Title:	Impact Assessment (IA)
Setting the limit on the use of international carbon units for the second carbon budget period (2013-2017)	**IA No:** DECC0053
Lead department or agency: Department of Energy and Climate Change	**Date:** 11/05/2011
Other departments or agencies: HM Treasury	**Stage:** Final
	Source of intervention: Domestic
	Type of measure: Secondary legislation
	Contact for enquiries: Kristen Tiley/Suzanne Al-Dabbagh

Summary: Intervention and Options

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

A limit must be placed on the quantity of international carbon units (ICUs) that the Government may choose to purchase in the non-traded sector to meet the second carbon budget (2013-17). Under the Climate Change Act 2008, the Government has a statutory duty to set a quantitative limit, through secondary legislation, on the net amount of ICUs that can be credited to the net UK carbon account for each five year carbon budget period. The limit for the second budget period (2013-2017) must be set no later than 30 June 2011. The limit concerns the quantity of ICUs that the Government could theoretically purchase; it does not set a level for the quantity of ICUs to be used as a part of an overall policy mix to meet the carbon budget.

What are the policy objectives and the intended effects?

Section 11 of the Climate Change Act requires a limit to be set on the net amount of carbon units that may be purchased to meet each carbon budget. Section 15 of the Act requires Government to have regard to the need for UK domestic action on climate change when considering how to meet the carbon budgets, including the use of international carbon units (ICUs). At a global level, the Government is strongly supportive of an international framework that allows countries to use the carbon market (through the purchase of ICUs) to help meet a proportion of their emissions reductions targets, in line with the UN's supplementarity principle.

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

Option 1: A sufficiently high limit on the amount of international carbon units (ICUs) that does not constrain their purchase under any emissions scenario - i.e. 1000 $MtCO_2e$;
Option 2: A limit of 55 $MtCO_2e$ in line with the EU effort sharing limit on the use of ICUs for the non-traded sector;
Option 3: A zero limit - no ICUs may be used to reduce the net carbon account in the non-traded sector.

No alternatives to regulation are considered as the Climate Change Act requires that the Government set in secondary legislation, the level of ICUs that may be used to help meet the statutory carbon budgets.

Will the policy be reviewed? It will be reviewed. **If applicable, set review date:** March 2016	
What is the basis for this review? Duty to review. **If applicable, set sunset clause date:** Month/Year	
Are there arrangements in place that will allow a systematic collection of monitoring information for future policy review?	Yes

SELECT SIGNATORY Sign-off For consultation stage Impact Assessments:

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 SELECT SIGNATORY:  Date: 16 May 2011

Summary: Analysis and Evidence

Policy Option 1

Description: To set a sufficiently high limit that effectively does not constrain the purchase of ICUs under any emissions scenario i.e. 1000 $MtCO_2e$.

Price Base Year 2009	PV Base Year 2011	Time Period Years 5	Net Benefit (Present Value (PV)) (£m)		
			Low: £0	High: £0	Best Estimate: £0

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		0	**0**

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

Costs relate to the imposition of a limit on the level of international carbon units (ICUs) that Government can purchase to help meet the second carbon budget. Under Option 1, the limit is set sufficiently high as to not constrain the Government in the purchase of ICUs under any foreseeable circumstances. As the limit on ICUs does not bind, additional costs from setting a limit for this option are zero.

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

Unrestricted access could be interpreted as reduced willingness to take action domestically. There is a small risk that by allowing effectively unlimited use of ICUs, investors have less certainty in the UK's preferred course of action to make emissions reductions in the non-traded sector, the effectiveness of domestic policies to deliver territorial savings may be reduced. This risk is, lower where Government has a clear and transparent domestic policy agenda. Stating that ICUs are to provide flexibility as an insurance mechanism, only required in the event that unforeseen additional reductions are needed, could help to counter negative signals to investors.

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		0	**0**

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

N/A

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

This option could signal an increased commitment by the UK government to purchase emissions reductions from developing countries, which would form part of the overall demand signal to the private sector to help drive investment in new projects overseas.

Key assumptions/sensitivities/risks **Discount rate (%)** 3.5

Under Option 1 it is assumed that there is full flexibility to decide between the use of ICUs and additional domestic abatement policy to meet a shortfall in the second carbon budget. This, in turn, assumes that the current limit on the use of ICUs under EU rules in the non-traded sector, is amended or that other credits not covered by the EU limit are used. Because the limit (at 1000 $MtCO_2e$) is set so high that it does not bind, there are no costs associated with the limit.

Option 1 represents the baseline for analysis of the costs of imposing a limit that does constrain the use of ICUs, under certain emissions scenarios under Options 2 and 3.

Direct impact on business (Equivalent Annual) £m):			In scope of OIOO?	Measure qualifies as
Costs: 0	**Benefits:** 0	**Net:** 0	YES	IN

Summary: Analysis and Evidence

Policy Option 2

Description: To set a limit of 55 $MtCO_2e$ in line with the EU effort sharing decision limit on the use of ICUs in the non-traded sector.

Price Base Year 2009	PV Base Year 2011	Time Period Years 5	Net Benefit (Present Value (PV)) (£m)		
			Low:£0	High: £0	Best Estimate: £0

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		0	**0**

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

Costs incurred are relative to the baseline Option 1. They stem from taking relatively more costly additional domestic abatement compared with the purchase of ICUs. The high, low and best estimates of costs are zero. This is based on the range for additional required emissions provided by the 95% confidence interval range in the DECC emission projections. Even at the top of the range of emissions projections, UK territorial emissions in the non-traded sector are expected to be below the non-traded sector share of the budget. The limit would not constrain the Government as it does not need to purchase ICUs.

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

Uncertainty not captured in the DECC emissions projections justifies the production of an Illustrative Higher Emissions Scenario. Under this illustrative scenario emissions are up to 80 $MtCO_2e$ above the budget level, with possible costs of up to £1890m.

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		0	**0**

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

N/A

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

Compared to Option 1, a positive limit on the use of ICUs, capped at a relatively low level of 55 $MtCO_2e$, does not have the same potential to reduce investors' certainty over the UK's preferred course of action to meet the budget. The Government will have to undertake domestic abatement. The potential to use ICUs, could act as an effective insurance mechanism - a limit of 55 $MtCO_2e$ avoids the situation where the Government is forced to take expensive domestic action just to compensate a small increase in emissions over the level of the non-traded sector share which could disadvantage UK business compared with its competitors e.g. other EU member states only bound by the EU Effort Sharing Decision

Key assumptions/sensitivities/risks **Discount rate (%)** 3.5

It is assumed that Government will purchase ICUs up to the limit of 55 $MtCO_2e$ if emissions exceed the budget level, based on minimising costs. Beyond this level, the assumption is that further reductions come from implementing relatively more costly additional domestic abatement policy. Using 'Borrowing' from the next budget period, up to a maximum 25 $MtCO_2e$ for the second budget, alongside ICUs, increases the level by which emissions can exceed the budget before additional costs of domestic abatement are incurred, in the period under consideration. However, delaying action may have dynamic implications for the overall level of costs incurred in meeting long-term targets. This analysis depends on assumptions on the level of additional domestic abatement and its cost-effectiveness relative to the price of ICUs. Key assumptions driving the £0 monetised cost estimates relate to the expectation that the UK will meet the budget, based on the range set out in the latest emissions projections. Emissions are very uncertain, driven by a wide range of factors. The range for the emissions projections captures some of this uncertainty but not all. A risk remains that emissions exceed the upper end of the range, with potential positive costs.

Direct impact on business (Equivalent Annual) £m):			In scope of OIOO?	Measure qualifies as
Costs: 0	Benefits: 0	Net: 0	YES	IN

Summary: Analysis and Evidence

Policy Option 3

Description: To set a zero limit so that no ICUs may be purchased in the non-traded sector.

Price Base Year 2009	PV Base Year 2011	Time Period Years 5	Net Benefit (Present Value (PV)) (£m)		
			Low: £0	High: £0	Best Estimate: £0

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		0	**0**

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

Costs incurred are relative to the baseline Option 1. They stem from taking relatively more costly additional domestic abatement compared with the purchase of ICUs. The high, low and best estimates of costs are zero. This is based on the range for additional required emissions estimated at zero provided by the 95% confidence interval range in the DECC emission projections. UK territorial emissions in the non-traded sector are expected to be below the non-traded sector share of the budget. The limit would not constrain the Government as it does not need to purchase ICUs.

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

Uncertainty not captured in the emissions projections justifies the production of an Illustrative Higher Emissions Scenario. Under this illustrative scenario emissions, possible costs are up to £4360m.

A zero limit would also not help provide signals to the private sector to encourage investment in new international projects. There would be no potential to support the development of low carbon development projects through credit purchase.

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		0	**0**

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

N/A

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

There is a small chance that setting a zero limit may make Government's domestic policies to deliver territorial emission reductions more effective if investors then have greater certainty over the UK's preferred course of action. The additional benefit that a zero limit has in this regard is likely however to be lower if Government has already set out a clear and transparent domestic policy agenda.

Key assumptions/sensitivities/risks **Discount rate (%)** 3.5

It is assumed that Government will purchase ICUs up to the limit of 55 $MtCO_2e$ if emissions exceed the budget level, based on minimising costs. Beyond this level, the assumption is that further reductions come from implementing relatively more costly additional domestic abatement policy. Using 'Borrowing' from the next budget period, up to a maximum 25 $MtCO_2e$ for the second budget, alongside ICUs, increases the level by which emissions can exceed the budget before additional costs of domestic abatement are incurred., in the period under consideration. However, delaying action may have dynamic implications for the overall level of costs incurred in meeting long-term targets. This analysis depends on assumptions on the level of additional domestic abatement and its cost-effectiveness relative to the price of ICUs. Key assumptions driving the £0 monetised cost estimates relate to the expectation that the UK will meet the budget, based on the range set out in the latest emissions projections. Emissions are very uncertain, driven by a wide range of factors. The range for the emissions projections captures some of this uncertainty but not all. A risk remains that emissions exceed the upper end of the range, with potential positive costs.

Direct impact on business (Equivalent Annual) £m):			In scope of OIOO?	Measure qualifies as
Costs: 0	**Benefits:** 0	**Net:** 0	YES	IN

Enforcement, Implementation and Wider Impacts

What is the geographic coverage of the policy/option?			United Kingdom		
From what date will the policy be implemented?			01/01/2013		
Which organisation(s) will enforce the policy?			UK Government		
What is the annual change in enforcement cost (£m)?			0		
Does enforcement comply with Hampton principles?			YES		
Does implementation go beyond minimum EU requirements?			YES		
What is the CO_2 equivalent change in greenhouse gas emissions? (Million tonnes CO_2 equivalent)			**Traded:** 0	**Non-traded:** 0	
Does the proposal have an impact on competition?			No		
What proportion (%) of Total PV costs/benefits is directly attributable to primary legislation, if applicable?			**Costs:0**	**Benefits:0**	
Distribution of annual cost (%) by organisation size (excl. Transition) (Constant Price)	**Micro** **0**	**< 20** **0**	**Small** **0**	**Medium** **0**	**Large** **0**
Are any of these organisations exempt?	No	No	No	No	No

Specific Impact Tests: Checklist

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

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

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

[1] Public bodies including Whitehall departments are required to consider the impact of their policies and measures on race, disability and gender. It is intended to extend this consideration requirement under the Equality Act 2010 to cover age, sexual orientation, religion or belief and gender reassignment from April 2011 (to Great Britain only). The Toolkit provides advice on statutory equality duties for public authorities with a remit in Northern Ireland.

Evidence Base (for summary sheets) – Notes

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

References

Include the links to relevant legislation and publications, such as public impact assessments of earlier stages (e.g. Consultation, Final, Enactment) and those of the matching IN or OUTs measures.

No.	Legislation or publication
1	Climate Change Act 2008: http://www.legislation.gov.uk/ukpga/2008/27/contents
2	
3	
4	

+ Add another row

Evidence Base

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

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

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

	Y_0	Y_1	Y_2	Y_3	Y_4	Y_5	Y_6	Y_7	Y_8	Y_9
Transition costs	0	0	0	0	0	0				
Annual recurring cost	0	0	0	0	0	0				
Total annual costs	0	0	0	0	0	0				
Transition benefits	0	0	0	0	0	0				
Annual recurring benefits	0	0	0	0	0	0				
Total annual benefits	0	0	0	0	0	0				

* For non-monetised benefits please see summary pages and main evidence base section

Microsoft Office
Excel Worksheet

Evidence Base (for summary sheets)

SUMMARY

This Impact Assessment (IA) considers the issue of setting a limit on the use of International Carbon Units (ICUs) in the non-traded sector to meet the second carbon budget 2013-2017. The Government is required under the Climate Change Act (CC Act) to set in secondary legislation what this limit shall be by June 2011.

Part A sets out the rationale for intervention, the policy objectives and intended effects of setting a limit. The Climate Change Act requires Government to set a limit on the net amount of carbon units that may be used to meet each carbon budget, having regard to the need for UK domestic action on climate change, including the use of ICUs. At a global level, Government is strongly supportive of an international framework that allows countries to use the carbon market (through the purchase of ICUs) to help meet a proportion of their emission reductions targets, in line with the UN's supplementarity principle. The limit on ICUs should look to balance the duty in the Act regarding territorial reductions with benefits of using the global carbon market.

To assess the costs and benefits of setting a limit on ICUs, the IA compares the option where the Government has effectively unrestricted use of ICUs through a non binding limit, with options in which limit on ICUs is binding on Government (a limit which constrains the Government's ability to use ICUs when it would otherwise choose to do so).

This provides the rationale for the three Options presented in Part B, which are:

- Option 1 'baseline': A limit which is very high and therefore does not bind – i.e. 1000 $MtCO_2e$;
- Option 2: A limit of 55 $MtCO_2e$, in line with the EU effort sharing agreement limit; and
- Option 3: A zero limit

Option 1 provides the baseline. This sets the costs and benefits that would have occurred if no action was taken to set a limit ('do nothing'). The Climate Change Act requires a limit is set and so a true 'do nothing' is not possible. The baseline is, therefore, generated by considering a limit which is sufficiently high so that it does not constrain the Government in choosing to use ICUs or not, akin to having no limit. Costs for the baseline are therefore zero, while costs for Options 2 and 3 are additional costs relative to this baseline.

Part C on the Assessment of Costs and Benefits presents firstly an assessment of the risk to achieving the budget (Section 1.2) because the costs of imposing a limit on the use of ICUs depend crucially on whether the constraint introduced by the limit binds. This, in turn, will be affected by whether the UK is expected to meet the budget through currently planned actions, and non-traded emissions remain within the non-traded sector share of the budget, (see Part C, Section 1.1 of this IA for a description of the traded and non-traded sectors). In this event, a limit on ICUs is never binding. If the UK is not expected to meet the budget *additional* actions to secure emissions reductions are required and a limit on ICUs may be binding.

Based on the DECC emissions projections, the risk to not achieving the second carbon budget through current planned actions is low. On low, central and upper estimates for emissions levels, the budget is expected to be met. Emissions are expected to be between 168 $MtCO_2e$ below the non-traded sector portion of the budget based on the lower bound emissions projections and 29 $MtCO_2e$ below on the upper bound. The central projection, suggests emissions at 114 $MtCO_2e$ within budget equivalent to allowing emissions to be around 20 $MtCO_2e$ on average over the central estimate in each year. The range in emission projections provides a 95% confidence interval. This captures a high proportion of the likely uncertainty in emissions levels, which signals the projections are very likely to fall within this range. This provides the justification for using the DECC emissions projections for the low, high and best estimate of costs in the summary sheets.

The 95% confidence interval range does not, however, fully take into account the factors that may cause emissions to be higher or lower than expected and some element of uncertainty around emissions levels over the second carbon budget remains. Therefore, an "Illustrative Higher Emissions Scenario" considers how more extreme levels of emissions would affect the costs from setting a limit on ICUs. This scenario assumes emissions will be greater than the upper end range of the DECC projections and the UK requires additional emissions reductions beyond currently planned actions to meet the budget; illustrative amounts ranging from 10 $MtCO_2e$ to 80 $MtCO_2e$ are analysed.

Part C, Section 2, presents the cost benefit analysis according to the DECC emissions projections and under the "Illustrative Higher Emissions Scenario". Sections 2.1 summarises the analytical approach before presenting monetised costs in Section 2.2.

DECC emissions projections imply that a limit set at any level will not bind because the Government will not need to purchase ICUs. Even at the top end of the DECC emissions projections range, the UK will meet the non-traded sector share of the second budget through currently planned domestic actions. No *additional* emissions reductions are required. In this situation, the imposition of a limit has no additional costs under Options 2 and 3 compared with the baseline Option 1 (Section 2.2.1).

In the Illustrative Higher Emissions Scenario a constraint on the use of ICUs has the potential to force relatively more costly domestic abatement to be taken rather than the purchase of ICUs. The extent of these additional costs relative to the situation where no binding limit is set (Option 1), depends on (i) the amount by which non-traded emissions exceed the non-traded budget level; and (ii) what is assumed about the costs of alternative action – in this analysis implementing additional domestic abatement measures. The assumptions are set out in full in Section 2.2.2.

There are in addition to monetised costs, qualitative costs and benefits associated with the options and these are discussed in Section 2.3. Finally, there are other mechanisms the Government can draw on to help make *additional* required emission reductions, which have the potential to impact on the costs of setting a limit. These include borrowing against the next budget or banking any overachievement in a previous budget to contribute towards the next. To simplify the analysis, the impact of setting a limit on the use of ICUs is assessed, where the only alternative action available to Government is to put in place additional domestic abatement measures. The interaction of these additional mechanisms with use of ICUs is discussed qualitatively in Section 2.4.

Overall Assessment

An overall assessment of the three options described above, draws on both the assessment of risk and the cost benefit analysis for the options. This IA suggests that, based on current DECC projections the risk is very low that the second carbon budget will be missed. The low, high and best estimate of monetised for all three options are therefore zero as explained above.

However, there could be significant costs to imposing a constraint on ICUs should non-traded emissions not remain on track. Under the Illustrative Higher Emissions Scenario the costs of the options are very different. Option 3 incurs by far the highest costs, while Option 1 which sets no binding limit has the lowest costs given the ability to optimise the choice of instrument used to meet the budget, based on least cost.

There are qualitative costs and benefits to consider in addition to monetised costs. These are concerned with the impact that setting a limit on ICUs potentially has on investors' certainty over the Government's preferred course of action to meet the second carbon budget. The limit for the second carbon budget should look to balance the duty "to have regard for domestic action to reduce emissions" in section 15 of the Act with benefits of using the global carbon market.

Unrestricted access to the use of ICUs could imply investors have less certainty in the UK's preferred course of action to make emissions reductions in the non-traded sector, and the effectiveness of domestic policies to deliver territorial savings may be reduced. A zero limit on the use of ICUs would have the inverse effect Where a positive limit on the use of ICUs is capped at a relatively low level (under Option 2) there is not the same potential to reduce investors' certainty over the UK's preferred course of action since the Government will have to undertake domestic abatement

In respect of encouraging the development of global carbon markets, unrestricted access to ICUs could signal an increased commitment by the UK government to purchase emissions reductions from developing countries, which would form part of the overall "demand" signal to the private sector to help drive investment in new projects overseas. Demand for new projects has been falling over the last 1-2 years due to uncertainty about the future of the international negotiations, and so this could be seen as a positive contribution. ICUs, if used would also have a subsidiary benefit of driving increased financial flows to low carbon projects in developing countries that deliver cost-effective mitigation. Setting a zero limit could be viewed as a lessening of the Government's commitment towards global carbon markets, although this would be inaccurate. This could be avoided by reaffirming the UK's commitment to a global

carbon market over time, and the likelihood of needing increased ICU purchase to meet more stringent emissions reduction goals.

The impact that setting a limit on ICUs has on investors is likely to be reduced where Government has a clear and transparent domestic policy agenda and affirms its commitment to global carbon markets. ICUs in the domestic framework for the second carbon budget could act as an effective insurance mechanism. A limit of 55 $MtCO_2e$ for example, avoids the situation where the Government is forced to take expensive domestic action just to compensate a small increase in emissions over the level of the non-traded sector share.

PART A: Rationale and policy objectives

1. Problem under consideration

This IA considers, at what level to set a limit on the use of ICUs to help meet the non-traded sector portion of the second carbon budget. Under the Climate Change Act 2008 the Government has a statutory duty to set a quantitative limit, through secondary legislation, on the net amount of carbon units that can be credited to the net UK carbon account[1] for each five year carbon budget period. The limit for the second budget period (2013-2017) must be set no later than 30 June 2011.

This limit is not concerned with the use of international carbon units in the traded sector where EU legislation has set a limit of around 1.6GT of ICUs - equivalent to 50% of emissions reductions – that participants in the EU ETS can purchase. For the purposes of calculating the UK's net carbon account and progress against carbon budgets, emissions reductions from the traded sector are given by the UK's share of the EU ETS cap. Actual territorial emissions in this sector may be higher or lower than the UK's share of the cap, if UK participants chose to purchase ICUs, but this does not affect the level of emissions that contribute towards meeting carbon budgets.

The IA is only concerned with the limit on the level of ICUs that may be counted towards the non-traded emissions portion of the UK carbon budget. These ICUs are Certified Emission Reductions (CERs) in the form of project credits from the Clean Development Mechanism (CDM), and Emission Reduction Units (ERUs) from Joint Initiatives (JI) project credits. Under the EU Effort Sharing Decision, the UK can use these ICUs up to the limit of 55.75 $MtCO_2e$[2] to help contribute towards its non-traded sector emission reductions. It also has the flexibility to meet a part of its non-traded effort share by purchasing over-achievement from other member states. The currency for this Member State trading mechanism has not been determined, and will be agreed as part of a comitology decision over the course of 2011. The new currency is referred to here as the Annual Emissions Allocations (AEAs). Currently AEAs are not in the list of eligible ICUs that can be counted towards the net carbon account. As the only eligible ICUs in the carbon accounting regulations (that are also compliant with EU rules) are CERs and ERUs, and EU rules only allow use of these up to 55.75 $MtCO_2e$, an ICU limit above 55.75 $MtCO_2e$ to contribute to the net carbon account is not currently possible. In the future, in theory, the carbon accounting regulations may expand the list of eligible carbon units to include AEAs. Under this situation an ICU limit above 55.75 $MtCO_2e$ is possible and in keeping with EU rules under the EU effort sharing decision.

The limit concerns the quantity of ICUs that the Government could theoretically purchase; it does not set a level for the quantity of ICUs to be used as a part of an overall policy mix to meet the carbon budgets.

2. Rationale for intervention

Section 11 of the Climate Change Act requires a limit to be set on the net amount of carbon units that may be used to meet each carbon budget. Section 15 of the Act requires the Government to have regard to the need for UK domestic action on climate change when considering how to meet the carbon budgets, including the use of international carbon units (ICUs). At a global level, the Government is strongly supportive of an international framework that allows countries to use the carbon market (through the purchase of ICUs) to help meet a proportion of their emissions reductions targets, in line with the UN's supplementarity principle. The limit for the second carbon budget should look to balance the duty in section 15 with benefits of using the global carbon market.

3. Policy objective

To set a limit on the net amount of ICUs that may be credited to the net UK carbon account for the 2013–2017 budgetary period that strikes the right balance between cost-effectiveness, reducing greenhouse gas emissions through UK territorial emissions reductions, and the possibility of financing emission reductions to occur elsewhere. A consideration for the appropriate level of UK territorial emissions is whether they are consistent with achieving the 2020 and 2050 reduction targets under the Climate Change Act.

[1] The net UK carbon account is what we measure to assess compliance against carbon budgets. It is the net UK emissions adjusted for the sale or purchase of any carbon units, either in the non-traded sector or as part of the EU Emission Trading Scheme.

[2] The EU Effort Sharing Decision states a member state can use credits up to a quantity that equals 3% of its 2005 level of non-traded emissions. UK NTS emissions in 2005 were 371.8$MtCO_2e$. This means a credit limit of 11.15MtCO2e per year or 55.75$MtCO_2e$ for the whole second budget period. This is rounded down to 55 $MtCO_2e$ as a purchase of 56 $MtCO_2e$ ICUs may imply a breach under EU ESD rules.

PART B: Description of options

Option 1: Set a limit which does not bind – i.e. 1000 $MtCO_2e$

Option 1 is the baseline. This sets the costs and benefits that would have occurred were there no action taken to set a limit 'do nothing'. 1000 $MtCO_2e$ sets a limit which is sufficiently high that it means it effectively does not constrain the Government in the amount of ICUs it can purchase to ensure non-traded emissions are within the non-traded sector share of the budget. This means the costs under Option 1 are the same as the costs in the absence of setting a limit. Costs for this baseline option are therefore zero while costs for options 2 and 3 are additional costs relative to the baseline.

Option 2: Set a limit of 55 $MtCO_2e$, in line with EU Effort Sharing Decision limit

The second option sets the limit at 55 $MtCO_2e$. The Government could use up to this limit over the 2013-2017 period, which is equivalent to the permitted level of eligible ICUs under the EU Effort Sharing Decision. This covers the non-traded sector and allows the use of CERs and ERUs up to 3% of a Member State's 2005 emissions levels (11.15 $MtCO_2e$ annually). This option provides more flexibility than Option 3, but less than Option 1 in the event that emissions exceed the non-traded sector share of the budget by more than the 55 $MtCO_2e$ limit.

Option 3: Set a zero limit

Setting a zero limit on the use of ICUs implies the Government must make additional required emission reductions to meet the non-traded budget by undertaking additional domestic abatement, or making use of an alternative 'flexibility instrument' such as borrowing against the next budget period.

PART C: Assessment of costs and benefits

1. CONTEXT

1.1 Level of second carbon budget (2013-2017) and carbon accounting rules

A carbon budget limits the total quantity of net emissions that the UK can emit over a five year period. For the second carbon budget the level is 2782 $MtCO_2e$. It comprises two elements:

(i) emissions permitted within the traded sector, which refers to emissions from installations included in the EU Emissions Trading Scheme (EU ETS). The traded sector essentially covers the power sector and intensive energy users in industry;

(ii) emissions permitted within the non-traded sector, which covers those remaining sectors of the economy that do not fall under the EU ETS and includes for example, transport, waste and agriculture, domestic and commercial use of heating fuels, and non energy intensive industry.

The level of emissions in the net carbon account[3] from the traded sector is defined by the UK's share of the EU ETS cap. This is equal to the total number of allowances received by UK installations plus the UK Government's auction rights. UK EU ETS participants can buy or sell EU allowances, meaning that UK territorial emissions in this sector may be higher or lower than the UK's share of the EU ETS cap without affecting emissions in the net carbon account or the net level of global emissions. This IA is, however, only concerned with the limit on the level of International Carbon Units that may be counted towards the non-traded emissions portion of the UK carbon budget, and not the traded sector (see problem under consideration Part A.1. for detail on rules around eligible ICUs and limits).

Changes to the estimated level of the UK share of the EU ETS cap and the non-traded sector budget

The UK Climate Change Act 2008 set the overall level of the first three carbon budgets in legislation following advice from the Committee on Climate Change (CCC). The legislated carbon budgets were slightly more challenging than the CCC recommendations to reflect changes to the EU climate and energy package after the CCC recommendations were published.

The CCC recommended two different target levels for the first three carbon budgets - 'interim and intended' - owing to the uncertainty over the level of ambition the EU would take with respect to reducing emissions by 2020. The 'interim' carbon budgets are set on the basis that the EU has a target for reducing emissions by 20% from 1990 levels by 2020. The 'intended' budgets are set on the proviso that the EU moves to a more challenging target of a 30% reduction by 2020. The current UK budgets set in the Climate Change Act are the 'interim' level of the budgets - the second carbon budget is set at a level of 2782 $MtCO_2e$. The analysis in this IA (including assessment of risk to meeting the budget and costs and benefits) considers the limit on the use of ICUs in relation to the interim level of the budget. Should a significant change to the budget level be proposed in the future, Government will need to consider whether the ICU limit set for the current second budget remains appropriate.

The CCC also advised on what the traded and non-traded sector shares should be for the first three carbon budgets. The Climate Change Act only specified the shares for the traded and non-traded sectors[4] for the first budget period but the IA "the EU Climate and Energy Package, the revised EU Emissions Trading System Directive, and meeting the UK non-traded target through carbon budgets[5]" showed the slighted revised overall budget levels and the shares of the traded and non-traded sectors for all three carbon budgets. These are set out in Table 1. To note that the non-traded sector share advised by the CCC (1704 $MtCO_2e$) was not amended, only the traded sector share.

[3] The net UK carbon account is what we compare against the carbon budgets to determine whether we are meeting them. It is calculated by taking net UK emissions for a given period and adjusting to account for the amount of carbon units which have been brought in from overseas by Government and others to offset UK emissions ("credits"), and UK carbon units which have been disposed of to a third party ("debits").

[4] The traded share for the first carbon budget is set out in the carbon accounting regulations 2009. The non-traded share is not explicitly set out in legislation but can be inferred by subtracting the traded share from the overall carbon budget level.

[5] See Impact Assessment of EU Climate and Energy Package, the revised EU Emissions Trading System Directive, and meeting the UK non-traded target through carbon budgets – 22 April 2009, p.9 to 10

Table 1: CCC advice level for non-traded second 'interim' carbon budget, and Government amended traded and overall budget levels, $MtCO_2e$

Traded budget	Non traded budget	Total budget (2013-2017)
1078	1704	2782

The traded sector budget of 1078 $MtCO_2e$ is determined as an *estimate* of the expected contribution of the UK share of the EU ETS cap. In practice, the actual UK share of the EU ETS cap that will contribute to the traded sector emissions in the overall net carbon account, may be different.

Current uncertainty in the level of the UK share of the EU ETS cap is associated with:

- The historical production data for UK and other EU installations. This will determine their level of free allocation and the level of UK auction volumes. These figures will not be known until after all Member States have submitted their National Implementation Measures (NIMs) Plan in September 2011.
- The number of closures and new entrants over Phase III will not be known before the close of the period.

The limit for the second carbon budget period traded sector cap, must be set out in the carbon accounting regulations that must be revised before the start of the second budget period i.e. by end 2012 at the latest. The implication is that by the time the regulations are set, Government should have much more certainty over the level of the UK share of the EU ETS cap that, in turn, sets the level of the traded sector portion of the budget. Some uncertainty over the actual final level of the UK share of the EU ETS cap will remain even once the accounting regulations for the limit have been set owing to the uncertainties around closures and new entrants in the EU ETS.

Should the traded sector portion of the budget determined by the final allocation of the UK share of the EU ETS cap end up being different to the level in the carbon accounting regulations, the Government can:

- Make use of the provision in the Act to amend the overall level of the budget, for example by the extent of the change in final UK share of the EU ETS cap compared with the original estimate. This maintains the expected level of effort required from the non-traded sector;
- Amend the level of the traded sector share of the overall budget in the regulations to reflect the actual final agreed UK share of the EU ETS cap but do not change the overall level of the budget. By implication this will change the non-traded emissions share of the overall budget.

The second option creates greater uncertainty in the non-traded emissions as the non-traded budget level is likely to change. The current estimate for the level of the UK share of the EU ETS cap in the latest DECC projections, suggests a traded sector share of the budget of 1051 $MtCO_2e$. This is 27 $MtCO_2e$ lower than the estimate set out in Table 1. On the basis of the latest estimate, which suggests a smaller UK share of the EU ETS cap, this would increase the non-traded sector share of the budget if the overall level of the budget were not amended.

The working assumption for this IA is that the overall level of the second carbon budget will be amended to reflect the difference in the original estimated level of the UK share of the EU ETS cap (as per Table 1) and the final level. This assumption removes any uncertainty associated with the level of traded sector emissions and fixes the non-traded sector share of the budget at 1704 $MtCO_2e$.

Use of ICUs and environmental integrity

At a global level, the UK is strongly supportive of an international framework that allows countries to use the carbon market (through the purchase of ICUs) to help meet a proportion of their emissions reductions targets, in line with the UN's supplementarity principle.

For the use of ICUs to be a credible measure to contribute to meeting the UK's climate change objectives, one tonne of carbon reduced elsewhere in the world through a project credit must be equivalent to reducing one tonne of carbon through domestic abatement action in the UK.

The carbon accounting regulations for carbon budgets provide assurance on that issue by ensuring that only ICUs recognised under the Kyoto Protocol can be used to meet carbon budgets. Kyoto Protocol credits are subject to a rigorous auditing process to ensure they represent genuine and verifiable

emissions reductions – and over the years the UK has been at the forefront of international efforts to further reform and improve the main project mechanisms. In the ongoing international negotiations which will determine the availability of ICUs from 2012, the UK is seeking to further reform the existing Kyoto Protocol mechanisms and introduce new large-scale carbon mechanisms that could deliver emissions reductions on a greater scale, perhaps on a cross-sectoral basis – whilst ensuring continued environmental integrity.

In addition, the EU 2020 Climate and Energy package, agreed in December 2008, includes a number of restrictions and obligations on the purchase of international credits by Member States to offset emissions in the non-traded sector in the period 2013-2020. These include a restriction on buying credits generated from nuclear facilities, an obligation to use credit purchase to enhance the geographical distribution of projects, and a restriction on buying project credits from advanced developing countries such as India and China registered after 2013.

Further provisions in the accounting rules on the use of flexibility instruments

The carbon budget accounting rules allow the possibility for the UK to borrow up to 1% against the next budget, which means approximately 25 $MtCO_2e$[6] from the third carbon budget that can be used to cover higher emissions in the second carbon budget. The rules also allow for the possibility of banking any overachievement (i.e. the quantity by which emissions are reduced below the budget level) against a current budget to count towards emissions reductions in the subsequent budget.

The second carbon budget period runs until the end of 2017. Because final emissions data will not be known until March 2019 owing to lags in when the data is collected and verified, the final level for the budget has to be settled by May 2019 after which no borrowing, banking or use of credits can be counted towards the final level of the budget.

1.2 Current assessment of the risk to meeting the second carbon budget

The carbon budget for 2013-2017 of 2782 $MtCO_2e$ is equivalent to ensuring emissions are on average over the period 29% below the 1990 base year level. As the legislation does not currently specify what the traded and non-traded portions of the second budget are, the non-traded sector budget that is assumed for the purpose of this IA, is in line with the level set in the CCC advice of 1704 $MtCO_2e$.

As described in section 1.1, the assumption is that the overall level of the second carbon budget will be adjusted to reflect any change in the final level of the UK share of the EU ETS cap. All uncertainty and risk in meeting the budget is therefore assumed to lie in the non-traded sector.

Table 2 shows the central projections estimate produced for the 4th Carbon Budget baseline.[7] Emissions over the period are expected to be 1590 $MtCO_2e$ compared with the budget level of 1704 $MtCO_2e$. The central emissions estimate suggests the budget will be met with quite a wide margin of comfort of 114 $MtCO_2e$ or, put another way, emissions could be up to around 20 $MtCO_2e$ on average, higher in each year of the budget and still be within budget at the end of the period.

Table 2: Central emissions projections and non-traded sector budget ($MtCO_2e$)

	2013	2014	2015	2016	2017	2013-2017	Insurance Margin
Central estimate	327	323	319	313	308	1590	114
Non traded budget						**1704**	

Graph 1 shows the emissions projections range for the non-traded sector, compared with the annual average given by the non-traded sector portion of the budget (the black line). The yellow line shows the lower estimate for non-traded emissions with an even wider margin of comfort (168 $MtCO_2e$). The red line represents the upper estimate for the projections and suggests that the UK would still be just within budget (29 $MtCO_2e$ over the whole period) if emissions were at the top end of the projected range.

[6] The EU Effort Sharing Decision allows annual borrowing of 5% of annual NTS allowances from year to year, so going between Carbon budgets 2 and 3, would limit us to borrow 5% of 2017 emissions (around 16 $MtCO_2$).

[7] These are baseline scenario projections for use in the 4th Carbon Budget Impact Assessment, which can be found through the following link (http://www.decc.gov.uk/en/content/cms/what_we_do/lc_uk/carbon_budgets/carbon_budgets.aspx), in which there is no extension to existing policies beyond 2022 and continuation of EU ETS carbon price trajectory . This differs from the latest previously published projections (June 2010) which assume a transition to a global carbon market by 2030 leading to higher carbon prices from 2021 onwards. These assumptions are unlikely to have a significant impact on 2nd Carbon Budget non-traded emissions projections.

Graph 1: Central projections and lower and upper ranges[8] in comparison with the budget level ($MtCO_2e$)

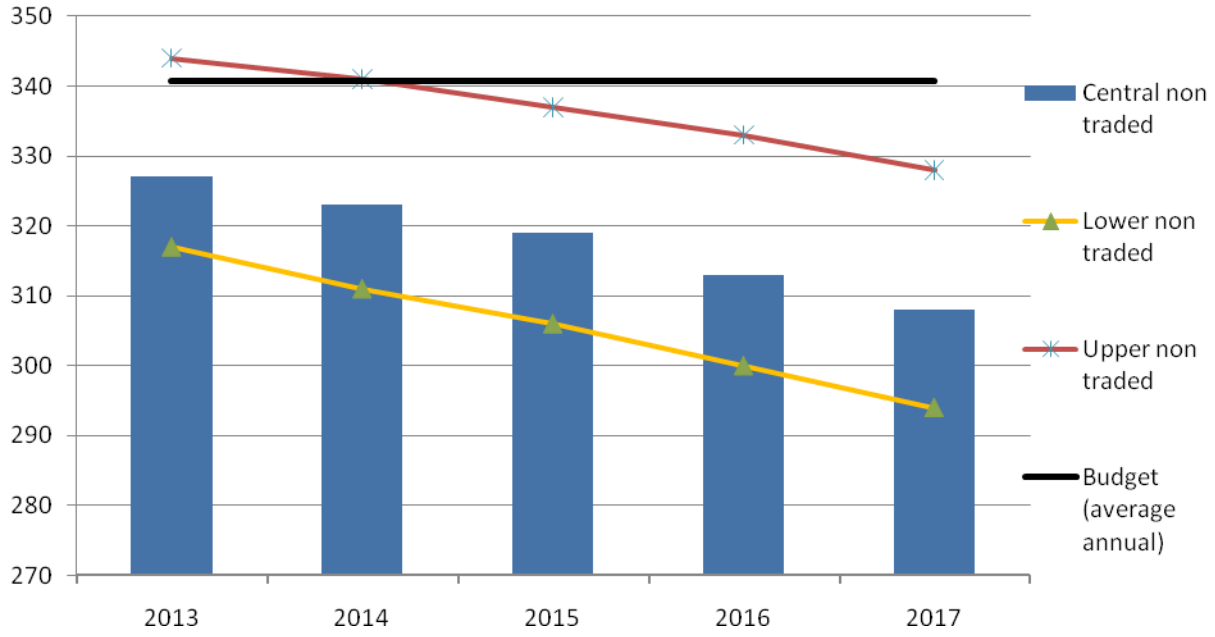

Table 3 sets out the uncertainty range for emissions in the second carbon budget period, as estimated by the latest DECC emission projections model runs.[9] The non-traded emissions estimates show a difference of 139 $MtCO_2e$ between the lower and upper bounds for the projections, or on average 9% over the budget period. The insurance margin in the final column is a measure of the level of risk to meeting the second carbon budget. This margin is derived by comparing the emission projections estimates for non-traded sector emissions with the non-traded sector budget of 1704 $MtCO_2e$. As explained above, on all three estimates the UK is expected to remain within budget.

Table 3: Projections of non-traded emissions estimates and uncertainty margin ($MtCO_2e$)

	2013	2014	2015	2016	2017	2013-2017	Insurance Margin
Lower estimate[10]	317	311	306	300	294	1536	**168**
Central estimate	327	323	319	313	308	1590	**114**
Upper estimate	344	341	337	333	328	1675	**29**
Non-traded BUDGET LEVEL						**1704**	

Additional sources of uncertainty

The DECC emissions projections suggest the risk that non-traded emissions are above the level of the non-traded sector budget is very low. Projecting emission levels into the future is subject to uncertainty and depends upon modelling correctly the link between economic activity and GHG emissions, and modelling and anticipating future drivers, such as temperatures, fuel prices, power station capital costs, economic growth, population and accurately forecasting emission reductions due to climate change policy.

The DECC emission projections capture some of this uncertainty through the use of Monte Carlo simulations which use different assumptions and assumed distributions of the levels of key variables to provide a range of outcomes. This analysis provides an indication of the impact of uncertainty in fossil

[8] These are 95% confidence intervals derived from Monte-Carlo simulations

[9] Source: Updated projections for the 4th carbon budget baseline published as part of the 4th budget Impact Assessment which can be found through the following link: http://www.decc.gov.uk/en/content/cms/what_we_do/lc_uk/carbon_budgets/carbon_budgets.aspx

[10] For the lower and upper estimates, annual uncertainties will not sum to total uncertainty figures for the whole 5 year budget period. This is because to obtain the uncertainty for the budget period as a whole, the annual emissions are summed for each randomised run and a distribution for the whole period is obtained for each run. This then allows that there can be some compensation between higher and lower results over the 5 years within each run, which is not the case for the annual estimates.

fuel prices, economic growth, temperature, policy delivery, power station capital costs, non-CO_2 emissions and LULUCF emissions and removals. The upper and lower bounds shown are not absolute bounds. These represent the range within which emissions projections lay in 95% of the simulated scenarios that were run. This means that in 0.3% of the simulations, the 2nd Carbon Budget was not met i.e. the upper bound of the 95% confidence interval. Therefore even if all sources of uncertainty had been taken into account there is a small risk that we will not meet the 2nd Carbon Budget.

There are also additional uncertainties that have not been taken into account which mean the risk of not meeting the 2nd Carbon Budget is higher than suggested by the 95% confidence intervals– in particular modelling uncertainty which will increase over time is only partially reflected. DECC will be undertaking a review of the emissions model before the next full emissions projections update is published in October 2011. This is likely to lead to revisions to the central estimate and to a widening of the uncertainty ranges. It should not, therefore, be taken as certain that emissions will fall within the range of the projections presented here. These issues aside, the assessment of risk, suggests the likelihood is that the second budget will be met and the potential for emissions to significantly exceed the level of the non-traded sector budget is low. This is based on the range for emissions given by the DECC emissions projections and the fact that these account for a large proportion of the uncertainty in emissions.

2. Assessment of costs and benefits of the options

2.1 Summary of the approach

The costs and benefits of the options are quite different where the UK remains on track to meet the budget compared with a situation where it may not be on track and additional action is required (whether through purchasing ICUs or some alternative means such as additional domestic abatement). Ultimately the best course of action for setting the limit on ICUs needs to consider the costs and benefits *given the level of risk.*

This judgement in this IA is that the risk to non-traded emissions exceeding the budget is low. Section 1.2 showed that currently non-traded emissions are projected to be lower than the non-traded sector share of the budget, and that there is a relatively comfortable insurance margin according to DECC projections. The DECC emissions projections are the basis for high, low and best estimate of costs in the summary sheets as they provide a range for expected emission levels over the second carbon budget period at the 95% confidence interval.

There is, however, a degree of uncertainty around emissions levels over the second carbon budget that is not captured in the DECC emission projections. Owing to this, the IA sets out an "Illustrative Higher Emissions Scenario" to show what the impact of imposing a limit on ICUs would be, were the Government to face a situation where non-traded emissions are higher than the non-traded sector share of the budget. This scenario assumes emissions will be greater than the upper end range of the DECC projections and the UK requires additional emissions reductions beyond currently planned actions to meet the budget; illustrative amounts ranging from 10 $MtCO_2e$ to 80 $MtCO_2e$ are analysed.

The final monetised costs of the options are the additional relative costs that arise from the imposition of a limit on the use of ICUs (Options 2 and 3), compared to a non-binding limit which imposes no costs, where Government has full flexibility to choose how to make emissions reductions (Option 1). The final costs from the alternative options, Options 2 and 3, are costs incurred through the imposition of a binding limit relative to Option 1.

The cost benefit analysis also considers qualitative costs and benefits for the different options. These are concerned with the impact that setting a limit on ICUs potentially has on investors' certainty over the Government's preferred course of action to meet the second carbon budget i.e. the use of domestic policy action versus the use of ICUs in the global carbon markets.

Assessing the costs and benefits is complicated by the interaction of the use of ICUs with other flexibility instruments in the CC Act. These are borrowing up to 1% against the next budget and banking overachievement in one budget to count towards progress in the next budget. To simplify the comparison of costs and benefits of the options, it is assumed there is no borrowing and no banking of over achievement, and the Government cannot simply choose to miss the budget. In this case, the Government relies on either the use of ICUs or additional domestic abatement measures to ensure the budget will be met. Section 2.4 explains qualitatively the potential implications of the interaction of the other flexibility instruments on the relative costs and benefits of the options.

The rest of section 2 is organised as follows:

Section 2.2 sets out the monetised costs of the options according to an assessment based on the DECC emissions projections (section 2.2.1) and the Illustrative Higher Emissions Scenario (section 2.2.2). There are no monetised benefits for any of the options so these are not presented. Section 2.3 then discusses the qualitative costs and benefits of the options. Finally, section 2.4 explains how interaction with the other flexibility instruments could impact on the results of the cost benefit analysis.

2.2 Monetised costs

2.2.1) DECC Emissions Projections: Emissions remain within the projections estimates - UK meets the budget

Summary of monetised costs

Even at the upper end of the range, emissions over the second carbon budget period are projected to be lower than the budget level. In Table 4 costs are the same for all options, as a limit on the purchase of

ICUs does not bind in all three cases. As the limit does not bind, the high, low and best estimates of costs are zero.

Table 4: Summary of monetised costs on the basis of the DECC emissions projections

	COSTS £m	
Option 1 – non binding limit 1000MtCO$_2$e	Costs to the Exchequer (credit purchase)	£0
	Additional domestic abatement	£0
	TOTAL	**£0**
OPTION 2 – 55 MtCO$_2$e limit	Cost to the Exchequer (credit purchase)	£0
	Additional domestic abatement	£0
	TOTAL	**£0**
OPTION 3 – Zero limit	Additional domestic abatement	£0
	TOTAL	**£0**

2.2.2) Illustrative Higher Emissions Scenario – Non-traded emissions exceed the budget

As described in section 2.1, monetised costs are the additional costs of imposing a binding limit that makes emissions reductions relatively more expensive compared to the baseline Option 1.

To assess the cost impacts of imposing a binding limit under Options 2 and 3 relative to Option 1, assumptions need to be made about the course of action which determine the baseline costs. This section firstly sets out what the assumptions are to determine the baseline costs. It then shows what the absolute costs of reducing emissions are under the three options. These are driven by the imposition of a binding limit on ICUs affecting the decision about how to meet the additional required emission reductions (either through purchase of ICUs or additional domestic abatement). The **final monetised costs** for the cost benefit analysis of the options are then the **relative costs** of Options 2 and 3 compared to the baseline.

Assumptions:

- The Government has two options available to it, should emissions be higher than the budget. It can either: (i) undertake additional domestic abatement; and / or (ii) purchase ICUs.
- Under Options 1 and 2, both measures are available to Government. For Option 1, the Government is unconstrained in its use of either measure but for Option 2, the use of ICUs is constrained once the 55 MtCO$_2$e limit is reached. Under Option 3, Government can only undertake additional domestic abatement.
- The Government is assumed to be economically rational in its choice of measure to achieve additional emission reductions, within the constraints imposed. Therefore Government compares the relative marginal costs of one tonne of emission reduction through ICUs versus additional domestic abatement, and minimises the costs to society by choosing the least cost combination of measures.
- The price of ICUs lies between £9 and £16 per tonne CO$_2$e. This range is given by market analyst and DECC carbon value prices owing to uncertainty in the cost of ICUs. Table 6 sets out the marginal cost of additional emissions reductions through the use of ICUs.
- Assumptions on the additional domestic abatement available and its costs are based on current knowledge of the feasible abatement potential.[11] As abatement must occur in time to contribute to emissions reductions in the second carbon budget, it is assumed that only the abatement occurring between 2015 and 2017 can contribute to reducing emissions, due to a lag between time taken to implement measures and when reductions will start to occur (i.e. a policy implemented in 2013 could not start to deliver savings until 2015).

[11] This has been developed through work undertaken for the 4th Carbon Budget Impact Assessment to examine the additional bottom up potential available from new of existing measures beyond those set out in the July plan 2009 which showed the previous administration's policies and proposals to meet the first three carbon budgets. The work on additional bottom up potential has been developed for the analysis to underpin setting the level of the 4th Carbon Budget – see Impact Assessment 4th CB which can be found here: http://www.decc.gov.uk/en/content/cms/what_we_do/lc_uk/carbon_budgets/carbon_budgets.aspx

- There is very limited additional domestic abatement for the years 2015-2017 that is readily identifiable. 12 $MtCO_2e$ is assumed cost-effective at the marginal ICU price of £9/tCO_2e to £16/tCO_2e and Government would therefore prefer to implement these measures than purchase ICUs under all options. The remaining potential (9 $MtCO_2e$) of identified abatement is not cost-effective, and under Options 1 and 2, purchase of ICUs is preferred (under Option 2, provided emissions reductions from additional measures are less than 55 $MtCO_2e$).
- Once the identified additional domestic abatement measures are used up, it is assumed that Government only has a 'back stop technology/measure' available to undertake further domestic emissions reductions, at an assumed marginal cost of £100 per tonne. This could be a fiscal, incentive or regulatory measure, that could be implemented quickly but would be costly to society. This is an illustrative figure only, not intended to represent any particular measure

- Costs for taking additional domestic abatement action are assumed to be incurred in 2015, 2016 and 2017 to allow early enough implementation of measures to take effect. Costs for the purchase of ICUs are assumed to be incurred in years, 2016, 2017, 2018 and 2019 as there is the possibility of purchasing these up until May 2019.

Availability of additional abatement measures and relative marginal costs

Table 5 summarises the additional domestic abatement assumed to be available and its marginal costs. 12 $MtCO_2e$ of cost-effective additional domestic abatement relative to the price of ICUs are estimated to be available, with an average marginal cost per tonne of -£97 (a net saving). A further 9 $MtCO_2e$ is estimated, but it is not cost-effective relative to the ICU price, at £90 per tonne. Unlimited potential in the back stop technology/measure at a marginal cost per tonne of £100 is also assumed.

Table 5: Availability and costs of additional abatement for emissions reductions in 2013-2017

Additional identified domestic abatement below ICU price	Additional domestic abatement above ICU price	Additional domestic abatement given by 'back stop' technology
12 $MtCO_2e$ (-£97/t)	9 $MtCO_2e$ (£90/t)	Abatement required above 21$MtCO_2e$ (£100/t)

International carbon unit prices

ICUs are carbon units from offsetting carbon reduction projects outside of the UK. The main source of ICUs available to the Government is the CER credit. Table 6 presents a range for the forecast price of ICUs expressed as price per tonne of abatement, in 2009 prices. The first line shows the DECC published traded EUA price series, consistent with the current EU ETS cap to 2020. The European Climate Exchange (ECX) quoted futures price for EUAs is lower by around £2 to £3 per tonne. The CER prices are given by two market forecasts, one from Bloomberg New Energy Finance (BNEF) and the other again from the ECX futures quoted prices.[12]

Table 6: Comparison of international carbon unit price estimates (converted to 2009 prices)

	2016	2017	2018	2019
DECC EUA	16.0	16.0	16.0	16.0
ECX EUA	12.7	13.2	13.6	14.0
BNEF CER	12.5	12.3	11.0	10.8
ECX CER	8.9	9.0	9.1	9.2

[12] ECX CER future prices: https://www.theice.com/marketdata/reports/ReportCenter.shtml?reportId=10&contractKey=81
ECX EUA futures prices: https://www.theice.com/marketdata/reports/ReportCenter.shtml?reportId=10&contractKey=20
DECC carbon values: http://www.decc.gov.uk/en/content/cms/statistics/analysts_group/analysts_group.aspx
BNEF: "Carbon Markets – Global – Deep Dive December 2011, Bloomberg New Energy Finance" This price series only applies to 'high-quality' CERs, i.e. credits that will be fully eligible for EU ETS compliance in Phase III. This specifically excludes CERs generated from HFC-23 and N2O adipic acid projects that are subject to EU ETS import restrictions. For the latter credit types prices are expected to be considerably lower over 2012-2020 as there is no price support provided by the EU ETS.

Absolute costs of reducing emissions under the different Options

The absolute costs of achieving different levels of additional non-traded emission reductions are shown in Table 7 for each of the Options 1 to 3. The required additional non-traded emission reductions (10 $MtCO_2e$, 20 $MtCO_2e$ etc.) over the second budget are illustrative and cover the whole five years of the budget.

Table 7: Absolute costs of the options under Illustrative High Emissions Scenario, £m

Emissions reductions needed to fill gap in budget	OPTION 1 Non binding limit 1000$MtCO_2e$	OPTION 2 Limit set at 55 $MtCO_2e$	OPTION 3 Zero Limit
10$MtCO_2e$	-£845*	-£845*	-£845*
20$MtCO_2e$	-£775 to -£720	-£775 to -£720	£385*
55$MtCO_2e$	-£520 to -£270	-£520 to -£270	£2410*
80$MtCO_2e$	-£335 to £50	£1500 to £1800	£4410*

*The ranges are driven by use of upper and lower ICU price of £9 and £16, which is why there is no ranges for Option 3 where ICU prices do not feature in the costs or in the 10 $MtCO_2e$ level of reductions needed where emissions reductions are achieved through cost-effective additional abatement.

Option 1 has the lowest costs. This is because there is full flexibility to choose between domestic abatement and the use of ICUs. Government draws on the additional cost-effective domestic abatement for any emissions reductions needed up to 12 $MtCO_2e$ (see Table 5). Beyond this point, ICUs become relatively cost-effective at £9 to £16 per tonne than the remaining alternative domestic abatement measures. ICUs are therefore assumed to be used for any emissions reductions required above 12 $MtCO_2e$.

Option 2, where ICUs can be used up to the limit of 55 $MtCO_2e$, has the same absolute costs as Option 1 except in the case where the additional emissions reductions are greater than the 55 $MtCO_2e$ limit. Government takes the same action based on least cost of abatement as under Option 1. Beyond the limit of 55 $MtCO_2e$, the Government is required to employ relatively more expensive domestic abatement at the back stop technology/measure price of £100 per tonne owing to the cap on the use of ICUs. So the cost increases quite steeply compared with Option 1.

Option 3 has the same absolute costs for the first illustrative scenario, where only 10 $MtCO_2e$ are required, since the cost-effective domestic abatement is drawn on first in all three options. The remaining three illustrative scenarios show relatively higher costs as more costly additional domestic abatement is required to make the remaining emission reductions.

Summary of final monetised costs for the Illustrative High Emissions Scenario

Table 8 below presents the relative costs of the options associated with setting the limit on ICUs by illustrative scenario.

Table 8: Summary of relative costs of imposing a limit on ICUs by illustrative scenario, £m

Emissions reductions needed to fill gap in budget	OPTION 1 Non binding limit 1000$MtCO_2e$ £m	OPTION 2 Limit set at 55 $MtCO_2e$ £m	OPTION 3 Zero Limit £m
10$MtCO_2e$	£0	£0	£0
20$MtCO_2e$	£0	£0	£335
55$MtCO_2e$	£0	£0	£2680
80$MtCO_2e$	£0	£1750 to £1890*	£4360

*The ranges are driven by use of upper and lower ICU price of £9 and £16, which is why there is no ranges for Option 3 where ICU prices do not feature in the costs.

Tables 8 presents the relative costs of making additional emissions reductions when there is a binding limit on the use of ICUs (Option 2 and 3) as opposed to a situation where a limit is set that does not

constrain the use of ICUs (Option 1). The analysis, in effect, shows the potential costs of setting a limit under the relatively unlikely scenario that emissions are higher than the budget.

The implications are that at relatively low levels of further required emissions reductions, e.g. 10 $MtCO_2e$ in the illustrative scenarios, the relative costs of a binding limit compared to no imposition of a binding limit are zero. This is because ICUs are not used owing to the existence of sufficient cost-effective additional domestic abatement. Hence, costs are zero for each of the options.

Under Options 2 and 3 the imposition of a binding limit starts to incur relatively higher costs compared with the baseline Option 1, for scenarios where emissions are significantly higher than the budget level. The limit forces the use of the relatively more expensive domestic abatement than purchase of ICUs. This is most evident for Option 3 where a zero limit exists.

Caveats to the analysis on costs

The presentation of costs in Table 8 does not reflect fully the dynamics of the trade-off between purchasing ICUs versus undertaking additional domestic abatement. The comparison of cost-effectiveness is restricted to a static comparison of the cost of an ICU and the cost-effectiveness of the policy in a particular year. However the commitment to a policy creates a flow of costs and benefits and emission reductions over the lifetime of the policy, which could extend into future budget periods. These future impacts *are* reflected in the calculation of cost-effectiveness (£/tCO_2e) for the policy as this takes total costs for the policy over total emissions reductions over the lifetime of the policy measure. But the comparison does not consider the potential for future carbon prices to rise, so over its lifetime the policy may be more cost-effective than the static comparison suggests.

On the other hand, the scope for pursing additional domestic abatement may be overstated. Some of this abatement is highly speculative in terms of actual feasibility. A strong argument against placing too much emphasis on the feasibility of additional domestic abatement to fill an emissions gap at short notice is that if these cost-effective measures were easy to implement and cost effective, then they would be being taken up anyway. This points at significant barriers to unlocking the abatement potential in the cost effective measures.

2.3 Qualitative costs and benefits

Option 1

Qualitative cost: There is a small risk that allowing effectively unlimited use of ICUs, may undermine investors' certainty in the UK's preferred course of action to deliver emissions reductions in the non-traded sector. The effectiveness of domestic policies may be reduced as a consequence. Where Government has a clear and transparent domestic policy agenda this risk is lower. Stating that ICUs are to provide flexibility as an insurance mechanism, only in the event where additional reductions beyond the domestic agenda, would help counter any potential negative signals to investors.

Qualitative benefits: This option could signal an increased commitment by the UK government to purchase emissions reductions from developing countries, which would form part of the overall demand signal to the private sector to help drive investment in new projects overseas. Demand for new projects has been falling over the last 1-2 years due to uncertainty about the future of the international negotiations, and so this could be seen as a positive contribution. ICUs, if used would have a subsidiary benefit of driving increased financial flows to low carbon development projects that deliver cost-effective mitigation.

Option 2

Qualitative cost: There is a small risk that setting a limit of 55 $MtCO_2e$ on the use of ICUs, which implies a majority of emissions reductions are achieved through domestic action, would reduce the demand signal to the private sector to invest in new projects overseas compared with Option 1. It also reduces the potential, in the event that Government decides to purchase ICUs, for flows of financial capital to support low carbon development projects.

Qualitative benefit: A positive limit on the use of ICUs capped at a relatively low level of 55 $MtCO_2e$, does not have the same potential to reduce investors' certainty over the UK's preferred course of action to meet the second carbon budget. The Government will have to undertake domestic abatement policy . The potential to use limited ICUs, could act an effective insurance mechanism, for example avoiding that Government takes expensive domestic action just to compensate a small increase in emissions over the level of the non-traded sector share of the budget.

Option 3

Qualitative cost: Setting a zero limit on the use of ICUs would not help provide any additional demand signals to the private sector to encourage investment in new projects overseas. There is also no potential for the UK Government to support the development of low carbon development projects through financial capital flows. There is a small risk that setting such a limit could also be viewed as a lessening of the government's commitment towards global carbon markets. This could be avoided by reaffirming the UK's commitment to a global carbon market over time, and the likelihood of needing increased ICU purchase to meet more stringent emissions reduction goals.

Qualitative cost: It is possible the UK would not know until past the end of the budget period or very late in the budget period that emissions were higher than the budget. In this event, it would not be feasible even to draw on very expensive additional domestic abatement policy to ensure the budget were met. The UK would risk either not achieving its budget or, if all borrowing potential were exhausted, would have to reset the limit on ICUs.

Qualitative benefit: Conversely to Option 1, there is a small chance the Government's domestic policies to deliver territorial emission reductions may be more effective as investors are more certain about the UK's preferred course of action. The additional benefit that a zero limit has in this regard is likely however to be reduced where Government has a clear and transparent domestic policy agenda.

2.4 Implication of interaction between instruments

There are a number of provisions in the Climate Change Act that are designed to allow some flexibility in how UK budgets are met. These are:

(i) An option to borrow up to 1% against the next budget period, budget 3.

(ii) To bank over achievement in a previous budget i.e. budget 1, to count towards budget 2;

(iii) To decide to purchase international carbon units.

This impact assessment is concerned with setting the level for the third instrument cited here: the use of ICUs. How the other two instruments are used could impact on the costs and benefits of ICUs compared with the alternative of additional domestic abatement.

The Government could decide to borrow up to 25 $MtCO_2e$ from the third budget. Where the UK remains on track to meet the budget, as DECC emissions projections suggest, there is no impact from the introduction of this instrument alongside the potential to use ICUs. Neither borrowing nor ICUs is required and there is no change in costs to setting a limit under any of the options. In the Illustrative Higher Emissions Scenario, the non-traded emissions are assumed to be above the non-traded sector share of the budget by illustrative amounts, ranging from 10 $MtCO_2e$ to 80 $MtCO_2e$. The use of borrowing in addition to ICUs would simply imply that emissions could be higher by 25 MtCO2e in each case before the equivalent level of costs in this analysis were incurred.

Whether it is preferable to use borrowing in the first instance rather than ICUs depends on how much weight is attached to the potential costs of borrowing compared with purchasing ICUs. The potential costs incurred through borrowing relate to taking later action to reduce emissions. Borrowing could take the UK off its optimal pathway for reducing emissions, increasing costs over the period to 2050.

In addition to the borrowing mechanism, the Climate Change Act 2008 allows banking from one carbon budget into the next. This means that if emissions are reduced to below the level of a carbon budget, the 'excess' can be carried over into the next period, with the next carbon budget level being raised by the same amount. The CCC has recommended that the UK Government does not bank from the first to the second carbon budget. A decision over banking from the first period would need to have been made by May 2014 to be permitted under UK carbon accounting rules. In any case, banking from the first carbon budget would not provide any more flexibility to meet the annual emissions targets for the non-traded sector between 2013 to 2020, under the EU climate and energy package. The UK's second and third carbon budgets are set consistent with these targets.

2.5 One-in, one-out

Setting the limit for the second carbon budget, as required under the Climate Change Act 2008, is essentially a public sector regulation, and will not lead to any costs on business. Even with a zero limit, costs will only arise if UK territorial emissions in the non-traded sector rise above the non-traded sector

share of the budget – as noted above, this is not expected to occur. Even at the top of the range set out in the Government's latest emissions projections, emissions are expected to be below the non-traded sector share of the budget. This means the limit would not incur costs and the Government would not have to pursue additional domestic abatement

In the unlikely event that emissions were higher than expected, a zero limit would mean that extra domestic abatement would be required. It is conceivable that this could be brought about by the introduction of short-term legislation, obliging businesses to cut emissions. As such, any potential cost to business (IN) would be a result of this subsequent legislation (and would be subject to OIOO at this stage). This argument is also true for Option 2 if emissions were to exceed the limit set on ICUs of 55 MtCO2e and Government had to then resort to domestic legislative measures. This eventuality with a limit of 55 $MtCO_2e$ is even more improbable given the current expectation for emissions over the second carbon budget period.

Annexes

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

Annex 1: Post Implementation Review (PIR) Plan

A PIR should be undertaken, usually three to five years after implementation of the policy, but exceptionally a longer period may be more appropriate. If the policy is subject to a sunset clause, the review should be carried out sufficiently early that any renewal or amendment to legislation can be enacted before the expiry date. A PIR should examine the extent to which the implemented regulations have achieved their objectives, assess their costs and benefits and identify whether they are having any unintended consequences. Please set out the PIR Plan as detailed below. If there is no plan to do a PIR please provide reasons below.

Basis of the review: [The basis of the review could be statutory (forming part of the legislation), i.e. a sunset clause or a duty to review , or there could be a political commitment to review (PIR)];

A review will take place when the decision for the limit on International Carbon Units (ICUs) is made for the third carbon budget period (2018-22). The decision on the limit has to be set in secondary legislation by June 2016. A review will take place therefore in spring 2016.

Review objective: [Is it intended as a proportionate check that regulation is operating as expected to tackle the problem of concern?; or as a wider exploration of the policy approach taken?; or as a link from policy objective to outcome?]

A review may be required if there is a move to change significantly the level of the second carbon budget in order to assess whether the limit set for the current level of the budget remains appropriate. It would also provide an opportunity to undertake a light touch review of whether setting a limit will have had any impact on low carbon investment (by creating greater certainty for investors) or wider impacts on international engagement in global carbon markets. The first is a direct policy objective intended to be affected through setting a limit, the second is a policy objective that may be indirectly impacted through the setting of a limit.

Review approach and rationale: [e.g. describe here the review approach (in-depth evaluation, scope review of monitoring data, scan of stakeholder views, etc.) and the rationale that made choosing such an approach]

The approach to the review will be to undertake ongoing monitoring of inventory and emissions projections data to assess the level of risk to achieving the second carbon budget. This is assessed formally on an annual basis currently. It will in 2016 take stock of what the historic data for the carbon budget period to date and the most up to date projections suggest as to the level risk and the appropriateness of the limit set on ICUs in the context of the most recent policy discussions. Monitoring is undertaken anyway to conform with the reporting obligations under the Climate Change Act, 'Annual Statement of Emissions' in march each year and 'Government Response to the CCC progress report' in October each year, and as a part of the Government's overall Carbon Budgets Management (CBM). Monitoring arrangements for CBM require quarterly monitoring and assessment of progress on the Government's climate change policy development, implementation and outcomes through a cross Whitehall scorecard system. This tracks progress against key policy milestones, and the policy indicators designed to assess the impact of the policies. In addition CBM tracks wider information on risks to meeting carbon budgets, through reviewing policy savings and changes in external factors that affect emissions and feed through to the emissions projections.

In addition, the review will consider wider impacts that setting the limit has had on low carbon investment and engagement in global carbon markets through review of empirical evidence where this is available and scan of stakeholder view e.g. international partners for international engagement issues in developing global carbon markets and domestic delivery partners involved in uptake of low carbon investment opportunities.

Baseline: [The current (baseline) position against which the change introduced by the legislation can be measured]

N/A

Success criteria: [Criteria showing achievement of the policy objectives as set out in the final impact assessment; criteria for modifying or replacing the policy if it does not achieve its objectives]

N/A

Monitoring information arrangements: [Provide further details of the planned/existing arrangements in place that will allow a systematic collection systematic collection of monitoring information for future policy review] Monitoring is undertaken anyway to conform with the reporting obligations under the Climate Change Act, 'Annual Statement of Emissions' in march each year and 'Government Response to the CCC progress report' in October each year, and as a part of the Government's overall Carbon Budgets Management.
Reasons for not planning a review: [If there is no plan to do a PIR please provide reasons here] N/A

Add annexes here.