scenarios and carbon price scenarios of high and low (as opposed to the central price scenarios used in the analysis above):

	NPV 2010 £m	Sensitivity %
Very High fuel prices	13,427	55%
High fuel prices	10,706	23%
Low fuel prices	4,975	-42%
Central fuel prices (preferred scenario)	8,647	0%

	NPV 2010 £m	Sensitivity %
High carbon prices	10,163	17%
Low carbon prices	7,122	-17%
Central carbon prices (preferred scenario)	8,647	0%

Cost scenarios

120. The cost assumptions have been tested to show the effect on total costs of a 10% higher/lower cost of installation, and the high/low estimates of hidden costs found in the research done for DECC by Ecofys. More details are in Annex H.

£m NPV 2010	Suppliers	Households & Social Housing Providers	Total
Hidden costs			
Central costs (preferred option)	0	1,581	1,581
Low costs	0	1,039	1,039
High costs	0	2,204	2,204
Installation Costs			
Central costs (preferred option)	2,308	1,614	3,922
Low costs	2,077	1,453	3,530
High costs	2,539	1,775	4,314
Total Costs			
Central costs (preferred option)	2,308	3,195	5,504
Low costs	2,077	2,492	4,569
High costs	2,539	3,979	6,518

121. *The sensitivities examined below which present the impact of assumptions on the central scenario. The relative changes are considered representative of the impact they would have if applied to the preferred scenario.*

Air quality sensitivity to coal assumptions

122. The air quality improvement benefit relies heavily on the assumption that around half the fuel switches installed are from coal to gas. If 50% of these were not coal, but electricity to gas, roughly 50% of the benefits from air quality would be lost, however these would be offsets by gains from fuel savings as electricity is a more expensive heating fuel.

Sensitivity to deadweight assumptions

123. In the preferred scenario it is assumed that there is no deadweight uptake of measures, as consumers who were willing to pay the full price of measures would have already taken advantage of previous supplier obligations. However, it is possible that there are people moving house who would want to install measures without subsidy. To test this it is assumed that the pre-supplier obligation uptake rates for insulation measures apply to the portion of householders moving within the CERT period. The deadweight in double glazing is also taken into account by applying the rate of new windows bought at grade C or above. The sensitivity to this deadweight only affects benefits and would result in a decrease in NPV of 0.75% or £63m.

Cavity Wall Insulation Capacity

124. Cavity wall insulation is currently being installed at 550,000 per year. The industries response to the consultation indicated it would be possible to increase this to 880,000 per year for the CERT extension period. Therefore it is assumed that 1.4 million cavities can be filled as part of the CERT extension. However this sensitivity tests the impacts on costs and benefits if 1.2 million, 1.3 million or 1.5 million can be installed.

<i>NPV £m</i>	Central Scenario - 1.4 million cavities	1.2 million cavities	1.3 million cavities	1.5 million cavities
Benefits				
Fuel savings	6,490	6,535	6,511	6,397
Emissions	2,876	2,880	2,886	2,928
Air Quality	979	946	976	956
Comfort	3,081	2,977	3,033	3,112
Total Benefit	13,427	13,338	13,406	13,393
Costs				
Suppliers	2,033	2,975	2,412	1,916
Households	1,441	1,720	1,525	1,311
Hidden	1,062	1,199	1,193	1,029
Total Cost	4,536	5,895	5,130	4,255
NPV	8,891	7,443	8,277	9,138
<i>MtCO2 change in:</i>				
Non-traded CO2	-60	-60	-60	-61

125. As shown, fewer cavity wall insulations achievable would greatly increase costs to suppliers. However if more than 1.4 million are achievable in the period, the costs could be considerably lower and as such NPV, higher.

126. As suppliers will be able to commence work on these targets before March 2011 and therefore may use more than the 21 months of the scheme, it is more likely that the 1.5 million cavity option would apply than the lower options. This would result in lower supplier costs and a higher NPV for the final option.

Size of SPG houses

127. Cavities are scored by size of cavity filled. It is possible that house sizes in the SPG are smaller than the UK average, although there is no firm evidence to support this claim. To test the sensitivity of this it is assumed that only 150,000 cavities can be filled in the SPG rather than the 275,000 assumed in the central and preferred options, which accounts for an assumption that if cavities are considerably smaller in the SPG, opportunities will be considerably lower as opportunities are measured against a standard size of cavity.

<i>NPV £m</i>	Central Scenario - 275,000 SPG cavities	150,000 SPG cavities
Benefits		
Fuel savings	6,490	6,428
Emissions	2,876	2,909
Air Quality	979	954
Comfort	3,081	3,062
Total Benefit	13,427	13,353
Costs		
Suppliers	2,033	2,081
Households	1,441	1,429
Hidden	1,062	1,135
Total Cost	4,536	4,646

NPV	8,891	8,707
<i>MtCO2 change in:</i>		
Non-traded CO2	-60	-61

128. This would increase supplier costs by some 2% and marginally decrease benefits. However in reality if the houses in the SPG were smaller than average, houses elsewhere must be larger and hence there would be an increase in fillable cavities in the PG and Non-PG, thus reducing costs back towards those in the central case.

SPG search costs

129. It is assumed that the costs of reaching houses in the SPG will be no higher than in the priority group. However it is possible that it will be more costly to find these houses and persuade householders to take up measures. If admin costs were 25% higher in the SPG to account for this then cost to suppliers would be 4% higher.

RHI measures

130. Currently microgeneration measures that are eligible for subsidy under the proposed RHI (Renewable Heat Incentive), are also eligible for SPG installation under CERT. Expected uptake rates of these measures in this analysis are low, however if all the measures expected to be installed under the proposed RHI were installed in the SPG in CERT the following impacts are seen:

<i>NPV £m</i>	Central Scenario - only cost efficient microgen in SPG	Proposed RHI levels of microgen in SPG
Benefits		
Fuel savings	6,490	6,271
Emissions	2,876	2,880
Air Quality	979	948
Comfort	3,081	3,045
Total Benefit	13,427	13,144
Costs		
Suppliers	2,033	2,001
Households	1,441	1,403
Hidden	1,062	1,051
Total Cost	4,536	4,455
NPV	8,891	8,689
<i>MtCO2 change in:</i>		
Non-traded CO2	-60	-61

131. The NPV would decrease due to benefits from these measures not being included in the benefits of CERT due to overlap with the proposed RHI. This is not considered a likely scenario.

Solid Wall Insulation Delivery

132. The following sensitivity examines the effect of assuming less SWI would be achievable in the CERT extension period. It assumes that 49,000 can be installed as opposed to the central case assumption of 82,000. In order to achieve the insulation minimum, 25,000 extra flat roof insulations were required, increasing costs, and slightly decreasing benefits.

<i>NPV £m</i>	Central Scenario - 82,000 SWI	Low SWI 49,000
Benefits		
Fuel savings	6,490	6,428
Emissions	2,876	2,909
Air Quality	979	954
Comfort	3,081	3,062
Total Benefit	13,427	13,353
Costs		
Suppliers	2,033	2,092
Households	1,441	1,449
Hidden	1,062	1,039
Total Cost	4,536	4,580
NPV	8,891	8,772
<i>MtCO2 change in:</i>		
Non-traded CO2	-60	-61

G COMPETITION ISSUES

133. The Office of Fair Trading guidance lists for key questions to assess whether policies have an impact on competition. Below is an assessment of these questions applied to the CERT Extension.

Does the policy:

- a. Directly limit the number or range of suppliers?

134. No. CERT extension applies directly to energy supply markets. In this market the obligation is designed to minimise effect on competition. Targets are based on customer numbers such that obligation is proportional to market capitalization. In recognition of the economies of scale available to larger firms, firms with under 50,000 customers are exempt from the scheme. This also significantly removes any barriers to entry caused by the policy. Any new entrants into the market would have no initial customers and so would not face an initial barrier and there is no reason to suggest existing firms would be forced out of the market by the legislation.

As part of the ongoing evaluation and analysis of the supplier obligation there will be a review of the level of this 50,000 customer threshold before the commencement of the extension period, to ensure that the level is set correctly to achieve the outcomes above.

- b. Indirectly limit the number or range of suppliers?

135. No. CERT extension indirectly affects the supplier industry of energy/carbon saving installations/products and it's supply chain. Barriers to entry into the market for most efficient energy/carbon saving products and services are relatively low. Whilst some suppliers may choose to undertake a large proportion of their obligations through in-house contractors, there is no reason to suppose this will reduce

competition in the rest of the energy supply market. It is possible that regional bottlenecks could develop in the supply of certain energy efficient products such as insulation, given a projected rapid expansion in the market for these products. Any resulting price increases are likely to be short lived, given that new market entry is possible and at low set-up cost, however there are some sectors such as cavity walls where the long term prospects may put off new entrants. This will be increasingly likely as CERT begins to promote more costly measures, presenting opportunities for energy services companies marketing whole house energy contracts to consumers.

136. The costs to entry and exit should not be changed by the legislation. Nor should the costs to some existing suppliers relevant to others. There is some potential for new entrants to miss out on the established relationships with energy companies (their customers) of existing firms, however this is a normal barrier to entry in a market with suppliers and customers. It is likely that many product markets will be working at full capacity, encouraging new entrants.

c. Limit the ability of suppliers to compete?

137. Possibly. Some suppliers may be disadvantaged by not being able to reap economies of scale benefits to the same degree as their larger competitors. This may affect in particular suppliers – with greater than 50,000 customers – that are nevertheless relatively small in comparison with their competitors. However, suppliers are able to organise their obligation as they wish. This includes contracting out the obligation, which would allow for economies of scale to be achieved alongside other firms of similar size.

d. Reduce suppliers' incentives to compete vigorously?

138. No. Suppliers are able to pass on the costs of their obligations under the CERT. A supplier that is inefficient is likely to lose customers, who have the freedom to switch to another supplier. Suppliers have an incentive to keep the costs of their obligations under CERT as low as possible in order to minimise the amount of any pass through. This reflects the competitive supplier market and the drive to retain or acquire customers. Suppliers therefore have an incentive to be competitive in the supply of energy/carbon saving products and services.

139. As there is no reason to believe the answers to any of these for questions is yes, no further detailed analysis is appropriate.

H SMALL FIRMS' IMPACT

140. Guidance from the Department for Business, Innovation and Skills stipulates that an impact assessment should include an assessment of impacts on small businesses:

- The legislation does not directly apply to small business. The CERT obligation does not apply to new and small energy suppliers with fewer than 50,000 domestic customers. This means that new entrants will not have to set up CERT programmes while at an early stage. The draft Order contains other provisions that avoid the risk of creating barriers to new entrant companies: where a supplier prefers not to set up its own CERT programmes, then it may transfer all or part of its target to another supplier, purchase accredited performance from another supplier or contract out the operation of its programme.

The level of this 50,000 customer threshold is to be reviewed as outlined above.

- Independent analysis commissioned by DECC into the previous supplier obligation phase states that the obligation has led to no discernable evidence that the impact of the scheme has in any way had a deleterious effect on smaller companies. It argues that the obligation has typically resulted in the smaller players in the insulation and lighting business organising themselves to be effectively a “bigger player” thus overcoming the perceived problems for energy suppliers of dealing with small businesses. The innovation of directly supporting the manufacturer in the creation of energy efficient products should mean that the retailers of appliance and consumer electronics will not be disadvantaged by their size other than through normal commercial arrangements.

I STATUTORY EQUALITY DUTIES

141. Initial policy screening of the CERT against Statutory Equality Duties suggested the policy is robust and there is no potential for discrimination or adverse impact. All opportunities to promote equality have been taken.

142. Race Equality: The CERT Extension proposals underwent race impact assessment screening. It was concluded that the CERT Extension would have no race equality impacts. CERT is a market based mechanism, therefore where opportunities exist to satisfy their targets (including priority and super priority group targets) suppliers have an incentive to deliver measures at least cost and without discrimination so that they remain competitive. It is understood that some ethnic groups are strongly represented in poor quality housing; the CERT, particularly the priority and super priority group targets, will help deliver improved housing conditions to the most vulnerable in our society.

143. Disability Equality: The CERT Extension should help deliver positive benefits to disabled or long term sick householders. It is understood that a high proportion of fuel poor households contain someone that is registered disabled or long term sick and that these people are often more vulnerable to detriment as a result of living in poorly heated homes than the general population. The CERT Extension includes targets designed to ensure measures reach these vulnerable households. Measures delivered to households in receipt of: an attendance allowance; disability living allowance; or, a disablement pension which includes a constant attendance allowance, may be counted towards suppliers' 40% Priority Group targets. Measures delivered to long-term sick and disabled households on certain means tested benefits¹⁴ may be counted towards suppliers' 15% Super Priority Group targets.

144. Gender Equality: The CERT Extension is not anticipated to have any disproportionate impact on gender. CERT is a market based mechanism, therefore where opportunities exist to satisfy their targets (including priority and super priority group targets) suppliers have an incentive to deliver measures at least cost and without discrimination so that they remain competitive.

J SOCIAL IMPACTS

145. Health and Wellbeing: The policy is expected to deliver positive health and wellbeing benefits, including reducing the inequity of healthy living conditions. The major benefit is increased comfort. A proportion of energy savings provided by installed measures (especially in vulnerable households served by the priority and super priority group targets) are expected to be used to increase comfort (increasing the internal temperature of the home) as heating the home becomes relatively cheaper. As this is a rational consumer decision it has positive benefit and is valued at the retail price, the price that homeowners are will to fore go for improved comfort. Increased comfort has been valued at £3,175m.

146. Human Rights: The policy will not engage anyone's convention rights. The Minister of Energy and Climate Change has made the following statement regarding the CERT:

147. *In my view the provisions of the Electricity and Gas (Carbon Emissions Reduction) (Amendment) Order 2010 are compatible with the Convention rights.*

148. Justice System: Although the CERT Extension introduces two additional targets on obligated energy suppliers (electricity or gas suppliers with more than 50,000 domestic customers), this is not expected to have any additional impact on the justice system. The CERT to March 2011 includes two legally binding targets: the overall target to reduce household emissions by 185 million lifetime tonnes of CO₂ (MtCO₂) and the additional requirement that 40% of these reductions is delivered in a priority group of households that contain an eligible benefit recipient or someone aged 70 or over. These obligations will be extended on a pro rata basis to December 2012 and two further targets will be introduced: that 68% of the increased target is delivered through the installation of approved insulation measures and that 15% of the increased target is delivered to the most vulnerable households as defined using certain benefit criteria.

¹⁴ Income Support, Income-based Jobseeker's Allowance or Income-related Employment and Support Allowance in the assessment phase, who are also in receipt of a disability or severe disability premium or an award of child tax credit that also includes an element for a disabled, or severely disabled, child or young person.

149. The Regulator, Ofgem, will continue to be responsible for the operation of the CERT including monitoring and enforcement (suppliers may be fined 10% of their global turnover if they fail to adhere to CERT requirements). The procedures that suppliers will follow in order to achieve their carbon dioxide emissions reduction obligations, including the two new targets, will be set out in Ofgem's Supplier Guidance. The existing Supplier Guidance can be found on the Ofgem website¹⁵. The analysis assumes full compliance with the policy, and that the mechanism for enforcing it (self-reporting on obligations to Ofgem) is effective. Experience with CERT and EEC has shown suppliers have always delivered their obligations and the analysis conducted as part of the impact assessment has shown that the new targets are achievable and cost effective.

K RURAL PROOFING

150. Rural interests were considered throughout the development of the CERT Extension policy. Discussions on the issues faced by rural communities and the levers available to address rural issues were conducted with the DECC rural champion, the Commission for Rural Communities and other interested parties. A question on the impact of CERT on vulnerable rural households was asked in the consultation document. The CERT is a market based instrument, and so is delivered in the most cost effective way by suppliers. While the scheme is delivered across GB it is not guaranteed that benefits are spread evenly to every area. Delivering measures in rural areas can be more expensive than in urban areas as installers may experience higher transport costs, lack of economies of scale and high rates of hard to treat homes (properties that are off-gas and/or have solid walls). However, there is also significant need for improvement of the rural housing stock; 35.6% of homes in rural areas in England are F or G SAP rated (Standard Assessment Procedure for Energy Efficiency) compared to 15.6% in other areas (English Housing Condition Survey 2007).

151. Most households in GB have had the opportunity to benefit from certain schemes delivered under CERT; for example from subsidised DIY insulation, the distribution of low energy light bulbs. However, an accurate picture of the geographical distribution of professionally installed CERT measures is only just becoming available. DECC and Devolved Administrations are finalising agreements with energy suppliers and the Energy Saving Trust that will enable the reporting of the number of CERT measures professionally installed at a local level. Initial analysis of geographical data from CERT's predecessor supplier obligation scheme, EEC 2, suggests that rural areas have been slightly under-represented in schemes that deliver cavity wall insulation. It is estimated that 23% of homes in England and Wales are classified as rural, but under EEC 2, 19% of cavity wall insulation measures were installed in rural homes.

152. A number of policies in the CERT Extension will help ensure measures are delivered in rural and urban areas. These include the increased target and insulation minimum which will require, for example, an estimated 1.4 million further cavity walls to be insulated; this ambitious level of delivery will only result in more rural homes receiving measures. Tackling the high number of properties that are solid wall and off-gas in rural areas will be made considerably more attractive given the introduction of fuel-dependent scores for solid wall insulation and the retention of the flexibility uplift for solid wall off-gas properties (see section for details).

L SUSTAINABLE DEVELOPMENT

153. The CERT Extension has been considered against overarching sustainable development principles. It has been concluded that the impact of the policy is positive now and in the future and that it adheres to the SD principles.

154. Taking into consideration the costs and benefits associated with the scheme, the final impact is estimated at a £8,647m benefit for society (discounted into 2010 prices). The details of the costs and benefits are set out in the full impact assessment.

155. Living within environmental limits: The primary aim of the CERT Extension is to reduce carbon emissions from the GB domestic sector. Energy suppliers will be required to promote or install measures that will score 108 MtCO₂ by December 2012. Annual CERT savings will be at their highest in 2013 as all measures will be installed and functioning. 2.3MtCO₂ savings are expected to be saved in 2013 from the non-traded sector.

156. The CERT is achieved substantially through the promotion of measures that reduce energy demand and thus reduces our resource use and contributes to improved security of energy supply. Projected annual savings in 2013 are: 9.93 TWh/year gas; 1.61 TWh/year electricity; 0.79 TWh/year fuel oil; 0.92 TWh/year coal.

¹⁵ <http://www.ofgem.gov.uk/Sustainability/Environment/EnergyEff/InfProjMngrs/Documents1/CERT%20supplier%20guidance.pdf>

These savings will decrease over subsequent years as the measures reach the ends of their lifetimes. These figures have been corrected for deadweight and for expected comfort taking.

157. Ensuring a strong, healthy and just society: The policy is expected to deliver positive health and wellbeing benefits, including reducing the inequity of healthy living conditions. The major benefit is increased comfort. A proportion of energy savings provided by installed measures (especially in vulnerable households served by the priority and super priority group targets) are expected to be used to increase comfort (increasing the internal temperature of the home) as heating the home becomes relatively cheaper. As this is a rational consumer decision it has positive benefit and is valued at the retail price, the price that homeowners are willing to forego for improved comfort. Increased comfort has been valued at £3,175m. Improving air quality will also improve society's health and wellbeing. The air quality impact of reduced emissions as a result of the CERT Extension is expected to be £989m. This is mainly associated with the reduction in burning coal.

158. Achieving a sustainable economy: The CERT extension will provide economic benefits through the creation of market opportunities for new or more efficient technologies and by providing certain incentives for demonstration and market transformation.

159. The impact on business is expected to be positive in that the energy efficiency industry – manufacturers, retailers and installers will benefit from the revenue and employment benefits stimulated by an increase to the carbon saving obligation and energy supplier investment needed to meet this. We assume the costs of the scheme can, and are, passed on in total to household electricity and gas consumers. Suppliers have an incentive to keep the costs of their obligations under CERT as low as possible in order to minimise the amount of any cost pass through to consumers. This reflects the competitive supplier market and the drive to acquire and retain customers.

160. Promoting good governance: The Regulator, Ofgem, will continue to be responsible for the operation of the CERT including monitoring and enforcement (suppliers may be fined 10% of their global turnover if they fail to adhere to CERT requirements). The procedures that suppliers will follow in order to achieve their carbon dioxide emissions reduction obligations, including the two new targets, will be set out in Ofgem's Supplier Guidance. Ofgem is required to report annually to the Secretary of State on suppliers' progress towards their carbon saving targets. Ofgem voluntarily report the headline information on a quarterly basis. The impact of CERT in how far it has achieved its carbon and energy saving ambitions, together with the range and number of energy efficiency measures installed, will be reported by Ofgem at the end of the programme in 2013. The Government will also look to commission an independent review of the broader social and environmental costs and benefits at the end of the scheme, consistent with and building on the independent reviews of the previous supplier obligation phases.

161. For the CERT Extension energy suppliers will be obligated to provide Ofgem with address level data for professionally installed measures. This will allow better scrutiny of possible fraudulent claims and assessment of savings reported against other schemes such as FITs and CESP.

162. Voluntary arrangements are currently being put in place between energy suppliers, the Energy Saving Trust, Devolved Administrations and DECC to enable better reporting of the geographical distribution of measures professionally installed under CERT.

163. Using sound science responsibly: The evidence base utilised and the assumptions made in their analysis are described in the impact assessment and its annexes. Sensitivity analysis has been conducted where appropriate to illustrate the impact of variations from the assumptions and different policy decisions.

Annexes

Annex 1 should be used to set out the Post Implementation Review Plan as detailed below. Further annexes may be added where the Specific Impact Tests yield information relevant to an overall understanding of policy options.

Annex 1: Post Implementation Review (PIR) Plan

A PIR should be undertaken, usually three to five years after implementation of the policy, but exceptionally a longer period may be more appropriate. A PIR should examine the extent to which the implemented regulations have achieved their objectives, assess their costs and benefits and identify whether they are having any unintended consequences. Please set out the PIR Plan as detailed below. If there is no plan to do a PIR please provide reasons below.

<p>Basis of the review: [The basis of the review could be statutory (forming part of the legislation), it could be to review existing policy or there could be a political commitment to review];</p> <p>The Department of Energy and Climate Change will look to conduct a Post Implementation Review of the CERT Extension in 2013. A number of strands will contribute to this PIR: (1) the regulator’s (Ofgem) statutory end of scheme compliance report to the Secretary of State; (2) commitment to a post-scheme independent review of the broader costs and benefits; (3) the voluntary agreement with obligated energy suppliers and the Energy Saving Trust to enable better data transfer and reporting of the geographical distribution of all measures professionally installed under CERT; and, (4) the Department’s ongoing research which informs the ‘Energy Consumption in the UK’ and ‘Energy Sector Indicators’ publications, as well further studies of in-situ performance of measures.</p>
<p>Review objective: [Is it intended as a proportionate check that regulation is operating as expected to tackle the problem of concern?; or as a wider exploration of the policy approach taken?; or as a link from policy objective to outcome?]</p> <p>The PIR will contribute to the continuing development of understanding of energy use in the household sector and the impact that the CERT Extension had on carbon emissions and energy efficiency. It will assess the degree to which targets were met, establish the actual contribution of the programme to carbon budgets (i.e. remove deadweight and uplift), analyse the approach taken to meet the targets (variation in measures installed between suppliers and compared to illustrative mix produced for the IA), establish the long term contribution of the measures to society (energy bill savings and comfort taking, etc) and identify if costs and benefits were in line with expectations. This will help inform future policy development and the tools used to assess proposed policies.</p>
<p>Review approach and rationale: [e.g. describe here the review approach (in-depth evaluation, scope review of monitoring data, scan of stakeholder views, etc.) and the rationale that made choosing such an approach]</p> <p>The review will include an evaluation of the extensive data collected throughout the scheme and the reports prepared by the regulator and an independent assessor when the scheme concludes. Feedback will be garnered from obligated energy suppliers, the regulator, installation industries and other interested parties. The review will be conducted with policy, analytical and economic support. This approach will ensure a quantitative and qualitative assessment of the CERT is prepared to satisfy the review objectives.</p>
<p>Baseline: [The current (baseline) position against which the change introduced by the legislation can be measured]</p> <p>The English, Scottish and Welsh Housing Condition Surveys, ‘Energy Consumption in the UK’ and ‘Energy Sector Indicators’ provide a baseline of the current housing stock. However, in addition to this DECC has created a National Energy Efficiency Data framework; this will help in investigating the effectiveness of installations of energy-efficiency measures by suppliers. The Data framework draws together data on energy-efficiency measures, energy consumption and other data, including information about buildings. Currently we are trialling the data to analyse the effectiveness of EECs major measures. We aim to develop the approach to enable us to evaluate the effectiveness of CERT and CERT extension measures.</p>
<p>Success criteria: [Criteria showing achievement of the policy objectives as set out in the final impact assessment; criteria for modifying or replacing the policy if it does not achieve its objectives]</p> <p>The primary aim of the CERT extension is to deliver a carbon score of 108 million lifetime tonnes of carbon dioxide emissions reductions from the domestic sector, expected to contribute around 70 million lifetime tonnes in real savings. Of this target 68% must be delivered through professionally installed insulation measures, 40% to a priority group of vulnerable households and 15% to a super priority group of the most vulnerable households.</p> <p><input type="checkbox"/> Reduced energy demand which will moderate wider environmental impacts of energy extraction,</p>

production and supply – helping contribute to meeting the UK’s security of supply concerns;

- Lower energy bills and/or higher levels of thermal comfort for millions of households who receive subsidised measures as a result of the scheme – helping Government meet social targets;
- CERT is one of a number of schemes which combine to deliver the Government’s fuel poverty strategy and help towards Government’s target that by November 2016, as far as reasonably practicable, no person in England should have to live in fuel poverty
- Local air quality improvements as a result of reduced fossil fuel use;
- in the context of the EU’s demanding renewable energy target, it also reduces the absolute investment needed to attain a given percentage of renewable energy supply
- Through promoting investment in established and innovative energy efficiency measures CERT provides further economic benefits by creating employment opportunities in manufacturing and service delivery of these technologies. As an incentive to the promotion of innovative measures, CERT attributes an additional 50% in carbon savings. In order to limit potential loss of carbon savings the uplift is only attributable within a ring fenced percentage of their total target.

Monitoring information arrangements: [Provide further details of the planned/existing arrangements in place that will allow a systematic collection systematic collection of monitoring information for future policy review]

Article 13 of the Electricity and Gas (Carbon Emissions Reduction) (Amendment) Order 2010 details the reporting requirements for the CERT Extension . Ofgem is required to provide an annual CERT performance report to the Secretary of State by 31st July each year (the CERT year runs from April to March). The Ofgem annual report disaggregates information to individual supplier progress to targets, including by measure type (insulation, lighting, heating, appliances, micro-generation & CHP and demonstration action) and consumer type (priority group/non-priority group) level. Ofgem voluntarily report the headline information on a quarterly basis. The impact of CERT in how far it has achieved its carbon and energy saving ambitions, together with the range and number of energy efficiency measures installed, will be reported by Ofgem at the end the programme in 2013. The Government will also look to commission an independent review of the broader social and environmental costs and benefits at the end of the scheme, consistent with the independent reviews of the previous supplier obligation phases. The voluntary agreement with obligated energy suppliers and the Energy Saving Trust will enable better data transfer and at least annual reporting of the geographical distribution of measures professionally installed under the CERT Extension. The Department conduct ongoing monitoring of: domestic energy consumption per person, household and unit of income; SAP (household energy efficiency) ratings; energy consumption by end use and fuel; consumption and ownership of different appliances; central heating ownership; insulation levels; energy efficiency of new cold and wet appliances; and, estimated energy savings due to insulation and efficiency improvements.

The Department also holds regular meetings with obligated energy suppliers, the regulator, installation industries and other interested parties.

Reasons for not planning a PIR: [If there is no plan to do a PIR please provide reasons here]

N/A

ANNEXES

Annex A: The total number of GB households; and the proportion which are in the Priority Group - in April 2011;

Annex B: The number of major energy saving opportunities remaining in the Able to Pay sector, the Priority Group and the Super Priority Group;

Annex C: Delivery Rates for different measures

Annex D: Central Assumptions:

- Table 1: Assumed carbon content of fuels.
- Table 2: shows annual CO₂ savings per measure for the average 3-bed semi-detached house (weighted average of all fuels and corrected for comfort)
- Table 3: shows cost savings (corrected for comfort)
- Table 4: Lifetime CO₂ saving score per measure, in the priority and non-priority groups
- Table 5: Average costs of individual measures
- Table 6: Assumed cost share per measure
- Table 7: Uplifts for Priority Group flexibility measures
- Table 8: Optimisation constraints
- Table 9: Boiler stock average efficiency

Annex E: An illustrative mix for the preferred option of a pro rata extension to CERT (108 MtCO₂) with requirements for a 15% super-PG and a 68% insulation minimum, not including CFLs

Annex F: An illustrative mix for the central scenario of a pro rata extension to CERT (108 MtCO₂) with requirements for a 15% super-PG and a 65% insulation minimum, with CFLs allowed up to 5% of the increased target

Annex G: Admin costs

Annex H: Hidden costs

Annex I: Methodology for valuing benefits

NUMBER OF HOUSEHOLDS IN GREAT BRITAIN

1. INTRODUCTION

This annex explains how the number of households in Great Britain has been estimated, including the size of the priority groups where suppliers have to focus some of their activity.

The estimated total number of households in GB has been taken from ONS projections (section 2 of this annex). For the purposes of this impact assessment, the numbers in the priority (see section 3) and non-priority groups remain as assumed for the Impact Assessment for CERT 2008 - 2011, presented to Parliament in January 2008. However, there is now a target for a Super Priority Group of householders within the existing Priority Group target, as proposed in the consultation Impact Assessment. Section 4 of this annex explains how the numbers in the Super Priority Group were estimated.

2. PROJECTED NUMBER OF GB HOUSEHOLDS

Data from the Office of National Statistics shows the following projections for the numbers of households in England, Scotland and Wales. For this analysis, DECC has selected the number of households in 2011, i.e. 26.2 million.

Table A1 : ONS data and projections for the number of households in GB

Millions

	Household numbers ¹			Household projections ²			
	1981	1991	2001	2006	2011	2016	2021
Great Britain	20.18	22.39	24.14	25.29	26.20
England	17.31	19.21	20.75	21.73	22.52	23.31	24.00
Wales	1.02	1.13	1.19	1.24	1.28	1.31	1.34
Scotland	1.85	2.05	2.19	2.31	2.41

1 Estimates for 2001 are based on mid-year population estimates which take into account 2001 census results. Estimates for 1981 onwards are subject to revision following revisions to population estimates.

2 For England and Wales figures for 2006 onwards are 1996-based projections. For Scotland figures for 2006 onwards are 2000-based projections. All projections do not take account of the 2001 census results.

Source: Office of the Deputy Prime Minister; National Assembly for Wales; Scottish Executive

3. NUMBER OF HOUSEHOLDS IN THE PRIORITY GROUP

The priority group for the CERT extension is defined in the same way as for CERT, i.e. it includes all households with a member aged 70 or over, as well as all those on the financial support described below. The analysis presented here is taken from the CERT Explanatory Memorandum of January 2008. It is believed to continue to represent a fair reflection of the actual number of households.

3.1 Benefits making up Benefits Priority Group (BPG)

According to the Electricity and Gas (Energy Efficiency Obligations) Order 2004, a household is in the priority group if they receive:

- (a) council tax benefit;
- (b) housing benefit;
- (c) income support;
- (d) an income-based jobseeker's allowance;
- (e) an attendance allowance;
- (f) a disability living allowance;
- (g) a war disablement pension which includes a mobility supplement or a constant attendance allowance;
- (h) a disablement pension which includes a constant attendance allowance;
- (i) pension credit; or
- (j) child tax credit or working tax credit with an income of no more than £15,592

The provision of all households with a member aged 70 or over (regardless of income) was added to the priority group list through the 2008 CERT Order, which adds an extra 2.4 million households to the priority group. In the remainder of this document, the term "Benefits Priority Group (BPG)" shall be used to refer to those households which qualify for the priority group because they are in receipt of benefits or tax credits, and "Priority Group (PG)" shall be used to designate the whole of the priority group, i.e. including those not on benefits or tax credits, but aged 70 or older.

Further, the CERT amendment Order July 2009 updated the income threshold to £16,040 whilst also providing for the inclusion of "an income-related employment and support allowance under the Welfare Reform Act 2007". This additional benefit criterion does not add any further households to the benefit group. For the CERT extension this will be increased to £16,190.

3.2 The Family Resources Survey

The Family Resources Survey (FRS) collects information on the incomes and circumstances of private households in the United Kingdom. It has been running since October 1992. During the 2004-05 full survey year approximately 26,000 households were interviewed in Great Britain.

In terms of the groups making up the Benefits Priority Group, the survey contains data on receipt of all applicable Priority Group benefits except disablement pension. It also does not collect whether someone in receipt of war disablement pension has a mobility supplement included in that payment. Unlike the main administrative data of the Department for Work and Pensions (DWP), the FRS survey allows household level data to be derived.

3.3 Derivation of the number of households in the Benefits Priority Group

The way the overall level of Benefits Priority Group households was derived was to start with those benefits received at individual level and then collapse the data into ultimately a household level data set.

At an individual level, this dataset contains whether someone is in receipt of income support, jobseeker's allowance, attendance allowance, disability living allowance, war disablement pension and pension credit (amongst other benefits). The assumption was made to include all war disablement pension cases, as it was not possible to separate out those that received a mobility component. The effect of this assumption was small. This data was used to derive how many households were in the Benefits Priority Group because they were receiving these benefits, which produced a figure of around 5.5 million Benefits Priority Group households.

At a household level, this dataset contains whether the household is in receipt of council tax or housing benefit. This brings an additional 1.1 million households into the Benefits Priority Group, who received council tax or housing benefit, but not income support, jobseeker's allowance, attendance allowance, disability living allowance, war disablement pension or pension credit.

Finally, at a benefit/family unit level, this dataset contains whether someone in the unit is in receipt of tax credits and the family income. This income was not adjusted to make it fully consistent with the applicable income used to derive the tax credit award, as this is not directly available in the survey and is dependent on individual circumstances. Therefore all those cases where the family income was no greater than £280 per week are included. The addition of the tax credit criteria was assessed to bring around a further 0.4 million households into the Benefits Priority Group

Combining households containing any of the above benefits or tax credits gives an overall figure of 7 million Benefits Priority Group households.

3.4 Why this will be an underestimate

Error! Reference source not found. compares overall benefit and tax credit receipt at an individual or family unit level for the FRS and DWP administrative data. Administrative data is based on larger samples or even information on all claimants, and covers information such as age and gender of claimant, duration of their spell on benefit and geographical locations of claimants. It is difficult to collapse this data down to household level, and to bring in tax credit and housing and council tax benefit data, which makes it difficult to derive the size of the Priority Group from this source alone.

Table A2: FRS and administrative data compared

Benefit	FRS data	Administrative data	Ratio of FRS to administrative data
Income Support	1,745,902	2,139,000	82%
Pension Credit	1,681,148	2,432,300	69%
Housing Benefit	3,407,021	3,932,800	87%
Council Tax Benefit	4,666,928	4,879,200	96%
Jobseeker's Allowance	561,026	739,800	76%
Attendance Allowance	977,027	1,510,400	65%
Disability Living Allowance (Care Component)	1,628,358	1,922,900	85%
Disability Living Allowance (Mobility Component)	1,681,804	2,134,500	79%
Working Tax Credit – family unit level	1,241,988	1,729,000	72%
Child Tax Credit – family unit level	3,942,431	4,166,000	95%

Source: Table M.6 of the 2004-05 FRS publication.

3.5 Addressing the undercount – scaling up the FRS statistics

Given the 7 million estimate will be an underestimate, there are various options to derive an estimate of the true Benefits Priority Group size. The first way is to scale up the estimates above based on the undercount data above.

The most straightforward way of approximating this effect is to work out the average percentage undercount on the FRS relative to administrative data, weighted by the numbers claiming the benefit. This gives an overall undercount of benefits on the FRS of around 84 per cent, so scaling up the Benefits Priority Group by this amount gives an estimated size in 2004-05 of around 8.3 million households.

This is a crude approximation, which does not incorporate any adjustments to reporting rates for household receiving multiple benefits. A possible refinement is therefore to average each of the benefit undercount data when the individual is on multiple benefits. This increases the estimated total to around 8.5 million households (Table A3).

Table A3: Adjusted and unadjusted FRS data compared

Benefit	Original FRS estimates	Adjustment for undercount
Main DWP benefits	5.5	6.8
Addition of Council Tax and Housing Benefit only recipients	1.1	1.3
Addition of tax credit only recipients	0.4	0.4
Total	7.0	8.5

3.6 Addressing the undercount – use of administrative data

An alternative way of addressing the undercount issue is to apply the profile of benefit recipients on the Family Resources Survey to administrative data. This has the advantage of using data that is not subject to the same survey variability. It also allows more timely estimates to be produced.

The Work and Pensions Longitudinal Study is based on DWP's complete claimant database. It estimates that the overall number of individuals in receipt of various combinations of Pension Credit, Income Support, Disability Living Allowance, Attendance Allowance or Jobseeker's Allowance (income-based) in May 2006 is around 7.8 million. The average number of households in receipt of these benefits over the four quarters making up the FRS survey year is 7.6 million. The increase is due to the number of benefit recipients increasing over the period for all benefits except income support.

According to the FRS, the number of households containing someone in receipt of these benefits is around 90 per cent of the number of individuals receiving these benefits. This implies around 7.0 million households in May 2006 contain someone in receipt of Pension Credit, Income Support, Disability Living Allowance, Attendance Allowance or Jobseeker's Allowance (income-based). The figure for the quarters making up the FRS survey is around 6.8 million.

According to the FRS, around a quarter of households in receipt of council tax benefit were not in receipt of any of the benefits detailed above, and there were very few households who were in receipt of only housing benefit. According to DWP data, around 5.1 million households were in receipt of Council Tax Benefit in May 2006. This means an additional 1.3 million households are in the Benefits Priority Group for that period. In terms of the period corresponding to the FRS survey, the figure was around 4.9 million, implying an additional 1.2 million households in fuel poverty. DWP's Council Tax and Housing Benefit data is based on a survey of Local Authorities and therefore is not as robust as their other benefit data.¹⁶

Finally, according to HMRC administrative data¹⁷, in April 2006, around 1.85 million individuals were in receipt of tax credits where the applicable income is less than £15,592, with 1.75 million over the FRS period. The relevant income banding published by HMRC goes from £10,000 to £20,000, and it has been assumed around half of the family units in this band have an applicable income less than £15,592. This is based on a random sample of 10 per cent of single adults (with or without children) and 20 per cent of couples. The FRS gives a much lower figure of households earning less than £15,592 on tax credits, but this might be because of the income definition differences or because of the banding approximation.

According to the FRS, around 55 per cent of tax credit recipients receiving earning less than £15,592 are not in receipt of any other benefits and the number of households containing someone in receipt of these tax credits is around 95 per cent of the number of family units receiving them. This means an additional 0.9 million households are estimated to be in the Priority Group in May 2006, and also an additional 0.9 million in the FRS period (Table A4).

Table A4: Administrative and scaled FRS data compared

Benefit	Adjusted FRS data	Administrative data (FRS period, Apr 2004 to Mar 2005)	Administrative data (May 2006)
Main DWP benefits	6.8	6.8	7.0
Addition of Council Tax and Housing Benefit only	1.3	1.2	1.3

¹⁶ See <http://www.dwp.gov.uk/asd/hbctb.asp> for details.

¹⁷ <http://www.hmrc.gov.uk/stats/personal-tax-credits/cwtc-quarterly-stats.htm>

recipients			
Addition of tax credit only recipients	0.4	0.9	0.9
Total	8.5	8.9	9.2

3.7 Extension of the Priority Group to include the elderly

Households with a member aged 70 or over, regardless of income, have been included in the priority group since the outset of CERT. BERR data suggested that this adds an extra 2.4 million households to the priority group. The overall size of the priority group is therefore taken as 8.8 million + 2.4 million =11.2 million households. In these Annexes, it has sometimes been necessary to distinguish the part of the priority group that is on benefits (the Benefits Priority Group). This is for calculation purposes only.

4. NUMBER OF HOUSEHOLDS IN THE SUPER-PRIORITY GROUP

The Super Priority Group is made up of a sub-set of the existing CERT Priority Group, hence similar methods are used to estimate the total number of eligible households in GB. Eligibility for this group is as follows:

- (1) Pension Credit
- (2) Child Tax Credit under £16,190 income threshold
- (3) Income-based Job Seeker's Allowance, Income-related Employment and Support Allowance (that includes a work-related activity or support component) or Income Support, and one of the following:
 - o pensioner premium
 - o disability or severe disability premium
 - o award of child tax credit that also includes an element for a disabled, or severely disabled, child or young person
 - o child under the age of five.

To estimate the size of the Super Priority Group, the following data sources were used:

- DWP data on the number of households currently receiving Pension Credit, and the relevant subsets of Income Support (IS) and Job Seeker's Allowance (JSA);
- HMRC data on households in receipt of Child Tax Credit (CTC) under the qualifying income threshold; and
- as the Employment and Support Allowance (ESA) was only introduced in 2008 DWP does not currently have reliable data on the number of households claiming ESA so the eligibility for cold weather payments prior to ESA, and 2007 data on eligible households were used instead.

After allowing for overlaps between the group of households who qualify for the Super Priority Group through groups (1), (2) and (3) above, the number of households in the Super Priority Group is as follows, rounded to the nearest 100,000 households:

(1) Pension Credit*	2.5m
(2) CTC under the income threshold:	1.5m
(3) Relevant subsets of JSA, IS, ESA:	1.6m

Total households in Super Priority Group 5.6m

*Note added 29 June 2010: Most recent data now shows 2.7m Pension Credit, which would increase Super Priority Group number to 5.8m households. Opportunity numbers in the Super Priority Group may be slightly higher than the 5.6 m number that was used in the calculation of opportunities for major measures in Annex B.

OPPORTUNITIES FOR INSTALLATION OF MAJOR MEASURES

1. INTRODUCTION

This annex presents the estimated remaining potential for cavity wall insulation (section 2), loft insulation (section 3), solid wall insulation (section 4), and boiler replacement (section 5) in 2011. Estimates are based on an update of the analysis in the original CERT Explanatory Memorandum. The overall approach is to use opportunity data from published surveys, subtract known installations from the policy before CERT (EEC 2), and then subtract likely activity during the first three years of CERT.

The CERT Explanatory Memorandum was based on 2004 data and used the 2004 English House Condition Survey (EHCS). In this annex, the English data has been updated using EHCS 2007. Given that no new data are available for Scotland and Wales, the 2002/2004 figures for Scotland and Wales were scaled in the same manner as the English data.

For each measure, the remaining opportunities in 2011 were then partitioned into CERT groups:

- Super-Priority Group (consists of households on pension credit, households on child tax credit and all other households eligible for cold weather payments)
- The remainder of the priority group
- Non-priority group

DWP considers that EHCS under-estimated pension credit data significantly in 2007 (when the benefit was relatively new). The data presented in this memo has been corrected for this under-estimation.

2. CAVITY INSULATION

The table below summarises our understanding of opportunities for cavity wall insulation in 2007, followed by a more detailed explanation. This is followed by our estimate for 2011 (Table B2) and then a breakdown by CERT group (Table B3).

Table B1 : EHCS cavity insulation data scaled to GB, for 2007¹⁸.

	GB
	<i>(source)</i>
Households (millions)	25.47
Houses with cavity walls (millions)	17.9
% Houses with cavity walls	70%
Cavities uninsulated (millions, uncorrected)	9.50
Cavities insulated (uncorrected)	8.39
Cavities insulated (corrected for under-reporting in EHCS)	9.230
Cavities uninsulated (millions, corrected)	8.665
Cavities uninsulated and fillable	7.848
% Cavities uninsulated	44%

Before 1983, almost all cavity walled homes were built without insulation. From 1983-2003, Building Regulations were progressively tightened, and after 2003, very few cavity dwellings are likely to have been built without insulation. Based on estimates by BRE, it is assumed that around 1.56 million cavity wall homes have been built with cavity insulation. The remaining 16.334 million were built without insulation. Of these, BRE estimates that around 5% cannot be insulated, due to various factors (timber / steel frame, high rise buildings, cavity width <

¹⁸ There is a slight discrepancy between the numbers of households from the EHCS scaled to GB (25.03 million) and the numbers of households in the ONS survey (25.47 million), and the figures presented above have been scaled to account for this.

50mm (or < 40mm for UF foam), This equates to around 817,000 homes. In practice, this figure may fall in the next few years, as CIGA and others are working on trying to draw up procedures for insulating these homes. Therefore, of the 17.895 million cavity walled homes, 15.517 were built without insulation, but were suitable for retrofit insulation, indeed many of these have been insulated through successive energy efficiency programmes.

The EHCS gives the estimate that around 9.50 million cavities in GB were filled by 2007. BRE's view is that EHCS tended to under-estimate the number of insulated cavities by about 10%. So, the number of insulated homes in 2007 would be estimated as $(17.895-9.50)*110\% = 9.230$ million, and the number of uninsulated homes which are technically suitable for insulation would be $(17.895 -9.230-0.817) = 7.848$ million.

EEC2, Fuel poverty programmes and CERT will reduce this figure:

Table B2 : Estimate of the number of technically-fillable cavities in GB in 2011

Number of fillable cavities (GB 2007)	7.848	million
Number of cavities filled during EEC2 (April 2007-March 2008 only - excludes carryover)	0.478	Million
Number of cavities likely to be filled during CERT	2	Million
Number of unfilled but fillable cavities likely to remain by April 2011	5.37	Million

Just over 300,000 cavity insulations were carried over from EEC2 to CERT, while around 1 million cavities were insulated during the first 21 months of the programme. It therefore looks reasonable to assume that the 2 million figure assumed above is approximately correct, even though the figure used in the CERT+20% Impact Assessment was 2.3 million. However, if the cavity insulation rate increases substantially, the potential number of fillable cavities in April 2011 could fall further. Note that these numbers refer to technical opportunities for installation, and take no account of non-technical issues such as unwilling householders.

Table B3 shows a breakdown of the figures of fillable, filled, and unfillable cavities by CERT group. There is potential in all CERT groups for further installation of cavity wall insulation.

In particular, the estimate of 1.20 m fillable cavities in the Super Priority Group in 2011 was found to be relatively insensitive to assumptions about where cavities are being filled in CERT 2008-11. Even if it is assumed that all social housing cavities in this group were filled by 2011, then the opportunities would only decrease to 1.15m.

Table B3 : Estimates of the number of technically-fillable cavities by CERT group in 2011

	Number of cavities (millions) by CERT group				
	Total	CERT non-PG	CERT PG	Benefits PG	Super Priority Group
2007					
No cavity	7.58	4.47	3.11	2.58	1.58
Unfillable cavity	0.82	0.45	0.37	0.10	0.06
Insulated cavity	9.23	4.49	4.74	3.64	2.34
Uninsulated but fillable cavity	7.85	4.55	3.30	2.54	1.65
Total	25.47	13.96	11.51	8.86	5.63
2011					
No cavity	7.58	4.47	3.11	2.58	1.58
Unfillable cavity	0.82	0.45	0.37	0.10	0.06
Insulated cavity	11.71	5.82	5.89	4.54	2.79
Uninsulated but fillable cavity	5.37	3.22	2.15	1.64	1.20
Total	25.47	13.96	11.51	8.86	5.63

3. LOFT INSULATION FROM < 100mm

EHCS data for 2007 indicates that around 28% of homes with lofts had < 100mm insulation. Scaling this to GB equates to around 6.341 million lofts.

It has been necessary to make several assumptions as there is not yet information available on the proportion of CERT loft insulations from < 60mm. However, in the original illustrative mix, it was assumed that 64% would be from < 60mm. It is assumed that there are relatively few lofts with insulation levels between 60 and 99mm, as loft insulation has long been supplied in 100 mm thicknesses or greater.

Data from Ofgem indicates that 72% of professional loft insulation in EEC2 was carried out in the PG. Making the assumptions that around 50% in CERT has been carried out in the PG and that no lofts with > 150mm are topped up further, it is estimated that the following depths of loft insulations in the various different groups.

Table B4 : Estimated numbers of lofts with different depths of insulation in different groups, 2007 and 2011 (millions)

	Total	CERT non-PG	CERT PG	Benefits PG	Super-Priority Group
2007					
No loft	2.52	1.12	1.40	1.26	0.80
< 100mm (including empty)	6.34	3.79	2.55	1.92	1.24
>=100mm and <=150mm	8.35	4.92	3.43	2.54	1.59
From > 150mm	8.26	4.24	4.02	3.24	2.07
Total	25.47	14.06	11.41	8.97	5.70
2011					
No loft	2.52	1.12	1.40	1.26	0.80
< 100mm (including empty)	3.32	1.74	1.58	1.19	0.76
>=100mm and <=150mm	6.65	3.77	2.88	1.95	1.34
From > 150mm	12.98	7.43	5.55	4.57	2.80
Total	25.47	12.94	10.01	7.70	4.90

If CERT has delivered more than 64% of loft insulations from < 60mm, then these estimates of opportunities for further top ups from < 100mm in 2011 will be optimistic.

4. SOLID WALL INSULATION

Data scaled from EHCS 2007 indicates that there were around 7.58 million homes with solid walls in GB. The Insulated Render & Cladding Association (INCA) estimates that around 500,000 domestic premises have had external insulation fitted in the past 40 years; however, it is not certain that these are all solid wall properties. It is expected that a further 50,000-70,000 properties will have received solid wall insulation by 2011 (through CESP and CERT).

Not all householders would accept solid wall insulation, because of aesthetic reasons, or loss of space. BRE's report "Delivering Cost Effective Carbon Saving Measures to Existing Homes" takes the conservative view that solid wall insulation could be acceptable to householders in around 50% of cases. This would equate to around 3.5 million homes in GB in 2011.

Table B5 shows estimated potential for solid wall insulation in different groups of households.

Table B5 : Estimated potential for solid wall insulation in different groups of households

	Number of houses (millions)					
	2007	Total	CERT non-PG	CERT PG	Benefits PG	Super-Priority Group
Number of solid walled properties		7.58	4.47	3.11	2.58	1.58
Estimated number already insulated		0.50	0.30	0.20	0.17	0.10
Estimated number that might be considered acceptable for solid wall insulation		3.54	2.09	1.45	1.21	0.74
	2011					
Number of solid walled properties		7.58	4.47	3.11	2.58	1.58
Estimated number already insulated		0.58	0.30	0.28	0.24	0.15
Estimated number that might be considered acceptable for solid wall insulation		3.46	2.09	1.37	1.14	0.70

5. BOILER REPLACEMENT

This section sets out the opportunities for the replacement of G-rated, now that CERT makes provision for recognition of the replacement of G-rated boilers.

The Building Regulations 2002 set a minimum standard of D rating (nominal 78% efficiency). This was increased to a B rating (86%) in 2005. Significant energy savings can be made by replacing boilers that pre-date 2002; less significant savings will be made by replacing boilers installed from 2002-2005. Unless there are significant technical improvements in boiler technology over the next few years, replacing boilers installed after around 2005 will not save energy. This section is based only on English data and has not been scaled to GB, owing to the lower proportion of houses with boilers in Scotland. It is worth noting that the EHCS sample contains very few houses without boilers and so is not quite representative of the stock.

Table B6 : Number and age of boilers in England

	Number of boilers in England only, 2006 (millions)
Total (2006)	21.729
Boilers aged 3-12 years	8.924
Boilers aged 12 years +	8.048
Proportion of boilers aged 3-12 years	41%
Proportion of boilers aged 12 years +	37%

NDH11: The Domestic Heating Boiler Energy Model: methods and assumptions 2002 estimated around 3.6 million inefficient G rated boilers in the GB housing stock in 2010. At least a pro rata proportion of these are expected to remain in the Priority Group and Super Priority Group.

Table B7 : Estimated numbers of G rated boilers in different household groups

	Estimated numbers of G rated boilers (millions)
In GB housing stock in 2010	3.6
In non-PG in 2011	1.9
In CERT PG in 2011	1.7
In super-PG (households on CTC, PC or cold weather payments) in 2011	0.88

DELIVERY RATES FOR DIFFERENT MEASURES

1. INTRODUCTION

This annex explains how delivery assumptions affect the derivation of the illustrative mix. The methodology of using an optimiser to derive an illustrative mix is explained in Annex D (note this is an *illustrative* mix, and is not necessarily predictive). Annex D also contains the central assumptions on carbon scores, the proportion of measures delivered in social housing, and the cost of measures assumed in the analysis.

2. OPPORTUNITIES FOR INSTALLATION

Delivery of measures requires both opportunities for installation as well as a supply chain to deliver them. These physical opportunities were estimated in Annex B for the remaining opportunities for the installation of:

- cavity wall insulation
- loft insulation
- solid wall insulation
- boiler replacement.

In the illustrative mix for the preferred option, delivery of the above three insulation measures alone accounts for two-thirds of lifetime carbon savings.

3. ESTIMATION OF REASONABLE DELIVERY RATES

DECC has estimated what it believes to be reasonable assumptions of delivery rates, which were entered into the optimiser to derive illustrative mixes. These assumptions are based on a combination of knowledge of the industries, consultation responses, and policy judgements.

For cavity wall insulation, 800 k per year was assumed in the base case. Although this is substantially greater than the c. 600 k delivered under the first phase of CERT, it is less than industry estimates of 880 k per year. This lower value reflects the possibility of demand restrictions (by householders) as this measure starts to move towards the 'sticky' end of the market. Even so, the 600 k rate would lead to a quarter of the estimated fillable cavities (in Annex B) being filled during CERT 11-12.

Similarly, for professional loft insulation, the industry estimates that 1500 k per year could be delivered, again assuming sufficient demand. The central scenario assumes a possible rate around 1250 k per year, which is similar to that currently delivered under CERT.

In contrast, current rates of solid wall insulation are much lower, and the challenge for the industry is growing the market while maintain quality. The industry estimates that it could grow to deliver 40 k external solid wall insulations per year by the start of the CERT extension. In the base case, it is assumed that 82 k solid wall insulations can be delivered (including internal), so remaining within industry limits.

In other cases, the constraints entered into the optimiser may not be *delivery* constraints, but simply an attempt to reflect what is reasonable relative to current delivery under CERT. Examples of this over the 21 month extension are: DIY loft insulation 800 k, insulated wallpaper 50 k, flat roof insulation 75 k, underfloor insulation 25 k and solar thermal 20 k.

4. SCENARIOS TO EXPLORE SENSITIVITY TO DIFFERENT DELIVERY RATES

In Annex G, the sensitivity of costs and benefits to different rates of delivery is explored, while the effects of policy options are explored in Annex H. In each case, changes relative to the central scenario in Annex F are explored. In general, the rationale for many of these analyses is to explore risks to delivery of the CERT policy as a whole. If, for example, the industry was able to deliver even greater rates of cavity wall insulation than in the base case, then this would not be a concern to DECC.

CENTRAL ASSUMPTIONS

1. INTRODUCTION

This annex presents the central assumptions for the derivation of illustrative mixes.

CERT is developed on the best available evidence. The lifetime benefits for certain measures differ here to those presented in the Assessment of Impacts for the Warm Homes, Greener Homes strategy published in March 2010. This strategy suggested that improved workmanship and innovation (of both standards and installation), backed by new accreditation standards, would ensure that the savings from measures delivered beyond the CERT extension will last longer than technologies current lifetimes. This work is focused on the post-2012 world and as such has not been adopted in the assumptions for the CERT extension which continue to reflect measures' lifetimes as those on which the scores were set.

2. CARBON CONTENT OF FUELS

Table D1 shows the assumed carbon contents of fuels, **for the purposes of establishing carbon saving scores.**

Table D1 : Assumed carbon content of fuels for the purposes of establishing carbon scores for suppliers

Fuel	Assumed CO ₂ content, kgCO ₂ /kWh
Electricity	0.431
Gas	0.190
Oil	0.249
Coal	0.300
Biomass	0.025

Note that these figures take account of emissions associated with combustion only, not with extraction, refining or transport. Additionally, for the purposes of establishing the fuel savings and benefits of the programme, the carbon factor assumed for electricity decreases after 2031, in line with guidance from the Inter-Governmental Analysts' Group.

Table D2 shows the assumed carbon content of fuels used for establishing the real carbon savings from the programme. This has no effect on the scores attributed to suppliers for electricity saving measures still operational after this date.

Table D2 : Assumed carbon content of fuels for the purposes of establishing real carbon savings from the policy

	Carbon content of fuel, kgCO ₂ /kWh				
	Electricity	Gas	Oil	Coal	Biomass
2011	0.4300	0.1836	0.2653	0.2958	0.0249
2012	0.4300	0.1899	0.2653	0.2958	0.0249
2013	0.4300	0.1899	0.2653	0.2958	0.0249
2014	0.4300	0.1899	0.2653	0.2958	0.0249
2015	0.4300	0.1899	0.2653	0.2958	0.0249
2016	0.4300	0.1899	0.2653	0.2958	0.0249
2017	0.4300	0.1899	0.2653	0.2958	0.0249
2018	0.4300	0.1899	0.2653	0.2958	0.0249
2019	0.4300	0.1899	0.2653	0.2958	0.0249
2020	0.4300	0.1899	0.2653	0.2958	0.0249
2021	0.4300	0.1899	0.2653	0.2958	0.0249
2022	0.4300	0.1899	0.2653	0.2958	0.0249
2023	0.4300	0.1899	0.2653	0.2958	0.0249
2024	0.4300	0.1899	0.2653	0.2958	0.0249
2025	0.4300	0.1899	0.2653	0.2958	0.0249

	Carbon content of fuel, kgCO ₂ /kWh				
	Electricity	Gas	Oil	Coal	Biomass
2026	0.4300	0.1899	0.2653	0.2958	0.0249
2027	0.4300	0.1899	0.2653	0.2958	0.0249
2028	0.4300	0.1899	0.2653	0.2958	0.0249
2029	0.4300	0.1899	0.2653	0.2958	0.0249
2030	0.4300	0.1899	0.2653	0.2958	0.0249
2031	0.3907	0.1899	0.2653	0.2958	0.0249
2032	0.3513	0.1899	0.2653	0.2958	0.0249
2033	0.3120	0.1899	0.2653	0.2958	0.0249
2034	0.2726	0.1899	0.2653	0.2958	0.0249
2035	0.2333	0.1899	0.2653	0.2958	0.0249
2036	0.1939	0.1899	0.2653	0.2958	0.0249
2037	0.1546	0.1899	0.2653	0.2958	0.0249
2038	0.1152	0.1899	0.2653	0.2958	0.0249
2039	0.0759	0.1899	0.2653	0.2958	0.0249
2040	0.0365	0.1899	0.2653	0.2958	0.0249
2041	0.0351	0.1899	0.2653	0.2958	0.0249
2042	0.0336	0.1899	0.2653	0.2958	0.0249
2043	0.0322	0.1899	0.2653	0.2958	0.0249
2044	0.0307	0.1899	0.2653	0.2958	0.0249
2045	0.0293	0.1899	0.2653	0.2958	0.0249
2046	0.0280	0.1899	0.2653	0.2958	0.0249
2047	0.0266	0.1899	0.2653	0.2958	0.0249
2048	0.0253	0.1899	0.2653	0.2958	0.0249
2049	0.0239	0.1899	0.2653	0.2958	0.0249
2050	0.0226	0.1899	0.2653	0.2958	0.0249
2051	0.0226	0.1899	0.2653	0.2958	0.0249
2052	0.0226	0.1899	0.2653	0.2958	0.0249
2053	0.0226	0.1899	0.2653	0.2958	0.0249
2054	0.0226	0.1899	0.2653	0.2958	0.0249
2055	0.0226	0.1899	0.2653	0.2958	0.0249
2056	0.0226	0.1899	0.2653	0.2958	0.0249
2057	0.0226	0.1899	0.2653	0.2958	0.0249
2058	0.0226	0.1899	0.2653	0.2958	0.0249
2059	0.0226	0.1899	0.2653	0.2958	0.0249
2060	0.0226	0.1899	0.2653	0.2958	0.0249
2061	0.0226	0.1899	0.2653	0.2958	0.0249

3. CARBON SAVING SCORES

Annual energy savings from heating and insulation measures were estimated using BREDEM12¹⁹. Savings for other measures were calculated by various methods, based on their likely effect on the energy consumption of a 'base case' dwelling which is assumed to be a three bedroom semi detached house. Delivered energy savings were multiplied by fuel carbon dioxide intensity and fuel cost factors, to derive annual carbon and fuel cost savings respectively. A lifetime for each measure was used to calculate lifetime carbon dioxide savings. The resulting values form the basis of the 'score' which Ofgem would attribute to each measure, to be credited toward the target for each of the energy supply companies under the CERT extension.

Table D3 shows annual CO₂ savings (corrected for comfort) and lifetimes in years. Table D4 shows cost savings (corrected for comfort and calculated using 3rd quarter 2009 fuel prices). Table 5 shows the lifetime CO₂ saving score per measure, in the priority and non-priority groups.

The scores for standard, well-established measures have been subject to consultation and their final scores were published in March 2007²⁰ and applied under CERT. At that time it was thought that loft insulations would be carried out in roughly these proportions:

¹⁹ BRE Domestic Energy Model <http://products.ih.com/cis/Doc.aspx?AuthCode=&DocNum=83783>

²⁰ www.defra.gov.uk/environment/energy/eec/pdf/illustrativemix-final2007.pdf

From empty 20%
 From 50 mm 46%
 From 100 mm 36%.

The score for insulation from < 60mm is made up from the first two (i.e. 20% * score from empty + 46%*score from 50mm)/(20%+46%). But, by 2011, it is expected that there will be virtually no empty lofts, which will decrease savings from insulation from <60 mm. However, the score will not change, largely because of Ofgem's requirements for continuity. Instead, the real carbon savings (and real fuel savings, from which the economic and bills impacts are calculated from) have been adjusted for this change in our analyses for this Impact Assessment.

The Government has consulted on modifying two of the scores, as described below:

- The score awarded for LED's under the scheme is based on the assumption that they will replace a mixture of halogens. For the purposes of the illustrative mix, a lifetime of 15,000 hours is assumed; this corresponds to the minimum requirements for ESR accreditation. However, since LED's are a relatively innovative technology, Ofgem will continue to award scores by bulb.
- The lifetime carbon score for saver plugs remains unchanged. However, for the purposes of establishing the true savings of the programme, a lifetime of 2.5 years is assumed, on the grounds that most purchasers will have replaced their old IT equipment with equipment that complies with the Standby Directive at some stage during the next 5 years.

Given the market penetration of various products achieved by previous phases of CERT, some products are no longer deemed eligible for support. This includes A rated cold and wet appliances (meaning A++ rated appliances are still acceptable) and iDTVs.

The tables include two additional measures: underfloor insulation and flat roof insulation. The flat roof insulation savings are considerably higher than those estimated for loft insulation where the original depth is < 60mm. This is for two reasons:

Flat roof insulation is an integral part of the building and needs to be fitted by competent builders. This means that it should be easier to ensure a good quality even insulation of the roof, without gaps or compression of insulation, and therefore DECC considers that it is not necessary to apply an underperformance factor (as applied for cavity and loft insulation).

It is assumed that where flat roof insulation is applied, the original roof was completely uninsulated. This is not the assumption for standard insulation, where most houses with < 60mm of insulation in fact have around 50mm (based on EHCS data and insulations to date under CERT).

Table D3: Annual CO₂ savings per measure (corrected for comfort) and lifetimes in years

	Carbon saving measure	Annual savings corrected for comfort kgCO₂/year (Note – the comfort factor used is that appropriate for the PG and NPG, but not the higher value used for the SPG).
	Cavity wall insulation	634.36
	Underfloor insulation	263.4
	Loft insulation professional (from < 60mm)	419.92
	Loft insulation professional (from > 60mm)	123.92
	Loft insulation (DIY)	268.66
	Flat roof insulation	1241.46
	SWI external	2,210.16
	SWI internal	2,089.76
	Insulated wallpaper	718.69
	Tank insulation - top-up	197.64
	Glazing E to C rated	82.12
	Draught proofing	132.81
HEATING	A/B rated boilers (exceptions)	356.45
	Fuel Switching	4,060.92
	Heating controls - upgrade with boiler	35.09
	Heating controls – extra	282.41

	Carbon saving measure	Annual savings corrected for comfort kgCO ₂ /year (Note – the comfort factor used is that appropriate for the PG and NPG, but not the higher value used for the SPG).
	Wood pellet stoves (secondary)	601.31
	Log burning stoves	215.98
	Wood pellet boilers (primary)	5,191.77
	Solar Water Heater (4m ²)	325.78
	Ground source heat pumps	2,599.50
	Air source heat pumps	3,074.53
	Wood chip CHP	3,438.12
	Community GSHP	545.61
	Community heating to wood chip	3,791.73
	Replacement of G rated boilers	982.96
LIGHTING	Dimmable CFLs – retail	No longer eligible
	Efficient halogens	No longer eligible
	LED's	6.90
APPLIANCES	A rated Cold Appliances	No longer eligible
	A rated Wet Appliances	No longer eligible
	IDTVs	No longer eligible
	PC mains panels	31.58
	Energy saving kettles	8.42
	LNBs	6.01
	A++ cold appliances	48.00
	A++ wet appliances	9.00
MICROGEN	Photovoltaic panels (2.5 kWp)	911.21
	micro Wind (1 kWp, 10% LF)	377.67
	micro Hydro (0.7kWp, 50% LF)	1,321.84
	Mini-wind 5 kW, 20% LF	3,776.69
	mCHP (80% heat, 15% elec)	210.12
OTHER	RTD's	66.40
	Advice only	89.00

Note 1: The savings for fuel switching, ground and air source heat pumps depend on the fuel assumed to be displaced. **For the purposes of the illustrative mix only**, the assumptions are:

Fuel switching: 10% electric storage heating, 20% solid fuel central heating, 20% gas non-central heating, 20% electric non-central heating and 30% solid fuel non-central heating.

Ground source heat pumps : 20% from gas central heating, 40% from oil central heating, 40% from electric storage heating.

Air source heat pumps: 80% from electric storage heating, 20% from electric non-storage heating.

For these measures, Ofgem will award scores on a case by case basis depending on the fuel displaced.

Note 2: A geometric factor is applied as appropriate for each measure. The corrected saving = (saving of a 3-bed semi) x (floor area factor)^(rate of variation with dwelling area). A value of 1 for the rate of variation means the saving is linearly proportional to floor area; a value of 0 means it is independent of floor area. Note that some of the electric/electronic apparatus shows a variation with floor area. This is because of the heat replacement effect, whereby lower energy use by the appliance means that the heating system will use more fuel to warm the room to the same temperature.

NB The difference in dwelling size for PG and non-PG homes compared with the average 3-bed semi-detached house is taken account of. Based on EHCS data for floor area, assumed here to be representative of the whole of GB, dwellings of households on benefits are 15% smaller, while those of other householders are 7% larger than the average. Making an adjustment for the fact that the PG has been expanded to include all households for which at least one member is aged 70 or over, an average PG dwelling is assumed to be 12.5% smaller, and an average non-PG dwelling to be 7.8% larger than the average, i.e. the two groups have floor area factors of 87.5% and 107.8% respectively.

Table D4 : Annual cost savings per measure (corrected for comfort)

	Carbon saving measure	Annual cost saving to householder, after comfort taking, £/year	
		PG	non-PG
INSULATION	Cavity insulation	£115.22	£127.87
	Underfloor insulation	£46.86	£57.70
	Loft insulation professional (from < 60mm)	£71.28	£87.78
	Loft insulation professional (from > 60mm)	£21.03	£25.90
	Loft insulation (DIY)	£45.62	£56.18
	Flat roof insulation	£225.36	£277.53
	SWI external	£401.46	£445.51
	SWI external (social sector)	£401.46	£445.51
	SWI internal	£379.56	£421.21
	SWI internal (social sector)	£379.56	£421.21
	Insulated wallpaper	£138.67	£153.89
	Tank insulation - top-up	£37.84	£37.84
	Glazing E to C rated	£14.71	£16.67
	Draughtproofing	£22.56	£27.79
	HEATING	A/B rated boilers (exceptions)	£65.45
Fuel Switching		£600.22	£680.09
Heating controls - upgrade with boiler		£6.26	£7.25
Heating controls – extra		£50.48	£58.40
Wood pellet stoves (secondary)		-£9.32	-£10.56
Log burning stoves		£0.82	£0.93
Wood pellet boilers (primary)		£152.33	£172.60
Solar Water Heater (4m ²)		£64.38	£64.38
Ground source heat pumps		£321.14	£363.87
Air source heat pumps		£466.76	£528.88
Wood chip CHP		£477.80	£530.23
Community GSHP		-£1.29	-£1.44
Community heating to wood chip		£182.37	£202.38
Replacement of G rated boilers		£181.52	£205.68
LIGHTING	CFLs – retail	No longer eligible	
	Efficient halogens	No longer eligible	
	LED's	£2.40	£2.40
APPLIANCES	A rated Cold Appliances	No longer eligible	
	A rated Wet Appliances		
	IDTVs		
	PC mains panels	£10.59	£11.15
	Energy saving kettles	£2.82	£2.97
	LNBs	£2.08	£2.08
	A++ cold appliances	£15.00	£15.00
	A++ wet appliances	£2.00	£2.00
MICROGEN	Photovoltaic panels (2.5 kWp)	£274.10	£274.10
	micro Wind (1 kWp, 10% LF)	£113.61	£113.61
	micro Hydro (0.7kWp, 50% LF)	£397.63	£397.63
	Mini-wind 5 kW, 20% LF	£1,151.14	£1,151.14
	mCHP (80% heat, 15% elec)	£114.35	£129.57
OTHER	RTD's	£15.91	£15.91

		Annual cost saving to householder, after comfort taking, £/year	
	Carbon saving measure	PG	non-PG
	Advice only	£18.84	£18.84

Table D5 Lifetime CO₂ saving score per measure, in the priority and non-priority groups.

	Carbon saving measure	Lifetime (years)	Lifetime CO ₂ savings per measure tCO ₂ (lifetime)	
			PG	Non-PG
INSULATION	Cavity wall insulation	40	23.74	26.34
	Underfloor insulation	40	9.22	11.36
	Loft insulation professional (from < 60mm)	40	14.70	18.10
	Loft insulation professional (from > 60mm)	40	4.34	5.34
	Loft insulation (DIY)	40	9.40	11.58
	Flat roof insulation	40	43.44	53.49
	SWI external	30	62.02	68.83
	SWI internal	30	58.64	65.08
	Insulated wallpaper	30	20.17	22.38
	Tank insulation - top-up	10	1.98	1.98
	Glazing E to C rated	20	1.52	1.72
	Draughtproofing	20	2.32	2.86
HEATING	A/B rated boilers (exceptions)	12	3.95	4.47
	Fuel Switching	20	74.97	84.94
	Heating controls - upgrade with boiler	12	0.38	0.44
	Heating controls – extra	12	3.09	3.57
	Wood pellet stoves (secondary)	20	11.10	12.58
	Log burning stoves	20	3.99	4.52
	Wood pellet boilers (primary)	20	95.84	108.60
	Solar Water Heater (4m ²)	25	8.14	8.14
	Ground source heat pumps	40	95.97	108.75
	Air source heat pumps ²¹	18	51.08	57.88
	Wood chip CHP	30	96.48	107.07
	Community GSHP	40	20.42	22.66
	Community heating to wood chip	30	106.41	118.08
	Replacement of G rated boilers	6	5.44	6.17
LIGHTING	Dimmable CFLs – retail	No longer eligible	No longer eligible	No longer eligible
	Efficient halogens		No longer eligible	
	LED's	19.5	0.15	0.15
APPLIANCES	A rated Cold Appliances		No longer eligible	
	A rated Wet Appliances		No longer eligible	
	IDTVs		No longer eligible	
	PC mains panels	5	0.15	0.16
	Energy saving kettles	5	0.04	0.04
	LNBs	7	0.04	0.04
	A++ cold appliances	12	0.58	0.58
A++ wet appliances	12	0.11	0.11	
MICROGEN	Photovoltaic panels (2.5 kWp)	25	22.78	22.78
	micro Wind (1 kWp, 10% LF)	10	3.78	3.78
	micro Hydro (0.7kWp, 50% LF)	20	26.44	26.44
	Mini-wind 5 kW, 20% LF	22.5	84.98	84.98
	mCHP (80% heat, 15% elec)	15	2.91	3.30
OTHER	RTD's	15	0.996	0.996
	Advice only	7.5	0.6675	0.6675

²¹ Note – the scores for fuel switching, ground & air source heat pumps depend on the fuel displaced. For the purposes of the illustrative mix, DECC has made some assumptions as to the proportions of different fuels displaced. However, Ofgem will apply a separate score for each of these measures on a case by case basis depending on the fuel displaced.

4. ASSUMED PROPORTION OF MEASURES IN THE SOCIAL HOUSING STOCK

A proportion of measures are expected to be undertaken in social housing. The optimiser does not specify an overall proportion of measures expected in social housing, but does specify the proportion of **PG** measures expected in social housing.

Table D6 shows the expected proportion of **PG** measures that are expected to be in social housing.

On average, it is expected that around 75% of residents in social housing are in the CERT PG. However, social housing authorities install the same measures for all residents, whether in the CERT PG or not. It is therefore assumed that around 75% of measures installed in social housing are installed in PG homes, and 25% are installed in non-PG homes. The exception to this rule is assumed to be measures eligible for the Renewable Heat Incentive, i.e. heat pumps and solar thermal. It is proposed that these measures are only eligible for CERT support if installed in PG homes. The third and fourth columns of Table 6 show the proportion of social housing measures in the PG and non-PG respectively.

Table D6 : Assumed proportion of measures in the social housing stock, and assumed proportion of social housing measures in the PG and non-PG respectively. Solar water heaters and heat pumps are only eligible for CERT support in the Super Priority Group.

Carbon saving measure	Proportion of PG measures in social housing	Proportion of social housing measures in PG and non-PG respectively	
		PG	non-PG
Cavity wall insulation	20%	75%	25%
Underfloor insulation	20%	75%	25%
Loft insulation professional (from < 60mm)	20%	75%	25%
Loft insulation professional (from > 60mm)	20%	75%	25%
Loft insulation (DIY)	0%	75%	25%
Flat roof insulation	20%	75%	25%
SWI external (private sector)	0%	75%	25%
SWI external (social sector)	100%	75%	25%
SWI internal (private sector)	0%	75%	25%
SWI internal (social sector)	100%	75%	25%
Insulated wallpaper	100%	75%	25%
Tank insulation - top-up	0%	75%	25%
Glazing E to C rated	100%	75%	25%
Draughtproofing	0%	75%	25%
A/B rated boilers (exceptions)	50%	75%	25%
Fuel Switching	50%	75%	25%
Heating controls - upgrade with boiler	20%	75%	25%
Heating controls – extra	20%	75%	25%
Wood pellet stoves (secondary)	100%	75%	25%
Log burning stoves	100%	75%	25%
Wood pellet boilers (primary)	100%	75%	25%
Solar Water Heater (4m ²)	75%	100%	0%
Ground source heat pumps	75%	100%	0%
Air source heat pumps	75%	100%	0%
Wood chip CHP	100%	75%	25%
Community GSHP	100%	75%	25%
Community heating to wood chip	100%	75%	25%
Replacement of G rated boilers	50%	75%	25%
Dimmable CFLs - retail	No longer eligible		
CFLs - direct	No longer eligible		
Efficient halogens			
LED's	0%	75%	25%
LED's (social sector)	100%	75%	25%
Appliances - Cold	No longer eligible		
Appliances - Wet			

Carbon saving measure	Proportion of PG measures in social housing	Proportion of social housing measures in PG and non-PG respectively	
		PG	non-PG
Appliances - iDTVs			
PC mains panels	0%	75%	25%
Energy saving kettles	0%	75%	25%
LNBS	0%	75%	25%
A++ cold appliances	90%	75%	25%
A++ wet appliances	90%	75%	25%
Photovoltaic panels (2.5 kWp)	100%	75%	25%
micro Wind (1 kWp, 10% LF)	100%	75%	25%
micro Hydro (0.7kWp, 50% LF)	100%	75%	25%
Mini-wind 5 kW, 20% LF	100%	75%	25%
mCHP (80% heat, 15% elec)	100%	75%	25%
RTD's	50%	75%	25%
Advice only	50%	75%	25%

5. ASSUMED COSTS OF MEASURES

Table D7 shows the assumed costs of measures, including administration costs. Table D8 shows the proportion of measures expected to be installed in the social housing stock.

Table D7 : Assumed costs of measures

	Carbon saving measure	Basic installation cost (£)			Administration cost		Total cost	
		All	PG	non-PG	PG	non-PG	PG	non-PG
INSULATION	Cavity wall insulation	£380	£356	£395	£87	£71	£443	£466
	Underfloor insulation	£800	£750	£831	£141	£113	£891	£944
	Loft insulation professional (from < 60mm)	£286	£268	£297	£70	£57	£338	£355
	Loft insulation professional (from > 60mm)	£286	£268	£297	£70	£57	£338	£355
	Loft insulation (DIY)	£120	£107	£128	£32	£28	£138	£157
	Flat roof insulation	£3,000	£2,813	£3,116	£243	£189	£3,056	£3,306
	SWI external	£12,600	£11,813	£13,089	£304	£232	£12,117	£13,321
	SWI external (social sector)	£6,300	£5,906	£6,544	£282	£217	£6,188	£6,761
	SWI internal	£11,068	£10,376	£11,497	£301	£230	£10,677	£11,727
	SWI internal (social sector)	£3,900	£3,656	£4,051	£259	£201	£3,915	£4,252
	Insulated wallpaper	£3,700	£3,469	£3,843	£256	£198	£3,725	£4,042
	Tank insulation - top-up	£14	£14	£14	£4	£3	£18	£17
	Glazing E to C rated	£212	£199	£220	£55	£45	£253	£265
	Draughtproofing	£101	£94	£105	£28	£24	£123	£128
HEATING	A/B rated boilers (exceptions)	£212	£209	£214	£57	£44	£266	£258
	Fuel Switching	£2,014	£1,888	£2,092	£216	£169	£2,104	£2,261
	Heating controls - upgrade with boiler	£90	£84	£94	£26	£21	£110	£115
	Heating controls - extra	£148	£139	£154	£40	£33	£179	£188
	Wood pellet stoves (secondary)	£1,417	£1,399	£1,428	£192	£147	£1,592	£1,575
	Log burning stoves	£1,000	£988	£1,008	£164	£125	£1,151	£1,133

	Carbon saving measure	Basic installation cost (£)			Administratio n cost		Total cost	
		All	PG	non-PG	PG	non-PG	PG	non-PG
	Wood pellet boilers (primary)	£7,200	£7,110	£7,256	£289	£220	£7,399	£7,476
	Solar Water Heater (4m ²)	£3,500	£3,500	£3,500	£257	£194	£3,757	£3,694
	Ground source heat pumps	£11,360	£10,295	£12,021	£301	£231	£10,596	£12,252
	Air source heat pumps	£5,844	£5,771	£5,889	£281	£214	£6,052	£6,103
	Wood chip CHP	£9,281	£9,165	£9,353	£298	£226	£9,463	£9,579
	Community GSHP	£4,250	£4,197	£4,283	£267	£203	£4,463	£4,486
	Community heating to wood chip	£350	£346	£353	£85	£65	£430	£418
	Replacement of G rated boilers	£2,500	£2,500	£2,500	£236	£179	£2,736	£2,679
LIGHTING	Dimmable CFLs - retail	No longer eligible						
	Efficient halogens	No longer eligible						
	LED's	£8	£8	£8	£3	£2	£11	£10
APPLIANCES	Appliances - Cold	No longer eligible						
	Appliances - Wet	No longer eligible						
	Appliances - iDTVs	No longer eligible						
	PC mains panels	£15	£15	£15	£5	£4	£20	£19
	Energy saving kettles	£17	£17	£17	£6	£4	£23	£21
	LNBS	£10	£10	£10	£3	£2	£13	£12
	A++ cold appliances	£50	£50	£50	£16	£12	£66	£62
	A++ wet appliances	£50	£50	£50	£16	£12	£66	£62
MICROGEN	Photovoltaic panels (2.5 kWp)	£6,338	£6,338	£6,338	£285	£216	£6,623	£6,553
	micro Wind (1 kWp, 10% LF)	£3,200	£3,200	£3,200	£251	£190	£3,451	£3,390
	micro Hydro (0.7kWp, 50% LF)	£1,890	£1,890	£1,890	£216	£163	£2,106	£2,053
	Mini-wind 5 kW, 20% LF	£21,000	£21,000	£21,000	£315	£239	£21,315	£21,239
	mCHP (80% heat, 15% elec)	£600	£563	£623	£119	£96	£681	£719
OTHER	RTD's	£20	£20	£20	£6	£5	£26	£25
	Advice only	£35	£35	£35	£11	£8	£46	£43

Carbon saving measure	Social housing						Non-social housing					
	SHP cost proportion		Supplier cost proportion		Householder cost proportion		SHP cost proportion		Supplier cost proportion		Householder cost proportion	
	PG	non-PG	PG	non-PG	PG	non-PG	PG	non-PG	PG	non-PG	PG	non-PG
Cavity wall insulation	50%	50%	50.0%	50.0%	0.0%	0.0%	0%	0%	100.0%	50.0%	0.0%	50.0%
Underfloor insulation	50%	50%	50.0%	50.0%	0.0%	0.0%	0%	0%	100.0%	50.0%	0.0%	50.0%
Loft insulation professional (from < 60mm)	50%	50%	50.0%	50.0%	0.0%	0.0%	0%	0%	100.0%	50.0%	0.0%	50.0%
Loft insulation professional (from > 60mm)	50%	50%	50.0%	50.0%	0.0%	0.0%	0%	0%	100.0%	50.0%	0.0%	50.0%
Loft insulation (DIY)	50%	50%	50.0%	50.0%	0.0%	0.0%	0%	0%	75.0%	75.0%	25.0%	25.0%
Flat roof insulation	50%	50%	50.0%	50.0%	0.0%	0.0%	0%	0%	100.0%	20.0%	0.0%	80.0%
SWI external	50%	50%	50.0%	50.0%	0.0%	0.0%	0%	0%	100.0%	20.0%	0.0%	80.0%
SWI external (social sector)	50%	50%	50.0%	50.0%	0.0%	0.0%	0%	0%	100.0%	20.0%	0.0%	80.0%
SWI internal	50%	50%	50.0%	50.0%	0.0%	0.0%	0%	0%	100.0%	20.0%	0.0%	80.0%
SWI internal (social sector)	50%	50%	50.0%	50.0%	0.0%	0.0%	0%	0%	100.0%	20.0%	0.0%	80.0%
Insulated wallpaper	50%	50%	50.0%	50.0%	0.0%	0.0%	0%	0%	100.0%	20.0%	0.0%	80.0%
Tank insulation - top-up	50%	50%	50.0%	50.0%	0.0%	0.0%	0%	0%	100.0%	20.0%	0.0%	80.0%
Glazing E to C rated	50%	50%	50.0%	50.0%	0.0%	0.0%	0%	0%	100.0%	20.0%	0.0%	80.0%
Draughtproofing	50%	50%	50.0%	50.0%	0.0%	0.0%	0%	0%	100.0%	20.0%	0.0%	80.0%
A/B rated boilers (exceptions)	50%	50%	50.0%	50.0%	0.0%	0.0%	0%	0%	100.0%	50.0%	0.0%	50.0%
Fuel Switching	50%	50%	50.0%	50.0%	0.0%	0.0%	0%	0%	100.0%	50.0%	0.0%	50.0%
Heating controls - upgrade with boiler	50%	50%	50.0%	50.0%	0.0%	0.0%	0%	0%	100.0%	50.0%	0.0%	50.0%
Heating controls - extra	50%	50%	50.0%	50.0%	0.0%	0.0%	0%	0%	100.0%	50.0%	0.0%	50.0%
Wood pellet stoves (secondary)	50%	50%	50.0%	50.0%	0.0%	0.0%	0%	0%	100.0%	20.0%	0.0%	80.0%
Log burning stoves	50%	50%	50.0%	50.0%	0.0%	0.0%	0%	0%	100.0%	20.0%	0.0%	80.0%
Wood pellet boilers (primary)	50%	50%	50.0%	50.0%	0.0%	0.0%	0%	0%	100.0%	20.0%	0.0%	80.0%
Solar Water Heater (4m ²)	50%	50%	50.0%	50.0%	0.0%	0.0%	0%	0%	100.0%	20.0%	0.0%	80.0%
Ground source heat pumps	50%	50%	50.0%	50.0%	0.0%	0.0%	0%	0%	100.0%	20.0%	0.0%	80.0%
Air source heat pumps	50%	50%	50.0%	50.0%	0.0%	0.0%	0%	0%	100.0%	20.0%	0.0%	80.0%
Wood chip CHP	50%	50%	50.0%	50.0%	0.0%	0.0%	0%	0%	100.0%	50.0%	0.0%	50.0%
Community GSHP	50%	50%	50.0%	50.0%	0.0%	0.0%	0%	0%	100.0%	50.0%	0.0%	50.0%
Community heating to wood chip	50%	50%	50.0%	50.0%	0.0%	0.0%	0%	0%	100.0%	50.0%	0.0%	50.0%

Replacement of G rated boilers	50%	50%	50.0 %	50.0 %	0.0 %	0.0%	0%	0%	100.0%	20.0 %	0.0%	80.0%
CFLs - retail	0%	0%	100.0 %	100.0 %	0.0 %	0.0%	0%	0%	50.0 %	50.0 %	50.0 %	50.0%
Efficient halogens	0%	0%	100.0 %	100.0 %	0.0 %	0.0%	0%	0%	20.0 %	20.0 %	80.0 %	80.0%
LED's	0%	0%	100.0 %	100.0 %	0.0 %	0.0%	0%	0%	50.0 %	50.0 %	50.0 %	50.0%
Appliances - Cold	50%	50%	50.0 %	50.0 %	0.0 %	0.0%	0%	0%	20.0 %	20.0 %	80.0 %	80.0%
Appliances - Wet	50%	50%	50.0 %	50.0 %	0.0 %	0.0%	0%	0%	20.0 %	20.0 %	80.0 %	80.0%
Appliances - iDTVs	0%	0%	100.0 %	100.0 %	0.0 %	0.0%	0%	0%	50.0 %	50.0 %	50.0 %	50.0%
PC mains panels	0%	0%	100.0 %	100.0 %	0.0 %	0.0%	0%	0%	20.0 %	20.0 %	80.0 %	80.0%
Energy saving kettles	0%	0%	100.0 %	100.0 %	0.0 %	0.0%	0%	0%	20.0 %	20.0 %	80.0 %	80.0%
LNBS	0%	0%	100.0 %	100.0 %	0.0 %	0.0%	0%	0%	20.0 %	20.0 %	80.0 %	80.0%
A++ cold appliances	50%	50%	50.0 %	50.0 %	0.0 %	0.0%	0%	0%	20.0 %	20.0 %	80.0 %	80.0%
A++ wet appliances	50%	50%	50.0 %	50.0 %	0.0 %	0.0%	0%	0%	20.0 %	20.0 %	80.0 %	80.0%
Photovoltaic panels (2.5 kWp)	50%	50%	50.0 %	50.0 %	0.0 %	0.0%	0%	0%	100.0%	20.0 %	0.0%	80.0%
micro Wind (1 kWp, 10% LF)	50%	50%	50.0 %	50.0 %	0.0 %	0.0%	0%	0%	100.0%	20.0 %	0.0%	80.0%
micro Hydro (0.7kWp, 50% LF)	50%	50%	50.0 %	50.0 %	0.0 %	0.0%	0%	0%	100.0%	20.0 %	0.0%	80.0%
Mini-wind 5 kW, 20% LF	50%	50%	50.0 %	50.0 %	0.0 %	0.0%	0%	0%	100.0%	20.0 %	0.0%	80.0%
mCHP (80% heat, 15% elec)	50%	50%	50.0 %	50.0 %	0.0 %	0.0%	0%	0%	100.0%	20.0 %	0.0%	80.0%
RTD's	50%	50%	50.0 %	50.0 %	0.0 %	0.0%	0%	0%	100.0%	20.0 %	0.0%	80.0%
Advice only	50%	50%	50.0 %	50.0 %	0.0 %	0.0%	0%	0%	100.0%	20.0 %	0.0%	80.0%

6. PRIORITY GROUP FLEXIBILITY MEASURES

The priority group flexibility option was developed to allow suppliers flexibility if they incurred very high costs in the priority group.

Under the flexibility option, suppliers can reduce their priority group target, provided that the money saved is invested in certain specific measures directed at **households in private sector housing and on benefits or in receipt of pension or tax credits**. These measures are:

- Solid wall insulation (in houses either on or off the gas grid).

The Priority Group flexibility option uplifts remain the same as for CERT 2008-11, see Table 9, below.

Table D9 : Priority Group Flexibility Option uplifts

Measure	Rounded equivalent uplift
Solid wall insulation (internal)	95%
Solid wall insulation (external)	175%

7. METHODOLOGY FOR DERIVING ILLUSTRATIVE MIXES

Overview of Illustrative Mix

The illustrative mix is a tool which allows Government to develop a CERT framework to be ambitious but, at the same time, to be reasonable and achievable. It is also used to gauge the likely impact on a number of key variables, particularly overall costs and benefits.

The data and assumptions underlying the draft illustrative mix for the Carbon Emission Reduction Target extension are informed by information provided by energy suppliers, by representatives of the industries concerned, and by experts, including the Energy Saving Trust (EST) and the Building Research Establishment (BRE) as well as experience from previous phases.

It must be emphasised that it is purely illustrative for analysis purposes and does not necessarily reflect the way in which suppliers might choose to proceed in practice, nor is it intended to suggest particular targets or levels of activity that can be derived from any particular measure.

Constraints and Assumptions

DECC has developed an optimiser model to produce an illustrative mix to represent the mix of measures that suppliers might deliver. The procedure is as follows:

Methodology

- I. Energy, fuel cost and carbon dioxide savings are calculated for a range of domestic carbon-saving measures and lifetime CO₂ saving scores per measure are ascribed to each measure. The carbon factors for each fuel used for establishing lifetime carbon scores are consistent with Defra's "Guidelines for Company Reporting on Greenhouse Gas Emissions", except for electricity, where the factor of 0.431 kgCO₂/kWh is used.
- II. Using assumed estimates of the unit cost of each measure, the share of that cost borne by suppliers, householders and social housing authorities, and the proportion of PG measures that might be expected to be undertaken in the social housing sector (tables 6-8), the programme calculates the cost to suppliers per lifetime tCO₂. The share of costs borne by suppliers depends on the householders' willingness to pay. For this reason, households on income or disability benefits, or elderly households (the Priority Group) are expected to require higher inducement than other households. Some measures are cheaper than others, and are therefore more attractive to suppliers.
- III. The optimiser contains estimates of maximum numbers of each measure that could feasibly be installed over the period of the policy, deduced by taking into account potential constraints such as the current state of the housing stock, of other physical and market constraints, of typical replacement cycles, and of consumer demand (see Annex B and C).
- IV. Subject to the following constraints, the optimiser estimates a mix of measures that minimises suppliers' costs²². These constraints are shown in Table D10, below:

Table D10 : Optimisation constraints

Constraints	Limits		Units
	Minimum	Maximum	
Householders and social housing costs	0.00	1,500.00	£million
Share from insulation	68%	100%	
Lifetime target MtCO ₂	108	108	MtCO ₂
PG share of target	40%	40%	
Super-PG share of target (included in the PG share)	15%	15%	

²² The optimisation results are clearly dependent on the constraints selected.

- V. It has been assumed that RTD's and home energy advice are limited to 2% of the target²³, and that the innovation ring fence remains at 10%, and that, on average, suppliers use 7.5%.
- VI. Once the mix has been calculated, the real carbon savings from the policy are estimated by taking into account interactions with other policies, and the anticipated decarbonisation of the electricity grid after 2030²⁴. This results in an estimated fuel savings profile from the year 2011 to 2052 (the estimated lifetime of the longest lived measures).
- VII. The resulting fuel savings profiles are used to establish cost benefits and bills impacts. They are also used internally in DECC's energy & carbon projections.

8. DEADWEIGHT

Deadweight refers to the uptake of measures that would have been installed in absence of policy. In previous household energy efficiency programmes, DECC has assumed that a certain level of deadweight is subsidised by the programme, principally for the following measures:

- Cavity & loft insulation
- Fuel switching
- CFL's
- Appliances.

However in the current CERT extension DECC has assumed that there is now **negligible deadweight** being subsidised by the programme.

By the start of the CERT extension programme, it is anticipated that more than 2/3 of the fillable cavities in the GB housing stock will be filled, and that virtually no truly empty lofts will remain. Whilst potential will remain for loft top ups, it seems reasonable to assume that the pool of buyers for both loft & cavity insulation willing to purchase at full price will have been exhausted by previous versions of the programme. This is equivalent to assuming zero deadweight for these measures.

Ofgem's regulations for fuel switching are considered to be sufficiently stringent to avoid suppliers subsidising fuel switching that would have occurred anyway. Most fuel switching in CERT takes place in the social housing stock, and suppliers and social housing are required to demonstrate that the work is additional to what would have been undertaken anyway. Previous analysis of EEC2 by Eoin Lees Energy indicated that a high proportion of white goods subsidised by the programme were deadweight. Ofgem is considering tightening the regulations to avoid this in future. DECC will not allow CFL's to qualify for CERT support.

It should be noted that the revised deadweight estimates have no effect on carbon targets for suppliers, but will affect the estimated fuel savings of the programme.

9. ESTIMATION OF FUEL SAVINGS PROFILES

Fuel savings profiles are estimated in the same manner as CERT, i.e. taking into account overlaps with other policies. There are five main policies that potentially overlap with CERT:

- 2005 Building Regulations (condensing boiler requirements)
- EuP Directive on Boilers
- EU Standby Directive 2008
- Renewable Heat Incentive
- Eu framework directive on energy using products

9.1. 2005 Building Regulations relating to Condensing Boilers

The 2005 Building Regulations, part L, and Scottish equivalent require that all new boilers are of the condensing type. Since these boilers are more efficient than the stock average, the stock average efficiency will rise gradually,

²³ The carbon saving score for real time displays is based on the assumption that, on average, a household would save 3.5% of their electricity for a period of 15 years. The carbon saving score for home energy advice is based on the assumption that the average household would save 1% of electricity and 2% of gas for 7.5 years;

²⁴ "Valuation of Energy Usage and Greenhouse Gas Emissions for Appraisal and Evaluation of Policy", DECC, November 2009.

until all boilers have been replaced. The nominal efficiency of these boilers is 90%, but field trials conducted for DECC suggest a slightly lower efficiency of 85%²⁵. Work carried out by BRE for DECC suggests an average efficiency of 85% in 2020²⁶. If these assumptions are built into the model, then the savings from insulation installed in CERT 2011/12 will decrease gradually over time, reaching a plateau at around 2020. Table D11 shows the expected stock average gas boiler efficiency; it has been assumed that the same corrections can be applied to oil boilers.

Table D11 : expected stock average boiler efficiency

2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
78.0%	78.7%	79.4%	80.1%	80.8%	81.5%	82.2%	82.9%	83.6%	84.3%	85.0%

The net effect of these two corrections is to ensure that there is no double counting of carbon saved by CERT.

9.2. EuP Directive on Boilers

Building Regulations 2005 require a minimum standard of B rated boilers in most properties, although there are exceptions where this is unfeasible because of lack of space (in these cases, the minimum standard is currently a D rating). Suppliers cannot subsidise A rated boilers in the place of B rated ones, although they can subsidise A or B rated boilers in place of D rated ones in the small number of homes where building regulation exemptions apply. These savings are expected to contribute only a tiny fraction to CERT.

In the coming months, the EuP Boilers Implementation Measure may set standards for the future above the SEDBUK A requirement. However as this could only potentially detract from savings attributed to CERT in the relatively few cases where the supplier replaces a D rated boiler, the potential for overlap between the EuP Directive on boilers and the savings from the CERT 2008-11 programme or the CERT 2011-12 programme is expected to be negligible.

9.3. EU Directive 1275/2008 (Ecodesign)

The EU Directive 1275/2008 17/12/2008 requires that standby on all new household and office electrical and electronic equipment is reduced to 1W or less, with a further reduction to < 0.5W by 2012.

This would significantly reduce savings from saver plugs promoted by CERT. When calculating the real fuel and carbon savings from the policy, DECC assumes that saver plugs will only save electricity when fitted to equipment purchased before the EU Directive came into force.

On average, MTP assumes that household IT equipment is replaced every 5 years. So a saver plug purchased in, say, April 2011 will only save if applied to equipment purchased before 17/12/2008. It would therefore save electricity only for a period of around 2.75 years. A saver plug purchased in December 2012 would only save for a period of around 1 year.

For the purposes of estimating the true fuel and carbon savings, DECC has therefore reduced the lifetime assumed for saver plugs to 2 years.

9.4. Proposed Renewable Heat Incentive

This section describes the potential double counting of savings with the Renewable Heat Incentive. Such double counting may occur because ground and air source heat pumps constitute a component of the illustrative mix, and are also eligible for support from the Renewable Heat Incentive. DECC proposes that measures eligible for RHI support should only remain eligible for CERT support if installed in the Super Priority Group.

Table D12, below, compares assumed uptake of heat pumps with the Renewable Heat Incentive.

²⁵ In-situ monitoring of efficiencies of condensing boilers and use of secondary heating”, Gastec at CRE, June 2009

http://www.decc.gov.uk/en/content/cms/what_we_do/consumers/saving_energy/analysis/analysis.aspx

²⁶ This is corroborated by data from the SBGI indicates that around 1.6 million boilers are replaced per year which means that, at this rate, it would take around 13 years to replace the entire stock of boilers in GB. It is therefore reasonable to assume that in around 2018, the average efficiency of gas boilers in the housing stock will be around 85%. For the purposes of this analysis, the BRE figure of 85% by 2020 has been used.

Table D12: Assumed numbers of heat pumps and solar thermal installations in the RHI

	ASHP	GSHP	Solar Thermal
2011	2,200	6,600	0
2012	10,050	27,725	78,125

When calculating the real fuel and carbon savings from CERT, DECC has omitted the savings from RHI measures as these are not additional to the savings from the RHI.

10. Heat Replacement Effect

The heat replacement effect is a well documented phenomenon²⁷. Inefficient electrical lights and appliances give off heat. When these are replaced with efficient lights/appliances, the incidental heat gains fall. The room thermostat will therefore compensate by increasing heat delivered from the main central heating system. DECC has used estimates of the heat replacement effect calculated by Defra's Market Transformation Programme; note that DECC has also taken into account the fact that some appliances (egg washing machines) are not always in rooms that are heated. The heat replacement effect has been calculated in exactly the same way as for CERT 2008-11.

²⁷ Market transformation programme : Briefing notes BNXS05 & BNXS24

ILLUSTRATIVE MIX FOR THE PREFERRED SCENARIO, WITH REQUIREMENTS FOR A 15% SUPER-PRIORITY GROUP, 68% INSULATION MINIMUM AND NO CFLs

This annex presents an illustrative mix for the preferred option for an extension of CERT for the 21 month period from April 2011 to December 2012.

Table E1 : Illustrative mix of measures for preferred option

	Carbon saving measure	Number of measures				
		SPG	Rest of PG	PG + SPG	Non-PG	Total
INSULATION	Cavity wall insulation	275,000	432,908	707,908	692,092	1,400,000
	Underfloor insulation	0	0	0	25,000	25,000
	Loft insulation professional (from < 60mm)	100,000	300,000	400,000	926,667	1,326,667
	Loft insulation professional (from > 60mm)	0	0	0	800,000	800,000
	Loft insulation (DIY)	0	50,000	50,000	750,000	800,000
	SWI external	1,000	4,000	5,000	0	5,000
	SWI external (social sector)	25,000	8,750	33,750	11,250	45,000
	SWI internal	1,000	14,000	15,000	0	15,000
	SWI internal (social sector)	25,000	12,500	37,500	12,500	50,000
	Insulated wallpaper	0	50,000	50,000	25,000	75,000
	Flat roof insulation	0	0	0	75,000	75,000
	Glazing E to C rated	0	350,000	350,000	350,000	700,000
	Draughtproofing	0	0	0	0	0
	HEATING SYSTEMS	A/B rated boilers (exceptions)	50,000	50,000	100,000	100,000
Fuel Switching		39,664	24,622	64,286	10,714	75,000
Heating controls - upgrade with boiler		0	789,921	789,921	52,661	842,582
Heating controls - extra		50,000	861,515	911,515	1,088,485	2,000,000
Wood pellet stoves (secondary)		0	0	0	0	0
Log burning stoves		0	0	0	0	0
Wood pellet boilers (primary)		0	0	0	0	0
Solar Water Heater (4m ²)		0	20,000	20,000	0	20,000
Ground source heat pumps		10,000	0	10,000	0	10,000
Air source heat pumps		5,000	0	5,000	0	5,000
Wood chip CHP		0	0	0	0	0
Community GSHP		0	1,500	1,500	500	2,000
Community heating to wood chip		0	0	0	0	0
Replacement of G rated boilers		5,000	0	5,000	833	5,833
LIGHTING	Dimmable CFLs - retail	No longer eligible				
	Efficient halogens	No longer eligible				
	LED's	0	0	0	0	0
	LED's (social sector)	0	454,545	454,545	4,545,455	5,000,000
APPLIANCES	Appliances - Cold	No longer eligible				
	Appliances - Wet	No longer eligible				
	Appliances - iTVs	No longer eligible				
	PC mains panels	0	0	0	0	0
	Energy saving kettles	0	1,403	1,403	14,030	15,433
	LNBs	0	0	0	0	0
	A++ cold appliances	0	0	0	0	0
	A++ wet appliances	0	200,000	200,000	2,060,000	2,260,000
MICROGEN	Photovoltaic panels (2.5 kWp)	0	0	0	0	0
	micro Wind (1 kWp, 10% LF)	0	0	0	0	0

	Carbon saving measure	Number of measures				
		SPG	Rest of PG	PG + SPG	Non-PG	Total
	micro Hydro (0.7kWp, 50% LF)	0	0	0	0	0
	Mini-wind 5 kW, 20% LF	0	0	0	0	0
	mCHP (80% heat, 15% elec)	0	18,750	18,750	6,250	25,000
OTHER	RTD's	0	1,242,857	1,242,857	207,143	1,450,000
	Advice only	0	600,000	600,000	100,000	700,000

Below is presented the costs, benefits, cost-effectiveness and bill impacts of the preferred option.

Table E2: Summary of Costs and Benefits

Societal benefits and costs			Preferred Option
Benefits	Net change in energy use	£m, 2009 prices, PV	6,916
	Net change in emissions	£m, 2009 prices, PV	3,071
	Net air quality impact	£m, 2009 prices, PV	989
	Net comfort taking	£m, 2009 prices, PV	3,175
	NPV of benefits excluding comfort	£m, 2009 prices, NPV	10,975
	NPV of benefits including comfort	£m, 2009 prices, NPV	14,150
	Annualised NPV of benefits (excl comfort)	£m, 2009 prices, NPV	500
	Annualised NPV of benefits (incl comfort)	£m, 2009 prices, NPV	645
Costs	NPV total costs (including hidden costs)	£m, 2009 prices, NPV	5,504
	NPV costs to suppliers	£m, 2009 prices, NPV	2,308
Benefits - Costs	NPV of costs and benefits	£m, 2009 prices, NPV	8,647
	Annualised NPV of costs and benefits	£m, 2009 prices, NPV	394
Changes in CO2e emissions	Net emissions CO2e in traded sector	Mt CO2e	-10.0
	Net emissions CO2e in non-traded sector	Mt CO2e	-64.2
	Net emissions CO2e, sum of sectors	Mt CO2e	74.2
Traded sector (EU ETS)	Net change in energy use	£m, 2009 prices, PV	12,129
	Net change in emissions	£m, 2009 prices, PV	202
	Net air quality impact	£m, 2009 prices, PV	32
	Total traded sector benefits	£m, 2009 prices, NPV	2,363
Non-traded sector	Net change in energy use	£m, 2009 prices, PV	4,786
	Net change in emissions	£m, 2009 prices, PV	2,869
	Net air quality impact	£m, 2009 prices, PV	956
	Total non-traded sector benefits	£m, 2009 prices, NPV	8,612
Cost effectiveness	Traded sector cost effectiveness indicator	£, 2009 prices	-841
	WAD EU Allowance	£, 2009 prices	20
	Non-traded sector cost effectiveness indicator	£, 2009 prices	-90
	WAD Shadow Price of Carbon	£, 2009 prices	45
Fuel Bills	Impact of higher fuel prices on average gas bill (2012)	£, 2009 prices	
	Impact of higher fuel prices on average electricity bill (2012)	£, 2009 prices	

Table E3: Real fuel savings for preferred option (after accounting for interactions with other policies), TWh/year

	Gas (TWh/year)	Electricity (TWh/year)	Oil (TWh/year)	Coal (TWh/year)
2011	0.0	0.0	0.0	0.0
2012	4.28	0.69	0.34	0.39
2013	9.93	1.61	0.79	0.92
2014	9.86	1.61	0.78	0.92
2015	9.80	1.61	0.78	0.92
2016	9.74	1.61	0.77	0.92
2017	9.67	1.61	0.77	0.92
2018	9.60	1.61	0.76	0.92
2019	9.56	1.55	0.76	0.92
2020	9.44	1.47	0.75	0.92
2021	9.32	1.45	0.74	0.92
2022	9.38	1.30	0.75	0.92
2023	9.47	1.11	0.75	0.92
2024	8.12	1.11	0.66	0.92
2025	6.33	1.11	0.55	0.92
2026	6.33	1.11	0.55	0.92
2027	6.36	1.01	0.55	0.92
2028	6.40	0.87	0.55	0.92
2029	6.40	0.87	0.55	0.92
2030	6.40	0.87	0.55	0.92
2031	6.40	0.87	0.55	0.92
2032	6.60	0.72	0.54	0.58
2033	6.88	0.53	0.53	0.12
2034	6.88	0.53	0.53	0.12
2035	6.88	0.53	0.53	0.12
2036	6.88	0.53	0.53	0.12
2037	6.88	0.53	0.53	0.12
2038	6.88	0.53	0.53	0.12
2039	6.88	0.53	0.53	0.12
2040	6.88	0.53	0.53	0.12
2041	6.88	0.53	0.53	0.12
2042	6.45	0.49	0.50	0.11
2043	5.89	0.45	0.45	0.10
2044	5.89	0.45	0.45	0.10
2045	5.89	0.45	0.45	0.10
2046	5.89	0.45	0.45	0.10
2047	5.89	0.45	0.45	0.10
2048	5.89	0.45	0.45	0.10
2049	5.89	0.45	0.45	0.10
2050	5.89	0.45	0.45	0.10
2051	5.89	0.45	0.45	0.10
2052	3.37	0.26	0.26	0.06
Total	294.11	35.33	23.34	20.66

Table E4: Bill impacts for preferred option

Below are the expected bill impacts to 2030 of the preferred option. For both gas bills and electricity bills there are two distinct effects:

1. The price effect of higher fuel prices which impacts all households.
2. The effect of fuel savings on bills for houses with measures installed.

The change in domestic bill column below is the sum of these changes as an average across the housing stock. In reality houses with measures installed will have lower bills than this suggests and houses without measures installed will have higher bill impacts.

68% insulation; no CFLs; high SWI								
	Electricity	Gas	Electricity	Gas	Electricity	Gas	Electricity	Gas
Year	Positive impact on fuel prices (£/MWh) (excl. VAT)		Positive impact on bill from higher price (£)		Negative impact on bill from energy saving (£)		change in domestic bill (£)	
2010	0	0	0	0		-	-	
2011	4.7	1.4	22	24		-	22	24
2012	6.4	1.9	30	31	-	3	27	24
2013	0	0	0	0	-	8	8	17
2014	0	0	0	0	-	8	8	17
2015	0	0	0	0	-	8	8	17
2016	0	0	0	0	-	8	8	17
2017	0	0	0	0	-	8	8	17
2018	0	0	0	0	-	8	8	17
2019	0	0	0	0	-	8	8	17
2020	0	0	0	0	-	8	8	18
2021	0	0	0	0	-	7	7	17
2022	0	0	0	0	-	7	7	17
2023	0	0	0	0	-	6	6	17
2024	0	0	0	0	-	6	6	15
2025	0	0	0	0	-	7	7	12
2026	0	0	0	0	-	7	7	12
2027	0	0	0	0	-	7	7	12
2028	0	0	0	0	-	6	6	12
2029	0	0	0	0	-	6	6	12
2030	0	0	0	0	-	6	6	12

ILLUSTRATIVE MIX FOR A CENTRAL SCENARIO, WITH REQUIREMENTS FOR A 15% SUPER-PRIORITY GROUP AND A 65% INSULATION MINIMUM

This annex presents an illustrative mix for the central scenario of an extension of CERT for the 21 month period from April 2011 to December 2012. Note that two measures have been added since the consultation impact assessment (underfloor insulation and flat roof insulation). This scenario has been used as a basic option around which sensitivities to policy decisions and constraints have been tested in order to arrive at a preferred option.

Table F1 : Illustrative mix of measures for central scenario

	Carbon saving measure	Number of measures				
		SPG	Rest of PG	PG + SPG	Non-PG	Total
INSULATION	Cavity wall insulation	275,000	467,684	742,684	657,316	1,400,000
	Underfloor insulation	0	0	0	0	0
	Loft insulation professional (from < 60mm)	100,000	300,000	400,000	926,667	1,326,667
	Loft insulation professional (from > 60mm)	0	0	0	800,000	800,000
	Loft insulation (DIY)	0	50,000	50,000	750,000	800,000
	SWI external	1,000	0	1,000	0	1,000
	SWI external (social sector)	25,000	1,250	26,250	8,750	35,000
	SWI internal	1,000	0	1,000	0	1,000
	SWI internal (social sector)	25,000	8,750	33,750	11,250	45,000
	Insulated wallpaper	0	10,245	10,245	3,415	13,660
	Flat roof insulation	0	0	0	75,000	75,000
	Glazing E to C rated	0	350,000	350,000	116,667	466,667
	Draughtproofing	0	0	0	0	0
HEATING SYSTEMS	A/B rated boilers (exceptions)	50,000	50,000	100,000	100,000	200,000
	Fuel Switching	39,664	24,622	64,286	10,714	75,000
	Heating controls - upgrade with boiler	0	0	0	0	0
	Heating controls - extra	50,000	1,438,475	1,488,475	511,525	2,000,000
	Wood pellet stoves (secondary)	0	0	0	0	0
	Log burning stoves	0	0	0	0	0
	Wood pellet boilers (primary)	0	0	0	0	0
	Solar Water Heater (4m ²)	0	0	0	0	0
	Ground source heat pumps	10,000	0	10,000	0	10,000
	Air source heat pumps	5,000	0	5,000	0	5,000
	Wood chip CHP	0	0	0	0	0
	Community GSHP	0	0	0	0	0
	Community heating to wood chip	0	0	0	0	0
	Replacement of G rated boilers	5,000	0	5,000	833	5,833
LIGHTING	Dimmable CFLs - retail	0	3,800,000	3,800,000	34,200,000	38,000,000
	Efficient halogens	No longer eligible				
	LED's	0	454,545	454,545	4,545,455	5,000,000
	LED's (social sector)	0	0	0	0	0
APPLIANCES	Appliances - Cold	No longer eligible				
	Appliances - Wet					
	Appliances - iDTVs					
	PC mains panels	0	0	0	0	0
	Energy saving kettles	0	0	0	0	0

	Carbon saving measure	Number of measures				
		SPG	Rest of PG	PG + SPG	Non-PG	Total
	LNBs	0	0	0	0	0
	A++ cold appliances	0	127,735	127,735	1,315,667	1,443,402
	A++ wet appliances	0	0	0	0	0
MICROGEN	Photovoltaic panels (2.5 kWp)	0	0	0	0	0
	micro Wind (1 kWp, 10% LF)	0	0	0	0	0
	micro Hydro (0.7kWp, 50% LF)	0	0	0	0	0
	Mini-wind 5 kW, 20% LF	0	0	0	0	0
	mCHP (80% heat, 15% elec)	0	0	0	0	0
OTHER	RTD's	0	1,242,857	1,242,857	207,143	1,450,000
	Advice only	0	600,000	600,000	100,000	700,000

Table F2: Real fuel savings for central scenario (after accounting for interactions with other policies), TWh/year

	Gas saving TWh/year	Electricity saving TWh/year	Oil saving TWh/year	Coal saving TWh/year	Biomass saving TWh/year
2011	0.0	0.0	0.0	0.0	0.00
2012	4.0	0.6	0.3	0.4	0.00
2013	9.2	1.4	0.7	0.9	0.00
2014	9.2	1.4	0.7	0.9	0.00
2015	9.1	1.4	0.7	0.9	0.00
2016	9.0	1.4	0.7	0.9	0.00
2017	8.9	1.4	0.7	0.9	0.00
2018	8.8	1.4	0.7	0.9	0.00
2019	8.8	1.3	0.7	0.9	0.00
2020	8.7	1.2	0.7	0.9	0.00
2021	8.5	1.2	0.7	0.9	0.00
2022	8.6	1.1	0.7	0.9	0.00
2023	8.6	1.0	0.7	0.9	0.00
2024	7.4	1.0	0.6	0.9	0.00
2025	5.8	1.0	0.5	0.9	0.00
2026	5.8	1.0	0.5	0.9	0.00
2027	5.8	0.9	0.5	0.9	0.00
2028	5.8	0.8	0.5	0.9	0.00
2029	5.8	0.8	0.5	0.9	0.00
2030	5.8	0.8	0.5	0.9	0.00
2031	5.8	0.8	0.5	0.9	0.00
2032	6.0	0.7	0.5	0.6	0.00
2033	6.3	0.5	0.5	0.1	0.00
2034	6.3	0.5	0.5	0.1	0.00
2035	6.3	0.5	0.5	0.1	0.00
2036	6.3	0.5	0.5	0.1	0.00
2037	6.3	0.5	0.5	0.1	0.00
2038	6.3	0.5	0.5	0.1	0.00
2039	6.3	0.5	0.5	0.1	0.00
2040	6.3	0.5	0.5	0.1	0.00
2041	6.3	0.5	0.5	0.1	0.00
2042	6.1	0.5	0.5	0.1	0.00
2043	5.8	0.4	0.5	0.1	0.00
2044	5.8	0.4	0.5	0.1	0.00
2045	5.8	0.4	0.5	0.1	0.00
2046	5.8	0.4	0.5	0.1	0.00
2047	5.8	0.4	0.5	0.1	0.00

2048	5.8	0.4	0.5	0.1	0.00
2049	5.8	0.4	0.5	0.1	0.00
2050	5.8	0.4	0.5	0.1	0.00
2051	5.8	0.4	0.5	0.1	0.00
2052	3.3	0.3	0.3	0.1	0.00
TOTAL	273.5	31.6	22.0	20.4	0.00

Below are the expected bill impacts to 2030 of the base case. For both gas bills and electricity bills there are two distinct effects:

1. The price effect of higher fuel prices which impacts all households.
2. The effect of fuel savings on bills for houses with measures installed.

The change in domestic bill column below is the sum of these changes as an average across the housing stock. In reality houses with measures installed will have lower bills than this suggests and houses without measures installed will have higher bill impacts.

Table F3: Bill impacts for central scenario

Base Case									
	Electricity	Gas	Electricity	Gas	Electricity	Gas	Electricity	Gas	
Year	Positive impact on fuel prices (£/MWh) (excl. VAT)		Positive impact on bill from higher price (£)		Negative impact on bill from energy saving (£)		change in domestic bill (£)		
2010			-	-	-	-	-	-	
2011	4.14	1.24	19	21	-	-	19	21	
2012	5.63	1.64	26	28	-	2	24	20	
2013	-	-	-	-	-	6	6	18	
2014	-	-	-	-	-	6	6	18	
2015	-	-	-	-	-	6	6	18	
2016	-	-	-	-	-	6	6	18	
2017	-	-	-	-	-	6	6	18	
2018	-	-	-	-	-	6	6	18	
2019	-	-	-	-	-	6	6	17	
2020	-	-	-	-	-	5	5	18	
2021	-	-	-	-	-	5	5	17	
2022	-	-	-	-	-	5	5	17	
2023	-	-	-	-	-	5	5	17	
2024	-	-	-	-	-	5	5	15	
2025	-	-	-	-	-	6	6	12	
2026	-	-	-	-	-	6	6	12	
2027	-	-	-	-	-	6	6	12	
2028	-	-	-	-	-	6	6	12	
2029	-	-	-	-	-	6	6	12	
2030	-	-	-	-	-	6	6	12	

Administrative burden

The administrative burden of the information obligation associated with CERT was calculated using the Standard Costs Methodology <http://www.berr.gov.uk/whatwedo/bre/policy/scrutinising-new-regulations/preparing-impact-assessments/toolkit/page44262.html>.

Based on discussions with suppliers, the administrative burden associated with complying with the information obligation was estimated as follows:

For one supplier:

280 hours to compile 7 quarterly reports (at 40 hours each)

400 hours to compile the final report

8 hours to compile a research report = 688 hours

For all suppliers, an estimate of the costs, is as follows:

688 (hours) x 6 (suppliers) x £25 (wage per hour) = 688 x 6 x 25 = **£103,200** (2009 prices)

Using a price deflator of 2.5%, this can be expressed in 2005 prices as £93,494 or as £53,425 (per annum). This estimate is rounded down to £53,000 for presentation on the opening pages.

Suppliers also face costs in original collection and collation of data. DECC has not been able to obtain an estimate of these costs in this Impact Assessment for reasons of commercial sensitivity and availability of cost data from suppliers, although it is understood that data collection is a significant part of the administrative burden. DECC will continue to undertake research into these costs.

Note: this estimate differs from the admin burden estimate for the 2008 CERT Impact Assessment. A contributing factor may be different methodologies – in particular it is not clear whether in the previous CERT impact assessment the standard cost methodology was used in estimating the cost of the information obligation

Hidden Costs

Valuation of “hidden costs” has been added to CERT cost-benefit analysis for the first time as part of the extension. These costs are those that are not reflected in the installation costs of measures.

Each measure has an installation cost which is borne by the supplier and in some cases, partially by the home owner or social housing provider. These costs are detailed in Annex D.

They do not include some of the additional costs (both financial and time) faced by households and housing providers.

For example, when installing internal solid wall insulation, the installation costs include the cost of direct labour, the cost of materials and the “make-good” costs of restoring to the original quality. However they do not include the costs of: lost internal space; time spent clearing and replacing furniture; specific re-decorations.

These hidden costs are, in the non-social sector assumed to be wholly borne by the owner, however in the social sector there is a split between housing provider and householders in terms of burden. For instance, in the above example, the social housing provider would bear the cost of decreased space due to a fall in value, but the householder would face the time cost of moving furniture and preparation.

Hidden costs used here are taken from the estimates in the Ecofys “hidden costs” report, except for solid wall insulation which was taken from the EEPH’s purple report. They are apportioned as presented in the table below, based on DECC assumptions on whether householders or housing providers bear certain costs.

“Make good” hidden costs, which are predominantly a fixture of Solid Wall Insulation are included in installation costs in this Impact Assessment as they are expected to fall on suppliers due to their nature (returning the property to its original state, e.g. re-rendering). In HEM analysis these have been included within hidden costs so while costs in this IA may appear lower, they are simply reflected elsewhere.

Table H1

Carbon saving measure £ 2010	Hidden Cost per measure		
	Social Tenant	Social Housing Provider	Private Owner
INSULATION			
Cavity wall insulation	12	88	100
Underfloor insulation	224	92	317
Loft insulation professional (from < 60mm)	95	70	165
Loft insulation professional (from > 60mm)	95	70	165
Loft insulation (DIY)	142	23	165
SWI external	10	200	210
SWI external (social sector)	10	200	210
SWI internal	4,600	266	4,866
SWI internal (social sector)	4,600	266	4,866
Insulated wallpaper	59	1,731	1,790
Flat-roof insulation	0	0	0
Draughtproofing	0	75	75
HEATING			
A/B rated boilers (exceptions)	0	20	20
Fuel Switching	1,641	69	1,710
Heating controls - upgrade with boiler	7	0	8
Heating controls - extra	7	43	50
Wood pellet stoves (secondary)	20	60	80
Log burning stoves	29	66	95
Wood pellet boilers (primary)	29	101	130
Solar Water Heater (4m ²)	214	142	355

Ground source heat pumps	402	410	812
Air source heat pumps	29	311	340
MICRO-GENERATION			
Photovoltaic panels (2.5 kWp)	215	150	365
micro Wind (1 kWp, 10% LF)	27	128	155
Mini-wind 5 kW, 20% LF	66	119	185
mCHP (80% heat, 15% elec)	22	108	130

Methodological notes and key assumptions in appraising policy impact

Below is the methodology of appraising benefits of the illustrative mixes for scenarios as described in Annexes E and F.

Calculating CO₂ abatement

Fuel saving profiles are converted into CO₂ emissions using fuel factors from Annex D, Table D2.

Valuing CO₂ abatement

CO₂ savings are valued at the non-traded price of carbon for oil, gas and coal, and CO₂ savings from electricity are valued at the EUA.

	Traded			Non-traded		
	Low	Central	High	Low	Central	High
2010	7	14	18	26	52	78
2011	7	14	18	26	52	79
2012	8	14	18	27	53	80
2013	8	15	19	27	54	81
2014	8	15	19	27	55	82
2015	8	15	19	28	56	84
2016	8	15	19	28	57	85
2017	8	16	20	29	57	86
2018	8	16	20	29	58	87
2019	8	16	20	30	59	89
2020	8	16	21	30	60	90
2021	11	22	29	31	61	92
2022	14	27	38	31	62	93
2023	16	32	46	32	63	95
2024	19	38	54	32	64	96
2025	22	43	63	33	65	98
2026	24	49	71	33	66	99
2027	27	54	80	34	67	101
2028	30	59	88	34	68	102
2029	32	65	97	35	69	104
2030	35	70	105	35	70	105
2031	38	77	115	38	77	115
2032	42	83	125	42	83	125
2033	45	90	134	45	90	134
2034	48	96	144	48	96	144
2035	51	103	154	51	103	154
2036	55	109	164	55	109	164
2037	58	116	173	58	116	173
2038	61	122	183	61	122	183
2039	64	129	193	64	129	193
2040	68	135	203	68	135	203
2041	71	142	212	71	142	212
2042	74	148	222	74	148	222
2043	77	155	232	77	155	232
2044	81	161	242	81	161	242
2045	84	168	251	84	168	251
2046	87	174	261	87	174	261
2047	90	181	271	90	181	271
2048	94	187	281	94	187	281
2049	97	194	290	97	194	290
2050	100	200	300	100	200	300
2051	103	207	312	103	207	312
2052	105	214	323	105	214	323

Valuing energy savings

Energy savings are presented net of comfort taking and are valued at the long run marginal resource cost to society, which varies by fuel.

Long run marginal resource costs				
Year	Electricity long run marginal resource cost (p/KWh 2009)	Gas long run marginal resource cost (p/KWh 2009)	Coal long run marginal resource cost (p/KWh 2009)	Oil long run marginal resource cost (p/KWh 2009)
2012	12.55	3.96	3.01	38.87
2013	12.42	4.19	2.95	39.26
2014	13.02	4.47	2.89	39.65
2015	13.42	4.55	2.84	40.05
2016	13.74	4.63	2.84	40.44
2017	14.12	4.78	2.84	40.83
2018	14.59	4.94	2.84	41.23
2019	14.86	5.04	2.84	41.62
2020	15.20	5.28	2.84	42.01
2021	15.36	5.12	2.84	42.40
2022	15.82	5.19	2.84	42.80
2023 onwards	various: see IAG toolkit	various: see IAG toolkit	various: see IAG toolkit	various: see IAG toolkit

Valuing air quality impacts

Air quality impacts were estimated using the 'damage cost' methodology. This 'short-cut' methodology was used because of time constraints, and because the more rigorous methodology, which uses a Pollution Climate Mapping (PCM) model, is very resource intensive. The online air quality damage cost guidance explains in greater detail the limitations of the damage costs methodology, and can be found at:

<http://www.defra.gov.uk/environment/quality/air/airquality/panels/igcb/documents/damage-cost-calculator-guidancepaper.pdf>

Air quality damage values of fuels are presented by fuel below.

Air quality damage values				
Year	air quality damage value of electricity (p/KWh)	air quality damage value of gas (p/KWh)	air quality damage value of coal (p/KWh)	air quality damage value of oil (p/KWh)
2012	0.12	0.04	4.80	0.70
2013	0.12	0.04	4.90	0.70
2014	0.13	0.04	5.00	0.70
2015	0.13	0.04	5.10	0.70
2016	0.13	0.04	5.20	0.70
2017	0.13	0.04	5.30	0.80
2018	0.14	0.04	5.40	0.80
2019	0.14	0.04	5.50	0.80
2020	0.14	0.04	5.60	0.80
2021	0.15	0.04	5.71	0.82
2022	0.15	0.04	5.83	0.83
2023 onwards	various: see IAG toolkit	various: see IAG toolkit	various: see IAG toolkit	various: see IAG toolkit

Valuing comfort

Comfort is a direct rebound effect that is valued at the full retail price of the fuel consumed, presented in the table below. Note that an indirect rebound effect has not been modelled in this analysis.

Retail price ²⁸ of fuel (domestic)				
Fuel	Electricity	Gas	Coal	Oil
Year	p/KWh (2009)	p/KWh (2009)	p/KWh (2009)	p/litre (2009)
2012	12.55	3.96	3.01	38.87
2013	12.42	4.19	2.95	39.26
2014	13.02	4.47	2.89	39.65
2015	13.42	4.55	2.84	40.05
2016	13.74	4.63	2.84	40.44
2017	14.12	4.78	2.84	40.83
2018	14.59	4.94	2.84	41.23
2019	14.86	5.04	2.84	41.62
2020	15.20	5.28	2.84	42.01
2021	15.36	5.12	2.84	42.40
2022	15.82	5.19	2.84	42.80
2023 onwards	various: see IAG toolkit			

²⁸ Retail prices include the impact of the following policies in line with the latest published policy assessments: The Renewable Heat Incentive, further Supplier Obligations, the Carbon Emissions Reduction Target (CERT), the Community Energy Savings Programme, Better Billing, Smart Metering, Defra-led Products Policies, Renewables Obligation, EU Emissions Trading System, Carbon Capture and Storage, Feed-in-Tariffs and the CERT Extension

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