

Title: The Future of the Energy Company Obligation: Final Impact Assessment IA No: Lead department or agency: Department of Energy and Climate Change Other departments or agencies: N/A	Impact Assessment (IA)				
	Date: 27/10/2014				
	Stage: Final				
	Source of intervention: Domestic				
	Type of measure: Secondary legislation				
Contact for enquiries: Hanne Gill, Mark Ewins					
Summary: Intervention and Options					RPC: GREEN

Cost of Preferred (or more likely) Option

Total Net Present Value	Business Net Present Value	Net cost to business per year (EANCB in 2009 prices)	In scope of One-In, Two-Out?	Measure qualifies as
£896m	-£491m	£661m	Yes	IN

What is the problem under consideration? Why is government intervention necessary?

The rationale for intervention to amend the Energy Company Obligation (ECO) targets currently in legislation is to realise the government's commitment to reduce the pressure on domestic consumers' energy bills in the near term and to improve the operation of ECO in light of evidence on the operation of the scheme over its first year. Intervention to introduce targets for the period to 2017 is justified on the basis that ECO will continue to address market barriers associated with the uptake of energy efficiency measures and therefore continue to reduce Greenhouse Gas (GHG) emissions and help meet future Carbon Budgets. The targets will also contribute to distributional objectives.

What are the policy objectives and the intended effects?

The overarching objective of the changes to the existing policy framework is to reduce the cost of ECO policies on domestic energy bills in the near term. The government will also provide longer term certainty to the energy efficiency market by introducing ECO targets in legislation for the two-year period to the end of March 2017.

What policy options have been considered, including any alternatives to regulation? Please justify preferred option (further details in Evidence Base)

The government has considered two options. Firstly, maintaining the ECO policy regulations currently in legislation, including not introducing ECO targets beyond 31 March 2015. The second option is to introduce a package of changes to the ECO targets currently in legislation to 31 March 2015, and introduce new ECO targets for a further two-year period to 31 March 2017.

The second option is the preferred option. It allows the government to deliver on its announced commitment to reduce the pressure on consumers' energy bills in the near term whilst maintaining its ambition to reduce carbon savings in the domestic sector. It will also help alleviate fuel poverty by introducing targets for a an additional two years to 31 March 2017.

Will the policy be reviewed? It will be reviewed. If applicable, set review date: 10 / 2017						
Does implementation go beyond minimum EU requirements?			N/A			
Are any of these organisations in scope? If Micros not exempted set out reason in Evidence Base.		Micro No	< 20 No	Small No	Medium No	Large Yes
What is the CO2 equivalent change in greenhouse gas emissions? (<i>net, CB2 and 3</i>) (Million tonnes CO2 equivalent)			Traded: -2.56		Non-traded: +2.02	

I have read the Impact Assessment and I am satisfied that, given the available evidence, it represents a reasonable view of the likely costs, benefits and impact of the leading options.

Signed by the responsible Minister: Edward Davey Date: 22 October 2014

Summary: Analysis & Evidence Policy Option 2

Description: Final option. Amend the target framework in the period to 31 March 2015, and introduce new ECO targets for the period to 31 March 2017

FULL ECONOMIC ASSESSMENT

Price Base Year 2013	PV Base Year 2013	Time Period 48 Years	Net Benefit (Present Value (PV)) (£m)		
			Low: Optional	High: Optional	Best Estimate: £896

COSTS (£m)	Total Transition (Constant Price) Years	Average Annual (excl. Transition) (Constant Price)	Total Cost (Present Value)
Low	Optional	Optional	Optional
High	Optional	Optional	Optional
Best Estimate	0	£15m	£724m

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

The largest monetised cost is that to the obligated suppliers of delivering their ECO targets. These are the costs associated with delivering heating and insulation measures to domestic households directly or contracting with the supply chain for measures to be installed. The cost to suppliers of delivering measures include some or all the installation costs, and any further funding required to drive consumer uptake to overcome hidden costs. We expect that the costs to suppliers of meeting their obligations will be passed on to consumers through domestic energy bills.

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

The reduction in the carbon target ambition in the period to 2015 may have an adverse impact on parts of the ECO supply chain, i.e. the heating and insulation industry. The associated cost to these industries has not been monetised. However, these costs should be offset by the benefits to the supply chain of introducing ECO targets for two additional years to 31 March 2017.

BENEFITS (£m)	Total Transition (Constant Price) Years	Average Annual (excl. Transition) (Constant Price)	Total Benefit (Present Value)
Low	Optional	Optional	Optional
High	Optional	Optional	Optional
Best Estimate	0	£34m	£1,619

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

The key beneficiaries of the policies are those households that receive measures that are partly or fully subsidised by ECO funding from the energy suppliers. These groups will benefit from energy savings (with a value to society of £1.1bn PV) and increased comfort (£303m PV). There are also benefits to wider society from improved air quality (£87m PV), and traded and non-traded carbon savings (£45m and £46m respectively, PV).

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

We estimate that the total present value of the health impacts from the net changes to ECO (i.e. net of the counterfactual) is around £225million. This benefit is not captured in the monetised benefits in the overall CBA figure due to the overlap with comfort taking.

Key assumptions/sensitivities/risks	Discount rate (%)	3.5
The targets in legislation are quantity based instruments and there is uncertainty about the actual cost to energy suppliers of delivering their obligations, and the associated impact on consumers' energy bills. The cost of delivering ECO is also sensitive to the extent of ECO blending with Green Deal or other sources of private finance, and the extent to which energy suppliers and the supply chain are able to deliver measures to the most cost-effective technical potential within the domestic housing stock.		

BUSINESS ASSESSMENT (Option 1)

Direct impact on business (Equivalent Annual) £m:			In scope of OIOO?	Measure qualifies as
Costs:	Benefits:	Net: £661m	Yes	OUT

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1. Executive summary

1. This document sets out the government's analysis of the impact of changes to the ECO targets currently in legislation for the period to 31 March 2015, and the introduction of new ECO targets in the two year period to 31 March 2017. Under the current legislation, by the end of March 2015, obligated energy suppliers have to deliver 20.9MtCO₂ lifetime savings by installing insulation measures in hard to treat households¹ (the Carbon Emission Reduction Obligation (CERO)), 6.8MtCO₂ lifetime savings by installing a fuller range of insulation measures to households in low income areas (the Carbon Saving Community Obligation (CSCO)) and £4.2bn lifetime space and heating cost savings to low income households (the Affordable Warmth obligation (AW)).
2. **The changes to the 31 March 2015 carbon targets** include measures that directly reduce the size of CERO target, and other measures that should further reduce the cost to obligated suppliers of delivering their targets. For CERO, these include: allowing lower cost measures to be eligible; reducing the carbon target by 33%; increasing the amount of carbon delivery that suppliers have already achieved by maximising the carry-forward from previous supplier obligation periods; and crediting suppliers that delivered early with an uplift to these suppliers' delivery to the end of March 2014. In addition, the eligibility criteria for the area-based CSCO target will be widened. While no changes will be made to AW for the March 2015 target, certain new rules for the period from April 2015 to March 2017 will be introduced. These changes are designed to achieve a more balanced profile of delivery between insulation and heating measures, as well as between on- and off-grid households. Further, to increase consumer protection, warranties will be required to accompany the delivery of replacement boilers.
3. **Government will legislate new ECO targets for the two year period to 31 March 2017** based on a pro-rata of the carbon reduction target levels to 31 March 2015. The targets for this period are lifetime savings of 12.4MtCO₂ for CERO and 6.0MtCO₂ for CSCO.
4. As discussed in the consultation document and the accompanying Assessment of Impacts,² the target for AW in 2017 has been set on the basis of a pro-rata of the original estimated cost of the policy i.e. £350m per annum of the scheme extension (in 2011 prices). This leads to a target of £3.7bn of lifetime notional bill savings. It also happens to be the case that this new target is a pro-rata extension of the 2015 target for AW of £4.2bn of lifetime notional bill savings.
5. **We have updated the analytical framework** since the consultation assessment. These changes include updating various input assumptions to reflect updated market delivery data and evidence received from the consultation, and changes to the models to better reflect the final policy package.
6. **Changes to the Green Deal Household Model (GDHM).** We have made a number of changes to the GDHM and its input assumptions since the consultation. These changes have been made in light of updated evidence on ECO delivery and costs, and evidence received through consultation. The most significant changes are:
 - Updated delivery statistics by supplier (to inform the impact of the levelisation mechanism);

¹ Hard To Treat Cavity Wall Insulation (HTT CWI) and Solid Wall Insulation (SWI) measures, and a wider range of other measures delivered alongside HTT CWI and SWI.

² DECC (2014), *The Future of the Energy Company Obligation: Assessment of Impacts*
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/286926/The_Future_of_the_Energy_Company_Obligation_Assessment_of_Impacts.pdf

- Changes to parameters affecting the uptake of Solid Wall Insulation (SWI) measures to deliver more external SWI measures;
 - Updated assumptions on the carry-forward to carbon targets from earlier obligation schemes; and
 - Calibration to updated statistics on the actual volume of ECO measures delivery and costs.
7. In addition, we have refined the modelling to more accurately reflect the final policy package. The impact of these, and other changes to the carbon target modelling, has amongst other things been to:
- Estimate a delivery of measures that better reflects historical statistics and market expectations (e.g. in terms of the split between internal and external SWI measures and delivery by tenure);
 - Bring forward some ECO activity from the target period between 1 April 2015 and 31 March 2017 to the period to 31 March 2015 (to reflect likely carry-forward between ECO target periods); and
 - Further reduce the level of carbon target activity required by suppliers, due to a larger impact of excess actions from CERT/CESP and greater level of delivery to March 2014 (which is uplifted in the levelisation mechanism).
8. **Changes to the AW model.** In recent months there has been a growing gap between observed delivery under AW and the delivery and cost estimates produced by the AW model. We have therefore looked to calibrate some of the key modelling assumptions and aspects of the methodology, where possible, to current delivery and market observations. The four most significant changes in this process are:
- That 2013 figures are based on actual delivery data;
 - To recognise customer contributions;
 - To decrease the cost of installing heating measures; and
 - Change in the incentive and ability to deliver packages of measures and ETT CWI.
9. The combined effects of these changes has led the estimated unit price of AW over the period April 2015 to March 2017 to decrease since the consultation IA from 18p to around 14p based on a scenario of no policy changes compared to the period from January 2013 to March 2015. These specific changes have been adopted following discussions with members of the supply chain about their delivery experience to date and the key factors that explain the difference in costs observed through modelling and delivery (see the Analytical approach section for a detailed description of the GDHM and AW modelling changes).
10. **Our counterfactual ECO scenario** is the ECO target framework currently in legislation, where there are no ECO targets beyond 31 March 2015. We estimate that the net impact of the ECO policy package is a NPV of £896m (net of the counterfactual ECO), and that the package will contribute to a total of 3.24MtCO₂ gross savings in Carbon Budget (CB) Period 3 (0.94MtCO₂ net of the ECO counterfactual). We estimate that over 1,870,000 households will be supported by ECO measures from 1 January 2013 to the end of March 2017, and that an average of around 260,000 low income households or households in low income areas will be supported each year through AW and CSCO (representing an increase from 230,000 households estimated in the original 2012 ECO IA).³
11. **The quantitative analysis** in this assessment is subject to considerable degree of uncertainty. This is due to the quantity based nature of the targets, the interaction with the market based Green Deal mechanism and uncertainties about the final level of CERT/CESP carry-forward

³ DECC (2012) *Final Stage Impact Assessment for the Green Deal and Energy Company Obligation* https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/42984/5533-final-stage-impact-assessment-for-the-green-deal-a.pdf. This IA is referred to as the 2012 IA in the rest of this assessment.

and to which ECO targets these carry-forward volumes will be allocated. Lastly, the assessment includes updated statistics on measures reported to Ofgem to the end of March 2014 but the final impact of the policy package on the target ambition will depend on the degree to which these measures will be approved by Ofgem. Nevertheless, we are relatively confident in our estimated carbon savings from the scheme as a whole (given that suppliers have legally binding targets to meet). However, the predicted mix of measures (apart from the minimum volume of SWI delivery), and the associated distribution of measures across house-types, is uncertain as it will be up to the suppliers to deliver to the most cost-effective households.

12. The trajectory of delivery over time, and the associated delivery costs, is also uncertain due to the fact that suppliers can carry forward surplus ECO activity from the current ECO targets to the end of March 2015 to the new targets to 2017. We are also aware of limitations in our models which mean that our estimated impacts might not fully capture the interactions between all domestic energy efficiency policies (see Analytical approach for further details).

2. Introduction

13. This final stage Impact Assessment (IA) accompanies the government's response to the Future of ECO consultation which ran from 5 March to 16 April 2014. The aim of this document is to provide an updated assessment of the final package of policy measures which the government will introduce in legislation following the consultation process. The ECO policy package is two-fold and includes:
 - A number of changes that will affect the ECO targets currently in legislation to 31 March 2015; and
 - Setting ECO targets for an additional two year period from 1 April 2015 to 31 March 2017.
14. The main part of this document provides our assessment of the impacts of the package which are of interest to the ECO supply chain and other market participants. This includes the estimated uptake of energy efficiency measures and the associated impacts on the number of households supported, jobs supported and costs to the obligated suppliers of delivering their targets. We have also provided a detailed assessment of the costs and benefits to society, and through the estimated Equivalent Annual Net Cost Business (EANCB), the net regulatory impact on costs of the policy to business (see section 10).
15. The document is structured as follows:
 - A **description of the final ECO policy package** that will be introduced in legislation;
 - An assessment of the **rationale for intervention** to change the current target framework and to introduce ECO targets for the two year period to 31 March 2017;
 - A description of the **policy counterfactual** scenario used in the assessment;
 - An **analytical approach** section, which includes descriptions of important changes to the modelling approach and input assumptions since the 5 March consultation assessment;
 - The **aggregate impact** section presents our modelled impact of the final package of key parameters such as the uptake of energy efficiency measures, the number of households supported and the impact on gross jobs supported;
 - A section on the estimated **costs and benefits of ECO**. This includes an assessment of the cost to suppliers of delivering the ECO targets, and our estimates of the societal impact of the package;
 - Analysis of the impact on ECO costs in a number **sensitivity scenarios** reflects the inherent uncertainty involved in projecting the cost of delivering supplier obligation targets;

- The **wider impact section** contains a detailed assessment of the cost to business, as well as the wider impact of the package included on protected groups; and
- The **annexes** contain detailed modelling outputs and further details on some input assumptions, as well as background analysis on some of the policy parameters that the government consulted on.

3. Description of final policy package

16. This section outlines the final ECO policy package that the government will introduce in legislation following the 5 March 2014 consultation
17. The final ECO policy package consists of the following **changes to the currently legislated target framework to 31 March 2015**:
 - To reduce the March 2015 CERO target by 33 per cent. The March 2015 CSCO and AW (also known as the Home Heating Cost Reduction Obligation (HHCRO)) targets will remain unchanged;
 - To enable obligated suppliers to carry forward over-delivery against their March 2015 targets to count towards their March 2017 targets (carryover measures must be compliant with the new obligation rules);
 - To enable obligated suppliers to deliver less than their share of the new 2015 CERO target. In which case, the supplier would see their CERO obligation for March 2017 increase by 1.1 times its shortfall in March 2015 (the 'ratchet'). This flexibility would not apply to the AW or CSCO targets, with both remaining enforceable compliance deadlines at 31 March 2015;
 - To enable obligated companies to more fully realise the benefits of carry-forward of over-performance ('excess actions') to ECO from the predecessor supplier obligation energy efficiency schemes (Carbon Emissions Reduction Target (CERT)/Community Energy Saving Programme (CESP)). Government will change the ECO legislation so that eligible suppliers can carry forward larger volumes to ECO, and thereby reduce the actual ECO targets these companies have to deliver;
 - To enable those energy suppliers that have delivered primary measures of more than 35 per cent of Phases 1 and 2 of their current CERO target, by the end of March 2014, to receive 1.75 times the carbon score for primary measures delivered to that date (or to adjust these suppliers' CERO targets to provide for the same effect). Activity carried forward from CERT/CESP would be excluded from this uplift. This uplift would only apply to primary measures under CERO and not to the other two ECO obligations;
 - To extend the CSCO element of ECO from 15 per cent to the 25 per cent lowest areas on the Index of Multiple Deprivation (IMD).⁴ In addition, the qualifying criteria for the CSCO rural sub obligation would be simplified by allowing suppliers to deliver against this sub-target to any domestic property located in the poorest quarter of rural areas, as well as to people living in rural areas who are members of the AW Group. These changes will apply for measures installed from 1 April 2014;
 - To allow District Heating (DH) connections made from 1 April 2014 to be included as an allowable primary measure under CERO;
 - To allow insulation of Easy to Treat Cavity Wall Insulation (ETT CWI) installed from 1 April 2014 to be included as an allowable primary measure under CERO; and

⁴ Suppliers will continue to be able to deliver 25% of any work to an eligible CSCO area to an adjoining area.

- To allow Loft Insulation (LI) installed from 1 April 2014 to be included as an allowable primary measure under CERO.
 - To require the delivery of a minimum level of SWI (the carbon equivalent of 100,000 measures (4.0MtCO₂)) to be delivered by the end of March 2017 across all companies and both carbon elements of ECO, namely CSCO and CERO.
18. In addition to the changes above, **ECO targets will be introduced for the two year period to 31 March 2017**, and the following changes to the framework will commence 1 April 2015:
- To extend the ECO scheme to March 2017 with new targets imposed for CERO, CSCO and AW (see the table below for the target levels).
 - To provide that broken electric storage heaters, and inefficient electric storage heaters where at least one electric storage heater in the property is broken, which are repaired or replaced under AW are scored in the same way as a ‘qualifying boiler’ and in doing so, achieve a higher notional bill saving.⁵
 - To deflate the scores achieved by the replacement of qualifying gas boilers by 0.8 i.e. the replacement of a qualifying gas boiler that originally scored 100 will now score 80 To uplift the AW score for measures delivered to households whose main fuel type is not natural gas. This is set at 1.35 for all insulation and 1.45 for all non-gas fuelled qualifying boilers. Electric storage heaters will not be eligible for this uplift as they are already estimated to be cost effective to suppliers, due to the deflator for gas replacement qualifying boilers (as noted above).
 - To require all replacement boilers delivered under AW to include an installer warranty.
 - To allow surplus activity towards the March 2015 AW target, which has been delivered after 1 January 2014, to be counted towards the 2017 AW targets. Such surplus activity delivered during 2014 will be subject to an exchange rate which standardises the return on investment between the different periods of the obligation. This exchange rate will not apply to surplus activity delivered between 1 January and 31 March 2015 as these measures will be required to be consistent with future scheme rules.
 - The table below summarises the final ECO targets for the two target periods for the 2.25 year period to 31 March 2015 and the two year period to 31 March 2017.

Table 1: Final ECO target levels

	1 Jan’13 – 31 Mar’15	1 Apr’15 – 31 Mar’17
CERO	14.0MtCO ₂ lifetime	12.4MtCO ₂ lifetime
CSCO	6.8MtCO ₂ lifetime	6.0MtCO ₂ lifetime
AW	£4.2bn lifetime savings	£3.7bn lifetime savings

19. The actual amount of carbon savings that the obligated suppliers have to deliver to 31 March 2015 under CERO and CSCO is less than the targets that will be introduced in legislation. This is due to the impact of the carry-forward of excess actions from CERT/CESP (4.1MtCO₂ excess actions in total are assumed to be carried forward to CSCO and CERO 31 March 2015 targets) and the levelisation mechanism (estimated to reduce the 31 March 2015 CERO target requirement by 2.26MtCO₂). See Annex C: Detailed analysis of the levelisation mechanism, Annex A: Background on CERT carry-forward assumptions for detailed assumptions on these mechanisms, and Annex J for an overview of the ECO carbon target ambition that is assumed in the modelling.

⁵ A qualifying boiler in AW is a boiler that is either broken or cannot be economically repaired. When these boilers are replaced, the household is assumed to be previously heating its home with an electric room heater.

4. Rationale for government intervention

20. This section provides an overview of the government's rationale for introducing ECO targets for the two-year target period to 31 March 2017 and for amending the policy framework for the ECO targets currently in legislation for the target period to 31 March 2015. The government recognises the implicit trade-off between long-run carbon and energy savings benefits realised through ECO targets and the short run bill savings realised by reducing the ECO carbon target ambition in the near term.

Rationale for introducing ECO targets in the two year period to 31 March 2017

21. The June 2012 Final Green Deal and ECO IA (referred to hereafter as the '2012 IA') provided a detailed assessment of the rationale for government intervention associated with the introduction of the ECO targets currently in legislation. This section provides a high-level summary of the earlier assessment, which has been updated where new evidence is available. This rationale remains valid for introducing ECO targets for the two year period to 31 March 2017.

Objectives supported by improved energy efficiency

22. The ECO supports three government objectives, which are to:
 - Reduce UK GHG emissions and contribute to carbon targets;
 - Maintain the security of UK energy supply; and
 - Tackle fuel poverty by addressing the key underlying drivers of low energy efficiency.
23. As highlighted in the government's 2012 Energy Efficiency Strategy⁶, an important benefit of energy efficiency policies is that they can contribute to economic growth, as investment in energy efficiency has the potential to boost employment and growth. There are also long-term growth benefits to realising domestic energy bill savings, as it can lead to higher disposable incomes that can be spent elsewhere in the economy.

Market failures and barriers

24. There are a number of market failures and barriers which could reduce the uptake of energy efficiency measures in the domestic sector to below the socially optimal level. A number of these are addressed or reduced by the ECO.
25. ECO will address negative CO₂ emission externalities by reducing energy demand in the domestic sector through obligating suppliers to deliver carbon saving targets. Also, energy prices do not always reflect the external cost of these emissions. For instance, there is no carbon price for the use of gas in the domestic sector. A minimum delivery for SWI measures will lead to a positive externality by driving deployment of this technology and lead to learning by doing. This, in turn, should reduce the cost of the technology in the future. This is important given the sizeable remaining technical potential of this technology and the strategic importance of this technology for the UK's long-term carbon reduction ambitions. The energy suppliers' subsidy of ECO measures will also overcome a time inconsistency of discount rate barrier as it reduces or (in the cases where measures are fully subsidised) removes large up-front financial cost of installing energy efficiency measures.⁷ This, in turn, changes the time profile of the costs and benefits of energy efficiency investments and will improve the net benefit to householders of taking up energy efficiency measures.
26. In order to meet the UK's long-term carbon ambition, the government aims to promote the most cost-effective energy efficiency measures. It must do this in an efficient way, however,

⁶ *The Energy Efficiency Strategy: The Energy Efficiency Opportunity in the UK*
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/65602/6927-energy-efficiency-strategy--the-energy-efficiency.pdf

⁷ As outlined in the 2012 IA, many studies suggest that individuals demand a higher rate of return on energy efficiency investments than for alternative investment. (see 2012 IA p. 23-4).

by encouraging cost reductions from learning by doing and from economies of scale from technologies like SWI on which the bulk of future carbon abatement will rely.

27. Marginal Abatement Cost Curve (MACC) analysis presented in the 2012 IA indicated that a substantial amount of socially cost-effective energy efficiency abatement potential remained in the domestic sector in 2013, and that this was expected to increase by 2020 as a consequence of falling installation costs, expected increase in fossil fuel prices and higher cost of a tonne of CO₂.⁸ The static analysis showed that the most cost-effective insulation measure is ETT CWI, and whilst a substantial amount of SWI potential is cost-ineffective, it varies substantially between house types. The cost of meeting carbon budgets will be substantially increased if this potential cannot be delivered.
28. A detailed assessment of the market failures and barriers, and how the ECO addresses these, can be found in the 2012 IA.

Distributional rationale

29. Expenditure on energy can represent a disproportionate share of available resources for certain groups in society. As identified in the government's fuel poverty strategic framework, poor standards in energy efficiency in some properties mean that many low-income households face high costs to maintain a warm and healthy home. High energy bills, partly a consequence of energy inefficient homes, are regressive in the sense that a low income household would need to spend a greater proportion of their income to pay the same bill than a higher-income household. The thermal efficiency of homes is a key driver of fuel poverty and improving energy efficiency means addressing one of the main drivers of fuel poverty in a way that has the most significant long run effect. Within ECO, the AW obligation targets thermal efficiency improvements at low income vulnerable private tenure households who are most at risk of fuel poverty. In addition, the CSCO targets measures at households in deprived areas that are also at risk of fuel poverty.

Rationale for amending the targets in legislation to 31 March 2015

30. The overarching rationale for intervention to amend the current ECO policy framework is to reduce the pressure on consumer energy bills and to improve the operation of ECO in light of evidence on the operation of the scheme over its first year. The former is the underlying rationale for the majority of changes to the carbon target framework, whilst changes to the AW target framework are linked to the latter.
31. Government has sought evidence from all involved in the delivery of ECO on the costs of the scheme, and has received a range of information in response to the consultation. In particular, government is also currently reviewing evidence from the obligated suppliers on the cost of policies and how these are passed through to consumer energy bills (see the Cost of the ECO targets section for details). Market evidence on ECO costs from its first year of operation, and up to the end of March 2014, suggest that scaled up annual average delivery costs for the target framework currently in legislation is around £1.4bn p.a., which is higher than what we estimated in the 2012 IA (£1.3bn p.a. on average).⁹ Before the introduction of the original targets, and over the first year of operation of the scheme, several external sources disputed the government's original estimates, suggesting costs would be higher than what we estimated in the 2012 IA; and indeed higher than what the subsequent statistics showed. Further, the obligated energy suppliers raised concerns that the ECO delivery costs would rise as they approached the legislated 31 March 2015 ECO target, particularly as they envisaged HTT CWI opportunities would diminish .

⁸ See 2012 IA p.36-38

⁹ For detailed reported ECO costs see Domestic Green Deal, Energy Company Obligation and Insulation Levels in Great Britain, Quarterly report https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/321179/Quarterly_Statistical_Release_-_GD_ECO_and_insulation_levels_in_Great_Britain_-_19_June_2014_FINAL.pdf

32. The new carbon target regulations are designed to provide relief to households' domestic energy bills in the short term whilst not compromising on long-term climate change targets through setting ECO targets in legislation for a further two years to 31 March 2017. One of the changes will directly reduce the CERO target in legislation. Others are designed to lower the unit cost of complying with these targets compared to those currently in legislation, by increasing the ECO eligibility criteria or reducing the actual amount companies need to deliver (beyond the reduction in the legislated CERO target).

Changes to CERO

33. Reducing the CERO target to 31 March 2015 by 33 % will directly reduce the cost to suppliers of delivering this target. The reduced level of CERO activity will, however, imply reduced uptake of energy efficiency measures with associated impacts on energy and carbon savings and the energy efficiency market more broadly. Extending the list of eligible measures should also reduce the cost of delivery (see Annex C in the consultation Assessment of Impacts for details) and address the suppliers' concerns about rising costs of HTT CWI measures. The SWI minimum of 4.0MtCO₂ (equivalent to 100,000 SWI measures) to 31 March 2017 will provide the market with certainty of a minimum level of demand for SWI. It could partially offset a negative impact on the SWI supply chain from the other changes to CERO.
34. Two other changes to CERO should further reduce delivery costs. The primary purpose of the uplifted score for early CERO delivery (the 'levelisation' mechanism) is to mitigate the adverse impact of the changes to CERO on those suppliers who delivered a significant amount of ECO compliance in the high CERO abatement cost environment where ETT CWI, LI and DHs were not eligible as primary measures. The uplifted score will reduce the amount of abatement required and therefore lower ECO delivery costs (for details see Annex C: Detailed analysis of the levelisation mechanism). Further, suppliers that over-delivered under previous obligation schemes (CERT and CESP) will be credited for all their over-delivery which can be carried forward to their ECO targets (this will impact both CERO and CSCO delivery costs) (see Annex A: Background on CERT carry-forward assumptions for more details). Both of these measures will result in reduced ECO activity.
35. Replacing uncertainty over sanctions for non-compliance with CERO targets to 31 March 2015 with a rule-based system built into the operation of the scheme itself (the 'ratchet') provides the obligated suppliers with more flexibility in their delivery trajectories, and an incentive to avoid a cliff-edge in CERO activity during the period to 31 March 2015. It also provides government with certainty that any loss of abatement from CERO under-delivery will be compensated with higher energy efficiency delivery in the next target period. Further, the government will not cap the amount of surplus CERO delivery that suppliers can carry forward from the 31 March 2015 target to their 2017 target. Government is introducing this measure to allow suppliers the flexibility to optimise their delivery profile over time; this could lower the overall delivery costs by enabling economies of scale to be realised for those projects delivered over a longer-term time frame. Allowing full carry forward should also avoid a hiatus in delivery in approaching the 2015 target deadline, and the associated negative impact on the supply chain (although a transfer in market delivery to the near term will imply reduced market activity later in the target period to 2017).

Changes to CSCO

36. The CSCO eligible areas is extended and the requirements for households in rural areas (under the rural safeguard) to be a member of the AW group removed. This change reflects a concern that the cost of identifying and targeting delivery at eligible households has proved challenging for obligated suppliers, particularly in rural areas. In particular, the obligated suppliers as a whole have delivered only 2 % of their original CSCO rural sub-obligation (all measures notified to the end of May and approved by the end of June).¹⁰ This change will

¹⁰ Ofgem ECO Compliance Updated, July 2014 <https://www.ofgem.gov.uk/ofgem-publications/88708/ecocomplianceupdatejuly2014andquarterlyannexv2.pdf>

increase flexibility for suppliers to deliver their obligations, and should therefore reduce search and delivery costs. These measures are, however, expected to lead to a lower level of support for fuel poor households given that a less stringent threshold of area deprivation will be used.¹¹

37. As under CERO, the government will not cap the amount of surplus CSCO delivery that suppliers can carry forward from the 31 March 2015 target to their 2017 target.

Changes to AW

38. No changes are made to AW for the 2015 target. The principle reason why we are making changes to AW for the 2017 targets is that we wish to align AW delivery with the guiding principles for fuel poverty action set out in the July 2013 Fuel Poverty Strategic Framework.¹² The Framework highlighted that being off the gas-grid was a significant risk factor in determining whether a household is fuel poor; as well as demonstrating that, while there is an important role for efficient boilers in supporting the fuel poor with cost-effective measures, there is a range of other cost-effective energy efficiency interventions that the policy should also focus on.
39. As such, the two broad changes to AW to begin this alignment with the Strategic Framework are 1) to incentivise increased support to non-gas fuelled households and 2) to take steps to ensure a more balanced mix of socially cost-effective measures are incentivised by reducing the dominance of gas boiler replacements being delivered under the scheme.
40. Less than two per cent of measures delivered to date under AW have been to non-gas fuelled households,¹³ despite low income households off the gas-grid being more at risk of falling into fuel poverty than gas fuelled households.¹⁴ Therefore, as one of the government's flagship fuel poverty policies, changes are proposed to increase the incentives to support these households. The specific changes to reach this aim are: (1) to uplift the AW score achieved by non-gas fuelled households; and (2) to introduce a new measure, a 'qualifying electric storage heater', which uses the same scoring methodology as a 'qualifying boiler'. This would effectively lead to a further increase in the AW score from the replacement of these measures, where they have reached the end of their technical lifetime or are inefficient.
41. To rebalance delivery between qualifying gas boiler replacements and other socially cost-effective measures, we are introducing a provision for deflating the score received for qualifying gas boilers. This change, in combination with an uplift for delivery to non-gas fuelled households, is expected to incentivise a more balanced delivery portfolio under the scheme, for instance bringing forward delivery of off-grid heating measures, boiler repairs, insulation and first time central heating.
42. There is another important reason why we wish to change some of the AW rules: to ensure there is adequate customer protection in all installations delivered under the policy.
43. Delivery evidence to date suggests some causes for concern in this context. Given that, by definition, households receiving support under AW are in some sense vulnerable (by dint of being on a low income), we want to ensure a high quality installation is guaranteed. We will therefore require in future that a warranty is included with the delivery of all boiler replacements.

¹¹ There is no explicit link between fuel poverty and deprived areas, but the two are correlated. By expanding the areas qualifying for CSCO support, we assume there will be a weakening of the focus on fuel poor households under CSCO.

¹² *Fuel Poverty: A Framework for Future Action*:

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/211137/fuel_poverty_strategic_framework_analytical_annex.pdf

¹³ See: <https://www.gov.uk/government/publications/green-deal-energy-company-obligation-eco-and-insulation-levels-in-great-britain-quarterly-report-to-march-2014>

¹⁴ See:

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/211137/fuel_poverty_strategic_framework_analytical_annex.pdf

44. These changes have been designed to be cost neutral, so that the estimated cost of meeting the AW target remains at £350 million (in 2011 prices) per annum. Where policy changes cause the unit cost to increase, the AW target is revised downwards; where the changes cause the unit cost to decrease, the AW target is revised upwards. The net effect of our proposals is set out throughout this document, and, broadly speaking, it represents no change on the estimated unit cost from those set out in the 2012 IA.

5. Counterfactual

45. This section sets out the counterfactual used in this assessment. In the absence of the policy package in this IA, we assume that there would be: non-policy driven uptake; the ECO counterfactual; Green Deal uptake in the absence of ECO; and the domestic Private Rented Sector (PRS) regulations. These are described in turn in the below.
46. **Non-policy driven 'Business As Usual' (BAU) uptake.** There could be some limited amount of uptake of energy efficiency measures in the absence of policies. This uptake would be influenced by behaviour trends and changes in awareness of energy efficiency, energy prices, the cost of measures and technological progress. It is likely to be driven by home improvement action and other policy drivers such as planning regulations. We have not included estimates of BAU uptake in this assessment; any uptake is likely to be marginal given the range of funding opportunities available for energy efficiency measures in the domestic sector.
47. **ECO regulations counterfactual.** The ECO regulations are as per the Electricity and Gas ECO Order 2012.¹⁵ Under these regulations, there are no ECO targets beyond 31 March 2015 (consistent with the Regulatory Policy Committee's (RPC) view on the appropriate counterfactual for the assessment).¹⁶ Until then, the target framework is as follows:
- **The CERO target:** 20.9MtCO₂ lifetime savings from the installation of HTT CWI or SWI, or other insulation measures packaged with these two primary measures;¹⁷
 - **The CSCO target:** 6.8MtCO₂ lifetime savings from installation of a wider list of insulation measures to low income areas (households in the 15% lowest IMD areas).¹⁸
 - **CSCO Rural Safeguard:** at least 15 % of the CSCO target must be achieved by promoting measures to households on AW benefits (see definition below) in rural areas.
 - **The AW target:** £4.2bn reduction in lifetime notional space and water heating costs through the installation of insulation measures or heating technologies. Only privately rented or owned households on certain benefits are eligible.¹⁹
48. **Domestic Green Deal counterfactual.** The Green Deal framework, launched in January 2013, continues for the entire appraisal period under the counterfactual and the final policy package. The Green Deal is a financing mechanism and a framework of advice, assurance and accreditation for the energy efficiency supply chain for homes and businesses. It enables the installation of energy efficiency improvements at little or no upfront costs, with payments recouped through customers' energy bills. In respect of the finance element of the Green

¹⁵ <http://www.legislation.gov.uk/ukxi/2012/3018/contents/made>

¹⁶ The RPC commented on the (unpublished) February 2014 ECO consultation Regulatory Triage Assessment that "Since it seems clear that, without any further government action, the current scheme is due to end on 31 March 2015, the appropriate counterfactual is that there is no ECO after that date". The opinion was not published.

¹⁷ A full list of the primary and secondary measures under the current ECO legislation is available here:

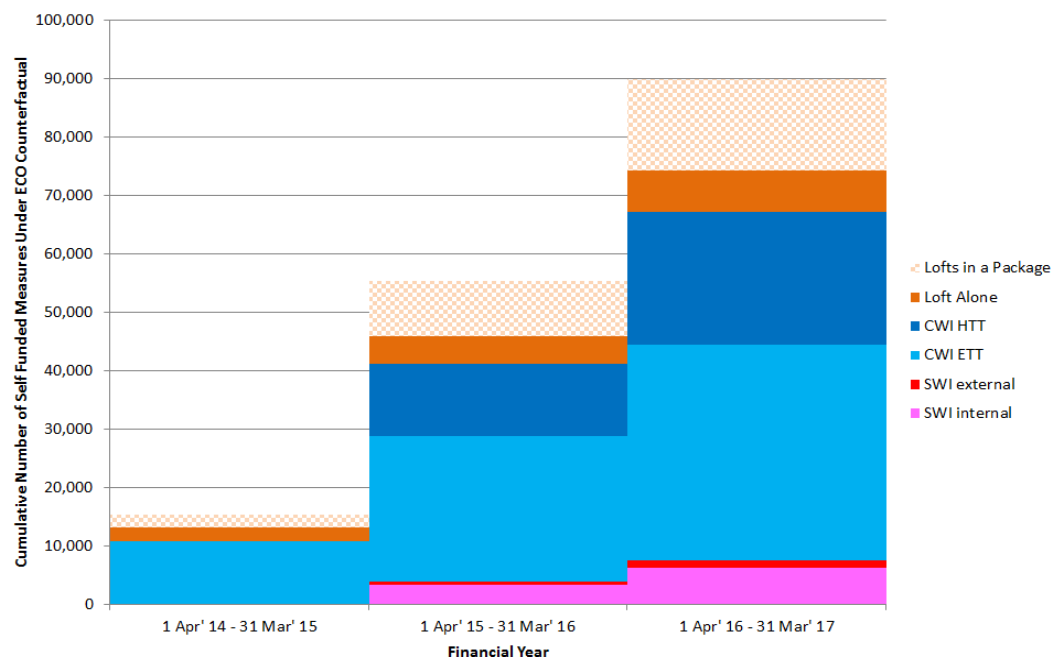
<https://www.ofgem.gov.uk/ofgem-publications/83100/ecomeasurestable03102013.pdf>

¹⁸ Suppliers can deliver 25% of the obligation in areas adjoining CSCO eligible areas.

¹⁹ These include those on certain elements of working tax credit under a household income of £16,010 and those in receipt of qualifying means tested benefits with children aged 19 years or under full time training. See the ECO 2012 order for further details: http://www.legislation.gov.uk/ukxi/2012/3018/pdfs/ukxi_20123018_en.pdf

Deal, the Green Deal's Golden Rule states that Green Deal finance repayments should be no more than what a typical household should save in energy costs as a result of the energy efficient installation. Figure 1 below shows the estimated uptake of energy efficiency measures funded by Green Deal finance or other personal sources, such as savings or personal bank loans, in the absence of an ECO beyond 31 March 2015. Under the final ECO package, we assume that all carbon target measures are partly or fully funded by ECO for the duration of the ECO targets.

Figure 1: Cumulative uptake of the main insulation measures driven by GD finance (or other sources of private finance) only



49. **Domestic PRS regulations counterfactual.** Government is due to consult on the secondary legislation for the PRS regulations shortly. The consultation will consider the manner of introducing energy efficiency regulations, required under the Energy Act 2011, to enable domestic private tenants' to request consent to energy efficiency improvements, and to establish a minimum energy efficiency standard for domestic and non-domestic private rented property based on a property's EPC rating. For the purposes of modelling counterfactual uptake within this IA, the PRS regulations have been modelled in line with the broad policy intent outlined with the passing of the Energy Act 2011 provisions and subsequent government statements which are as follows:

- **Component (1)** From April 2016, landlords of a domestic property may not unreasonably refuse requests from their tenants for consent to energy efficiency improvements, where financial support is available that ensures no upfront costs to landlords for the measures.
- **Component (2)** From April 2018, applicable private rented properties must be brought up to a minimum EPC rating of an 'E' if this can be achieved with no upfront costs for the required improvements. Landlords would fulfil this requirement if the property had either reached an 'E' threshold or carried out the maximum package of measures that can be funded without upfront cost, for example through a Green Deal finance arrangement.

50. In modelling the PRS within the ECO counterfactual (and the final ECO policy package), we have assumed that the PRS Regulations impact the ECO and Green Deal uptake within the PRS by increasing the Decision Making Frequency (DMF) of PRS households from 2016. The DMF is assumed to increase from 2016, ahead of the minimum energy efficiency standard requirement in 2018, as we assume that some landlords will act early in anticipation of the PRS Regulations coming into force. This impact is accounted for in the 'ECO regulation counterfactual' (and the 'Final ECO policy package') scenario. More details on the impact of the PRS Regulations will be outlined in an IA that will accompany the PRS consultation.

51. In addition to the above policies, the government recently announced the GDHIF which is a new incentive scheme open from early June 2014 to all householders in England and Wales wanting to make their homes more energy efficient. 9,559 GDHIF Applications had been received up to 14 July.²⁰ Government do not currently have estimates of the uptake of measures from the GDHIF, but it will be relatively small in scale compared to ECO given that the size of the available funds.

6. Analytical approach

52. The modelling tools and overall approach in this IA are similar to those used for the 5 March 2014 consultation Assessment of Impacts.²¹ We have, however, amended the analysis in light of updated market data and evidence received from consultees. This section provides an overview of the major changes in the analytical approach in this assessment compared to the consultation stage assessment. It outlines the changes to the models used and their input assumptions, and our approach to modelling the final policy package. Background information on the models used in the assessment can be found in Annex E: Models used in the assessment. An overview of changes to the ECO counterfactual scenario since the 2012 IA is provided in Annex G: Changes to the ECO counterfactual scenario since earlier assessments.

Changes to the GDHM

53. The GDHM has been developed since the 5 March Assessment. It has been rebuilt to streamline its operation and logical structure. Its core functionality is the same, however; so the results are consistent with those produced in the previous model. The main advantage of the new model is its improved transparency which makes it easier to quality-assure the model's inputs and results.

Changes to GDHM input assumptions

54. The majority of the modelling input assumptions remain unchanged since the 5 March consultation assessment. The major changes to input assumptions from the 2012 IA to the 5 March consultation assessment are detailed in that assessment, but have also been repeated in this IA in Annex G: Changes to the ECO counterfactual scenario since earlier assessments. We have, however, modified some assumptions in light of better evidence and responses to the consultation and updated market data. This has, in particular, improved the modelling of the costs and benefits of the ECO policy package. These input assumption changes are described below.

Internal and external SWI uptake

55. Many consultees raised concern over the predicted split between external and internal SWI in our consultation stage assessment. This had estimated that a large share of total SWI uptake would be internal SWI, while statistics on ECO delivery up to the end of April 2014, in contrast, showed that the large majority of SWI uptake under ECO is currently external SWI.²² Some respondents to the consultation suggested that DECC had underestimated the disruption associated with internal wall insulation, and that the majority of future SWI uptake would be external SWI. On this basis, we have adjusted input assumptions to align the predicted split better with both the historical statistics and the expectations of the market.

²⁰ <https://www.gov.uk/government/publications/energy-savings-advice-service-esas-calls-and-green-deal-webpage-views>

²¹ *The Future of the Energy Company Obligation: Assessment of Impacts*
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/286926/The_Future_of_the_Energy_Company_Obligation_Assessment_of_Impacts.pdf

²² 93% of SWIs delivered under ECO to the end of April 2014 were external SWIs. See:
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/321192/Monthly_Statistical_Release_-_Green_Deal_and_ECO_in_GB_19th_June_FINAL.pdf, table 5a.

56. Some consultees felt that the assumed SWI installation costs appeared higher than the rates seen in the market. However, the majority of respondents noted that the department's assessment of internal SWI underestimated the disruption it causes (i.e. the hidden cost to households) and therefore overestimated the uptake of this technology. We have therefore increased the hidden cost assumption for internal SWI to £16,400 from £12,250. This represents a move from the 'central' to 'high' hidden cost assumption in the underlying source of hidden costs (used in this and the consultation assessment).²³

Table 2: SWI hidden cost assumptions in consultation assessment and final IA

Measure	Hidden cost (old)	Hidden cost (updated)
Internal SWI	£12,250	£16,400
External SWI	£1,720	£1,720 (unchanged)

57. The assumed external SWI costs in the Social Housing sector have also been reduced. In the consultation stage assessment, we assumed that the delivery cost of external SWI was 30% lower than the delivery costs in other sectors; we now assume that costs are 40% lower.
58. With these two adjustments, we achieve a split between external and internal SWI which we believe better represents the past and likely future uptake of these technologies (see section 7 for details on the predicted uptake).
59. DECC recognises that there remains uncertainty about the extent to which future delivery patterns will mimic historical delivery, and indeed on the cost of technologies. As the market for SWI matures, for instance, householders' acceptance of internal SWI could grow, especially where the external appearance of period properties is a major consideration.

Suppliers' performance towards Phase 1 and 2 ECO targets

60. We have updated our assumptions on individual suppliers' progress towards their Phase 1 and 2 ECO targets (CERO carbon scores), and the assumed allocation of the targets between the obligated suppliers, in order to revise the estimated effects of the levelisation mechanism on modelled CERO delivery. The updated assumptions are based on unpublished data on delivery of carbon target units (by company) for measures reported to Ofgem to have been installed to the end of March 2014, and Ofgem information on the share of these that were primary measures.²⁴ These figures are used to estimate the amount of the 31 March 2015 CERO target that is left for suppliers to deliver (after the 33 % reduction and CERT/CESP carry-forward) and therefore of the impact of the levelisation mechanism.
61. We have taken the same approach to incorporate information on suppliers' performance towards their Phase 1 and Phase 2 AW and CSCO targets.²⁵ Government is not introducing a levelisation mechanism for AW and CSCO delivery, but updated AW and CSCO delivery statistics have been used to inform our modelling of what AW and CSCO target ambition remains for the suppliers to deliver from 1 April 2014 the end of March 2015.

Update statistics on ECO delivery of measures

62. The measures delivered for the period to the end of 31 March 2014 reported in the output tables in this IA are based on DECC statistics on actual measures delivered to the end of March 2014.²⁶ The modelling outputs for the period from 1 April 2014 have to an extent been calibrated to historical data on uptake of ECO measures. The GDHM is calibrated to match, as far as possible, statistics on measures delivered within the CERO and CSCO obligations, especially between internal and external SWI. Because of the way in which the model works,

²³ ECOFYS (2009), *The hidden costs and benefits of domestic energy efficiency and carbon saving measures. Final report*

²⁴ Only savings from primary measures will be eligible for the levelisation uplift.

²⁵ The total ECO target was allocated in phases. 20% was allocated in Phase 1, and 40% each in Phases 2 and 3.

²⁶ Green Deal and ECO Monthly statistics (May 2014), <https://www.gov.uk/government/publications/green-deal-and-energy-company-obligation-eco-monthly-statistics-may-2014>

it is not possible to optimise it to deliver an exact ex-post match of the obligated suppliers' delivery of measures.

Updated market evidence on ECO costs

63. We have updated the administrative cost assumptions to reflect more recent statistics on costs of ECO during its first year of operation (to the end of December 2013). Delivery costs for the period to 31 March 2014 are based on the scaled up annual average costs statistics for the original targets in the year to 31 December 2013, scaled up to the full 2.25 year original target period. This total estimated target costs is then scaled down to estimate the costs incurred in the period to the end of March 2014 by applying the percentage share of the total targets that was delivered to the end of March 2014 (the latter is based on the unpublished Ofgem data). Costs from 1 April 2014 are estimated in the GDHM. See Administrative costs section for details on our updated assessment of admin costs.
64. Other modelling changes noted in this section have also had an impact on the estimated ECO delivery costs, but we have not updated the underlying *calibration* methodology (which affects all modelled outputs from 1 April 2014) for the GDHM to new market evidence on ECO costs since the approach taken for consultation stage assessment. This is because there has been very limited trading on the ECO brokerage platform since the time of the consultation analysis, and the prices at which lots have been traded reflect an unsettled market since the December 2013 announcements. We therefore do not think that the costs observed in the market in the period in early 2014 are likely to be a robust basis on which to calibrate cost for future years of ECO to the end of March 2017.

Updated calibration to market evidence on delivery by tenure

65. The estimated distribution of uptake by tenure in the consultation assessment differed from the available statistics. In particular, our modelling predicted that a significantly smaller share of measures would be delivered in PRS households than what the delivery statistics to the end of September 2013 showed. We have therefore increased the likelihood of PRS households considering taking up measures in our modelling. In the consultation stage assessment, we assumed that PRS households were 5% as likely to consider measures as the households in the Owner Occupier sector; we have increased this parameter to 50%. Our consultation stage assessment also underestimated delivery of measures to the Social Housing sector; this has now been addressed through the amendment to the revised assumptions on external SWI delivery costs described above.

Carry-forward of ECO surplus activity between target periods

66. Under the central scenario in this assessment, we have assumed that the obligated suppliers as a whole over-deliver towards their 31 March 2015 carbon and AW targets and that this over-delivery is carried forward to the 31 March 2017 targets. We have captured this in the GDHM by apportioning the total CERO and CSCO targets for the two year period to the end of March 2017 plus the remaining CERO and CSCO target ambition in the period to 31 March 2015 equally over the three financial years 2014/15, 2015/16 and 2016/17. (The remaining ambition to 31 March 2015 is what is left of the original targets after historical delivery, impact of the policy package and carry-forward from CERT/CESP equally. See Annex J: ECO targets to be legislated and assumed ECO carbon target ambition following historical delivery and impact of policy changes for details).
67. We have captured this in the AW model by assuming 31 March 2015 targets for AW are met in 2014 and delivery for the 2017 ECO targets begins from October 2014. This has been adopted because the current rate of delivery over 2013 would lead to the industry as a whole meeting the ECO 2015 target by June 2014.²⁷ However, we recognise that the consultation process has introduced uncertainty into market conditions and consequently may have slowed down delivery, as seen by low levels of activity under brokerage through April 2014.

²⁷ Source: <https://www.gov.uk/government/collections/green-deal-and-energy-company-obligation-eco-statistics>

Furthermore, suppliers who are due to meet their targets imminently may wait to begin delivery towards ECO 2017 targets after legislation and/or guidance on the scheme has been published. We have therefore assumed a lag in delivery of 3 months between when the 2015 AW target is due to be met and when delivery for 2017 AW target starts. This early delivery causes the costs of meeting the 2017 target to be spread over 2.5 years instead of the 2 years of the scheme. Further changes to the Affordable Warmth model are shown in Annex E: Models used in the assessment.

Recognition of customer contributions in the AW model

68. In our earlier assessments of ECO, we have assumed that there is blending of ECO and Green Deal finance under the two carbon targets, but not under AW. However, we have been frequently advised by the supply chain that customers are being asked to contribute towards measures received through AW and that this has allowed a lower cost of delivery to be achieved. As a result we have recognised these contributions are now recognised in the model. This has been achieved by assuming that a certain proportion of households are willing to pay for heating measures so that the unit cost of delivering to them is the same as delivering the market leading option for heating measures i.e. replacement of gas boilers to large homes. This method has been adopted to mirror the feedback we have received from industry regarding how customers are being asked to contribute in practise. More details of this are provided in Annex E: Models used in the assessment.

Changes to AW input assumptions

69. **Boiler replacement cost.** We have revised down our central estimate of installing heating costs, for instance we now use a central estimated cost of replacing gas boilers of around £1,800 compared to the previous figure of £2,200. This has been adopted following the low AW prices seen traded through brokerage and following conversations with the supply chain on the typical costs of delivery. The central cost estimate remains based on evidence of delivery costs seen under previous energy efficiency schemes; however, the central estimate of cost has been adopted as opposed to the previous figure which was more towards the 'upper bound'.
70. **Cost of a boiler warranty.** The cost of a warranty required with boiler replacements from 2015 onwards is estimated to be £130 per year. This is an increase from £50 per year on the estimate that was adopted for the Assessment of Impacts that accompanied the consultation. This new evidence stems from a search of warranties offered through the market which appear similar to kind required under the policy. Reflecting responses from numerous parts of the supply chain through the consultation, this figure is higher than we originally proposed.

Changes to the modelling of the domestic energy efficiency policy environment

71. The core approach to modelling the domestic energy efficiency policy environment has not changed since the 5 March consultation stage assessment. As before, the GDHM and AW models are run in sequence; the technical potential of the AW model is what remains after the projected uptake in the GDHM model. This ensures that we are not double-counting the domestic technical potential between the two models.
72. We have, however, made some changes in our models to better capture the final ECO policy package. An overview of our analytical approach to the various components of the ECO policy measures consulted on are provided in Annex B: List of policy mechanisms – approach taken in consultation and final assessment. An overview of the changes to the counterfactual scenario since the earlier ECO assessments is provided in Annex G: Changes to the ECO counterfactual scenario since earlier assessments.
73. The uptake in PRS households that are assumed to get no ECO subsidy is modelled separately to the GDHM; the uptake in one model is not netted of the technical potential off the other model. This non-ECO uptake will be assessed within a consultation stage IA for the PRS regulations.

74. DECC recognises that there are limitations to the current approach to modelling the domestic energy efficiency policy landscape and that the policy environment should ideally be modelled in one model to better capture the interactions between the different policy drivers. This is why DECC is developing the National Household Model (NHM) to enable the department to model the interactions of all domestic policies on a consistent basis.
75. In particular, the current modelling will not capture interactions between the schemes beyond those described above. For instance, we have not included the potential uptake driven by the GDHIF in our counterfactual, nor have we captured a possible interaction between ECO and the GDHIF scheme. Under the GDHIF, at scheme launch eligible householders could claim up to £1,000 for installing two measures from an approved list and/or up to £6,000 for installing SWI. A customer cannot be in receipt of any ECO or other government funding for measures being installed, so any interrelationship with ECO will only be indirect. However, it could be the case that the GDHIF incentive level for SWI would push up the market rate for SWI measures under ECO and thereby increase SWI delivery costs. Similarly, there could be limited uptake of non-SWI incentive measures under GDHIF if the market rates for these measures under ECO are higher than those offered under GDHIF. This would reduce the amount of uptake under the incentive scheme.

7. Aggregate impact analysis

76. This section sets out our estimated impact of the final policy package. The impacts presented are net of the counterfactual impact, unless otherwise specified.²⁸

Carbon savings

77. The Climate Change Act 2008 established a target for the UK to reduce its emissions by at least 80 % from 1990 levels by 2050. The Act also established a system of five-yearly Carbon Budgets (CBs), currently stretching out to 2027. Reducing emissions from domestic buildings will be important in order for the UK to meet its 2050 emission reduction targets, and energy efficiency supplier obligation policies will play an important role within this.
78. We have estimated the gross and net impact of the final ECO package (including measures taken up under the domestic Green Deal alongside ECO) on carbon savings in CB periods 2 (2013-2017) and 3 (2018-2022). Under both scenarios, we have not included savings from historical delivery between 2013 to the end of March 2014. On this basis, we estimate that the ECO policy package will contribute 1.91MtCO₂ gross savings to CB 2 and 3.24MtCO₂ gross savings to CB 3. Table 3 below shows the breakdown of traded and non-traded savings from ECO (gross and net of the counterfactual savings). It shows the cumulative savings in a given five year CB period which includes the savings from measures installed under ECO in the years prior to that particular five year period (except for January 2013 to the end of March 2014).
79. AW leads to an increase in non-traded sector emissions because the scheme delivers a significant number of gas boilers leading to an increase in the consumption of gas. This rise in consumption is in comparison to a scenario where a significant proportion of households are assumed to heat their homes with an electric room heater when their boiler is broken – a scenario that was found under an evaluation of previous energy efficiency policies.
80. The analysis suggests that there are greater carbon savings under CSCO in the final package than under the counterfactual. This is due to the extension of the CSCO target for a further two years to 31 March 2017 under the final package.

²⁸ As we capture the impact from the domestic Green Deal both in the policy package and in the counterfactual scenario, the impact of the Green Deal only will be netted off where net impacts are presented. However, due to the interlinkages between the Green Deal and ECO, there will be some difference in Green Deal only uptake after ECO ends between the two scenarios as different amount of ECO uptake will affect the remaining potential for Green Deal only uptake.

81. Under CERO, we estimate that carbon savings in CB Period 2 are lower in the final package than in the counterfactual. Even though the overall CERO target ambition is higher under the final package than the counterfactual, the 33% reduction to the 2015 target and the impact of the levelisation mechanism and carry-forward from CERT/CESP reduce the amount of the CERO carbon target ambition that needs to be delivered. In addition, the counterfactual assumed that ETT measures would be delivered through households self-financing, providing additional carbon savings to those under ECO; these are now assumed to be part or fully funded by CERO under the final ECO package, so there is complete crowding out of these measures that would have been self-funded under the counterfactual. The net impact is a reduction in savings in CB period 2 in the final package compared to the counterfactual.
82. Under CERO in CB Period 3, overall carbon savings are greater under the final ECO package than in the counterfactual. This reflects the greater cumulative impact of carbon savings from the two extra years of ECO targets in the final package compared to the counterfactual, despite the lower CERO ambition to 2015 in the final package compared to the counterfactual (explained above).
83. Our analysis suggests that the traded savings are lower in the final package than in the counterfactual, but that non-traded savings are higher than in the counterfactual. This is explained by the heating fuel used in the households that we predict are crowded out under the final policy package (by the process explained above). The households that are crowded out are likely to be those that meet the Golden Rule by a large margin without ECO subsidy, those that generate large energy savings per measure installed. Everything else being equal, these (highly cost-effective) households are likely to be heated by non-gas fuels, mainly electricity, as non-gas heating is generally more expensive per unit of energy. Energy savings from these electrically heated households lead to traded carbon savings. Our modelling predicts that the crowding out of these electrically heated households under the final package, therefore, leads to a decrease in traded carbon savings relative to the counterfactual.

Table 3: Contribution from ECO and domestic Green Deal (to end 31 March 2017) to CB periods (traded and non-traded²⁹)

Total contribution from final ECO package				
<i>MtCO_{2e}</i>	CB 2 (traded)	CB 2 (non-traded)	CB 3 (traded)	CB 3 (non-traded)
CERO	0.18	0.73	0.36	1.40
CSCO	0.09	0.34	0.19	0.63
AW	1.39	-0.82	2.11	-1.46
Total	1.66	0.24	2.66	0.58
Difference from counterfactual ECO scenario				
<i>MtCO_{2e}</i>	CB 2 (traded)	CB 2 (non-traded)	CB 3 (traded)	CB 3 (non-traded)
CERO	-0.02	-0.16	-0.02	0.03
CSCO	0.04	0.16	0.08	0.36
AW	0.89	-1.32	1.58	-1.10
Total	0.91	-1.32	1.64	-0.70

Uptake of measures

84. We estimate that around 102,000 SWI, 995,000 CWI, 514,000 LI and 500,000 heating measures will be taken up under ECO and the domestic Green Deal up to the end of March 2017 (these are gross figures). The net impact of the ECO package (relative to the ECO counterfactual scenario) is an increase in the number of measures overall, due to the additional two years of ECO targets in the final package.
85. Our modelling suggests that there will be 304,000 fewer HTT CWIs taken up in the year to 31 March 2015 compared to the counterfactual scenario. Over the same period, the uptake of

²⁹ Traded savings occur in the domestic sectors when energy savings are in households heated by electricity. Non-traded savings are from energy savings in households heated by other fuels.

ETT CWI is three times that in the counterfactual but that there are around 23% fewer LI. The net impact is driven by several different factors:

- The 33% reduction to the CERO target in the final package will, everything else being equal, reduce the uptake of HTT measures, and also ETT measures packaged with these.
 - Our central scenario assumption that suppliers will choose to over-deliver against their March 2015 targets to smooth out the overall delivery profile to March 2017 will, everything else being equal, increase delivery of measures to March 2015 compared to the counterfactual.
 - The net increase in ETT CWI uptake during this period is driven by the policy change to allow ETT measures under CERO.
 - The net decrease in LI uptake is driven by our assumption that the majority of LI is that packaged with HTT CWI. This assumption is based on the conjoint survey which underpins the GDHM,³⁰ and is supported by ECO delivery statistics which show that 23% of all CWI measures taken up to the end of December 2013 were packaged with LI, and the majority of these were HTT CWI. We predict that there will be an increase in the uptake of stand-alone LI measures under the final package, but the significant reduction in LI measures packaged with HTT CWI means that the net impact of LI uptake (compared to the counterfactual delivery) to March 2015 is negative.
86. In contrast to the consultation stage assessment, we now project that a greater share of total SWI uptake will be external rather than internal (see Changes to GDHM input assumptions section for details in our updated analytical approach to estimating SWI uptake). This projection is better aligned with the historical split in SWI uptake, although our projections still assume that a relatively large share (around 21 %) of SWI uptake to 31 March 2017 will be internal SWI. We recognise that there remains a great degree of uncertainty around the mix of measures that suppliers will deliver in order to comply with their targets.

Table 4: Uptake of insulation measures under ECO package (gross and difference from ECO counterfactual scenario)

Gross uptake under final ECO package						
	LI (stand alone and as part of package)	ETT CWI	HTT CWI	Internal SWI	External SWI	Heating measures
1 Jan'13 – 31 Mar'14	162,000	49,000	236,000	3,000	48,000	196,000
1 Apr'14 – 31 Mar'15	119,000	88,000	151,000	3,000	11,000	90,000
1 Apr'15– 31 Mar'17	232,000	157,000	312,000	15,000	22,000	214,000
<i>Cumulative to 31 Mar'17</i>	514,000	295,000	700,000	22,000	80,000	500,000
Difference from ECO counterfactual						
	LI (stand alone and as part of package)	ETT CWI	HTT CWI	Internal SWI	External SWI	Heating measures
1 Jan'13 – 31 Mar'14	0	0	0	0	0	0
1 Apr'14 – 31 Mar'15	-35,000	59,000	-304,000	-10,000	-13,000	33,000
1 Apr'15– 31 Mar'17	232,000	157,000	312,000	15,000	22,000	214,000

³⁰Details of the conjoint survey are presented in the 2012 IA and the 2011 consultation IA (https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/43000/3603-green-deal-eco-ia.pdf)

Cumulative to 31 Mar'17	197,000	217,000	9,000	5,000	8,000	247,000
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Uptake of measure by tenure, house size and fuel type

87. This section provides information on the projected delivery of measures across tenure, house size and heating fuel, and compares this with the available evidence on actual ECO delivery. The mix of measures delivered and the estimated delivery of these across different household characteristics should be read as illustrative only, as the government neither controls nor regulates this. Following the consultation assessment, we have updated our calibration of predicted delivery to reflect better the historic market data and, in some cases, the delivery profile expected by consultees. We have not been able to calibrate our model to reflect all aspects of where the delivery statistics differ from our projections.
88. We recognise that there remain discrepancies in the modelled uptake compared to historical delivery. However, there is considerable uncertainty about what the actual distribution of measures will be, and whether historic delivery statistics are illustrative of what the distribution of measures will be in later stages of the scheme, when remaining levels of available abatement will differ from those today. In particular, our modelling continues to assume that suppliers will target the cost-effective measures potential, whereas the extent to which suppliers are able to do so in practice is uncertain.
89. **Tenure.** We project that the majority (60%) of the uptake of measures under the carbon targets will be to the Owner Occupied sector and that around a further third of measures will be installed in the social rented sector. This broadly reflects the delivery split by tenure under CERO and CSCO to the end of March 2014, although the statistics suggest that a higher proportion of measures were delivered to the rented social tenure than what we estimate in our forward projections.

Table 5: Proportion of insulation measures installed by tenure (CERO and CSCO targets)

1 Jan'13 to 31 Mar'14 (ECO supported delivery only ³¹)	CERO	CSCO	Total (CERO and CSCO)
Owner-occupied	70%	72%	71%
Rented (private)	11%	10%	11%
Rented (social)	19%	18%	18%
1 Apr'14 to 31 Mar'17	CERO	CSCO	Total (CERO and CSCO)
Owner-occupied	67%	51%	60%
Rented (private)	5%	7%	6%
Rented (social)	28%	43%	34%

Figures may not add due to rounding

90. **House size.** The majority of measures delivered under the carbon targets are predicted to be delivered to larger houses; just under 40% of all measures delivered under the carbon targets in the period from 1 April 2014 to 31 March 2017 are projected to be delivered in semi-detached houses and 30% in detached houses.

Table 6: Proportion of insulation measures installed by property type (CERO and CSCO targets)

1 Apr'14 to 31 Mar'17	CERO	CSCO	Total (CERO and CSCO)
Detached house	44%	11%	30%
Semi-detached or end-of-terrace	36%	43%	39%

³¹ These estimates are based on the reported delivery statistics of ECO supported measures (i.e. excluding measures taken up by Green Deal Finance only or any other finance option) to the end of March 2014. Around 6% of total CERO and CSCO measures were in the 'unknown' category (see published quarterly statistics, table 1.12b: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/321179/Quarterly_Statistical_Release_-_GD_ECO_and_insulation_levels_in_Great_Britain_-_19_June_2014_FINAL.pdf).

Mid-terrace	6%	13%	9%
Flat	14%	33%	22%

Figures may not add due to rounding

91. Statistics on the provisional number of households in receipt of ECO measures by property type broadly support our projections; 68 % of households in receipt of measures delivered in the period to end of March 2014 lived in houses and 27% in flats.

Table 7: Historic proportion of ECO measures installed by property type to end March'14³²

% of main insulation measures delivered to 31 Feb' 14	CERO	CSCO	Total (CERO and CSCO)
House	62%	84%	68%
Bungalow	4%	4%	4%
Flat	33%	12%	27%
Maisonette	1%	1%	1%

Figures may not add due to rounding

92. **Fuel type.** Our modelling predicts that around 40% of carbon target measures will be delivered to households that are not heated by gas (i.e. households that are heated by electricity, solid fuels, oils or other non-gas fuels). Our analysis is based on the assumption that, everything else being equal, the obligated suppliers should have a strong incentive to deliver measures to non-gas heated households. This is because a greater volume of carbon savings (and therefore ECO carbon target compliance units) will be realised from a unit of energy saving from these properties. Cost savings to off-gas households as a result of insulation measures are also typically higher than gas-heated ones.³³

Table 8: Proportion of measures installed by heating fuel (CERO and CSCO)

1 Jan'13 to 31 Mar'14 (ECO supported delivery) ³⁴	CERO	CSCO	Total (CERO and CSCO)
Electricity	13%	3%	10%
Gas	85%	96%	87%
Solid fuels, Oil & Other	3%	1%	2%
1 Apr'14 to 31 Mar'17	CERO	CSCO	Total (CERO and CSCO)
Electricity	23%	22%	22%
Gas	52%	70%	59%
Solid fuels, Oil & LPG	26%	8%	18%

Figures may not add due to rounding

93. ECO delivery statistics suggests that for ECO as a whole, around 13% of measures delivered to the end of March 2014 were in houses with electricity or other non-gas fuels as the main fuel type. The statistics do, however, show that measure delivery by fuel type varies between the carbon and AW targets. Under CERO, just over 15% of measures were to properties heated by non-gas fuels, whereas less than 2% of measures delivered under AW were delivered to properties heated by non-gas fuels.³⁵

³² These estimates are based on the reported delivery statistics of ECO supported measures to the end of March 2014 (i.e. excluding measures taken up by Green Deal Finance only). See Green Deal June quarterly stats release, table 1.12a.

³³ Other factors that would differentiate gas and non-gas heated households would influence the extent to which the obligated suppliers would target different households. For example, there could be supply chain constraints associated with delivering measures to households that are off the domestic gas grid.

³⁴ These estimates are based on the reported delivery statistics of ECO supported measures (i.e. excluding measures taken up by Green Deal Finance only) to the end of March 2014. See Green Deal June Quarterly statistics, table 1.12.

³⁵ These 'other' fuels include electricity, oil, coal, District Heating Systems, Liquefied Petroleum Gas and renewables.

94. The discrepancy between actual and predicted delivery to non-gas heated properties under ECO carbon targets arises in part because our model assumes that more cost-effective measures will be delivered before less cost-effective measures and that the delivery of measures to electrically heated households is more cost-effective than in the equivalent gas-heated homes. Also, it is possible that the energy suppliers have continued to use existing delivery models from previous supplier obligations (CERT and CESP), which focused delivery efforts on parts of the country that are on the gas grid. As the market develops, we would expect to see a rising concentration of non-gas heated properties being treated, as they tend to be where the most cost-effective savings lie.
95. For AW, we will be incentivising delivery to non-gas fuelled households from 1 April 2015, through uplifting the notional lifetime bill saving scores of these households and deflating the score achieved by gas fuelled qualifying boilers. This is because non-gas fuelled households are more vulnerable to being in fuel poverty and thus low levels of delivery to such households is undesirable.³⁶ The results from the AW model are shown in table 9, highlighting the expected impact that policy changes will have on the mix of measures delivered for the 2017 target, in comparison to delivery towards the 2015 target.

Table 9: Proportion of ECO measures installed by heating fuel (AW)

Target period to the end of March 2015	AW
Electricity	1%
Gas	99%
Solid fuels, Oil & Other	0%
Target period to the end of March 2017	AW
Electricity	26%
Gas	70%
Solid fuels, Oil & LPG	4%

96. Some respondents to the consultation felt that our modelled carbon saving per measure was higher than what obligated suppliers are likely to deliver because they do not necessarily target the most cost-effective households. For example, one energy supplier noted that they do not have perfect information on which properties are electrically heated and that SWI delivery is likely to be focused on smaller properties in social housing and flats.
97. Analysis of the average ECO scores by measure and carbon target to the end of December 2013 indicates that there is a wide range in average ECO scores for measures, in particular under CERO (see table below and chart in Annex F: Average ECO score per measure in CERO and CSCO for details). A comparison of the average carbon score for measures delivered under ECO to the end of December 2013 and those projected in our modelling shows that our modelling generally predicts a higher average carbon score than the actual average scores. However, our modelling projects a lower carbon score for LI, and ETT CWI under CSCO, than what was actually delivered.
98. A lower carbon score per measure implies that suppliers will have to deliver more measures (and support more households) in order to meet their targets. If historic statistics are representative of future scores, then this implies that suppliers will have to deliver more measures, and therefore support more households, than what we estimate in this IA. A

³⁶https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/211137/fuel_poverty_strategic_framework_analytical_annex.pdf

comparison on carbon scores does not *in itself* reveal anything about the unit cost of measures and therefore the cost of ECO compliance. But a high carbon score per measure, *for a constant unit cost (per tonne of carbon) and everything else being equal*, would imply that suppliers would deliver their obligation at lower cost than with a low carbon score, as they would need to deliver a smaller volume of measures to meet their targets.

99. The extent to which historical average scores are representative of future average scores will depend on what properties the obligated suppliers will target. The CERO policy changes will likely imply (as is reflected in our uptake of measures estimates) that a larger share of total ECO uptake of measures going forward will be from ETT measures at the expense of HTT CWI. Given the limited remaining technical potential for ETT CWI measures, it is likely that, over time, the remaining technical potential for ETT measures will be those with lower carbon savings potential and/or higher search and household persuasion costs, so the cost of delivering the ETT measures per tonne of CO₂ saved may rise. Our estimated total cost to suppliers of delivering their targets will only be affected if the cost of abatement per tonne of CO₂ is affected at the margin, not by the cost of abatement per measure. Our projections suggest that suppliers will deliver a substantial amount of HTT CWI measures under the final policy package, and it is therefore unlikely that lower average carbon scores per ETT CWI measure will affect delivery costs at the margin.

Table 10: Historical and projected average carbon scores for carbon target ECO measures (lifetime tCO₂, after adjustment for in-use factors)³⁷

Measure	Modelled average ECO carbon score (from GDHM, based on projected measures delivered between 1 April 2014 to 31 March 2017)	Historical statistics - average ECO carbon score (for measures delivered to end December 2013 ³⁸)	Historical statistics - lowest quintile	Historical statistics - highest quintile
CERO				
Internal SWI	42	19 ³⁹	<i>Insufficient data points to estimate</i>	
External SWI	47	34	13	61
HTT CWI	38	23	7	44
ETT CWI	28	10	2	22
LI	12	12	3	29
CSCO				
Internal SWI	34	15 ⁴⁰	<i>Insufficient data points to estimate</i>	
External SWI	42	27	9	46
HTT CWI	25	18	5	36
ETT CWI	21	23	8	39
LI	8	11	3	25

Households supported

100. We estimate that a total of around 1 million households will be supported under ECO to the end of March 2015, and that by 31 March 2017 a cumulative total of around 1,870,000 households will be supported. Compared to the counterfactual ECO scenario, there would be around 223,000 fewer households supported to 31 March 2015 (largely due to the reduction

³⁷ The scores are weighted by the frequency of the scores. The statistical scores do not take into account a very limited amount of measures that have scored more than 100 ECO points. Taking into account these outliers would inflate the statistical averages somewhat.

³⁸ The total estimated carbon savings through ECO to the end of December 2013 is published at <https://www.gov.uk/government/publications/green-deal-energy-company-obligation-eco-and-insulation-levels-in-great-britain-quarterly-report-to-december-2013>

³⁹ Based on less than 1,000 measures delivered to the end of December 2013.

⁴⁰ Based on less than 100 measures delivered to the end of December 2013.

in CERO). However, all of the 842,000 households supported in the two year period to 31 March 2017 are additional to the counterfactual, so the net impact is an increase of around 620,000 households supported under ECO for the whole target period to 31 March 2017.

101. Our analysis suggests that, on average, around 260,000 low income and vulnerable households, or households in deprived areas, would be supported by AW and CSCO every year up to 1 April 2017 under the final ECO package (gross). We also estimate that, on average, around 40,000 households in social housing are supported each year through CERO in the period to end of March 2017.

Table 11: Households supported under ECO (gross and net impact)

Total households supported (gross)	CERO	CSCO	AW	Total
1 Jan'13 – 31 Mar'15	435,000	221,000	373,000	1,029,000
1 Apr'15 – 31 Mar'17	335,000	246,000	261,000	842,000
<i>Cumulative to 31' Mar 17</i>	<i>771,000</i>	<i>467,000</i>	<i>634,000</i>	<i>1,871,000</i>
Difference from counterfactual	CERO	CSCO	AW	Total
1 Jan'13 – 31 Mar'15	-258,000	-37,000	72,000	-223,000
1 Apr'15 – 31 Mar'17	335,000	246,000	261,000	842,000
Cumulative to March 2017	<i>78,000</i>	<i>209,000</i>	<i>333,000</i>	<i>620,000</i>

Impact on Fuel Poverty

102. Table 12 shows the impact of ECO on the number of households in fuel poverty and the fuel poverty gap in England. These figures represent the cumulative impact of the ECO policy package at the beginning of 2017 compared to a scenario where no changes to ECO are made i.e. no 2017 target is set and no changes to the targets for the period 2013-15 are made.

Table 12: Impact on fuel poverty in England at the beginning of 2017 from the net changes to ECO

Fuel poverty in England	Impact of final ECO package
Change in number of households in fuel poverty	-10,000
Change in aggregate fuel poverty gap	+ £10 million

103. As can be seen, looked at in this way, the effect of ECO is to lower the number of households in fuel poverty while increasing the aggregate fuel poverty gap.
104. These impacts are driven by two factors. The first is that ECO delivers a long-term decrease in energy bills for those households receiving support. This is estimated to drive a reduction in the fuel poverty gap for those households receiving support, with the aggregate fuel poverty gap for this group falling by £22 million. The second is that the delivery costs associated with ECO cause an increase in energy bills for all households. In the short-term at least, this latter effect offsets the former.
105. It is important to note that in the long term, as the deployment of energy efficiency measures continues, more fuel poor households will benefit from this support and the reduction in energy bills that result from these measures will be long lasting.
106. There are also reasons to believe the impacts shown in the table above are conservative. This is because we have not made the assumption that suppliers target high cost households

specifically, despite the fact that such households represent the best value for money to suppliers. If this were factored in, the estimate would reflect more support reaching the fuel poor through Affordable Warmth.

Employment

107. Our analysis suggests that the gross number of jobs supported as a result of the uptake of insulation⁴¹ and heating measures under ECO and the domestic Green Deal in 2015/16 is between 28,000 and 34,000. There is no relevant comparison with the ECO counterfactual as this assumes there is no ECO beyond 31 March 2015. Our estimates represent the gross number of jobs supported as a direct consequence of the policy package, and does not attempt to capture the net employment impact. Further, employment impacts will vary over time according to the estimated trajectories for uptake of measures.

Table 13: Impact on jobs supported (gross impact of final package and counterfactual scenario)

Gross jobs supported : Final ECO policy package - 2015/16				
	Installers	Supply chain jobs (excluding assessors)	Green Deal Assessors	Total
<i>Method A</i>	10,000	22,000	3,000	34,000
<i>Method B</i>		25,000	3,000	28,000

108. In the consultation stage assessment, we estimated that around 35,000-36,000 jobs would be supported in 2015/16 as a result of the package consulted on.⁴² Our updated estimates are lower, reflecting changes to the modelling approach and the final policy design. Firstly, we now assume that suppliers deliver fewer of the labour intensive SWI technologies (102,000 SWI delivered to 31 March 2017, compared to 120,000 in the consultation assessment). Secondly, some 2015/16 ECO delivery is assumed to be brought forward to the period to the end of March 2015 (the effect of the ECO carry forward change or surplus 2015 delivery). Both of these changes have the effect of, everything else being equal, lowering the estimated jobs supported in 2015/16 compared to the consultation stage assessment.
109. The table above outlines two sets of job estimates, which are based on two different methods that can be used to estimate jobs supported; these two methods are outlined below.
110. **Method A.** The number of installers is based on our projections about the number of measures installed each year multiplied an assumed number of labour days required to install measures (the number of labour days differ by technology). Supply chain job estimates are based on evidence from Innovas on the ratio between installer numbers and supply chain jobs (manufacturing, supply, distribution and development). This evidence suggests that there were around 4.75 jobs in the supply chain for an installer job.⁴³ The number of Green Deal assessors has been estimated based on the assumption that an assessor will conduct an average of two assessments per day and that there will be three assessments for every successful Green Deal. A detailed description of the methodology for estimating jobs is provided in the 2012 IA.
111. **Method B.** This estimate is based on comparing the total estimated capital spend under ECO in 2015 with the labour-to-capital spending ratio estimate of 32.6 jobs per £1m output produced by the Sector Skills Council for construction of. This estimate of installer and supply chain jobs (excluding assessors) is calculated by applying this ratio to the projected CERO, CSCO and AW capital investment in 2015. The total jobs estimate is calculated by adding the estimated number of Green Deal Assessors to the installer and supply chain jobs.
112. The methodology for estimating jobs supported is unchanged from the 2012 IA. See 'Annex G: Changes to the ECO counterfactual scenario since earlier assessments' for details.

⁴¹ This includes jobs supported from CWI, SWI, LI and floor insulation.

⁴² The higher end estimate in the consultation assessment did not include the estimated impact on jobs from AW measures.

⁴³ Innovas (2009) *Low Carbon Good and Services: an industry analysis*, <http://www.bis.gov.uk/files/file50253.pdf>

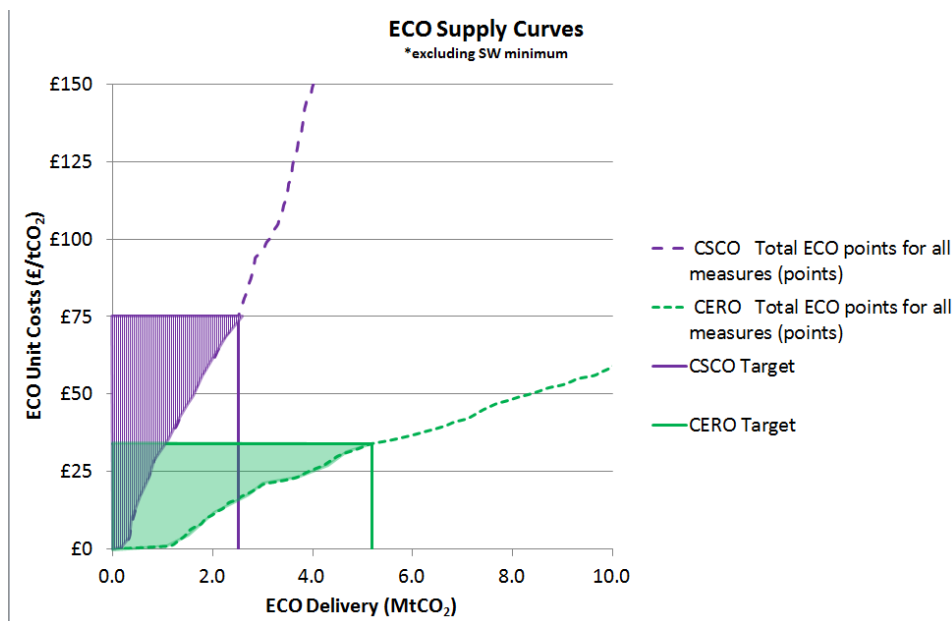
8. Costs and benefits of ECO

Cost of the ECO targets

Delivery costs for energy suppliers

113. Energy suppliers will face costs of delivering their target obligation through providing subsidies to drive householders' demand for energy efficiency and heating measures. These costs will include contributions to the installation costs, subsidies to overcome demand barriers and hidden costs, and any 'additional subsidy' (economic rent) accruing to householders or businesses in the market for ECO points (see 2012 IA section 9 for details on our approach to estimating delivery costs).⁴⁴
114. This is illustrated in the chart below. This shows illustrative upwards sloping ECO point supply curves (for CERO and CSCO) and vertical purple and green lines representing the carbon target ambitions for the two targets on the x-axis. The solid purple and green horizontal lines indicate the intersection of the supply curve and the target ambitions to be achieved, and the associated point on the y-axis is the target unit costs for each of the targets. The total ECO cost, for each of the obligations, is the rectangle formed by y- and x-axis and the horizontal and vertical purple and green lines for CSCO and CERO respectively. The associated economic rent is the shaded areas above the dotted supply curves and under the solid horizontal lines.

Figure 2: Illustration of economic rent in the market for ECO points



115. Our assessment of the impact of the ECO package on ECO delivery costs is summarised in Table 14 below. The cost of meeting the ECO targets will depend on factors such as the scale of the carry forward from previous supplier obligations to ECO, consumers' willingness to take up measures, blending of ECO and Green Deal finance (or other sources of private finance) and the obligated suppliers' ability to target the most cost-effective abatement potential. The cost profile over time will also depend on how suppliers choose to deliver between the two ECO target periods. There is also uncertainty about how, and to what extent, the obligated suppliers choose to pass through delivery costs to their customers over time (see Impact on energy bills section below).
116. In our modelling, we have imposed an assumption that the market as a whole over-complies with the 31 March 2015 ECO targets (there is therefore no impact of the CERO 'ratchet'), and that suppliers carry forward this over-delivery to the two year target period to 31 March 2017

⁴⁴ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/42984/5533-final-stage-impact-assessment-for-the-green-deal-a.pdf

target. This is the case for all three policies in ECO. This reflects the final policy position that there will be no cap on the carry-forward for CERO, CSCO and AW. Our central scenario implies that suppliers that will easily achieve the 31 March 2015 targets will bring forward some delivery costs in the period to 31 March 2015 compared to a scenario where they would not be allowed to carry-forward between periods. In our carbon target modelling, we assume that the sum of the amount of carbon target ambition that remains to be delivered in the period 2014/15 (after delivery to 31 March 2014, the impact of the ECO policy package and CERT/CESP carry-forward) and the two year targets to 31 March 2017 are spread evenly across the three financial years 2014/15, 2015/16 and 2016/17 (see Annex J: ECO targets to be legislated and assumed ECO carbon target ambition following historical delivery and impact of policy changes for details).

117. For AW we assume the 31 March 2015 target is met by October 2014 with delivery for the 2017 target starting from that point. This date has been chosen because the rate of delivery over 2013 suggests that the industry, as a whole, would meet the original target by June 2014.⁴⁵ However, delivery has slowed during the consultation process, as reflected, for example, by low levels of activity under brokerage. Furthermore, suppliers who are due to meet their targets imminently may wait to begin delivery towards ECO 2017 targets after legislation and/or guidance on the scheme has been published.
118. Taking an effective delivery period of October 2014 onwards, and given that the target for AW in March 2017 has been set based on a cost of £350million per annum (in 2011 prices) of the scheme's extension (i.e. £700m over two years), the annualised cost for AW is £290 million. Thus the early start to meeting the March 2017 targets allows for a reduced annualised cost of the scheme.
119. The extent to which suppliers will over-deliver and therefore carry forward ECO compliance between target periods is naturally uncertain, as this will depend on suppliers' commercial decisions on delivery strategies and their view of likely cost of compliance between the target periods. However, our central assumption of over-compliance with 2015 targets is supported by anecdotal evidence from the suppliers that they are likely to be over-delivering against these targets, and by the fact that suppliers stated in their consultation responses that they would not like a cap on ECO carry-forward.
120. We have also included a second cost profile scenario to reflect the uncertainties around how suppliers incur costs over time and how, in turn, these are passed through to consumer bills. In this 'averaged costs' scenario, we have assumed that suppliers will average their delivery costs across the financial years 2014/15, 2015/16 and 2016/17.⁴⁶ The total delivery cost to 31 March 2017 is the same as under the central scenario. This could be a realistic scenario of how costs are passed through to bills (even if the underlying delivery costs are incurred as per the central scenario), given pressures on energy suppliers not to change their tariffs frequently and the foresight they have over this period of the targets they need to deliver.
121. Based on these two methodologies, we estimate that the average annual delivery cost that could be passed through to consumer bills in the period to 31 March 2015 is between £976m to £1,005m and between £787m and £820m for the two year period to 31 March 2017.

Table 14: ECO delivery costs of final package, total costs and target period annual average costs

Central scenario

⁴⁵ Source: DECC quarterly stats report <https://www.gov.uk/government/publications/green-deal-energy-company-obligation-eco-and-insulation-levels-in-great-britain-quarterly-report-to-december-2013>

⁴⁶ The total delivery costs under all three ECO targets in the period to 31 March 2014 is the same under the 'central' and 'averaged costs' scenarios. The total costs in the three financial years to 31 March 2017 are the same between the two scenarios. The projected costs in 2014/15 in the 'central' scenario is lower than the average of the three financial years to 31 March 2017, so the 2014/15 costs in the 'averaged costs' scenario is higher than under the 'central scenario'. The average annual cost in the period to 31 March 2015 is therefore greater under the 'averaged costs' than under the 'central' scenario.

£m	1 Jan'13-31 Mar'14 (delivery costs in period)	1 Apr'14- 31 Mar'15 (delivery costs in period)	1 Apr'15 -31 Mar'16 (delivery costs in period)	1 Apr'16 – 31 Apr'17 (delivery costs in period)	<i>Average annual delivery costs in period 1'Jan13- 31 Mar'15</i>	<i>Average annual delivery costs in period 1 Apr' 15- 31 Mar'17</i>
CERO	815	247	305	253	472	279
CSCO	111	198	261	234	137	247
AW	548	277	294	294	367	294
Total	1,474	722	859	780	976	820
Central scenario – averaged costs						
£m	1 Jan'13-31 Mar'14 (delivery costs in period)	1 Apr'14- 31 Mar'15 (delivery costs in period)	1 Apr'15 -31 Mar'16 (delivery costs in period)	1 Apr'16 – 31 Apr'17 (delivery costs in period)	<i>Average annual delivery costs in period 1 Jan'13- 31 Mar'15</i>	<i>Average annual delivery costs in period 1Apr'15- 31 Mar'17</i>
CERO	815	268	268	268	481	268
CSCO	111	231	231	231	152	231
AW	548	288	288	288	372	288
Total	1,474	787	787	787	1,005	787

122. Suppliers can count SWI delivery under any of the three targets towards the SWI minimum. The cost to suppliers of delivering the SWI minimum is therefore a sub-set of the cost of delivering the CSCO, CERO and AW targets. The modelled ECO delivery costs also include our estimates of ECO administrative cost (see below for details).
123. Our modelling does not capture the potential impact on costs from allowing DHs as primary measures under CERO, and could therefore underestimate the reduction in CERO delivery costs relative to the counterfactual. The scale of the potential downside to the modelled CERO costs will depend on the extent to which the obligated suppliers choose to deliver DH measures, and whether these will have an effect on the cost of delivering the marginal CERO measure (i.e. the most costly unit of CERO required to meet the targets).

Administrative costs

124. Evidence from the obligated energy suppliers shows that the administrative cost of ECO during its first year of operation (up to the end of December 2013) was around £80 million in total.⁴⁷ This compares with £76 million assumed in the consultation assessment.⁴⁸ The observed figure is based on quarterly returns from energy suppliers and the cost includes set up costs to administer the scheme, the cost of reporting and compliance, marketing costs, procurement costs, additional IT infrastructure, and all staff costs including specialist support, such as lawyers.
125. Based on costs from the first year of ECO, we have no evidence that administrative cost are decreasing over time. Therefore, it is difficult to make conclusions about the extent of one-off costs compared to on-going administrative costs. Further, we received no hard evidence from consultees on our consultation assumption on administrative cost.
126. For the purpose of this assessment, therefore, we have assumed that the annual administrative cost of ECO to energy suppliers continue at £80 million p.a. (in 2013 prices) for the entire ECO target period. Administrative costs could be higher in future years as suppliers will have transitional set-up costs to accommodate the new policy landscape (for example to change administrative processes around reporting ETT measures delivered under CERO and proving that a warranty has been provided for all boiler replacements). However, administrative costs could be lower in future years given the lower reporting costs associated

⁴⁷ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/294343/Quarterly_Statistical_Release_-_GD_ECO_and_insulation_levels_in_Great_Britain_-_20_March_2014.pdf

⁴⁸ The 2012 final stage IA assumed that these administrative costs were a proportion of the cost of delivering each measure.

with delivering fewer HTT CWI and the reduced size of the carbon targets 31 March 2015 (due to the 33 % reduction to CERO, levelisation and increase carry-forward from CERT). In the absence of robust evidence, we have maintained the consultation approach that the administrative costs remain constant across all years (albeit with an updated estimate for annual administrative costs from £76 million to £80 million).

127. The estimated administrative costs are included in the total ECO delivery costs. For the purpose of modelling the targets and their impacts, we have assumed that the £80 million annual costs is spread between the three ECO obligations based on the three targets' share of total annual average delivery cost in the first year of ECO (once delivery costs are scaled up to meet the original ECO targets).⁴⁹ In reality, we believe that administrative costs will vary with the degree of target activity, which will vary by year.

Impact on energy bills

128. The cost of measures delivered under ECO will be partly or fully funded by energy suppliers and we assume that the suppliers will pass through these costs to domestic energy consumers.⁵⁰ The cost of measures that are paid for by customer contributions (Green Deal finance or other sources of private funds) are captured in our estimated 'Finance costs' (see the Cost Benefit Analysis table below). The pricing decisions and pass-through of costs associated with ECO are commercial decisions for the obligated energy suppliers, and we do not have firm evidence on how policy costs are passed through in practice. Therefore, the impact on bills is uncertain, and some suppliers have publicly disputed our earlier estimates of the cost to the obligated suppliers of delivering ECO.⁵¹ Government has recently requested more information from energy suppliers on the extent to which ECO costs are passed onto consumer bills, including how ECO costs are apportioned between customers and how these are factored into pricing decisions.⁵² The department is reviewing the information received and will consider relevant evidence in future policy development and appraisal, and in its assessment of the cost of policies on bills.
129. The impact of ECO on energy bills is two-fold. The amount of ECO costs that the suppliers are assumed to pass through to bills increases the unit cost of energy (which other things being equal increases bills). At the same time, the installation of energy efficiency measures supported by ECO reduces domestic energy consumption which helps to offset price increases and therefore (everything else being equal) reduces bills. The government publishes its estimates of the impact of all energy and climate change policies on energy prices and bills on an annual basis, and the forthcoming prices and bill report will include further analysis of the government's assessment of the impact of ECO.
130. The impact on energy bills from the final ECO package will depend on how the obligated suppliers deliver the targets and how suppliers choose to pass through costs to bills. Early indications from energy suppliers of how they would respond to the policy package as announced on 2 December suggested that the proposed changes to the ECO carbon targets could result in an average reduction in energy bills of £30-£35 (before VAT) in 2014.⁵³

⁴⁹ The £80m annual administrative costs are apportioned between the three targets on the basis of percentage share of delivery costs from the ECO components of the scaled up annual average target costs in DECC statistics. This implies that around 22 % of £80m are included in AW, 12 % in CSCO delivery costs and 65 % in CERO delivery costs.

⁵⁰ We assume the total cost incurred by energy companies for measures within each obligation is governed by the marginal measure required to fulfil each obligation.

⁵¹ As described in the Analytical approach section, we have calibrated our modelling to the market data on costs and amended some of our input assumptions to reflect concerns raised by consultees.

⁵² For details please see <https://www.gov.uk/government/publications/letter-from-edward-davey-to-energy-suppliers-on-the-energy-company-obligation-eco>

⁵³ The government estimated that an energy bill rebate could save the average customer £12 on their annual energy bill for the next two years and a one-off reduction to electricity network costs could further reduce bills by around £5, meaning that the total impact of the measures announced on 2 December would be a saving of around £50 on energy bills. See 2013 Autumn Statement

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/263942/35062_Autumn_Statement_2013.pdf

131. A review of more recent public statements from the largest obligated energy suppliers suggests that these suppliers have already implemented cost reductions through limiting price increases in 2013 and/or introduced the reductions at various dates during the first quarter of 2014.⁵⁴

Benefits of the ECO targets

132. The overarching benefits of ECO in improving energy efficiency are outlined section 3, but not all of these benefits have been monetised for this assessment. The following benefits have been monetised in line with Green Book Supplementary Guidance: carbon savings, energy savings and air quality. We have also monetised the comfort benefit to consumers associated with improved energy efficiency in their homes.⁵⁵
133. Subsequent to the consultation assessment, we have for the first time undertaken analysis on the impact of health from the ECO package (see below).

Overall costs and benefits

134. The detailed breakdown of the costs and benefits of the total ECO package, and by its sub-target components, is shown in the table below. This table shows the impact of the final ECO package for the period 1 January 2013 to 31 March 2017, net of the costs and benefits of the ECO counterfactual scenario.
135. We estimate that the total benefit of the ECO package is £1.6bn, and that the total cost is £0.7bn. The estimated Net Present Value (NPV) of the policy package is therefore £0.9bn. The majority of the total costs are from installation costs (71%) and administration costs (20%), whilst the majority of the total benefits are from monetised energy savings (70%).

Table 15: Monetised social impacts of final ECO package (targets from 1 January 2013 to 31 March 2017 (2013 prices) – impact net of the ECO counterfactual (ECO targets currently in legislation from 1 January 2013 to 31 March 2015)

£m (unless stated otherwise)	CERO	CSCO	AW	Total ECO
Installation costs	-164	194	487	517
Hidden/hassle costs ⁵⁶	-107	74	5	-28 ⁵⁷
Assessment costs	-10	58	Captured in installation costs	48
Finance costs	6	10	N/A	17
Administration costs ⁵⁸	93	17	32	142
Green Deal mechanism costs	-6	35	N/A	29
Total costs	-189	390	523	724
Energy savings (Variable element) ⁵⁹	-35	359	814	1,139

⁵⁴ Energy UK has published a summary of the actions of each of the energy suppliers, based on the suppliers' public statements. For details, see: <http://www.energy-uk.org.uk/press-releases/940-statement-on-energy-companies-obligation-restructure.html>

⁵⁵ We assume a comfort taking factor of 15% of the energy saved from the measure and value the savings at the retail price of energy.

⁵⁶ Hidden or hassle costs are costs to the householders above installation costs. These are related to time spent by householders researching, arranging, preparing for installation and returning their home to its previous condition. These costs also cover costs in addition to the installation costs that may be required when work is carried out independently of other major refurbishment or redecoration.

⁵⁷ Hidden costs are largely driven by the uptake of HTT measures. The amount of hidden cost is lower in the final scenario than the counterfactual because we estimate that there will be slightly fewer HTT measures taken up in the final scenario than in the counterfactual over the period to 2022 (taking into account measures delivered with GDF only after ECO ends in 31 March 2015 and 31 March 2017 in the counterfactual and central scenario respectively).

⁵⁸ There is no difference between administrative costs in the counterfactual and the final package for the period to 31 March 2014 (as these are captured by historic costs). For the projected period to 31 March 2017, the admin costs in the financial years 2014/15, 2015/16 and 2016/17 remain at the £80 million annual level of administration costs of the scheme reported to DECC for 2013.

Comfort benefits	-16	92	227	303
Air quality benefits	45	29	13	87
Lifetime non-traded carbon savings	-5	165	-115	46
Lifetime EU Allowance savings	-4	7	42	45
Total benefits	-14	651	982	1,619
Net Present Value	175	262	459	896

Figures may not add due to rounding

136. The gross NPV of the final CSCO package (£396m) is almost three times the NPV of the CSCO counterfactual scenario. This is explained by the increase in CSCO eligible areas in the final package (which should, everything else being equal, reduce delivery costs) and the introduction of two additional years of CSCO targets for the period to 31 March 2017. This benefit of an extended scheme is also seen in the positive NPV results for AW. The gross NPV of the final CERO package (£1,316m), however, is only 15% (£175m) greater than the NPV of the CERO counterfactual scenario. There are several factors which affect the difference in the NPV of the counterfactual and the final CERO policy package:

- Allowing ETT measures under CERO should, everything else being equal, reduce the delivery costs and improve the NPV of the final package relative to the counterfactual.
- As ETT measures can receive ECO funding, much of the self-funded uptake is crowded out and encompassed within the policy's delivery. This leads to lower total carbon savings from CERO resulting from the policy package compared to the counterfactual, even though the ECO-related savings are higher in the policy package (see Counterfactual section for more details of uptake of self-financed measures under the counterfactual scenario).
- Extending the target period by two years to 31 March 2017 (an additional target of 12.4MtCO₂ is introduced) in the final package should also lead to a greater NPV of the package relative to the counterfactual (given the cost-effective nature of energy efficiency measures)
- The reduction in the CERO target ambition in the period to 31 March 2015 should, everything else being equal, dampen the effects of the two changes above. The CERO target ambition in this 2.25 year target period is directly reduced by the 33% cut to 31 March 2015 CERO targets, the increased amount of carry-forward from CERT /CESP, and the impact of the levelisation mechanism.

137. This overall NPV analysis does not capture the distributional benefits of policies targeted at low income and vulnerable households. For example, whilst the gross NPV of the AW component of ECO is around £625m, the equity weighted NPV is estimated to be around £2,900m. This significantly higher equity weighted NPV reflects the strong distributional benefits of AW given that only low income and vulnerable households are eligible for AW measures.

138. The NPV analysis also does not capture the health benefits associated with improving the thermal comfort of many of the households supported through the scheme. This includes a reduction in the risk of cardiovascular and respiratory diseases. We have monetised the health benefits associated with the delivery of energy efficiency and heating measures through ECO using DECC's Health Impacts of Domestic Energy Efficiency Measures (HIDEEM)

⁵⁹ The monetised value of the net changes in energy use is valued at the Long Run Variable Cost of energy supply. This is different to the actual energy savings in domestic households, which will be greater.

model. HIDEEM uses the Quality Adjusted Life Year (QALY) method to monetise these health impacts. This involves placing a value on the change in a person's health over time.⁶⁰

139. This analysis estimates that the total present value of the health impacts from the net changes to ECO (i.e. net of the counterfactual) are around £225 million. These monetised benefits have not been included in the main CBA tables. This is because we are aware that there is no agreed methodology by which to incorporate health impacts into NPV calculation as of yet.
140. The estimated benefits to society from measures installed under ECO last for 48 years, but tail off over time as the measures installed reach the end of their assumed lifetime. The discounted average annual benefit of the final package (net of the benefits in the ECO counterfactual scenario) is £34 million; this is the total discounted benefit of £1,619 million averaged over 48 years. The vast majority of the costs are front-loaded in the period to 2017, which is the period during which suppliers face costs of delivering their ECO targets. There are, however, costs to households associated with Green Deal plans beyond 2017. The discounted total cost of the final package (net of the costs in the ECO counterfactual scenario), averaged over the same period as the benefits (48 years), is £15 million.

9. Sensitivity analysis

141. The ECO targets are quantity based and there is uncertainty over the cost to energy suppliers of meeting their obligations. As outlined in earlier sections, this implies that the market will determine the price for ECO units of compliance. Government does not know what the detailed supply curve for ECO units is, and what the actual values of the underlying variables that affect the cost to suppliers of delivering ECO are, so we cannot know the true future cost of the scheme.
142. Due to this uncertainty, we have undertaken sensitivity analysis on key uncertain parameters that we believe could have a significant impact on ECO costs. These include parameters that are external to the policy environment (such as fossil fuel prices and consumer preferences towards measures (for CERO and CSCO)) and input cost assumptions (such as HTT CWI and SWI installation costs) on the basis that we recognise that there is uncertainty about the actual cost of these measures. These sensitivities are presented in the table below.
143. We have also included sensitivities around the Green Deal mechanism due to the interlinkages between Green Deal finance and ECO, as blending private finance with ECO funding can lower suppliers' ECO delivery costs. A high degree of blending of ECO funding and Green Deal finance, or other sources of private funding, will tend to reduce the cost of ECO and vice versa.
144. Some of the sensitivities reflect the market based nature of the Green Deal mechanism and the associated uncertainty about the availability and demand for Green Deal finance. In particular, some stakeholders have raised concerns that our projections over-estimate the extent of blending of ECO and Green Deal finance; we have therefore included scenarios that reflect a low uptake of Green Deal Finance. Other scenarios are included to illustrate the impact that allowing customers to borrow more on their Green Deal plans, or households finding more finance from other means, could have on ECO costs. These are strictly illustrative of the large impact on the cost of ECO that Green Deal policy developments could have, as the government does not currently have specific proposals to change the Green Deal policy to this effect.
145. The impact of Green Deal sensitivities on ECO costs is based on the assumption that there is blending of ECO funding and Green Deal finance and other private funds. Unpublished

⁶⁰ More details on this model can be found in the Fuel Poverty Strategic Framework Analytical Annex: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/211137/fuel_poverty_strategic_framework_analytical_annex.pdf

analysis of DECC Green Deal statistics shows that there is currently only a small percentage of households (less than 5%) have had measures installed through ECO and some other form of finance. If the current limited amount of blending continues, we would not expect the Green Deal sensitivities to have an impact on ECO costs.

Table 16: Sensitivity scenario assumptions for CERO and CSCO costs of compliance

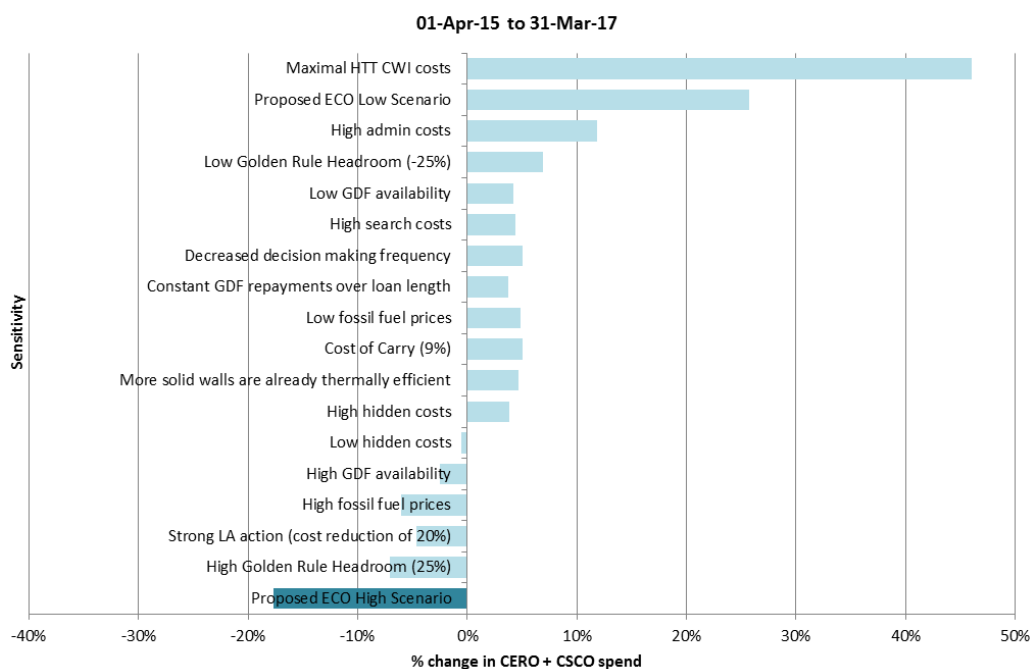
Scenario	Description of sensitivity	Central scenario assumption
Maximal HTT CWI costs	Doubles the costs of HTT CWI measures to £2,591.	HTT CWI installation cost is £1,296.
High admin costs	Doubles the annual carbon target admin costs to CERO and CSCO share of £125m.	Annual carbon target admin costs are £62m for CERO and CSCO combined.
High Golden Rule headroom (+25%)	The low headroom scenario models bill savings that can be 25 % less than costs to meet the Golden rule (i.e. the Golden Rule requirements are less stringent than under central assumptions). The effect is to deliver more measures at a lower ECO cost.	There is no headroom: estimated bill savings have to be greater than or equal to green deal repayments for the Golden Rule to be met.
Low GDF availability	GD finance is available to 70 % of the population.	GD finance is available to 80 % of the population.
High search costs	Doubles search costs for all measures.	Search costs are assumed to make up 6 % of SW installation costs and 15 % of CWI and LI installation costs.
Decreased Decision Making Frequency (DMF)	Reduces DMF for CWI and SWI by 1% per annum from 2014.	No change in DMF for CWI and SWI over time.
Constant GDF repayments over loan length	No ability to increase GD plan repayments over time.	GD plan repayments can increase by 2 % per annum.
Low fossil fuel prices	DECC's low fossil fuel price projections.	DECC's central fossil fuel price projections.
Cost of carry (9%)	This imposes a cost of carry effect of 9 % per annum.	No cost of carry.
More SWIs are already thermally efficient	The ratio of solid walls with U-values of 1.9 and 1.4 is 30:70 respectively.	The ratio of solid walls with U-values of 1.9 and 1.4 is 70:30 respectively.
High hidden costs	This scenario uses the high hidden costs from the ECOFYS report.	Uses the average hidden costs from the ECOFYS report.
Low hidden costs	Uses the low hidden costs assumptions (for all measures) from the ECOFYS report.	Uses the average hidden cost assumptions from the ECOFYS report.
High GDF availability	Green Deal finance is available to 90% of households in GB.	Green Deal finance is available to 80% of households.
High fossil fuel prices	DECC's high fossil fuel price projections.	DECC's central fossil fuel price projections.
Strong Local Authority (LA) action	A 20 % cut in costs for measures delivered to social housing.	Cost of measures delivered to social housing is 10 % lower than cost of measures delivered to private rented and owner occupied households.
Low Golden Rule headroom (-25%)	Estimated energy bill savings have to be 25 % higher than the Green Deal costs in year 1 in	Energy bill savings need to be greater than or equal to Green Deal repayments in year 1 of

	order to meet the Golden rule (i.e. a more stringent Golden Rule requirement than under central assumptions).	the Green Deal plan in order to meet the Golden Rule.
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146. We have modelled two combination scenarios in addition to the individual sensitivity scenarios listed above.
147. **ECO low uptake scenario.** A scenario which combines the following sensitivity assumptions:
- Cavity wall decision making frequency decreases by 1 % a year from 2014/15;
 - Solid wall households' decision making frequency decreases by 1 % a year from 2014/15;
 - Energy prices are low;
 - Bill savings must exceed costs by 25 % to meet the Golden rule;
 - GD Finance covers 70 % of the population;
 - Search costs are double those in the central scenario; and
 - More SWIs are already thermally efficient.
148. **ECO high uptake scenario.** A scenario which combines the following sensitivity assumptions:
- Solid wall households' decision making frequency increases by 1 % a year from 2014/15;
 - Energy prices are high;
 - Bill savings can be 25 % less than costs to meet the Golden rule;
 - Green Deal Finance covers 90 % of the population; and
 - SWI learning by doing rate reduces SWI costs by 20 % from 2014/15.
149. The sensitivity analysis shows that the actual costs of delivering the ECO targets can vary considerably around the central estimate. The central estimate of the total (gross) CERO and CSCO costs is £1,100 million in the two years to 31 March 2017. Our sensitivity analysis suggests that the range in gross carbon target costs is around £900-£1,500 million for the two year period to 31 March 2017. Figure 3 shows the estimated difference in the annual average cost to suppliers of meeting their CERO and CSCO targets in the two years to the end of March 2017. The bars represent the marginal impact of each scenario, and should not be read as cumulative.
150. The analysis shows that the highest positive difference in ECO costs is the 'maximal HTT CWI costs' scenario, where total CERO and CSCO costs are around 46% greater than under the central scenarios (£480 million greater). This result is driven by our assumption that a large amount of HTT CWI will be taken up under the CERO target, even though suppliers can deliver ETT measures under CERO from 1 April 2014. This is driven by the limited remaining technical potential for ETT measures. Some respondents to the consultation suggested that the government has overestimated the uptake of HTT CWIs given that suppliers can choose to deliver ETT measures under CERO in the final policy package. If our projections do overestimate the future uptake of HTT CWI (because there are more cost-effective ETT measures available), then the impact of the high HTT CWI costs sensitivity would be smaller.
151. We estimate that the greatest reduction in the carbon target costs is in the ECO 'high uptake' combination scenario, where the annual average cost is estimated to be around 18 % lower than in our central scenario (around £190 million less). We have not undertaken an assessment of the likelihood of each of the individual sensitivity scenarios, or of the combination scenarios, materialising. Within the 'high ECO demand' scenario, it seems reasonable to assume a link between increased SWI decision making frequency (and thus uptake) and SWI learning by doing. However, these factors are separate to potential changes to the Green Deal (a less stringent Green Deal Golden Rule requirement and greater coverage of GDF) and the external factor of energy prices. This scenario could therefore be interpreted as a 'best case' scenario, but it is not given that all the underlying factors would coincide. The largest reduction on costs from an individual sensitivity scenario is under the 'high Golden

Rule headroom' (i.e. the Green Deal Golden rule requirement is less stringent) scenario, where costs are just under 7% lower than the central scenario (around £75 million lower).

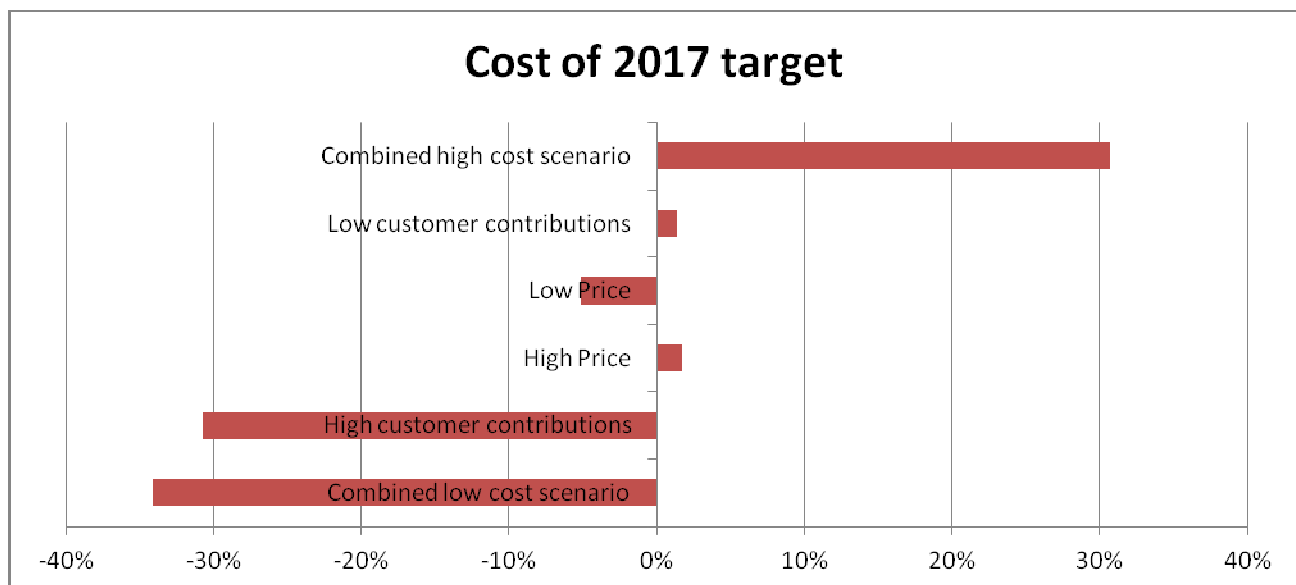
Figure 3: Marginal variation in the estimated annual average cost of meeting the 31 March 2017 carbon targets



152. Sensitivity analysis has also been carried out for AW to recognize the uncertainties associated with this policy. Three sensitivities have been explored on the following inputs used in the model, with their results shown in Figure 4:

- Varying the amount of people willing to contribute finance for heating measures;
- Varying cost scenarios (changing all of the following costs: installation, warranties and search costs); and
- Varying fossil fuel price scenarios.

Figure 4: Affordable Warmth Sensitivity Analysis for the two year target period to 31 March 2017



153. The results highlight that the cost of the 2017 AW target is relatively insensitive to changes in fossil fuel prices and low customer contributions. The insensitivity to prices is expected as the analysis only covers three additional years, therefore the degree that these prices can change is likely to be fairly small. The lack of sensitivity to customer contributions between 2015 and 2017 is less intuitive. The high cost scenario tested is one where no one contributes to

measures at all, compared to a range of 35 – 45% of households contributing in the central scenario (the range depends on the amount households are asked to pay). The lack of sensitivity arises because we estimate costs at the margin of the policy i.e. after ranking measures in cost-effective order, we assume the price of delivering the most expensive measure to meet the policy’s target sets the unit price of the policy. This measure is estimated to not involve any contributions and therefore the impact of assuming no contributions are involved with any measure has little impact on the overall costs. (See Annex E: Models used in the assessment for more details).

154. However, if all of the AW group were willing to contribute towards heating measures (such that all households were able to compete with the market leading price for heating measures in the policy) this would decrease costs as it would lead to a change in the cost of the marginal measure. Put another way, it would expand the amount of cheap potential to the supply chain allowing for a large decrease in costs.
155. The cost of AW for the 2017 target would increase costs by around 30% if a combination of high input costs were realised. A description of the costs assumed is shown in Table 17 below.

Table 17: Cost assumptions the AW model

Input cost	High scenario	Central Scenario	Source
Installation cost (cost shown is for replacement gas boilers)	£2,200	£1,800	Costs from previous energy efficiency scheme.
Search costs	Same as adopted in GDHM for insulation measures plus an additional £200 for gas households and £500 for non-gas households.	Same as adopted in GDHM for insulation measures plus an additional £300 for non-gas households and, for delivery towards the 2017 target, £50 for gas fuelled households following the introduction of a deflator.	Informal evidence from supply chain about the highest ranges of search costs.
Search cost	Around £50 per survey, with 4 failed surveys carried out for every measure delivered	Around £50 per survey, with 2 failed surveys carried out for every measure delivered	2012 Green Deal and ECO Impact Assessment
Warranty	£215	£130	Market research and feedback from consultation.

156. The combined scenario of high costs for AW does have a significant effect on costs. However, we have confidence in the sources of evidence used for the major costs in the central scenario. Furthermore, the marginal price of the scheme over 2014 under the central scenario is around 12p per AW point. This is higher than the prices traded under brokerage for AW over 2014 (6p – 10p) suggesting this central scenario could already be deemed conservative. However, we do not want to calibrate our cost estimates to brokerage prices precisely, as brokerage represents only around 20% of all sales for AW and the anonymity of the transaction may increase the perception of risk which could cause downward pressure on suppliers’ willingness to pay through this route. Therefore, our central scenario has been grounded on the best available evidence while producing a price that is reflective of current delivery.

10. Wider impacts

Equivalent Annualised Net Cost to Business (EANCB)

157. This section assesses the direct costs and benefits to businesses to calculate the EANCB, which is calculated to assess net impact of the Regulations for One In, Two Out (OITO) purposes. The assessment of the PV net costs to business takes into account updated market evidence that directly impacts the estimated impact of the ECO package and is consistent with the analysis presented elsewhere in this IA.⁶¹ The reported EANCB figure and estimated impact on the OITO balance, however, are consistent with the EANCB estimates submitted to the RPC on 15 May. This EANCB estimate was based on an assessment of ECO submitted to the RPC in May 2014 which was reflective of the available evidence at that time.⁶² Direct costs or benefits are defined in Better Regulation Executive guidance as costs or benefits that can be identified as resulting directly from the implementation or removal/simplification of a regulation. The treatment of costs and benefits as direct/indirect is consistent with the 2012 IA.

Business directly affected by the package

158. Under ECO, energy suppliers that have more than 250,000 domestic customer accounts and supply more than 400GWh of electricity or 2,000GWh of gas to domestic customers a year will be allocated a legally binding target to delivery insulation and heating measures in the domestic sector. The only companies that are directly affected by the package are these domestic energy suppliers. Other companies in the ECO delivery supply chain will be affected indirectly through the amended demand for measures from the energy suppliers in the two target periods; this is expected to be a net positive impact for the target period as a whole (see details below). Any benefits from improved technological progress in insulation and heating technologies associated with the ECO-driven delivery of measures will be an indirect benefit to the market in future years. ECO can also impact on suppliers by requiring them to engage in the energy efficiency market. A strong and early position in this market could help these companies to compete in the energy efficiency market in future.
159. The energy suppliers that currently have an ECO obligation and the suppliers that will have an obligation in future target periods to 31 March 2017 will be directly affected by the final ECO policy package. In the period to 31 March 2015, these suppliers will be allocated lower CERO targets, and will also be required to comply with the new target framework. For the two year period to 31 March 2017, the suppliers will be allocated shares of the new two year legally binding targets and be required to comply in accordance with the ECO target framework described earlier in this assessment. No other type of businesses will be directly affected by the ECO changes as we are not changing the criteria for businesses to become obligated under ECO.
160. For the target period to 31 March 2015, there were nine energy suppliers with an obligation under ECO. The future number of obligated suppliers is uncertain as it will depend on, amongst other things, the smaller suppliers' commercial decisions associated with expanding in the market. Based on current market evidence, and anecdotal evidence from suppliers to the scheme administrator, we assume that two additional suppliers can become obligated in the target period from 1 April 2015, so that a total of 11 suppliers are likely to be obligated under ECO in the two year period to 31 March 2017.

Direct costs

161. All the monetised costs to energy suppliers are considered to be as a direct result of the ECO regulations. For the affected energy suppliers, this is the ECO delivery costs (the installation

⁶¹ In particular, it reflects the latest evidence from Ofgem on reported delivery of primary CERO measures to the end of March 2014, as this has a direct impact on the value of the uplifted carbon score from the levelisation mechanism and therefore on CERO target ambition. The impact of the levelisation mechanism will depend on the Ofgem's verification of these measures.

⁶² This earlier assessment used actual delivery statistics to the end of February 2014; the delivery to the end of March 2014 was assumed to be the same as the monthly delivery in February.

costs and other costs associated with driving uptake, i.e. overcoming hassle costs, or the brokerage costs if they have chosen to buy compliance that way) and associated ECO administrative costs discussed in section 8.

162. For the purpose of estimating ECO costs, we assume that there will be a market clearing price for units of ECO compliance set at the most expensive (marginal) unit of abatement required to meet the individual ECO targets. The total cost of the ECO obligation is the cost of these market clearing unit costs (£/MtCO₂ lifetime for CERO and CSCO or £/lifetime heating savings for AW) times the size of the ECO targets (MtCO₂ lifetime savings for CSCO and CERO or lifetime heating cost savings for AW). Some of this total cost is therefore economic rent (see Delivery costs section for details). The government does not have robust evidence on the extent to which economic rent in the market for ECO target units are allocated to energy suppliers, the supply chain or households. In the absence of robust evidence, we have maintained the assumption that none of the economic rent is captured by energy suppliers. Any share of the economic rent that in reality accrue to energy suppliers would be counted as a benefit to business, and the associated EANCB would be lower. We therefore believe that our assumption is very cautious from the point of view of estimating the cost to business from these regulations. This is supported by some anecdotal evidence from the consultees which suggested that ECO rates are not visible to households and that almost all of the economic rent has been captured by the obligated suppliers. We do not have robust evidence to confirm this assertion, and in reality, any rent not captured by consumers could also be accrued to the ECO supply chain, not just by the energy suppliers.
163. It is likely that suppliers will pass on the ECO costs to consumers through domestic energy bills. However, consistent with the 2012 IA, the costs have been treated as direct costs for the OITO purposes.
164. The costs described above are presented for the entire ECO target period from 1 January 2013 to 31 March 2017. See the 'Cost of the ECO targets' section for details on the ECO costs in the target period to 31 March 2015 and for the two year target period to 31 March 2017.

Direct benefits

165. We do not believe that there are any direct benefits to business from being allocated a target under the ECO regulations. There are therefore no direct benefits to business associated with introducing new ECO targets in the period to 31 March 2017 compared to the counterfactual. However, suppliers that already have an obligation under ECO for the period to 31 March 2015 will benefit from having to comply with a lower CERO target level compared to the counterfactual. Consequently, the competitive advantage of the smaller suppliers in this period is lower under the final package compared to the counterfactual. These suppliers will also benefit from the increased flexibility for compliance in the final policy package compared to the counterfactual (see Description of final policy package for details of the package).

Net impact (PV) on cost to business

166. We have not monetised indirect costs to business in this assessment so there are no indirect costs included in below assessment.
167. ECO costs (delivery and administrative costs) are higher in the counterfactual scenario than in the final package for the period to 31 March 2015 so the net impact on costs is negative in this period. However, all the costs incurred from 1 April 2015 to 31 March 2017 under the final policy package are additional, as there are no ECO costs incurred in the counterfactual scenario after 31 March 2015. The net impact for the period from 1 January 2013 to 31 March 2017 consistent with the latest assessment of costs (taking into account reported measures delivered to the end of March 2014) as a whole is an increase in the cost to business (£491m PV).⁶³

⁶³ Appraised with 2013 base year, consistent with the rest of the assessment apart from EANCB calculations which has been calculated with 2014 as PV base year for EANCB methodological reasons.

EANCB counterfactual

168. The RPC validated the government’s estimate of an ECO EANCB of £1,265 million until the end of 2022 in the 2012 IA. In this assessment, the government assumed that all three ECO targets would continue at their current level of ambition for a 10 year period to end December 2022. The ECO target ambition after 31 March 2015 was assumed to be set at the amount of carbon and heating cost savings that could be achieved at an estimated annual average delivery cost to energy suppliers of around £1.3bn on average.⁶⁴

OITO balance sheet

169. The original ECO is scored as an ‘IN’ of £1,265 million. As this ends in March 2015 it will generate an ‘OUT’ of the same amount, consistent with the Better Regulation Framework Manual.
170. The targets under the final ECO package in this IA run until 31 March 2017, with the actual changes to the original ECO targets currently in legislation occurring between 1 April 2014 and the end of March 2017.
171. In the period from 1 January 2013 to 31 March 2014, there is no difference between the ECO costs in the counterfactual scenario in this IA and the estimated costs of the final policy package. In the period from 1 April 2014 to 31 March 2015, reductions to the scale of the ECO carbon target ambition and other changes that make it less costly for suppliers to deliver their targets under the final policy package (compared to the relevant counterfactual) leads to a reduction in the cost to suppliers to deliver ECO from £1,771 million in the policy counterfactual to £722 million (gross) in the final package; a net reduction in delivery costs of £1,049 million. For the two year target period to the end of March 2017, the ECO cost to suppliers under the final package is £1,640 million – all of which is additional to the relevant counterfactual (where there is no ECO target in legislation). The gross cost to business under the final policy package between 1 April 2014 and the end of March 2017 is therefore £2,362 million.
172. The gross cost to business estimated in the May 2014 assessment was slightly higher at £2,432m. The difference reflects the greater estimated impact of the levelisation mechanism, and therefore slightly lower cost in the final policy scenario, in this updated assessment. Using the BRE EANCB calculator on the originally estimated gross costs to business of £2,432m⁶⁵ this implies an overall EANCB of £661m.⁶⁶
173. The gross cost to business is used because we are assessing the total cost of the amended policy and comparing it to the total cost of the original ECO, which was assessed at £1,265 million in the 2012 IA. Using the net cost of the amended ECO, as is done elsewhere in this assessment, would double-count the costs of the original ECO for OITO purposes and so would overstate the OITO benefits of the policy change. The net overall impact is therefore an OUT of £604 million. This is summarised in the table below.

Table 18: OITO balance sheet: EANCB submitted to the RPC

	OUT	IN	Net OITO balance
OITO value (£m)	£1,265m	£661m	-£604m

Small and micro business assessment

⁶⁴ Due to the upwards sloping nature of the Marginal Abatement Cost Curve, the estimated carbon and heating costs savings from a fixed level of spend reduces over time.

⁶⁵ See the Better Regulation Framework Manual for details of the OITO framework and EANCB calculations https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/211981/bis-13-1038-better-regulation-framework-manual-guidance-for-officials.pdf

⁶⁶ This is based on the gross costs in calendar years 2014 to 2017, with the estimated 2017 policy costs to 31 March 2017 prorated to a full calendar year costs. The policy is appraised over 4 years from 2014. Costs have been pro-rated to calendar years for EANCB methodological reasons. The EANCB ‘in’ based on the updated assessment would be around 2% lower.

174. The government has committed to consider separately the impact of regulations on small (up to 49 FTE employees) and micro-businesses (up to 10 FTE employees).⁶⁷ The intent is to mitigate any disproportionate burden on these businesses, and the government has to demonstrate this in the analysis.
175. Because the ECO targets apply only to large energy suppliers, small and micro businesses are not directly affected by the proposed changes to ECO targets and their timescales. In particular, small energy suppliers are excluded from the obligation. However, ECO installers, many of which are smaller firms, are likely to be indirectly affected in a positive way (compared to the counterfactual of the previous ECO legislation) by the change in demand for energy saving and heating measures as a result of the target amendments. They will also continue to be required to meet the current standards of certification should they wish to participate in the scheme.

Indirect impact on small businesses of the final ECO package

176. Although the CERO target is being lowered for the period to March 2015, all the three ECO targets are being extended for an additional two years until the end of March 2017. This is likely to have a net positive impact on the demand for energy saving measures. There are currently around 2,600 certified Green Deal installer organisations⁶⁸, the majority of which are believed to be SMEs or microbusinesses. This does not necessarily represent the entire ECO supply chain as non-GD accredited companies can also deliver ECO measures, and not all of these companies will necessarily deliver ECO measures going forward.
177. We estimate that the changes to the targets will result in a net increase of 435,000 insulation measures and 247,000 heating measures delivered to the end of March 2017, compared to what would have been provided under the previous ECO legislation. This net increase in market activity is likely to generate additional revenues and profits for the supply chain.
178. Conversely, there is research to suggest that the supply chain is concerned that changes to ECO will result in the energy suppliers undertaking more installations in-house as a result of the changes to ECO, although this has not been verified. One stakeholder remarked that "(...) after the Autumn Statement, energy suppliers had started to cancel or renegotiate existing bilateral contracts". It was also reported that this had started to happen in anticipation of the Autumn Statement. If true, then this is likely to reduce the revenue and profits of small and micro business in the ECO supply chain.
179. It should be noted that these potential impacts are gross profit changes. For an accurate estimate of the net impact, a calculation of the reduction in profits of small businesses elsewhere in the economy (as a result of higher energy bills feeding through to lower consumer spending power) would be required. On the grounds of proportionality, and because of the uncertainty surrounding our projections, we have not attempted to calculate the gross or net profit changes for small and micro businesses.

Certification

180. Installer businesses (and other businesses in the ECO supply chain) that choose to become ECO suppliers will face one-off certification costs (in the sense of obtaining accreditations, such as the Publicly Available Specification (PAS)⁶⁹, that they might not otherwise have undertaken and which are necessary for ECO). These costs are not mandatory as they are only incurred if the installation company chooses to enter the ECO market. We have no evidence base to support a projection of the number of new companies that will enter the ECO supply

⁶⁷ See better regulation framework manual for more details:

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/211981/bis-13-1038-better-regulation-framework-manual-guidance-for-officials.pdf

⁶⁸ DECC, June 2014 Monthly Green Deal statistics

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/321192/Monthly_Statistical_Release_-_Green_Deal_and_ECO_in_GB_19th_June_FINAL.pdf

⁶⁹ PAS is the Publicly Available Specification for the installation of energy efficiency in existing buildings.

chain (and that will therefore face certification costs) following the changes to ECO. We consider that the extension of the ECO target period is unlikely to affect many suppliers as they will have already incurred the cost in order to be able to carry out installations in the period to March 2015. We have therefore not quantified the impact of the certification costs in the ECO supply chain.

Justice impacts

181. There will be no impact on the legal system or the volume of cases going through the courts from the policy package because DECC is not changing the ECO enforcement regime.⁷⁰ The justice system would only become involved were someone to seek to challenge an Ofgem enforcement action for a breach of the obligation or possibly if Ofgem were to seek a court order - which has never happened since this type of obligation first started in the 1990s.

Rural impacts

182. Suppliers will continue to be required to deliver 15% of their CSCO target to low income rural households which will safeguard the benefit to rural households.
183. Further, many properties with remaining energy efficiency potential are off the gas grid; the 2011 EHS suggests that 16 % of domestic properties with potential for energy efficiency improvements are off the gas grid.⁷¹ Energy suppliers should have an incentive to deliver measures to these households because, everything else being equal, installing a measure in a property not heated by gas will generate a higher carbon or heating bill saving score compared to a measure installed in a house on the gas grid.
184. However, it is likely that many of the rural properties are dispersed and difficult to access, and suppliers could therefore face higher search costs in finding these and have less opportunity for benefiting from economies of scale in installing measures.

Local community impact

185. CSCO is an area based scheme and could therefore provide benefits to local communities. In general, energy efficiency improvements can bring a range of social, economic and aesthetic benefits to communities. In particular the area based delivery of SWI can help regenerate neighbourhoods and substantially improve the local environment, making it a more attractive place to live. Under the previous CESP scheme, a number of large scale energy efficiency schemes helped improve some of the most deprived areas in the country. Under one of these schemes a deprived inner city area in the North East which was originally largely scheduled for demolition under the pathfinder policy has been transformed into an attractive area in which to live.⁷²

Competition impacts

186. Although ECO targets are being relaxed in the period to 31 March 2015, the extension of the targets until 31 March 2017 may have a positive effect on competition in terms of decreasing domestic retail energy market concentration. Currently the nine suppliers obligated under the scheme control over 95% of the domestic retail market. Smaller suppliers are exempt under ECO, and unlike the larger suppliers they therefore do not face any costs associated with ECO targets. Everything else being equal, this gives the smaller suppliers a cost advantage over the larger suppliers which face ECO compliance costs. This exemption may therefore increase the ability of smaller suppliers to price competitively, compared to larger suppliers, thereby potentially allowing them to expand their domestic retail market share. However, as the

⁷⁰ Under the current enforcement regime, Ofgem (the electricity and gas market regulator) administer the ECO. Their duties include to allocate targets to qualifying energy companies, monitor progress and determine whether companies have achieved their obligations, reporting to the DECC Secretary of State, as well as audit, compliance and the prevention and detection of fraud.

⁷¹ The 2011 dataset consists of two years of data collected between April 2010 and March 2012.

⁷² Findings from the forthcoming end of scheme evaluation of CERT and CESP.

estimated costs of delivering ECO compliance are projected to fall, this competitive advantage is likely to narrow.

Equality impacts

187. This section of the IA provides an assessment of ECO against the protected characteristics of age, disability, gender, gender-reassignment, marriage and civil partnerships, pregnancy and maternity, race, religion or belief and sexual orientation, as specified in the Equality Act 2010. Where a particular protected characteristic is not listed below for different ECO sub targets, it is because there is no evidence that people with this protected characteristic are more or less likely to benefit from the policy or are discriminated against by the policy.

Impact of AW obligation on protected groups

188. The AW obligation will continue to be focussed on vulnerable and low-income households and have specific eligibility criteria. It ensure that help is available to those who most need assistance to reduce the cost of heating their homes, and to those who might not achieve significant energy savings and are therefore unlikely to take up Green Deal finance. We estimate that some of the measures under CERO and CSCO would also be delivered to AW eligible households, and the impact of the AW obligation described below would be valid for these households too.

Age

189. The AW obligation is expected to have a positive impact on some age groups, and a potentially negative impact on others. Households which include a person receiving working tax credit and qualifying element, or child tax credit with a household income lower than £15.860k, pension credit or one of the eligible means tested benefits and qualifying criteria (including those with a child under 16 years old or 19 years old or under in full time education), will be eligible for AW support. Those households that are not eligible for AW will not receive measures but could face the costs of suppliers meeting their obligations as this cost is assumed to be passed on to consumers through domestic energy bills.

Disability

190. The AW obligation is expected to have a positive impact on disabled people who are on low incomes. Households with an occupant in receipt of both disability and income related benefits will be eligible for AW support. On the other hand, those with a disability who do not claim income related benefits will not be eligible for AW support, but are likely to still face the costs of ECO that are passed on through energy bills.

Pregnancy and Maternity

191. The AW target is expected to have a positive impact of recent mothers on low incomes. Households on income related benefits with a child under the age of 16 or in full time education up to the age of 19 will be eligible for AW support, and so will be proportionately more likely to benefit.

Human rights

192. The ECO regulations will not have an impact on human rights.

Annex A: Background on CERT carry-forward assumptions

193. Under CERT and CESP regulations, obligated energy suppliers had to notify final positions against each of their obligations, for each of their supply licences, by 31 January 2013. The ECO Order allows for over-delivery against these obligations to be carried forward into ECO ('excess actions'). However, due to the way that the ECO rules interact with supplier licences and CERT sub-obligations, some suppliers are not able to carry forward all excess CERT activity under the current ECO legislation. Following consultation, the government has decided to implement two changes to the ECO regulations which will allow some suppliers to realise greater benefits from over-delivery under CERT.

- **Redistribution change.** This will allow energy suppliers to redistribute CERT excess actions across their supplier licences. This will minimise the volume of carbon which is currently 'stranded'.
- **New deadline for excess actions applications change.** Some suppliers are expected to be able to carry over a greater volume of excess action if they are able to resubmit applications for excess action in line with the legislative amendments. As suppliers were unaware of this legislative change when they originally submitted their excess action applications, we have enabled them to resubmit their applications under the revised legislation.

194. The actual level of carry forward to ECO will be determined by Ofgem. The table below shows our assumed volumes of carry forward under the ECO counterfactual (BAU) and with the two changes.

Table 19: Estimated volume of CERT/CESP carry forward used in the modelling

	Volume without changes to regulations ('BAU' volume included in ECO counterfactual) ⁷³	Additional volume from 'redistribution change'	Maximum additional volume from 'new deadline' change	Total maximum volume following changes (counterfactual + 'redistribution' + 'new deadline')
MtCO ₂ lifetime (ECO target units)	2.6 MtCO ₂	0.4 MtCO ₂ ⁷⁴	1.1 MtCO ₂	4.1 MtCO ₂

195. The estimated volumes of potential carry forward have not changed since the consultation assessment, and the same degree of uncertainty around the estimates remain as at the consultation stage. Ofgem analysis of the proposed changes to excess actions has been conducted without visibility of all of the details of the measures installed under CERT and has been limited to the level of data collected under CERT and in current applications for excess action. High level assumptions have been made about suppliers' abilities to maximise their excess action under the proposed changes to the excess action regulations. Further details on the uncertainties and the assumptions made in estimating the impact of the changes can be found in Annex A of the 5 March Assessment of Impacts.⁷⁵

196. We do not know how suppliers will allocate excess actions between the ECO targets. For modelling purposes, we have assumed that suppliers will seek allocate 85% of the total carry-forward to the CSCO target and 15 % to the CERO target under the ECO final package. This is

⁷³ The BAU volume includes some carry-forward from CESP. There was no 'trapped carbon' under CESP, therefore there is the same amount of CESP carry-forward under the current regulations as there will be under the future regulations

⁷⁴ This figure has been corrected since the consultation assessment. The estimated total volume of excess action following the proposed legislative changes remains unchanged.

⁷⁵

on the assumption that CSCO unit delivery costs will be greater than CERO unit delivery costs, and that, therefore, suppliers will allocate the maximum amount possible to this target (carry-forward cannot count towards the CSCO rural sub-obligation). This assumed cost differential is supported by our modelling; we estimate that CSCO target unit costs are greater than CERO target unit costs under the final ECO package. In reality, suppliers may seek to reallocate carry-forward from CERT/CESP to CERO if they get close to meeting their CSCO obligations or do not have sufficient excess action activity eligible for carryover into the CSCO obligation.

197. For the purposes of modelling the ECO counterfactual scenario, we also have assumed that suppliers will carry forward 85% of the 2.6MtCO₂ to CSCO and 15% to CERO. This is on the basis that we estimate that the CSCO unit costs will be higher than CERO unit costs also in this scenario, despite the fact that ETT measures are not eligible under CERO in this scenario. The higher CSCO unit cost is explained by the fact that the obligated suppliers would still be required to deliver a significant share of their original 31 March 2015 CSCO target, whilst they have made better progress to date on their original CERO target.⁷⁶

⁷⁶ Ofgem's June 2014 ECO compliance update showed that the obligated suppliers as a whole had delivered around 28% and 39% of the original CSCO and CERO 31 March 2015 target levels respectively by the end of May 2014 (this includes approved and notified measures). See <https://www.ofgem.gov.uk/ofgem-publications/88130/ecocompliance-update-june-2014-v1.pdf> for details.

Annex B: List of policy mechanisms – approach taken in consultation and final assessment

198. The analysis in this assessment includes quantified impacts, as far as possible, of the different elements of the ECO policy package. The analysis of some of the elements remains unchanged from the consultation stage assessment but the analysis of other elements has been updated. Lastly, this final IA includes analysis of some elements of the package that were not assessed at the time of the consultation. This is summarised in Table 20 below. A detailed description of the various policy measures consulted on are provided in the government’s 5 March consultation document.⁷⁷

Table 20: Analytical approach to the individual elements of the ECO policy package

Consultation proposal	Analytical approach in consultation assessment	Policy position	Analytical approach in final IA
Carbon targets only			
33 % reduction to 31 March 2015 CERO target to 14MtCO ₂	20.9 MtCO ₂ *(2/3) = 14 MtCO ₂	Confirmed	Unchanged
33 % reduction applied to Phase 3 only, or all Phases	The 33 % reduction was applied in Phase 3 only for modelling purposes. The modelling is not affected by whether the reduction is applied to Phase 3 only or all phases, as long as the 33% reduction does not affect levelisation impact. This is because we only assess company level performance for the purpose of estimating the impact of levelisation.	Phase 3 only	Unchanged
Allow carry forward of CERO under delivery to 2017 targets (remove CERO 2015 hard target, introduce 1.1 ‘ratchet’ penalty). Carry-over measures must be compliant with the new obligation rules.	The modelling included a 1.1 penalty factor. However, the ratchet did not affect the modelling output as we assume compliance with each target period.	Confirmed	Unchanged (but we now assume over-delivery to the March 2015 targets, see below).
Pro-rata methodology for two year targets to 31 March 2017	CERO: (14 MtCO ₂ /2.25)*2=12.4MtCO ₂ CSCO: (6.8 MtCO ₂ /2.25)*2=6.0MtCO ₂	Confirmed	Unchanged
Extend list of CERO eligible measures (to allow DHS, ETT CWI and LI as primary measures under CERO from 1 April 2014)	ETT CWI and LI allowed under CERO from 1 April 2014 in modelling. Impact of DHS not modelled.	Confirmed	Unchanged
Safeguard for	Not assessed in modelling, qualitative	Decision not to	N/A

⁷⁷ *The Future of the Energy Company Obligation: Consultation Document* (https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/291900/Energy_Company_Obligation_ECO_The_Future_of_the_Energy_Company_Obligation_Consultation_DocumentFINAL.pdf)

delivering CERO ETT CWI and LI to low income households	assessment of potential impact on cost.	introduce measure.	
Extend CSCO eligible areas from 15 % to the 25 % lowest areas on the IMD and allow suppliers to deliver rural sub-obligation to any domestic properties in the poorest quarter of rural areas (from 1 April 2014).	CSCO eligible households increased from 3.9m to 6.5m in modelling to replicate the increased eligibility criteria of the 25% lowest IMD households.	Confirmed	Unchanged
Legislating GDF and ECO blending.	Neither assessed in modelling nor qualitatively.	Decision not to introduce measure.	N/A
Scoring uplift for blended finance.	Neither assessed in modelling nor qualitatively.	Decision not to introduce measure.	N/A
Levelisation mechanism: 25-35% threshold, 1.75-2.0 uplift factor for secondary measures above threshold.	Assumptions included in modelling: <u>Threshold:</u> 35 % of suppliers' original CERO Phase 1 and 2 targets (before CERT/CESP carry forward). <u>Uplift:</u> 1.75 uplift factor for primary and secondary measure above threshold.	<u>Threshold:</u> 35 % of original CERO Phase 1 and Phase 2 target (before CERT/CESP carry-forward). <u>Uplift:</u> 1.75 (for primary measures above threshold).	<u>Threshold:</u> 35 % of suppliers' original CERO Phase 1 and 2 targets (before CERT/CESP carry forward). <u>Uplift:</u> 1.75 uplift for primary measures above threshold.
Allow the maximum amount of CERT/CESP carry-forward to ECO.	Assumptions included in modelling: <u>Option 1 (no change):</u> 2.5 MtCO ₂ carried forward (no change to regulations). <u>Option 2 (preferred option):</u> 3.0 MtCO ₂ carried forward (redistribution change only). 83 % allocated to CERO 31 Mar'15 target, 17 % to 31 Mar'15 CSCO target under both scenarios.	Allow maximum carry-forward. This includes the 'redistribution change' and 'reallocation change'.	<u>Counterfactual:</u> 2.6 MtCO ₂ carried forward. <u>Final package:</u> 4.1 MtCO ₂ carried forward ('redistribution' and 'reallocation change'). 85 % allocated to CSCO 31 Mar'15 target, 15 % to 31 Mar'15 CERO target under both scenarios.
ESAS or other demand aggregation service.	Not assessed	Decision not to introduce measure.	N/A
AW target only			
Target level for 2 year target period to March 2017	Pro rata spend on AW in real terms: £350 million per annum.	Confirmed	Unchanged
Off-grid delivery incentives	Electric storage heater, other non-gas fuelled heating measures and insulation measures in non-gas fuelled households all given an uplift to their score to ensure they are able to be delivered under the scheme on cost-effective grounds.	Confirmed other than for electric storage heater.	The same methodology has been applied whereby uplifts are applied to ensure measures meet the estimated unit cost of the scheme. Under the new rules chosen for AW this leads to an uplift of 1.35 for insulation measures and 1.45 for qualifying boilers in non-gas fuelled

			households. However, this uplift will not be offered to electric storage heaters because when the 'qualifying gas boiler deflator' is also applied they are expected be cost effective in their own right.
Electric storage heaters scoring	The model assumes that electric storage heaters are used throughout the whole house. AW score achieved is based on counterfactual heating technology of an electric room heater, instead of an inefficient electric storage heater.	Confirmed	Unchanged
Package of AW measures	Neither assessed in modelling nor qualitatively.	Decision not to introduce measure	N/A
Part funded by customer contribution	Neither assessed in modelling nor qualitatively.	Allowed to continue but recognized in modelling.	Some customers in smaller households contribute finance for heating measures so they are as cost-effective to deliver to as heating measures in large households. The higher the required amount of contribution the less likely you are to contribute. Full assumptions are described in Annex E: Models used in the assessment.
Warranties	An additional £100 is added to the cost of heating measures to account for a two year warranty.	Confirmed warranty included with a duration of one year .	The cost of warranties has been revised upwards to £130 to reflect new market research on the subject and feedback on the cost of such a warranty from the consultation. The methodology for accounting for this cost is unchanged.
Qualifying gas boiler deflator	Not specifically proposed in consultation.	Included, reflecting the consultation responses.	The scores achieved by the replacement of qualifying gas boilers are deflated by 0.8 to incentivise a more balanced profile of delivery (i.e. increase insulation, boiler repairs and first time central).
Levels of boiler repairs	Neither assessed in modelling nor qualitatively.	Decision not to introduce measure.	N/A
Carry-over of surplus activity from the 2015 AW target towards the 2017 target	None assessed – assumed to meet targets on time.	An "exchange rate" is applied to surplus activity delivered during 2014 on current scheme rules, to	No impact on the size or cost of policy as assumed all suppliers meet the AW target on time. However analysis carried out to

		ensure the amount of lifetime notional bill savings (per pound spent) achieved with surplus activity is equivalent to what is achieved under the new rules for the 2017 target.	determine the appropriate exchange rate to apply to surplus activity, shown in Annex E.
GDAR required for recommending ECO measures	GDAR costs are included for all measures in CERO and CSCO costs in modelling, not in AW costs. Qualitative assessment of impacts.	Decision not to require GDARs. (No change.
Cross cutting			
CSCO and AW 31 March 2015 target unchanged	Modelled 31 March 2015 targets: -CSCO: 6.8MtCO ₂ -AW: £4.2bn	Confirmed	Unchanged
ECO over-delivery carry forward to the two year targets to 31 March 2017.	Qualitative assessment but no modelling of the impact. Modelling assumed compliance by target period.	No cap on carry-forward of surplus activity from current obligation period to period to end Mar'17.	Carry- forward between ECO target periods is captured in the modelling of the central scenario.
Interlinkages with the incentives package	Not assessed	N/A – no associated policy decision	Unchanged
SWI minimum to 31 March 2017 of 100,000 SWI or carbon equivalent (excluding savings from secondary measures delivered alongside SWI)	Estimated 4.0MtCO ₂ carbon target equivalent. This included savings from primary and secondary measures.	A carbon equivalent SWI minimum of 4.0MtCO ₂ is introduced (excluding savings from secondary measures).	Carbon target equivalent of 100,000 SWI minimum (excluding savings from secondary measures) is 4.0MtCO ₂ .
Lifetime for 'other measures'	Not assessed	Will introduce lifetime of SWI in legislation of 36 years.	No change - modelling assumes SWI lifetime of 36 years so the change does not impact on modelled outcomes.
Transfers between suppliers and re-elections between obligations	Not assessed	Confirmed	No change – will not have an impact on modelled cost and benefits.
Transfer and re-election of Adjoining Installations, Qualifying Actions and Excess Actions	Not assessed	Confirmed	No change – will not have an impact on the modelled cost and benefits.
Requiring ECO measures to be installed using accredited GD installers/ PAS 2030 accredited installers	Not assessed	Confirmed	Not modelled, but measure will not have an impact on real world delivery costs as installers already have to install measures "in accordance with PAS".
Mandating brokerage	Not assessed	Decision not to mandate brokerage at this stage	N/A

Annex C: Detailed analysis of the levelisation mechanism

Background

199. The levelisation mechanism will provide an uplift to the CERO carbon scoring for energy suppliers that delivered a significant element of their CERO target by 31 March 2014. The rationale for this uplift is that the proposed changes to ECO should not have “an unfair impact on costs and the competitiveness of the market”.⁷⁸ The levelisation mechanism rewards those suppliers who delivered early under CERO before ETT CWI, LI and DHs were to become eligible as primary measures under CERO (from 1 April 2014).
200. The central scenario analysed in this assessment is that suppliers which delivered more than 35 % of their Phase 1 and Phase 2 CERO obligation (from primary measures) by 31 March 2014 (before 33 % reduction and carry-forward) will benefit from an uplift of 1.75 to the CERO carbon delivered from primary measures above this threshold. This is based on the volume of CERO units reported to Ofgem for measures installed to the end of March 2014. The impact of the levelisation mechanism will reflect the final position of Ofgem verified measures delivered to the end of March 2014.

Consultation proposal

201. The government’s proposal for consultation was that the threshold for benefiting from the uplift would be at between 25% and 35% progress towards a company’s Phase 1 and 2 targets original CERO targets. The government’s central proposal was that suppliers that had delivered CERO measures which accounted for more than 35% of their allocated Phase 1 and 2 CERO target (before a 33% reduction and CERT/CESP carry forward) by the end of March 2014 would have an uplift of 1.75 applied to the scoring of CERO primary measures above that 35% threshold.
202. Based on the available evidence at the time of consultation, DECC estimated that CERO delivery would be reduced by 1.7MtCO₂ due to the levelisation mechanism. This was based on a threshold of 35 % and uplift factor of 1.75 and earlier assumptions about suppliers’ CERO delivery by 31 March 2014. However, our consultation modelling did not reflect the policy intent that the uplift should only apply to primary measures (had this been reflected in the modelling, then the estimated impact would have been less than 1.7MtCO₂).

Analysis underpinning the threshold parameter

203. The government stated in consultation that the threshold should be set at the “lowest end of the leading performers”. The government flagged through consultation that it predicted that suppliers would realise a significant proportion of uplift, and that it “may be appropriate for Government to consider a higher threshold than 35 per cent on which to apply the uplift of 1.75”.
204. Actual CERO delivery, by company, reported to Ofgem on measures installed to the end of March 2014 suggests that the worst performing of the leading suppliers delivered around 50 % of their Phase 1 and 2 targets (from primary measures) by 31 March 2014. The final position will depend on Ofgem’s verification of these measures.

Analysis underpinning the uplift parameter

205. Government has done analysis on the difference in CERO unit prices for HTT measures (HTT CWI and SWI) and ETT (ETT CWI and LI) measures based on evidence from cost reporting and evidence received from the obligated suppliers.

⁷⁸ See the ECO consultation document, Section 9, for details

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/291900/Energy_Company_Obligation_ECO_The_Future_of_the_Energy_Company_Obligation_Consultation_DocumentFINAL.pdf

Delivery cost reporting

206. The delivery costs reported by the energy suppliers up to the end of December 2013 suggested that the average price per lifetime tonne of CO₂ saved was around £58 for CSCO and £100 for CERO, i.e. that CERO unit delivery costs were around 74% higher than CSCO units. The statistics do, however, indicate that there is a large range between the highest and lowest price for the individual suppliers – between £38-£86/tCO₂ for CSCO units and £81-£125/tCO₂ for CERO units.⁷⁹ Further, CSCO delivery unit costs are not representative of CERO ETT measure unit delivery costs because suppliers are constrained to deliver CSCO units in specific geographic (low income) areas.
207. **ECO brokerage.** Evidence from ECO brokerage for the period prior to the December announcements indicate that the unit price of HTT measures (CERO measures) were around 70 % greater than that of ETT measures (CSCO measures) over this period. This is based on the brokered prices for the period prior to 2 December only (up to auction 24 held on 19 November 2013), during which the weighted average traded unit price was £102/tCO₂ for CERO units and £60/tCO₂ for CSCO units.
208. **Anecdotal evidence from suppliers.** Anecdotal evidence received from suppliers to inform the levelisation analysis suggests that the energy suppliers have delivered CERO measures at a unit cost of between around £93/tCO₂ and £133/tCO₂, and that they predict that the unit costs for CERO with ETT measures to be between £25/tCO₂ and £60/tCO₂. If one used the average of the historic and projected unit costs across the suppliers (not weighted by the size of the company), then the associated up-lift parameter would be around 2.8. However, recent engagement with the energy suppliers on the suppliers' ECO cost reporting suggests that there may be inconsistencies in the way different suppliers' report costs under ECO. A comparison between the anecdotal evidence from different energy suppliers might not therefore be done on a consistent basis, and the resulting up-lift parameter should be seen as illustrative.

Impact of different options for levelisation parameters.

209. There are trade-offs associated with rewarding suppliers for early delivery under CERO. High uplift parameters would reward suppliers that delivered CERO under the old framework, and help to 'level the playing field' by compensating those suppliers who delivered a lot of CERO compliance early in a high-cost environment (when only HTT CWI and SWI measures were eligible as primary measures). It would reduce the actual amount of CERO delivery required in order for suppliers to meet their 2015 targets, and therefore also reduce CERO delivery costs and the impact on consumers' energy bills. However, a lower actual delivery of CERO units will also reduce the number of homes supported by CERO measures, lowering the contribution from ECO to Carbon Budgets. These trade-offs are illustrated in three scenarios in the table below.

Table 21: Impact on CERO from levelisation mechanism options- estimated delivery data to 31 March 2014

	Threshold	Uplift parameter	Value of uplifted volume (lifetime MtCO ₂)	Total number of households supported under CERO to 31 March 2017 (gross)	Annual average CERO delivery costs (central scenario (non-averaged), period to 31 March 2015, gross)	Total CERO delivery costs in financial years 2014/15, 2015/16 and 2016/17 (gross)
Final threshold	35%	175%	2.26	771,000	£472m	£804m
Higher	50%	175%	0.91	810,000	£479m	£895m

⁷⁹ Highest and lowest prices should be treated with caution as they may related to relatively low levels of delivery, different measures installed and different routes of meeting the obligation. See https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/294343/Quarterly_Statistical_Release_-_GD_ECO_and_insulation_levels_in_Great_Britain_-_20_March_2014.pdf for further details.

threshold						
Lower threshold, higher uplift	35%	200%	3.02	750,000	£463m	£753m

Annex D: Uptake by measure by ECO obligation

210. Table 22 below shows the estimated gross uptake of measures by ECO target component.

Table 22: Uptake of measures by ECO target

CERO						
	LI (stand alone and as part of package)	ETT CWI	HTT CWI	Internal SWI	External SWI	Heating measures
1 Jan'13 – 31 Mar'14	46,000	2,000 ⁸⁰	234,000	3,000	46,000	0
1 Apr'14- 31 Mar'15	59,000	50,000	74,000	2,000	8,000	0
1 Apr'15– 31 Mar'17	113,000	92,000	177,000	10,000	15,000	0
<i>Cumulative to 31 Mar'17</i>	218,000	144,000	484,000	16,000	69,000	0
CSCO						
	LI (stand alone and as part of package)	ETT CWI	HTT CWI	Internal SWI	External SWI	Heating measures
1 Jan'13 – 31 Mar'14	83,000	33,000	2,000	0	2,000	0
1 Apr'14- 31 Mar'15	41,000	26,000	61,000	1,000	2,000	0
1 Apr'15– 31 Mar'17	90,000	45,000	135,000	5,000	7,000	0
<i>Cumulative to 31 Mar'17</i>	214,000	104,000	197,000	6,000	11,000	0
AW						
	LI (stand alone and as part of package)	ETT CWI	HTT CWI	Internal SWI	External SWI	Heating measures
1 Jan'13 – 31 Mar'14	34,000	14,000	0	0	0	196,000
1 Apr'14- 31 Mar'15	19,000	13,000	17,000	0	0	90,000
1 Apr'15– 31 Mar'17	30,000	19,000	1,000	0	0	214,000
<i>Cumulative to 31 Mar'17</i>	83,000	46,000	18,000	0	0	500,000

⁸⁰ ETT measures are eligible as secondary measures under the current ECO regulations. There were around 2,000 standard CWI delivered under CERO to the end of March 2014 (see Green Deal and ECO monthly statistics for May: <https://www.gov.uk/government/publications/green-deal-and-energy-company-obligation-eco-monthly-statistics-may-2014>)

Annex E: Models used in the assessment

211. We have used three models for the quantitative assessment. These are described in the below.

Green Deal Household Model (GDHM)

212. The GDHM is used to model the uptake of insulation measures within the CERO and CSCO obligations. It models measures that are either fully funded through ECO, part-funded through ECO, and those funded wholly outside ECO by various sources of private finance, including Green Deal finance. In our policy counterfactual, we assume that some ETT measures are taken up with Green Deal finance or other personal funds without ECO funding. In the final policy package, where ETT measures are eligible as primary measures under CERO, we project that all measures are part or fully funded by ECO.

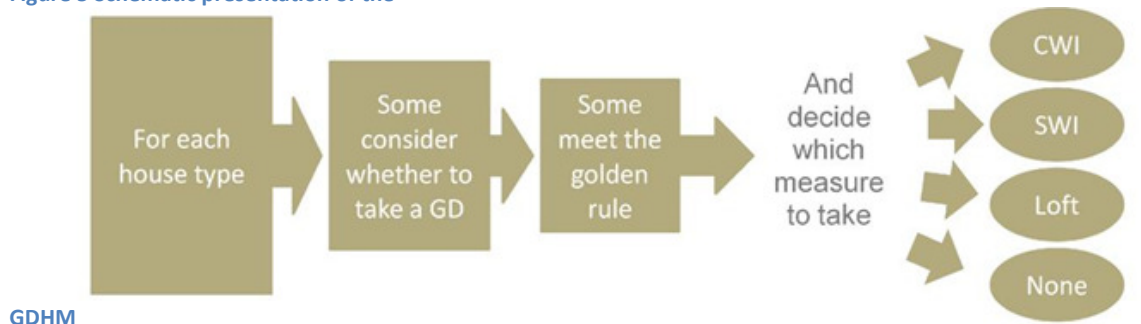
213. The model contains a typology of around 1,350 different households. This breaks down the GB housing stock into households with different: property sizes; loft and wall insulation types; heating fuels/ technologies; tenures; and priority groups (whether or not they qualify for AW measures or fall inside a CSCO area).

214. Within each typology, households are classified as suitable for measures if they have not yet received an insulation measure. We assume a proportion of this household stock make a decision about whether or not to take out an insulation measure in any given year – their decision making frequency (DMF). Of those households who make this decision in a given year, the model assesses which (combination of) measures met the Golden Rule, after an ECO subsidy is applied. A utility function calculates how much a household is likely to value installing those insulation measures that meet the Golden Rule. Based on this value, a proportion of households are assumed to take up the respective measure. Not all households end up taking up a measure as ‘do nothing’ is an option in the model. This is based on the findings of the conjoint surveys undertaken before the Green Deal and ECO were launched (see figure, below). The uptake of measures and the cost of ECO are calibrated to mimic the observed market prices as much as possible.

215. The model introduces an ECO subsidy, which enables energy suppliers to deliver their carbon targets by reducing the cost of installing measures taken up by households. This subsidy rises to a level at which the energy suppliers supply sufficient measures to households that just meet their obligations. The model assumes that the ECO price will rise to the cost required to deliver the marginal measure’s CO₂ savings to meet the suppliers’ obligations. This is the cost which, when multiplied by the volume of CO₂ saving required, establishes the total cost of the energy suppliers’ obligation that we assume is passed on to energy customers. Where the cost does not meet the SW minimum, a higher ECO price for SW is established.

216. A detailed description of the GDHM and the way in which ECO costs are set and assumed to be passed through is presented in the 2012 IA annex B, and is not repeated here.

Figure 5 Schematic presentation of the



217. As in the consultation assessment, the following steps are taken in the phased approach to modelling uptake between the GDHM and the AW models:

- Modelling of ECO carbon target and Green Deal only uptake in the GDHM; and
- Modelling of AW measures in the AW model is based on the remaining technical potential after the projected ECO GDHM uptake is netted off.

The AW Model

218. The core logic and methodology of the AW model has not changed since the analysis conducted for the Consultation Stage Assessment of Impacts. For an understanding of how the model works please refer to this document.

Detailed changes to the AW Model from consultation assessment

219. In recent months there has been a growing gap between observed delivery under AW and the delivery and cost estimates produced by the AW model. We have therefore looked to calibrate some of the key modelling assumptions and aspects of the methodology, where possible, to current delivery and market observations. The four most significant changes in this process are:

- 2013 figures are based on actual delivery data;
- Recognition of customer contributions;
- Decrease in the central estimate for the cost of replacing a gas boiler; and
- Change in the incentive and ability to deliver packages of measures and ETT CWI.

220. **2013 delivery data introduced to the model.** The introduction of actual delivery data into the model ensures that the most of up to date data is being used. The key impact this has had on the model is the recognition that suppliers have achieved a significant share of the 2015 target to date, leading to less activity required to meet this target. This causes the costs to reduce as suppliers are able to focus on cheaper measures to meet this low activity. Furthermore, it leads to suppliers able to begin delivery towards 2017 AW targets earlier than March 2015 which, as discussed, allows for the costs to meeting this target to be spread over a longer time period.

221. **Customer contributions.** We have heard throughout the consultation period that customers are being asked to contribute towards measures in certain circumstances. Whilst we have confidence that this is occurring and subsequently leading to a downward pressure on costs (as observed in recent clearing prices on brokerage, for example), there is limited evidence on how widespread this practice is and how many people are willing or able to pay for measures. Although this uncertainty prevails, we have sought to take a balanced approach to modelling the level of the AW target in this IA by reflecting the fact that private finance is being sought in some circumstances, given the importance it is expected to play in determining what the target level should be; while keeping the overall level of subsidy required to achieve the target fixed at £350 million per year. To reflect this uncertainty in the evidence base, we have included several sensitivities on the assumptions adopted.

222. Discussions with members of the supply chain have highlighted a number of key themes to explain how and when customers are being asked to contribute towards the cost of measures, in particular replacement boilers. These are:

- Parts of the supply chain are focusing on delivering replacement boilers to large, gas-fuelled homes where large, cost-effective, scores are achieved. They do this without asking for private contributions from the customer. This then becomes a benchmark against which installers' expectations of a price they are able to deliver at is set;
- Where eligible households do not live in large homes, customers are asked to contribute when the cost of delivering measures to them is more expensive than in larger homes, with private finance used to make up the difference;
- This request for customer contributions primarily occurs in the delivery of replacement boilers; and

- This is not reflective of the whole supply chain, with many not seeking any customer contributions at all.

223. We have used this market intelligence and sought to emulate it within the AW model. As a result, the model now allows a proportion of households to contribute private finance towards replacement boilers in so far as they cost the same amount to suppliers as delivering a replacement boiler to a detached house (which represents the largest house type and thus the most cost-effective option amongst heating measures). We have decided to not change our assumption that low income households are not willing to contribute for insulation measures given the lack of evidence to contradict this.

224. The new modelling approach is represented in figure 6 (a and b) below which shows a simplified indicative supply curve estimated by the model, and what the new estimated unit price of the policy is taking into account customer contributions.

Figure 6: Changes to modelling approach

Figure 6 a: Current model which does assumes 100 per cent subsidy

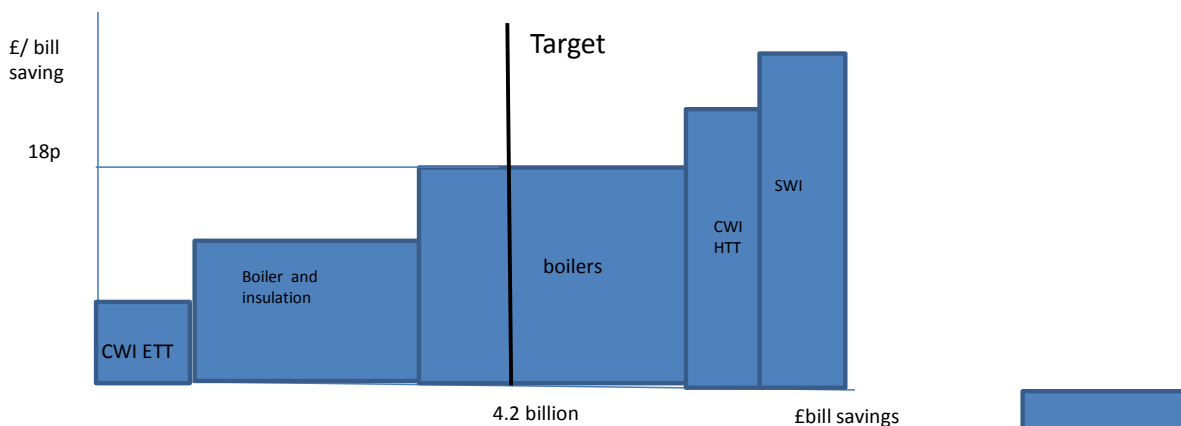
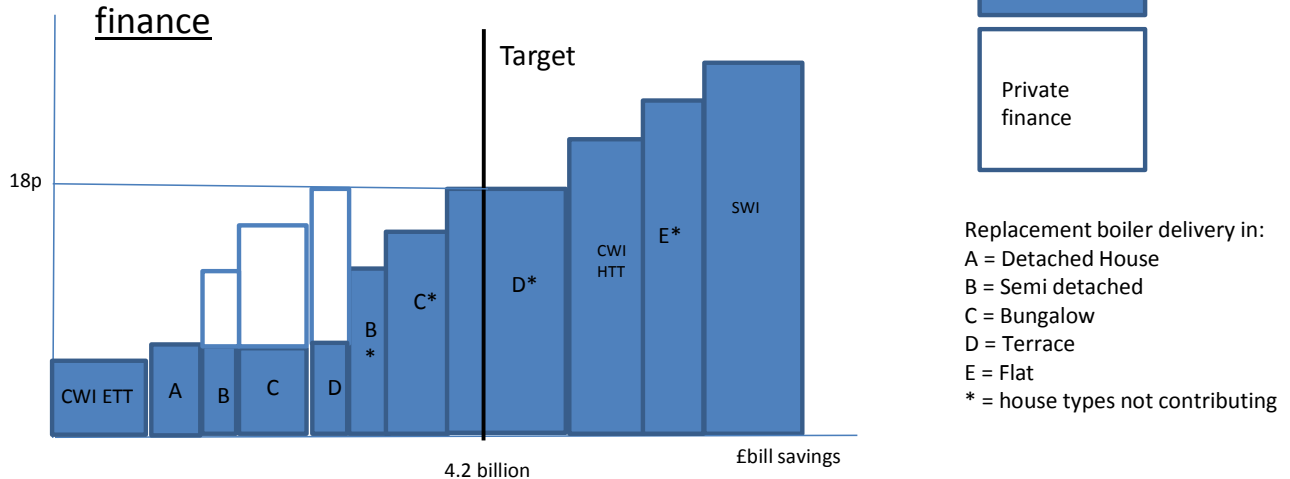


Figure 6 b: New model up to 2017 including private finance



225. Figure 6(b) highlights the amount people are asked to contribute (represented by the blank bars) and that this varies depending on the size of the dwelling they live in. This differentiation occurs because the unit cost of delivering replacement boilers will vary depending on the size of the dwelling, which leads to different levels of contribution required to make them cost-effective. The diagram also highlights that a certain proportion of households are not willing to contribute towards the cost of a replacement boiler (denoted by *). This reflects two things:

- The limited evidence on the proportion of the supply chain that are asking for contributions towards replacement boilers; and

- The limited evidence on the proportion of eligible low income households willing to contribute for replacement qualifying boilers, and thus the scalability of this delivery approach across the whole AW market.
226. We know from reported cost data that the average unit cost of delivery over 2013 was 17p per £ of bill saving⁸¹ (i.e. AW units of compliance), which is far higher than the unit cost of delivering replacement boilers to detached houses (around 10p). This suggests that either:
- Not all eligible households are willing to contribute to measures; or
 - Customer contributions are not being sought in all cases.
227. We have therefore made the assumption that the more a low income household is required to contribute, the lower the proportion of households that are willing to contribute. The central assumptions on the proportion of households willing to contribute and how much we estimate they would be required to contribute to receive a replacement gas boiler is shown in the table below.

Table 23: Proportion of households contributing towards a replacement boiler

House type	Amount of contribution required	Proportion willing to pay
Detached house	£0	0%
Semi-detached house	£555	45%
Bungalow	£725	35%
Terrace house	£770	35%
Flat	£1,000	0%

228. The proportions of households in different house types that are willing to contribute are broad assumptions that have been adopted. There is limited evidence on which to base these assumptions, therefore we have chosen to make these assumptions in a simple and transparent fashion and calibrated them to ensure that the model estimates a market price comparable to that observed typically over the first ECO period - around 15p. This market price is higher than the recent low prices seen under brokerage (6-8p). This is because whilst it is apparent that customer contributions have allowed this delivery to be achieved during the recent period, there is a lack of evidence on the scalability of this delivery approach (i.e. how many people are willing to pay for these measures) and thus whether it could be relied upon to meet all of the costs of a new target. To reflect the uncertainty and importance of these assumptions, we have included sensitivities on these values in the Sensitivity analysis section.
229. Figure 6 highlights that customer contributions have very little effect on what the marginal measure is estimated to be for the 2017 target and therefore has little impact on the estimated cost of delivery towards this target i.e. if the blank bars were filled in to represent subsidised finance, the marginal cost would hardly change leading to little change in the estimated total cost of the policy. Thus the model estimates that, assuming the proportions of people willing to contribute set out in table 26, customer contributions would not affect the marginal measure and therefore have little effect on the cost of the policy. This explains why if we took the conservative assumption that no-one would be willing to pay for measures then the total cost of the policy would hardly change, as shown in the Sensitivity analysis section.
230. **Cost of heating measures** As discussed in the Changes to AW input assumptions section, new estimates of heating measures have been adopted. These still stem from evidence gathered by previous energy efficiency schemes, however, we have taken the central estimates from the data provided instead of conservative estimates. The key change is on replacement gas boilers which have reduced from £2,200 to £1,800.

⁸¹ Source: <https://www.gov.uk/government/collections/green-deal-and-energy-company-obligation-eco-statistics>

231. **Packages of measures.** Following the 2012 ECO consultation, the AW model assumed that, where possible, packages of measures would be delivered through the scheme. This was based on learning from Warm Front and had been assumed to be a likely delivery model. However, to date only 2 % of boiler replacements have been delivered in a package with insulation measures also counting towards the AW target. Discussions held during the consultation period indicated that this is because the two industries (heating and insulation) are not sufficiently joined up to communicate the potential to deliver measures from any one household. Furthermore, few businesses exist with the skills required to install both types of measures. Thus, the likelihood of packages of measures being delivered is limited under current delivery models. We have therefore tried to reflect this supply chain constraint within the model by calibrating to delivery evidence and thus constrained the potential to deliver packages of measures (i.e. heating and insulation measures) to 2% of the total potential to deliver heating measures. Following this split, the model still decides which measures are delivered on the basis of what is most cost-effective to do. There is no constraint on the ability to deliver packages of insulation measures given there is no evidence to suggest this would not otherwise occur.
232. **Potential to deliver ETT CWI.** Modelling uptake of ETT CWI to date has assumed that largely all of the technical potential is available for installers to seek out where it is cost-effective, on the assumption that good information exists on where these opportunities can be located. This has, in past modelling estimates, resulted in high levels of ETT CWI being delivered in early years of ECO as it is a particularly cost-effective opportunity under AW, costing around 7-11p per £ of notional bill saving. However only 11% of these measures have been delivered to date under the policy, a much lower level than we might expect given its relative attractiveness in terms of AW scoring. It is likely that that the reason uptake has been lower than expected so far is that, at the beginning of 2013, only around 80,000 unfilled ETT CWI in the AW group were estimated to exist - making up less than 3 % of the total housing stock in the AW group, meaning that good information about where these opportunities can be located is unlikely to be easily and quickly obtainable.
233. We have thus sought to represent this supply chain constraint of imperfect information using evidence from delivery to date, by assuming that only 20% of the ETT CWI potential is able to be found by the supply chain each year. This percentage has been adopted as it is around the same levels shown through the delivery statistics to date, with a slightly higher figure adopted given the additional incentives to find these measures following the policy changes made.
234. The combined impact of these methodological changes to the model has led the estimated marginal price of the policy between 2015 to 2017 to reduce from around 18p to around 14p, assuming no policy changes from that set out for the 2015 target.

Impact and methodology of policy changes to AW between target periods

235. There are four key policy changes to AW that are being introduced for the 2017 target, in comparison to the rules set for the 2015 target. They are:
- Warranty required for replacement boilers;
 - Incentivise delivery to non-gas fuelled households by:
 - Introducing a new measure called ‘qualifying electric storage heater’ which is scored on the same basis that qualifying boilers are currently scored i.e. using a counterfactual heating technology of an electric room heater;
 - Applying an uplift to all other non-gas fuelled qualifying boilers and insulation measures in non-gas fuelled households; and
 - Deflator applied to gas fuelled qualifying boiler.
236. The first three of these policy changes were analysed in the 5 March consultation assessment. The methodologies by which these costs are incorporated into the model have not changed for this assessment.

237. However the introduction of a deflator for qualifying gas boilers was not analysed as it is a new policy change being introduced. That said, this policy change was suggested by some respondents through the consultation process, who felt the scores achieved by qualifying gas boilers were inflated in comparison to those for other measures. The main reason for adopting this approach is to achieve a more balanced mix of delivery within AW and reduce the dominance of replacement gas boilers in AW. The deflator is thus intended to increase the price of this measure, and consequently the price at which AW points are traded. This should allow other measures to compete with qualifying gas boiler installations, such as boiler repairs, the delivery of first time central heating and the delivery of insulation. Packages will therefore also be incentivised.
238. The value of this deflator has been estimated using modelling results from the AW model to show what mix of measures can be expected using different deflator values. The results are shown in Table 24. This has been done in the absence of any uplift applied to non-gas fuelled households to avoid mixing the effects of these two policy changes.

Table 24: Impact of deflator applied to gas fuelled qualifying boilers

	No deflator	Deflator value: 0.9	Deflator value: 0.85	Deflator value: 0.8	Deflator value: 0.75	Deflator value: 0.7
% of delivery through gas boilers	92%	91%	82%	75%	75%	75%
% of measures delivered to non-gas fuelled households	99%	99%	89%	82%	82%	82%

239. Table 24 highlights that a deflator has a significant effect on the distribution of measures up until 0.8, after which the affect diminishes. We have thus adopted a value of 0.8 as the value of the deflator to incentivise this affect.
240. To incentivise a higher level of delivery to non-gas fuelled households an uplift is still proposed for these measures. However when a deflator for a gas boiler is also introduced, the marginal cost of the policy is expected to increase, causing a decrease in the level at which an uplift is required to be set (given it is designed to increase the cost effectiveness of insulation and qualifying boilers in non-gas fuelled households up to the point at which they would cost the same as the marginal price of the policy). Taking this into account, as well as the reduced cost of heating measures adopted for this analysis, leads to the uplifts applied for insulation measures in non-gas fuelled households to be 1.35 and 1.45 for all non-gas fuelled qualifying boilers. However electric storage heaters are no longer eligible for an uplift given they are expected to be competitive without them when a deflator for gas boilers are also applied.
241. The calculations used to produce these uplifts are shown in Table 25 below with the new estimated unit cost of the policy estimated to be 19p in the absence of these uplifts i.e. the uplifts applied are designed for these measures to be delivered at a cost of around 19p per notional lifetime bill saving.

Table 25: Uplifts applied to non –gas heating measures

Measure type	Cost ⁸²	Score	Unit cost	Uplift required for measure to be cost effective
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⁸² This includes the cost of installation, survey, search costs and, where applicable, warranties

Electric storage heater	£1,600	£8,700	£0.19	Already cost effective
Replacement oil boiler	£3,660	£13,500	£0.28	1.45
Replacement LPG boiler	£2,800	£5,800	£0.51	2.55
Typical non gas fuelled loft insulation	£770	£3,000	£0.26	1.35

242. We have kept to the principle, set out in the 5 March assessment, of setting the uplifts at a level which allows cost effective measures delivered to non-gas fuelled households to compete in the policy. That is why we have set the uplift for heating and insulation measures at a level estimated to be able to bring forward these measures and not set numerous uplifts for every single measure and fuel type.

243. The combined impact of the policies introduced for the 2017 target, in comparison to making no policy changes, is set out in the table below.

Table 26: Impact of changes to AW

	Without any changes to AW for the 2017 target	With changes to AW for the 2017
AW target	£4.9bn	£3.7bn
AW unit price (£ / £ notional bill saving)	£0.14	£0.19
% of measures that are heating measures	94%	73%
% of measures that are insulation measures	6%	27%
% of measures that go to gas fuelled households	99%	70%
% of measures that go to non-gas fuelled households	1%	30%
Number of households assisted per year of the scheme's extension	160,000	165,000

244. The table above highlights that the combined impact of the policy changes made to AW is to achieve a more balanced mix of measures delivered, an increase in support to non-gas fuelled households and a marginal increase in households supported overall. These numbers do not highlight that the introduction of a warranty which also means that customer protection has increased from the changes made. In recognition of the marginal price of the policy increasing as a result of these changes, the overall target has been reduced from £4.9bn to £3.7bn, so that the total cost of the policy remains constant.

Exchange rate for surplus action towards 2015 AW target

245. The notional lifetime bill savings associated with surplus actions (i.e. activity carried out prior to March 2015 that counts towards the 2017 target) which are installed between 1 January 2014 and 31 March 2015 will be subject to an exchange rate. This exchange rate is designed to ensure that this surplus activity will achieve the same score compared to what would have occurred if it was delivered under the rules set for the 2017 target, whilst allowing delivery to continue in the absence of guidance on the rules for the 2017 target.

246. The actual proposed exchange rates for measures delivered under AW which are surplus to the 2015 target are shown in Table 27.

Table 27: Exchange rates applied to surplus actions which are installed during 2014 and under current scheme rules

Measure	Installed 1 January-31 December 2014 Exchange rate		Installed 1 January-31 March 2015 Exchange rate
	New warranty requirement not met	New warranty requirement met	New warranty requirement obligatory
Replacement gas 'qualifying boilers'	0.75	0.8 (installation warranty)	0.8 (installation warranty)
Replacement non-gas 'qualifying boilers'	1.40	1.45 (installation warranty)	1.45 (installation warranty)
Replacement boilers which are not 'qualifying boilers'	0.95	1 (installation warranty)	1 (installation warranty)
Repaired non-gas 'qualifying boilers'	1.45	1.45	1.45
Insulation measures in non-gas fuelled properties	1.35	1.35	1.35
All other measures	1	1	1 (warranty for replacement electric storage heaters)

247. The table above shows that, with the exception of when a warranty is not delivered with the appropriate measure, the exchange rates are the same as the uplift and deflators being applied to each measure. This is true during any time between 1 January 2014 and 31 March 2015.

248. All measures which are not subject to a change in the policy rules between the 2015 and 2017 target periods will have a simple 1:1 exchange rate. The one exception to this is electric storage heaters which will face a change in the policy rules but will be still be subject to a 1:1 exchange rate. We have not included a specific exchange rate for these because there are likely to be additional compliance requirements (similar to those required for a 'qualifying boiler' now) and without these in place, we are concerned about creating perverse incentives to replace working electric storage heaters. They will therefore be allowed to carry forward on a 1:1 basis, instead of adjusted for any change in score following changes being introduced for the 2017 target.

249. Prior to 1 January 2015 suppliers will have flexibility to choose whether to include a warranty with the delivery of qualifying and non-qualifying boilers through surplus activity. However the exchange rates applied to measures delivered without a warranty are lower than those that do contain one to account for their lower cost of deliver. Table 28 highlights the methodology by which the exchange rates applied to measures delivered without a warranty have been estimated.

Table 28: Impact of installer warranties on exchange rates

Measure	Delivery costs			Exchange rate for measures delivered with a warranty	Exchange rates for measures without a warranty
	Without a warranty	With a warranty	% change in delivery costs		
Gas fuelled qualifying boiler	£1,970	£2,100	94%	0.8	0.75
Non-gas fuelled qualifying boiler (figures shown relate	£3,530	£3,660	96%	1.45	1.4

250. The table above highlights that delivery without a warranty is estimated to be around 95% of the cost of delivering qualifying and non-qualifying boilers with a warranty. Therefore this percentage change in the delivery costs has been applied to the exchange rates of measures delivered without a warranty to compute the appropriate exchange rate for qualifying and non-qualifying boilers without a warranty.
251. After 1 January 2015 surplus actions must include a warranty for replacement boilers and electric storage heaters. This is because we do want to ensure that some over-delivery is compliant with this policy change as this will improve the support available to Affordable Warmth customer receiving these measures.
252. All exchange rates will be applied to the lifetime notional bill savings achieved under current scheme rules. For example if a non-gas fuelled qualifying boiler with a warranty achieved a score of 100 under the rules for the 2015 target, suppliers could count a score of 145 towards their March 2017 target.

Domestic EPC PRS Packages (DEPP) Model

253. The DEPP model assesses the potential impact of the anticipated domestic PRS Regulations. The model estimates the impact of the Regulations by assessing the PRS housing stock currently below an 'E' rating ('F' or 'G' rated), their exposure to the Regulations and the changes to the stock that will result from compliance with the Regulations. It is used to provide projections for the uptake of most energy efficiency measures recommended in household EPCs and Green Deal assessments. The model assesses the possible impact the energy efficiency measures would have on different types of housing. It then determines the most cost-effective package of measures each housing type would need to install in order to reach an 'E' rating, and considers whether this meets the Golden Rule and 'no upfront cost to landlords' constraints. For those households that cannot reach an 'E' rating, it assumes measures are taken up that still improve their energy efficiency within the Golden Rule constraint. Further details on the DEPP model can be found in the PRS consultation IA.⁸³

⁸³ Please see the PRS consultation IA for further details

Annex F: Average ECO score per measure in CERO and CSCO

Figure 7: CERO ECO points distribution by measure for installations to end December 2013

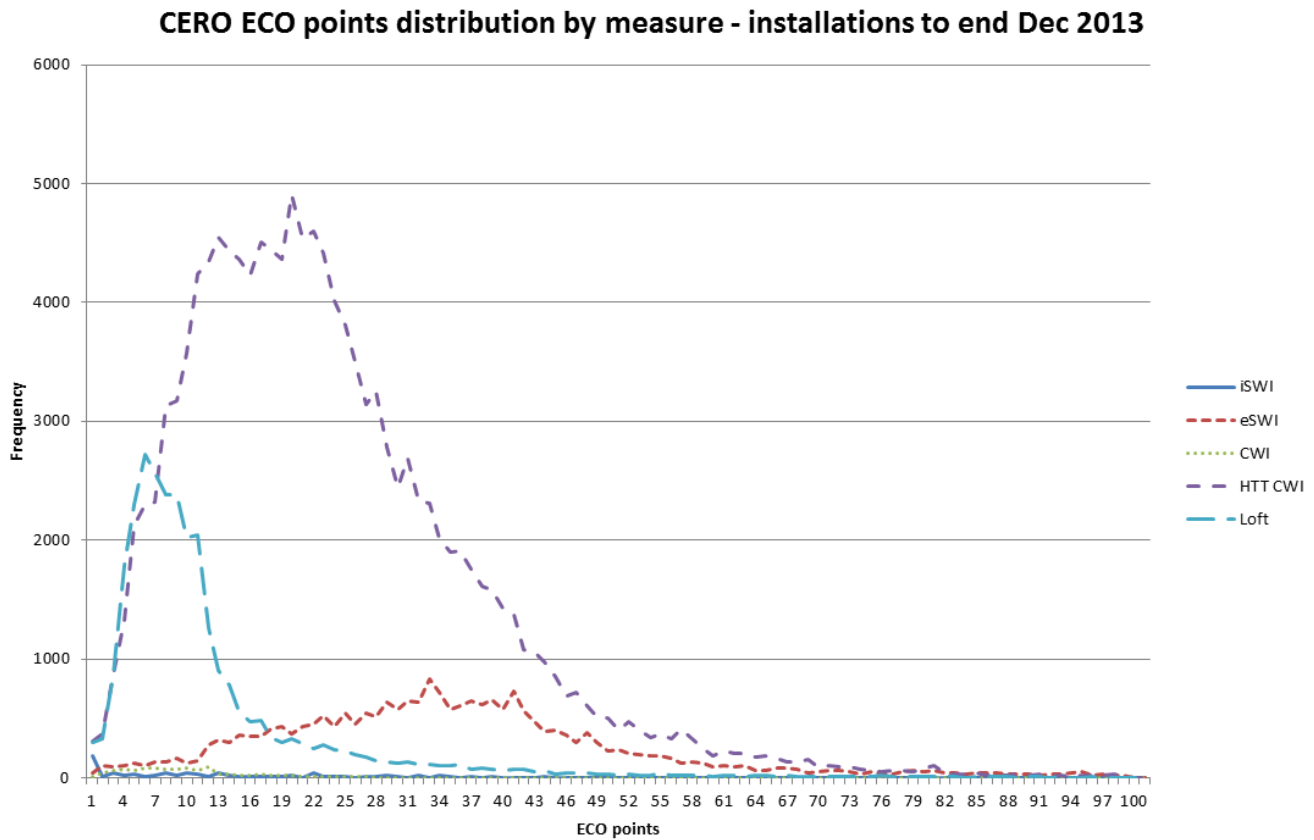
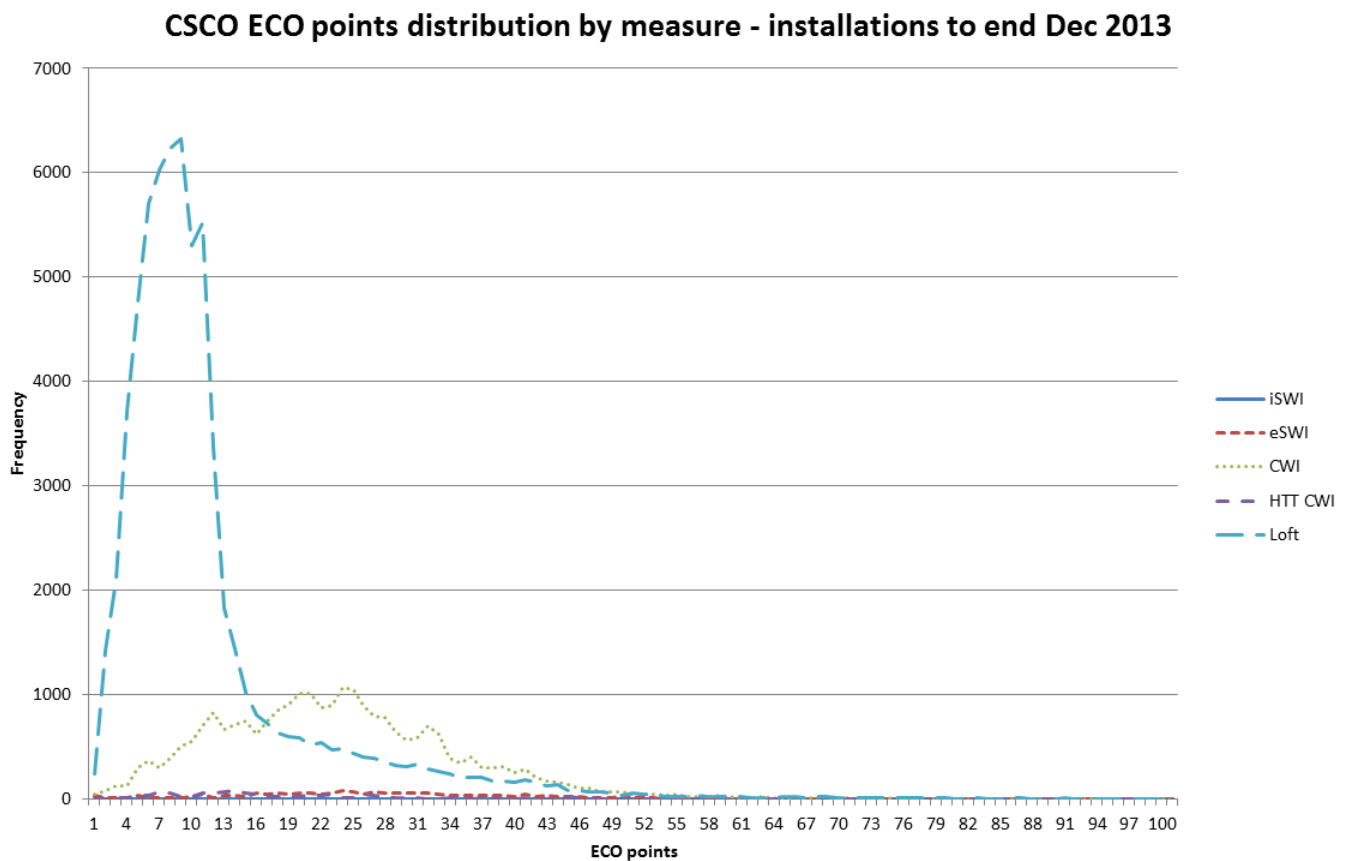


Figure 8: CSCO ECO points distribution by measure for installations to end December 2013



Annex G: Changes to the ECO counterfactual scenario since earlier assessments

254. The counterfactual scenario in this assessment reflects the ECO target framework currently in legislation.
255. The government has made a number of changes to the assessment of this scenario since the 2012 IA, which means that our current analysis of the impact of this scenario differs to the one presented in the 2012 with respect to key parameters of interest such as costs of delivery, uptake of measures, households supported and jobs supported.
256. An overview of changes to key input assumptions from the 2012 IA to the 5 March 2014 consultation assessment can also be found in Annex D of that assessment.⁸⁴ Details of changes to the analytical approach between the 5 March assessment and this IA are detailed in the Analytical approach section. Some of the headline changes since the 2012 IA and 5 March assessment are covered below.
257. **Policy changes.** The following policy changes have been amended:
- **ECO policy:** In the 2012 IA, we assumed that ECO targets would be introduced for the period to the end of 2022, in line with the government's ambition for a long term and ambitious framework for ECO and the Green Deal. The updated ECO counterfactual reflects the targets currently in legislation (to 31 March 2015), and there are no ECO targets after this time.
258. **Modelling input assumption changes.** We have amended a number of the modelling input assumptions since the 2012 IA in light of better market evidence and responses to the 5 March ECO consultation. The most important of these are explained below.
- **CERT/CESP carry-forward:** Our 2012 assessment did not take into account carry-forward from earlier supplier obligation scheme. In this IA, we assume that 2.6MtCO₂ ECO carbon target units will be carried forward from CERT/CESP to the counterfactual ECO scenario carbon targets. This has the effect of lowering the overall ECO carbon target activity in the updated counterfactual relative to the 2012 assessment.
 - **Green Deal plan costs:** For the 5 March consultation assessment, we increased the set up costs of a Green Deal plan from £16 to £63 from the 2012 IA, and the annual charge for a Green Deal plan has been increased from £8 to £20.⁸⁵ We have not amended this further in this IA.
 - **Measure costs:** The underlying source of measure cost assumptions has not changed since the 2012 IA.⁸⁶ Based on market evidence, we reduced the installation cost of HTT CWI from £1,875 (2011 prices) to £1,250 (2011 prices) or £1,296 (2013 prices) for the 5 March consultation assessment; we have not updated its cost further for this IA.
 - **Hidden costs:** For the 5 March consultation assessment we updated the hidden cost to £12,250 for internal SWI, £1,720 for external SWI, £100 for CWI and £125 for LI.⁸⁷ For this IA, we have increased the hidden costs for internal SWI further to £16,400 (see [Internal and external SWI uptake](#) section for details).
 - **ECO administrative costs:** In the 2012 IA, we assumed a total discounted value of ECO administrative costs of £6.3million for the 10 year ECO period (2012 PV, 2011 prices). The

⁸⁴ DECC (2014), *The Future of the Energy Company Obligation: Assessment of Impacts* https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/286926/The_Future_of_the_Energy_Company_Obligation_Assessment_of_Impacts.pdf

⁸⁵ See the 2012 Green Deal and ECO IA p.112 for further details on the original £8 and £16 assumptions. The updated assumptions are based on fees currently charged by the Green Deal Finance Company.

⁸⁶ The underlying cost assumptions are source from Energy Efficiency Partnership for homes (2011), *Review of costs and benefits of energy efficiency measures, building fabric, insulation and glazing*

⁸⁷ The original hidden cost assumptions are sourced from ECOFYS (2009), *The hidden costs and benefits of domestic energy efficiency and carbon saving measures. Final report*

administrative costs have been updated, and increased, to reflect reported ECO costs from the obligated suppliers. In the 5 March consultation assessment, we assumed an annual admin cost of £76 million (see 5 March assessment page 26 for details). In the counterfactual scenario in this IA we assume an annual administrative cost of £80m per annum, based on reported administrative costs from suppliers in 2013 (see Administrative costs section for details).

- **Energy price series:** The energy price series was updated for the 5 March assessment to use a historic price from SAP, projected forwards using the IAG price series used in the 2012 final IA.⁸⁸ We have not amended the energy prices from the 5 March assessment in the updated analysis.

PRS and EPC compliance: For the consultation assessment, and in this IA, we assume that households fully comply with EPC regulations and the PRS regulations once introduced, after 10% of the household stock who are exempt from the regulations are removed, leaving 90% of households complying.

259. **Calibration to market data.** Analysis for the 2012 IA was undertaken before the launch of the Green Deal and there were no ECO targets in place. Modelling for the 5 March consultation assessment was calibrated to historical ECO market data, and this has been done also for this IA.

- **Cost calibration:** In the 2012 IA we estimated that the average annual cost to suppliers of delivering their ECO targets would be £1.3bn p.a. on average (2011 prices). Modelling for the 5 March assessment of the carbon targets currently in legislation (the counterfactual scenario in this IA) suggested that the modelled cost of meeting these carbon targets were lower than what the early market evidence on delivery costs (published data from the ECO brokerage platform) showed.⁸⁹ The modelling was therefore calibrated to the market evidence on delivery costs. This calibration increased the estimated delivery costs per unit of carbon target abatement (£/tCO₂ lifetime). Compared to the 2012 IA, the updated analysis suggested that total cost of delivering the ECO counterfactual targets would have been around £1.4bn p.a. ECO delivery cost statistics based on cost reported to the end of March 2014 show that the scaled up annual average cost to suppliers of meeting their ECO targets currently in legislation (the counterfactual in this IA) is also around £1.4bn, which mirrors our estimated annual average cost estimates for the ECO counterfactual scenario in this IA.⁹⁰
- We have not amended the underlying cost calibration since the 5 March assessment, but this IA takes into account actual statistics on ECO costs up to the end of December 2013 (this, and the updated statistics on costs to the end of March 2014, suggests that the scaled up annual average cost of delivering the currently legislated ECO targets would be around £1.4bn). The calibration methodology used was as follows:
 - The model estimated a total CERO and CSCO spend for the modelled uptake of measures from 1 January 2013 to 31 March 2014. This modelled annual cost was calibrated to the statistics on actual costs incurred between 1 January and 31 December 2013.
 - The following parameters were adjusted in order to calibrate the model to the market data: households' decision making frequency; households' utility;⁹¹ the cost of HTT CWI; and Local Authorities' costs and frequency of delivering measures.

⁸⁸ Information about the underlying IAG price series can be found here:

<https://www.gov.uk/government/publications/valuation-of-energy-use-and-greenhouse-gas-emissions-for-appraisal> . SAP price series are not published.

⁸⁹ The ECO brokerage is fortnightly auction platform where the obligated energy suppliers and Green Deal Providers trade units of ECO compliance. For details on the ECO brokerage platform and historic auction results see <https://www.gov.uk/government/statistical-data-sets/eco-brokerage-results>

⁹⁰ DECC publishes quarterly statistics on ECO costs here: <https://www.gov.uk/government/publications/green-deal-energy-company-obligation-eco-and-insulation-levels-in-great-britain-quarterly-report-to-march-2014>

⁹¹ Utility is the overall benefit that households get from installing a measure or package of measures.

- The calibration changed the values of the above parameters to a level where cost and quantities are consistent with actual delivery. The final choice of values was based on the extent to which the parameters' values are changed, so adjusting a mix of parameters by a moderate amount was preferred to adjusting a single parameter by a significant extent.
 - **Measure delivery calibration:** The 2012 IA modelling of the carbon targets was calibrated to historical delivery of CWI measures under the previous supplier obligation schemes CERT and CESP (See Annex B in the 2012 IA for details). In the updated 2014 consultation and this final assessment, we have calibrated our projected carbon target modelling for 2013 to ECO delivery statistics. In this IA, measure delivery is calibrated to historic ECO delivery to the end of December 2013; this is reflected in the input assumption changes listed above.⁹² The calibration in this final IA was developed from the 5 March assessment to reflect better the historical, and the market's expected, distribution of measures by tenure, heating fuel and house sizes. Based on evidence received from the consultation, we also made a particular change to our methodology for predicting the uptake of SWI measures as the predicted split in delivery of internal and external SWI measures were highlighted as a particular weakness of our 5 March consultation assessment. Further details on the updated calibrations from the consultation assessment are provided in the Changes to the GDHM section of this IA.⁹³
260. For the 2012 IA we used the delivery statistics for CWI delivered under CERT in order to calibrate the modelled results with the obligated suppliers' delivery of measures
261. **General analytical approach changes.** The following analytical updates have also been made:
- **Prices year:** 2011 in the 2012 assessment, updated to 2013 in this IA.
 - **Present value base year:** 2012 in the 2012 IA, updated to 2013 in this IA (2014 for the EANCB calculations, see OITO balance sheet for details).

⁹² The impact of the levelisation mechanism has been updated to reflect measures delivered to the end of March 2014. However, the model *calibration* to historic delivery remains based statistics of delivery of measures to the end of December 2013. Updated statistics on the distribution of measures (e.g. by tenure and fuel type) to the end of March 2014 show that there has been little change in the distribution of measures between December 2013 and March 2014. Therefore, the fact that the underlying calibration methodology is based on delivery to the end of December 2013 and not March 2014 should not have a significant impact on the modelled results.

⁹³ The calibration undertaken has brought the model's outputs more in line with the mix of measures and associated costs delivered by the obligated suppliers to December 2013. However, given the high number of dimensions in which the calibration could be undertaken, and the need to maintain the model's internal logic, the modelled results do not exactly match the suppliers' early delivery history.

Annex H: Longer term ECO

262. The analysis in this IA assumes that there is no ECO beyond 31 March 2017, because this is the period to which ECO targets will be introduced in legislation. As the government has previously confirmed, the obligation is intended to be both ambitious and long-term, extending through until at least 2022 but previous targets were set only until March 2015, which meant that there was a lack of long-term certainty for the supply chain and others interested in delivery. The conclusions in the government's response to the consultation should provide longer term certainty by extending the scheme through to 2017. However, any targets beyond 1 April 2017 will be the subject to consultation with appropriate accompanying analysis.
263. Whilst ECO is assumed to end 31 March 2017 in the other analysis presented in this IA, we have updated our modelling of ECO to 2022 to inform other DECC analysis which assesses the overall impact of policies that the government is committed to in a longer time perspective. There is naturally uncertainty about the ECO policy framework beyond 31 March 2017. For the purpose of modelling, we have assumed that ECO reverts to an ambition associated with cost to suppliers of around £1.3bn on average p.a. (in 2011 prices) from 1 April 2017. We assume that the carbon target framework reverts to the policy as per the 2012 regulations (described in the 2012 IA) with the exception of CSCO eligibility (which remains at the 25 % lowest IMD beyond March 2017). We have assumed that the changes to the AW policy framework introduced in the new ECO legislation, however, remain unchanged until the end of 2022.
264. This longer term modelling has been used to inform the department's forthcoming prices and bills report and will be used to inform the forthcoming 2014 Updated Emissions Projections (UEPs). The tables below present the estimated impact with an illustrative ECO to 2022 as described above.

Table 29: Estimated annual average ECO delivery costs – longer term impact for illustrative ECO that ends 31 December 2022

Central scenario			
	1 Jan'13 – 31 Mar'15	1 Apr'15 – 31 Mar'17	1 Apr'17-31 Dec'22
Annual average delivery costs	£976m	£820m	£1,347m

Table 30: Contribution from ECO and domestic Green Deal to CB periods (traded and non-traded) – longer term impact for illustrative ECO that ends 31 December 2022 (gross impact)⁹⁴

<i>MtCO_{2e}</i>	CB 2 (traded)	CB 2 (non-traded)	CB 3 (traded)	CB 3 (non-traded)
CERO	0.2	1.0	0.5	3.9
CSCO	0.1	0.4	0.3	1.3
AW	1.8	-1.0	6.4	-4.5
Total	2.1	0.3	7.2	0.7

⁹⁴ An updated assessment of the impact of policies on carbon emissions will be published in the 2014 UEP. The UEP estimated impacts could differ from the ones presented here because of potential differences in final energy use and emissions factor assumptions underpinning the forthcoming projections.

Annex I: Blending of ECO funding and sources of private finance

265. Table 31 below shows the projected share of measures' costs that are funded by ECO subsidy under the final option, broken down by ECO target component. It shows that our modelling projects that the share of ECO funding is more than 50% of total measure cost for the vast majority of carbon target measures, and that over 40% of carbon target measures are estimated to receive ECO subsidy that covers 100% or more of the measure costs.

Table 31: Percentage of measures' costs that are funded by ECO subsidy under the final package, split by ECO target components⁹⁵

% ECO subsidy	CSCO	CERO
Less than 50%	1,918	45,334
50% to less than 100%	123,894	321,976
100% or greater	229,498	121,511

266. Internal DECC analysis show that the large majority of ECO measures delivered in 2013 were not blended with other funding sources, but the extent of blending of ECO and private finance sources in the future is uncertain and difficult to predict as it is up to energy suppliers to decide how they deliver their ECO targets. DECC continues to work to improve and streamline the Green Deal and improve the attractiveness of the finance offer.

⁹⁵ This table captures packages of measures (where applicable) and not individual measures.

Annex J: ECO targets to be legislated and assumed ECO carbon target ambition following historical delivery and impact of policy changes

267. The actual carbon target ambition that the suppliers will have to delivery will be less than the targets introduced in legislation. This is because suppliers will benefits from carry-forward from previous supplier obligation schemes and the levelisation mechanism (in the case of CERO). Further, we assume that suppliers will evenly spread out the carbon targets that remain to be delivered to 31 March 2015 and the new two year targets for the period to 31 March 2017, so that one third of the total remaining target delivery is delivered in each financial year 2014/15, 2015/16 and 2016/17. This is illustrated in the table below.

Table 32: ECO carbon target levels: from original target levels to remaining target ambition to be delivered to 31 March 2017 (all in MtCO₂ lifetime)

Target levels	1 Jan 2013 to 31 March 2015	2 year period to 31 March 2017 (new target levels to be introduced)
CERO (original target levels)	20.9	12.4
CSCO (original target levels)	6.8	6.0
Delivery to 31 March 2014		
CERO	8.1	
CSCO	1.9	
Reduction to target ambition from policy changes		
<i>33% reduction to CERO</i>		
CERO	6.9	
<i>Impact of levelisation mechanism (35% threshold)</i>		
CERO	2.3	
<i>CERT/CESP carry forward</i>		
CERO	0.6	
CSCO	3.5	
Remaining target ambition to be delivered after delivery to March 2014 and policy impacts following consultation changes		
CERO	3.0	12.4
CSCO	1.4	6.0

268. We have assumed that the suppliers will seek to smooth their delivery of the carbon target between the three financial years to 31 March 2017. In our modelling, we have therefore assumed that the suppliers deliver one third of the remaining total target ambition to 31 March 2017 in each of the years 2014/15, 2015/16 and 2016/17. This is illustrated in the below.

Table 33: Assumed target ambition to be delivered in each financial year period (MtCO₂ lifetime)

Modelled target ambition by year (MtCO ₂ lifetime)	2014/15	2015/16	2016/17
CERO	5.2	5.2	5.2
CSCO	2.5	2.5	2.5

Glossary of terms and abbreviations

AW	Affordable Warmth
BAU	Business As Usual
CERO	Carbon Emissions Reduction Obligation
CSCO	Carbon Saving Communities Obligation
CO₂	Carbon Dioxide
CO₂e	Carbon Dioxide equivalent
CWI	Cavity Wall Insulation
DECC	Department of Energy and Climate Change
DEPP	Domestic EPC PRS Packages model
DH	District Heating
DMF	Decision Making Frequency
ECO	Energy Company Obligation
EPC	Energy Performance Certificate
ETT CWI	Easy to Treat Cavity Wall Insulation
CERT	Carbon Emissions Reduction Target
CESP	Community Energy Saving Programme
GDF	Green Deal Finance
GDHIF	Green Deal Home Improvement Scheme
GDHM	Green Deal Household Model
GHG	Greenhouse Gas
HTT CWI	Hard to Treat Cavity Wall Insulation
IA	Impact Assessment
IMD	Index of Multiple Deprivation
LI	Loft Insulation
MACC	Marginal Abatement Cost Curve
NPV	Net Present Value
PAS	Publicly Available Specification
PM	The Incentive Package Model
PRS	Private Rented Sector