Title: **Opt-in of nitrous oxide emissions from nitric acid production into the EU ETS**	**Impact Assessment (IA)**
Lead department or agency: DECC	**IA No:** DECC0032
	Date: 25th February 2011
	Stage: FINAL
Other departments or agencies:	**Source of intervention:** EU
	Type of measure: Secondary legislation
	Contact for enquiries: Adam Kidson (0300 068 5269)

Summary: Intervention and Options

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

The EU ETS is a cap and trade system designed to cap carbon emissions and allow the trading of permits which puts a price on carbon emissions and incentivises abatement at the lowest cost. Nitrous oxide (N_2O) is a highly potent greenhouse gas with a global warming potential 310 times that of carbon dioxide (CO_2). There is significant potential for N_2O emissions reductions in the nitric acid producing sector that means companies can in theory bring their emissions down dramatically once a carbon price incentive is in place. The Government is proposing, subject to European Commission approval, to unilaterally include N_2O emissions from nitric acid production into Phase II (2008-2012) of the EU ETS.

What are the policy objectives and the intended effects?

The policy objective is to incentivise low carbon investment in the nitric acid producing sector, where significant abatement potential is currently not being realised. It is anticipated that the proposed N_2O opt-in will save around 1.6 $MtCO_2e$, compared to average annual emissions over 2011 and 2012, and will result in a drop in the emissions intensity of the sector from 3 to 0.4 kg N_2O / tonne of 100% nitric acid for the two operational UK nitric acid manufacturing installations. This will assist the UK in reducing emissions under the Kyoto Protocol 1st commitment period (concurrent with Phase II of the EU ETS) , and against our national carbon budgets.

What policy options have been considered? Please justify preferred option (further details in Evidence Base)

Option 1 - The minimum mandatory requirement of including UK N_2O and CO_2 emissions from nitric acid production from 1 January 2013 as per the revised EU ETS Directive 2009/29/EC. Option 2 - UK unilateral opt-in of N_2O emissions from nitric acid production from 1st April 2011. Both CO_2 and N_2O emissions from nitric acid production would be included from 1 January 2013. Both options are assessed against a notional 'do nothing' counterfactual. Option 2 is also assessed against Option 1.
Option 2 is the Government's preferred option. The net benefit of Option 2 compared to Option 1 is £90.3m arising from reductions in emissions in the non-traded sector. However Option 2 does result in an additional transfer of EU allowances worth £12.6m (present value) from the Government to Industry. Including N_2O emissions from nitric acid production into the EU ETS, before it is mandatory at an EU-level, provides the greatest net benefits, incentivises early abatement in the sector and contributes to building a low carbon manufacturing sector in the UK.

When will the policy be reviewed to establish its impact and the extent to which the policy objectives have been achieved?	It will not be reviewed
Are there arrangements in place that will allow a systematic collection of monitoring information for future policy review?	No

Ministerial 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 Minister: .... Date:......................................

Summary: Analysis and Evidence — Policy Option 1

Description:

The minimum mandatory requirement of including UK N_2O and CO_2 emissions from nitric acid production from 1 January 2013 as per the revised EU ETS Directive 2009/29/EC

Price Base Year 2009	PV Base Year 2010	Time Period Years 10	Net Benefit (Present Value (PV))		
			Low: Optional	**High:** Optional	**Best Estimate: £397.4m**

COSTS (£m)	**Total Transition** (Constant Price)	Years	**Average Annual** (excl. Transition) (Constant Price)	**Total Cost** (Present Value)
Low				
High		1		
Best Estimate	£10.5m		£17,700	**£9.9m**

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

Industry incurs a cost of £9.8m for abatement technology (all costs and benefits in present values unless indicated). Ongoing maintenance costs and the extra compliance cost to industry including the monitoring, reporting and verifying N2O emissions are £113,000.

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

As a result of the opt-in, government forgoes £3.9m in revenues from allowances that would otherwise be auctioned. This is considered a transfer.
One North East Regional Development Agency are giving a grant of £1.34m (nominal) to GrowHow (the relevant industry). This grant is not conditional on this policy and is considered a transfer.

BENEFITS (£m)	**Total Transition** (Constant Price)	Years	**Average Annual** (excl. Transition) (Constant Price)	**Total Benefit** (Present Value)
Low				
High				
Best Estimate	£0m		£63.6m	**£407.3m**

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

The total environmental benefit of reduced N_2O emissions in the UK in the non-traded sector, from 1 January 2013 is £393.9m.
The value of surplus allowances that the UK receives as a result of the opt-in is £13.4m. This represents the additional free allocation industry receives (see below) minus the allowances needed for compliance and the reduction in UK auction revenue.

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

UK industry receives an additional share of freely allocated allowances from the central EU industry allocation pot during phase III of the EU ETS. The surplus value of these allowances (beyond compliance need) is £17.3m. £3.9m of these allowances comes from a reduction in UK auction revenues (see above) and are considered a transfer.
As noted above, the industry will also receive £1.34m (nominal) from One North East (considered a transfer).

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

The estimates are based on future carbon prices, which are sensitive to assumptions on fossil fuel prices, exchanges rates and any decision taken by the European Commission to move to a tighter EU ETS target. As noted on page 20, this option is considered outside of the scope of "one-in-one-out" assessment.

Impact on admin burden (AB) (£m):			**Impact on policy cost savings (£m):**	**In scope**
New AB: 0.05	**AB savings:** -	**Net:** -	**Policy cost savings:** -	Yes

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?			Environment Agency		
What is the annual change in enforcement cost (£m)?			Zero		
Does enforcement comply with Hampton principles?			Yes		
Does implementation go beyond minimum EU requirements?			No		
What is the CO_2 equivalent change in greenhouse gas emissions? (Million tonnes CO_2 equivalent)			**Traded:** 1.4	**Non-traded:** -8.6	
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:** -	**Benefits:** -	
Annual cost (£m) per organisation (excl. Transition) (Constant Price)	**Micro** -	**< 20** -	**Small** -	**Medium** -	**Large** -2.9
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	Yes	
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] Race, disability and gender Impact assessments are statutory requirements for relevant policies. Equality statutory requirements will be expanded 2011, once the Equality Bill comes into force. Statutory equality duties part of the Equality Bill apply to GB only. The Toolkit provides advice on statutory equality duties for public authorities with a remit in Northern Ireland.

Summary: Analysis and Evidence — Policy Option 2

Description:

UK unilateral opt-in of N_2O emissions from nitric acid production from 1st April 2011. CO_2 emissions from nitric acid production would be included from 1 January 2013.

Price Base Year 2009	PV Base Year 2010	Time Period Years 10	Net Benefit (Present Value (PV))		
			Low: Optional	**High:** Optional	**Best Estimate: £487.7m**

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	£10.5m		£18,310	**£10.7m**

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

Industry incurs a cost of £9.8m for abatement technology (all costs and benefits in present values unless indicated). Ongoing maintenance costs and the extra compliance cost to industry including the monitoring, reporting and verifying N2O emissions are £153,000.

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

As a result of the opt-in, government forgoes revenues of £12.6m in Phase II and £3.9m in Phase III from allowances that would otherwise be auctioned. This is considered a transfer.
One North East Regional Development Agency are giving a grant of £1.34m (nominal) to GrowHow (the relevant industry). This grant is not conditional on this policy and is considered a transfer.

BENEFITS (£)	**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		£60.5m	**£498.3m**

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

The total environmental benefit of reduced N_2O emissions in the UK in the non-traded sector, from 1 January 2013 is £488.7m.
The value of surplus allowances that the UK receives is £9.6m. This represents the increase in free allowances industry receives minus the allowances needed for compliance and the reduction in auction revenues.

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

There will be a benefit to the Government in terms of increased certainty that the UK will meet its carbon budgets. UK industry receives a surplus of allowances (beyond compliance need) of £8.8m for Phase II and £17.3m for Phase III. £16.5m of these allowances come from a reduction in UK auction revenue.
As noted above, the industry will also receive £1.34m (nominal) as a transfer from One North East.

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

The NPV figure presented above is relative to a notional 'do nothing' counterfactual. Compared to Option 1 (the minimum required under EU ETS legislation) the NPV of Option 2 would be £90.3m. Therefore, there is an additional benefit of £90.3m as a result of opting in N_2O emissions early from 1 April 2011 compared to the minimum statutory requirements of the revised EU ETS Directive 2009/29/EC.
The estimates are based on future carbon prices, which are sensitive to assumptions on fossil fuel prices, exchanges rates and any decision taken by the European Commission to move to a tighter EU ETS target.
GrowHow (the relevant operator) will voluntarily comply with the EU ETS from April 2011 with compulsory participation in the EU ETS from until the date when the regulations come into force. There is a risk that GrowHow will not comply for the voluntary period. In such an event, NTS emissions would be higher than expected.
As noted on page 20, this option is considered a zero in under the "one-in-one-out" assessment.

Impact on admin burden (AB) (£m):			**Impact on policy cost savings (£m):**	**In scope**
New AB: 0.07	**AB savings:** -	**Net:** -	**Policy cost savings:** -	Yes

Enforcement, Implementation and Wider Impacts

What is the geographic coverage of the policy/option?			United Kingdom		
From what date will the policy be implemented?			01/04/2011		
Which organisation(s) will enforce the policy?			Environment Agency		
What is the annual change in enforcement cost (£m)?			Zero		
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:** 1.7		**Non-traded:** -10.5
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:** -		**Benefits:** -
Annual cost (£m) per organisation (excl. Transition) (Constant Price)	**Micro** -	**< 20** -	**Small** -	**Medium** -	**Large** -3.2
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[2] 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	Yes	
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	

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

Evidence Base (for summary sheets) – Notes

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

References

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

No.	Legislation or publication
1	Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 91/61/EC. Please see: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2003:275:0032:0046:EN:PDF
2	The Greenhouse Gas Emissions Trading Scheme Regulations 2005. Please see: www.opsi.gov.uk/si/si2005/20050925.htm
3	Final: Impact Assessment of First Stage Transposition of EU Directive 2009/29/EC (EU Emissions Trading System). Please see: www.decc.gov.uk/en/content/cms/consultations/etstranspos1/etstranspos1.aspx
4	DECC guidance on carbon valuation. Please see: www.decc.gov.uk/en/content/cms/what_we_do/lc_uk/valuation/valuation.aspx
5	Consultation document: Consultation on the UK unilateral opt-in of Nitrous Oxide emissions from nitric acid production into Phase II of the EU Emissions Trading System http://www.decc.gov.uk/en/content/cms/consultations/n2o_emissions/n2o_emissions.aspx

+ 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	**10.5**									
Annual recurring cost	10.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total annual costs										
Transition benefits										
Annual recurring benefits		40.8	55.3	60.4	61.3	62.2	63.1	64.1	65.0	66.0
Total annual benefits		40.8	55.3	60.4	61.3	62.2	63.1	64.1	65.0	66.0

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

Evidence Base (for summary sheets)

Background on the European Union Emissions Trading System (EU ETS)

Directive 2003/87/EC of the European Parliament and of the Council ('the EU ETS Directive') established a system for greenhouse gas emission allowance trading within the European Community. The establishment of the EU ETS in 2005 was a major milestone in the global effort to tackle climate change. It was one of the key policies introduced by the European Union to help meet the EU's greenhouse gas emissions reduction target of 8% below 1990 levels under the Kyoto Protocol. The EU ETS is divided into distinct phases. Phase I ran from 2005 to 2007 and was a pilot phase. Phase II, the current Phase, runs from 2008 to 2012 and corresponds with the first Kyoto compliance period. Phase III will run from 2013 to 2020.

The EU ETS works on a 'cap and trade' basis, with a target level of emissions set for installations covered by the EU ETS. The rationale behind emissions trading is that it enables emission reductions to take place where the cost of the reduction is lowest, thus lowering the overall costs of tackling climate change. More abatement will be undertaken by operators with lower abatement costs, therefore reducing the overall costs of meeting the emissions target set by the trading system.

The EU ETS currently (i.e. in Phase II) covers the carbon dioxide (CO_2) emissions from heavy emitting industries, such as electricity generation, iron and steel, mineral processing industries (e.g. cement manufacture), and pulp and paper processing industries. All operators under the existing EU ETS must monitor and report their emissions. At the end of each year they are required to surrender allowances to account for their actual emissions. They may use all or part of their allocation and have the flexibility to buy additional allowances or to sell any surplus allowances generated from reducing their emissions below their allocation.

Rationale for policy

Article 24 of the original EU ETS Directive enables EU Member States, subject to approval by the European Commission, to unilaterally include additional gases and activities into the EU ETS from 2008. To date, three countries have unilaterally opted in nitrous oxide (N_2O) emissions from nitric acid production into Phase II of the EU ETS – Austria, the Netherlands and Norway. From the beginning of Phase III both CO_2[3] and N_2O emissions from nitric acid production will be covered by the EU ETS across all Member States.

The UK has made an Article 24 application to the European Commission to opt-in N_2O emissions from nitric acid production from 1st April 2011. The opt-in application did not include CO_2 emissions from nitric

[3] Nitric acid production plants may be included in the EU ETS in Phase II if their emissions from combustion exceed the threshold. From the start of Phase III any CO2 process emissions would also be included.

acid production, which will be covered in Phase III. The UK Article 24 application will need to be approved by the European Commission before the opt-in can be implemented into UK law. If the UK opt-in is successful, the European Commission's final decision will need to be transposed into UK law by an amendment to the Greenhouse Gas Emissions Trading Scheme Regulations 2005 (the '2005 Regulations'), which established the EU ETS in the UK.

The policy rationale for including additional activities and gases into the EU ETS is that by putting a price on greenhouse gas emissions low carbon investment is incentivised and emissions reductions are encouraged. N_2O is a highly potent greenhouse gas with a global warming potential of 310 times that of CO_2. In addition, there is significant N_2O emissions reduction potential in the nitric acid sector that means companies can bring their emissions down dramatically at relatively low cost. In summary, a Phase II UK opt-in would encourage early greenhouse gas abatement in the nitric acid sector and would contribute to building a low carbon manufacturing sector in the UK.

Changes since the consultation Impact Assessment (IA)

The following changes have been made to the Impact Assessment since the consultation stage;

- The Phase III benchmark and free allocation rules have been revised in light of the decision voted on by the European Commission's Climate Change Committee on 15 December 2010 regarding the Phase III free allocation rules;
    - The revision has reduced the benchmark from 0.342 tCO_2 per tonne of 100% nitric acid to 0.302 tCO_2 per tonne.
    - However the benchmark is not differentiated by technology (as assumed in the consultation IA), so UK industry using Non Selective Catalytic Reduction (NSCR) technology will now receive much more free allocations than previously anticipated.
    - The benchmark is now assumed to apply to the median rather than the mean of 2005 to 2008 production levels. This has marginally increased the level of free allocation.
    - Overall, the net result is much higher benefits to industry (in terms of free allocation) in Phase III and a greater number of allowances for the UK as a whole. Thus the NPV of both options has increased by around £12m. However this cost rise only applies to Phase III costs, so the additional costs and benefits of opting in the sector early during Phase II have not changed since the consultation IA; the estimated net benefit of option 2 (early opt-in) relative to option 1 (opt-in in 2013) is still £90.3m.

- The previous IA noted a risk that the UK's opt-in might not be approved by the European Commission. This risk has been considerably reduced, as its draft approval decision was approved by the European Commission's Climate Change Committee on 15 December 2010. The only change in the proposed legislation since the previous IA (other than the transitional provisions noted below) concerns the partial closures rule during Phase II. The revision to the partial closures rule, now means that there is no possibility of reducing the number of free allocations that the industry will receive in Phase II, regardless of whether their output falls, unless the output drops to zero and the installation is considered completely closed. Given that the prospect of the firm partially closing in such a short space of time is relatively slim, we do not think this revision significantly changes the costs and benefits of the legislation and this issue is not reflected in this revised Impact Assessment.

- There has been an unanticipated delay to the European scrutiny process, in that following the approval of the Climate Change Committee the Commission was unable to immediately submit its draft approval decision for scrutiny by the Council of the EU and the European Parliament, and had instead to wait until January 2011 to do so. In consequence, the three-month scrutiny period will not end until 9th April 2011, and the Commission will not be able to adopt its decision until after that date. If adopted, the decision will have effect as of 1st April 2011; but the UK's implementing legislation cannot itself have retrospective effect. As a result, the implementing Regulations will require compulsory participation only from the date they come into force (which is anticipated to be some time in May 2011). However, the transitional provisions in the Regulations will include provisions that, in effect, allow the relevant industry (notably the company GrowHow) to comply voluntarily (monitoring and reporting emissions and surrendering the appropriate number of allowances) for the period from 1st April until the date that compliance becomes compulsory. As indicated on pages 17-18, this does not affect the overall costs and benefits but does represent an additional risk of non-compliance with the EU ETS during the voluntary period and as a result, NTS emissions would not be reduced. We believe this risk to be minimal, as the additional free allowances GrowHow will receive if they can show that they have complied with EU ETS monitoring requirements during that voluntary period, should more than exceed the expected emissions over this period.
- In order to improve clarity, the costs and benefits section on the summary sheets have been simplified;
    - The costs now only refer to the costs of abatement plus the administrative costs associated with compliance in the EU ETS.
    - The benefits now refer to the environmental benefits of reduced emissions and the net benefits associated with the UK receiving a greater number of European Union Allowances (EUAs). Changes in the number of allowances that the UK government receive (in the form of auctioning) and the number which industry receive (as free allocation) are now netted off each other and are considered as implicit transfers on the summary sheets.

Options considered

The following options are being considered:

Option 1: Wait until 1 January 2013 to include UK N_2O emissions from nitric acid production in the EU ETS. There would be no additional regulatory measures to incentivise abatement in this sector until the start of Phase III (1st January 2013), where N_2O and CO_2 emissions from nitric acid production are included across the EU on a mandatory basis.[4]

[4] The inclusion of N_2O and CO_2 from nitric acid production from the start of Phase III is part of a wider expansion in the scope of the EU ETS in Phase III. Please see 'Impact Assessment of First Stage Transposition of Revised Directive 2009/29/EC (EU Emissions Trading System)', November 2009. At the time of writing the wider Impact Assessment, there was insufficient evidence to monetise benefits and costs of abatement resulting from the proposed expansion,

Option 2: UK unilateral opt-in of N_2O emissions from nitric acid production into the EU ETS from 1 April 2011 (subject to European Commission approval). Both CO_2 and N_2O emissions from nitric acid production would be included from 1 January 2013.

The options have been assessed against a notional baseline, or counterfactual, of 'do nothing'.[5] However, 'do nothing' would not be feasible under EU legislation from 1 January 2013 and so Option 2 has also been assessed against minimum requirements of the EU ETS revised Directive 2009/29/EC given by Option 1.

Preferred option

Option 2 is the Government's preferred option. **The net benefit of Option 2 compared to Option 1 in net present value terms is £90.3m**. Including N_2O emissions from nitric acid production into Phase II of the EU ETS, before it becomes mandatory at an EU-level, provides the greatest net benefits, will incentivise early abatement in the sector and will contribute to building a low carbon manufacturing sector in the UK.

Cost Benefit Analysis – Option 2

Environmental benefits – Greenhouse gas assessment

The Phase II cap will not be increased as a result of the inclusion of UK N_2O emissions from nitric acid production in the EU ETS. There has also been no increase in the Community-wide cap for Phase III as a result of N_2O and CO_2 emissions from UK nitric acid producers being included in the EU ETS.

For Phase III, the revised Directive 2009/29/EC requires historic emissions data to be collected from installations only included in the EU ETS from 2013 onwards, in order to adjust the Phase III cap for the increase in scheme scope. In reporting historic emissions for calculating the expanded scope, the UK reported emissions only from those installations which will be in the EU ETS for the first time in Phase III. Emissions data from installations already included in the EU ETS in Phase II (but impacted by the Phase III expansion of scope) were not reported. This is in line with the Directive's requirements and reduces

however, as far as the expansion relates to CO_2 and N_2O emissions from nitric acid production, the benefits and costs of abatement have been quantified as part of this assessment.

[5] The counterfactual is therefore the notional situation where all other Member States implement the EU ETS directive regarding the inclusion of N2O and CO2 from nitric acid production and the UK does not. This is in line with the guidance on Impact Assessment preparation. Please see: www.bis.gov.uk/policies/better-regulation/policy/scrutinising-new-regulations/preparing-impact-assessments

administrative burden on installations.[6] As both nitric acid producing installations are already captured by the EU ETS under the combustion activity definition, no N_2O and CO_2 emissions data relating to nitric acid production, which is part of the EU ETS Phase III expansion of scope, were reported to calculate the cap.

As Option 2 involves the transfer of emissions from the non-traded to the traded sector without an increase in the cap, no adjustment is required to the non-traded sector target in the UK. As we assume no change in the non-traded sector emission reduction policies relative to the counterfactual, the reduction in N_2O emissions represents a net reduction in the overall level of greenhouse gas emissions in the UK under the Kyoto Protocol 1st commitment period, and against our national carbon budgets.

N_2O is a greenhouse gas listed in Annex II of the EU ETS Directive and has a global warming potential of 310 times that of CO_2. For the UK's two operational nitric acid producing installations, the average per annum emissions of N_2O from 2002-2008 was about 3,490 tonnes of N_2O, or 1,080,000 tonnes of CO_2 equivalent (tCO_2e), with an average emissions intensity of 3.0 kg N_2O / tonne of 100% of nitric acid. It is anticipated that Option 2 will reduce the UK's annual emissions of N_2O to approximately 520 tonnes, or 160,000 tCO_2e, and the emissions intensity of the nitric acid sector to a combined 0.4 kg N_2O / tonne of 100% nitric acid by the end of Phase II.[7] This is equivalent to a reduction of about 920,000 t CO_2e per year in UK territorial emissions.

The benefit of the reduction in N_2O emissions in the non-traded sector of 1,080,000 tCO_2e has been assessed using the marginal cost of abatement for the non-traded sector given by the non-traded carbon values. Implicit in this approach is the assumption that the reduced effort needed to meet the non-traded target, as a result of moving nitric acid production to the EU ETS, has a negligible effect on the marginal cost of abatement. This is reasonable given the relatively small change in effort compared to the non-traded sector target.

In the same way, the cost of the increase of 160,000 tCO2e in UK territorial N_2O emissions in the traded sector has been valued using the marginal cost of abatement for the traded sector given by the price of an EU allowance. This approach captures the economic cost to the UK of the increased import (or reduced export) of EU allowances. As above, the relatively small change in effort is assumed to have a negligible impact on the EU allowance price.

The carbon valuation methodology used is in line with the approach set out in our guidance[8] and gives a total environmental benefit from the reduction of greenhouse gases in the non-traded sector of £488.7m

[6] Please see government response to the consultation on the transposition of the revised EU ETS Directive. www.decc.gov.uk/en/content/cms/consultations/etstranspos1/etstranspos1.aspx

[7] Based on the assumption the opt-in starts from 1 April 2011.

[8] Please see: www.decc.gov.uk/en/content/cms/statistics/analysts_group/analysts_group.aspx

(present value). There is an increased cost to the UK for EU allowances of £21.7m (present value). Please see Annex 2 for a more detailed breakdown by year.

Also, the full environmental benefits would only arise if the level of emissions reductions resulting from the increased scope of the EU ETS is above that which would have occurred outside the EU ETS. This would depend on the extent to which the UK N_2O emissions would have been subject to emissions reductions policies in the non-traded sector. In making this assessment, it is assumed that the counterfactual includes no additional policies aimed at reducing N_2O emissions below current levels in the event of N_2O remaining part of the non-traded sector.

Wider environmental issues

It has not been possible at this stage to quantify any wider environmental impacts this option would have on ambient air quality. However, so long as it is operated correctly and in accordance with the conditions set by the Environment Agency in the plants' environmental permits, the abatement technology should not lead to any increase in emissions of NOx or ozone, both of which might otherwise be a concern for local air quality.

Industry benefits and costs

In the UK, there are two installations for the production of nitric acid, both operated by GrowHow UK Ltd. These installations are at Ince and Billingham.

Phase II

The anticipated total cost of installing N_2O abatement technology to bring the nitric acid manufacturing sector to the proposed benchmark levels, and install the appropriate monitoring regime, is estimated at £10.5m (present value).[9] This figure includes additional input and rental costs, revenue losses arising from, for example, temporary plant closures, as well as capital expenditure.

It is anticipated that the UK nitric acid manufacturing sector will need to submit approximately 280,000 allowances in Phase II in relation to their N_2O emissions (following abatement), corresponding to a cost in Phase II of £3.8m (present value). The level of submitted allowances per year will depend on the annual emissions of the UK nitric acid producing sector following the abatement which is incentivised by the opt-in. There are a number of uncertainties associated with this anticipated level of emissions and the corresponding cost to the nitric acid sector. For example, investment in abatement equipment that is incentivised by the opt-in may not become fully operational until later in Phase II after the opt-in date, or the abatement technology is less effective at reducing emissions than originally estimated. In both

[9] This is assumed to be paid prior to the 1 April 2011.

examples, emissions for the nitric acid manufacturing sector would be greater, requiring the surrender of more allowances, and thus a potentially higher cost to industry.

For Phase II, the cost of abatement investment and submitting of allowances will be offset, at least in part, through the free allocation of allowances by the UK Government. Installations will be allocated free allowances based on a benchmark (an emissions intensity figure) multiplied by historical nitric acid production. The proposed benchmark levels of the opt-in are: 1.5 kg N_2O / tonne of 100% nitric acid in 2011; and 1.3 kg N_2O / tonne of 100% nitric acid in 2012. These benchmarks are in line with those in the successful Dutch and Austrian unilateral N_2O opt-ins and are within the range of N_2O emissions intensities associated with what is considered best available technology for the manufacture of nitric acid in existing installations as described in the European Commission's reference document for Integrated Pollution Prevention and Control (0.12-1.85 kg N_2O/ tonne of 100% nitric acid). In addition, the proposed staged benchmark levels are considered to provide a balance between stimulating significant investment incentive to abate N_2O emissions in the manufacture of nitric acid and the cost of abatement measures to reduce emissions below the benchmark.

The declining benchmarks are applied to the average production level of the base years (the three most productive years in the period 2002-2008). Assuming an optimistic anticipated emissions intensity for the nitric acid sector of 0.4 kg N_2O / tonne of 100% nitric acid from the start of the opt-in (1st April 2011), the sector will receive a surplus in Phase II of 640,000 allowances above what they require for compliance. This surplus equates to a benefit of £9.3m (undiscounted). Again the number of surplus allowances beyond what is required for compliance and their corresponding value, or benefit, is subject to the uncertainties highlighted above. The benefit is also based on the latest DECC traded carbon values and the benefits could vary from those estimated above should the carbon price in 2011 and 2012 deviate from the current values based on a 20% EU target.[10] Also, any change in the Euro to Pounds Sterling exchange rate will impact on the cost to the nitric acid production sector.

We have assumed there would be no new entrants in Phase II, however, any installations that commence operations of nitric acid production in Phase II will be entitled to an allocation of free allowances, based on a benchmark of 0.12 kg N_2O / tonne of 100% nitric acid. This benchmark is in line with the best available techniques to new plants as described in the European Commission's reference document for Integrated Pollution Prevention and Control.

In addition to the surplus allowances received, the existing operator has been awarded a Regional Development Agency (RDA) grant of £1.3m (undiscounted) towards the installation of new N_2O abatement technology. The grant is subject to a clause that enables the RDA, or appropriate alternative organisation, to claw back, pound for pound the grant, if revenue from surplus allowances (allocated between 1 April 2011 and 31 December 2012) and grant combined rise above the total cost of the N_2O abatement project. Although the RDA have provided the grant towards the capital cost of the abatement

[10] For example, the moving of the EU to a higher emissions reduction target could lead to higher carbon prices than those assumed as part of this assessment.

kit, the claw back will be assessed against the full abatement project cost including the additional input and rental costs associated with the project. Current estimates suggest the combined undiscounted revenue of £10.6m (£9.3 from surplus allowances and £1.3m from the grant) will exceed the total project cost by £0.1m.[11] This would need to be repaid to the RDA. Therefore, the project cost of installing the abatement technology is expected to be fully funded by the sale of surplus allowances and the RDA when considered in undiscounted terms. However, the difference in timings of the sale of surplus allowances relative to the initial investment costs means in Phase II there is a cost to industry in net present value terms of £0.5m.

The project cost above excludes any ongoing maintenance costs associated with the new abatement technology estimated to be about £19,000 (present value) in Phase II. There is also estimated to be administrative costs associated with the monitoring, verification and reporting of N_2O emissions estimated to be about £21,000 (present value) for Phase II.[12]

Phase III

For Phase III, industry across EU Member States will need to submit allowances for N_2O emissions from nitric acid production in compliance with the EU ETS, as part of the Phase III expansion of scope. In the UK, this is estimated at about 160,000 t CO_2e per annum over Phase III. Industry will also be required to submit allowances for CO_2 emissions from nitric acid production estimated at 20,000 t CO2e per annum. Submitting allowances for both their N_2O and CO_2 emissions equivalent to 180,000 t CO2e per annum is estimated to cost about £17.9m (present value) over the whole of Phase III. That is, costs of £15.9m (present value) in relation to N_2O emissions and £2m (present value) for CO_2. These figures are based on the latest DECC traded carbon values.[13]

Sectors, such as nitric acid production, considered at risk of carbon leakage will receive for free 100% of the allowances given by the appropriate benchmark in Phase III.. The European Commission's Climate Change Committee agreed a nitric acid benchmark of 0.97 kg N_2O / tonne of 100% nitric acid (302 kg CO_2e / tonne of 100% nitric acid). Note that the consultation stage Impact Assessment assumed a benchmark of 1.1kg N_2O / tonne of 100% nitric acid.
This benchmark applies to all installations within the EU ETS and is not differentiated according to technology used as had been assumed in the consultation stage Impact Assessment. As a result, the UK nitric acid industry is expected to receive significantly more free allowances in Phase III.

The production baseline to which the benchmark is applied to determine free allocation is the higher of;
- The median of 2005 to 2008 production levels, or
- The median of 2009 and 2010 production levels.

[11] This figure is subject to the uncertainties around the value of surplus allowances discussed earlier.

[12] This is based on information supplied by industry specific to this particular abatement technology.

[13] Please see: www.decc.gov.uk/en/content/cms/statistics/analysts_group/analysts_group.aspx

We do not currently have access to production data for 2009 or 2010, so have assumed that the median of 2005 to 2008 production data will determine the free allocation. This may be a reasonable assumption given that the economic downturn significantly reduced output across most EU industrial sectors in 2009.

Using the above approach to allocation, industry will receive free allowances in Phase III estimated at the value of £35.2m (present value). Out of this total, £17.9m (present value) of allowances are expected to be needed for compliance with the EU ETS, giving a net surplus of allowances estimated at £17.3m (present value).

In addition to the cost of submitting allowances, there is estimated to be total administrative costs for Phase III associated with EU ETS compliance of £49,000 (present value) and ongoing maintenance costs of £64,000 (present value). These costs are based on industry estimates. Subtracting the combined administrative and maintenance costs of £113,000 from the £17.3m from the sale of surplus allowances gives a net benefit to industry in Phase III of £17.2m.

Net benefit to industry

Adding the net cost of £0.5m (present value) for Phase II with the net benefit of £17.2m for Phase III gives a total net benefit to industry of £16.6m (present value).

Government benefits and costs

Phase II

In Phase II, the free allowances allocated to the nitric acid sector for the proposed N_2O opt in will be obtained from the allowances returned to the UK Government for auctioning due to the closures of EU ETS installations in the UK. No new allowances are to be created in Phase II to facilitate the proposed opt-in, with the UK Government forgoing the revenue from the sales of these allowances at auction. This equates to the Government allocating 922,000 allowances in total to industry in Phase II and forgoing auction revenue of £12.6m (present value).[14] This assumes that Government does not reach its Phase II 10% auctioning limit, beyond which we are committed in the UK National Allocation Plan (NAP) to cancelling surplus allowances. Currently, we are committed to auctioning 7% of UK allowances, with the potential of auctioning up to a further 3% from any surplus in the new entrant and closures pots.[15] The UK Government still intends to auction or sell any additional surplus allowances from closures beyond those required for the N_2O opt in (up to the 10% limit).

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[14] The Budget 2010 states the inclusion of N_2O emissions from the UK nitric acid production in the EU ETS from 2011 will cost the Exchequer £10m in 2011-12. The difference arises from Treasury using carbon price based on current prices and the forward curve rather than the published carbon values (used in project appraisal and this IA).

[15] The 922,000 additional allowances allocated to the nitric acid sector in Phase II, is less than 0.4% of total UK allowances and unlikely to take the UK over the 10% auctioning limit.

This also assumes a negligible increase in the carbon price. In theory, the additional effort created in the system, by opting in N_2O emissions without increasing the cap, would lead to an increase in the carbon price generating additional revenue from auctioned allowances. However, the increased effort in the system is sufficiently small as to expect a negligible impact on the price of allowances.

Not creating any new allowances to facilitate the opt-in, will further improve the environmental integrity of the EU ETS and assist the UK in meeting its Kyoto targets and carbon budgets. Adding the cost of the grant given to industry for the new technology of £1.2m (including expected £0.1m repayment) gives a total cost to the UK Government of Option 2 of £13.8m (present value).

Finally, zero enforcement cost has been assumed as the N_2O opt-in only impacts on two nitric acid producing installations in the UK, both of which are already included in the EU ETS under the combustion activity criterion. The inclusion of N_2O emissions from nitric acid production into Phase II will represents an expansion of EU ETS activity on both sites with any increase in enforcement likely to be negligible.

Phase III

For Phase III, all EU nitric acid producing installations will receive a free allocation of allowances based on EU wide harmonised allocation rules (agreed in December 2010). These allowances will come from the Phase III EU ‘industry cap’. The EU ‘industry cap’ is a proportion of the total EU-wide cap based on historic emissions in the industrial sectors in 2005-07, adjusted for the increase in scope in Phase III.

As previously explained, no UK N_2O and CO_2 emissions data relating to nitric acid production, was reported to calculate the adjustment in the Phase III cap. Therefore, there has been no increase in the Community-wide ‘industry cap’ for Phase III as a result of N_2O and CO_2 emissions from UK nitric acid producers being included in the EU ETS.

Given there will be no adjustment to the ‘industry cap’, the allocation of free allowances to the UK nitric acid sector will reduce the availability of allowances elsewhere in the EU ETS. In the case where the benchmarked free allocation to industry is less than the ‘industry cap’, the free allowances allocated to the UK nitric acid sector would reduce the surplus of allowances available for auction, as any surplus of allowances in the ‘industry cap’ following the benchmarked free allocation would be transferred to the ‘auction pot’.

However, should the benchmarked level of free allocation exceed the ‘industry cap’, the free allocation to all industry sectors would be reduced by applying a cross-sectoral correction factor. In this situation, the free allocation to the UK nitric acid sector necessitates a reduction in the allowances available to other industrial sectors across the EU.

For the purpose of this Impact Assessment, we have assumed the sum of free allocation based on the benchmarks will be less than the 'industry cap' with the free allocation to the UK nitric acid reducing the surplus of allowances in the 'industry pot' available for auction. Assuming also, the additional effort from including the UK nitric acid sector has a negligible effect on the carbon price, the UK government is estimated to forgo revenue of £3.9m (present value) in Phase III. This is based on a UK share of the auction pot of 11%.

As the level of total free allocation to industry for Phase III is not yet known, there is considerable uncertainty as to whether the benchmarked allocation will exceed the 'industry cap' in Phase III. This leads to uncertainty on whether the free allocation to the UK nitric acid sector would reduce the level of allowances available for auction or reduce the availability of free allowances to other EU industrial sectors. Either way there is estimated to be a cost to the UK in Phase III of about £3.9m (present value).

Net cost to government

The cost to Government in Phase III of £3.9m (present value) plus the Phase II cost of £13.8m (2009 prices) gives a total net cost to government equal to £17.7m (present value).

<u>Net cost to the UK</u>

Summing the net benefit to industry of £16.6m (present value) and net cost to Government of £17.7m (present value) provides an estimate of the net benefit to the UK of Option 2 of £1.0m (present value).

<u>Net welfare benefit</u>

Adding the estimated environmental benefit of £488.7 (present value) to the net benefit to the UK of £1.0m (present value) **gives a net welfare benefit of £488m (present value)**. A full breakdown of the calculations is given in Annexe 2.

<u>Impact on the carbon price</u>

The decision of the UK to not increase the cap to cover the extra emissions from the inclusion of N_2O will increase the effort in the EU ETS in Phase II and III. The level of increase will be the 1.7m allowances the opted-in installations are expected to need for compliance over the period. This will have a negligible effect on the carbon price. Any allowances allocated to the sector above this would be expected to come to market.

<u>Voluntary compliance from April 1st</u>

As noted above, European scrutiny (by the Council of the EU and the European Parliament) will not be completed until 9th April 2011; and hence our implementing Regulations will not be able to be made and come into force until after that date. Given the need to allow time for debate in the UK Parliament, the commencement date of the Regulations will probably not be until May 2011. As a result, operators cannot be required to compulsorily monitor their N_2O emissions from 1st April 2011. Instead the Regulations will require compulsory monitoring only from the commencement date. On the other hand, the Regulations will allow the relevant industry (notably the company GrowHow) to choose to participate in the scheme voluntarily (monitoring and reporting emissions and surrendering the appropriate number of allowances) for the period from 1st April until the date that participation becomes compulsory.

An operator that chooses to participate voluntarily (at any time between April 1st 2011 and the date of commencement of the Regulations) will receive a free allocation for the period of voluntary compliance, but will still have to surrender allowances to cover their monitored emissions for that period. In such a case, there will be no change to the estimated benefits of the opt-in.

However there is a risk that GrowHow (the relevant company) choose not to monitor their emissions and surrender allowances for that voluntary period. We think this is unlikely, given that they have agreed to do so and as the additional free allowances they would receive from voluntary compliance is estimated to exceed the number of allowances they will have to surrender to cover their emissions. Never the less, without being legally bound, the risk of non-compliance clearly remains – for example, GrowHow's emissions could be unexpectedly high for the period of voluntary inclusion in the EU ETS, meaning non-compliance may be beneficial to them. If this risk materialised, NTS emissions for the period of voluntary compliance would not be reduced. In such an instance the benefits of the policy would be reduced accordingly. If GrowHow did not comply for a voluntary period of 1 month, then the environmental benefits of the opt-in would be reduced by £4.7m. It is not possible to assess the estimated loss in benefits to GrowHow as a result of them not choosing to comply; it is assumed that such a choice would be made by them with the interest of maximising profits for their business.

Cost Benefit Analysis – Option 1

The impact of Option 1 is similar to that of Option 2, with the main difference being the timing of when the benefits and costs arise. Therefore, only a brief summary of the benefits and costs of Option 1 has been presented here (for comparison with Option 2). More detail on the breakdown of the impact of Option 1 can be found in Annex 2.

<u>Environmental benefits – Greenhouse gas assessment</u>

As the inclusion of UK N_2O emissions in the EU ETS begins later from 2013, the total environmental benefit, arising from the reduction in greenhouse gases, is lower than Option 2 at £393.9m (present value).

<u>Wider environmental issues</u>

As per Option 2, it has not been possible at this stage to assess the impact the abatement technology would have on ambient air quality.

Industry benefits and costs

The benefit and costs to industry from Option 1, are similar to those identified for Phase III in Option 2. The net benefit to industry of Option 1 is £8.6m (present value).

Government benefits and costs

The revenue forgone by the UK Government under Option 1 is the same as that for Phase III in Option 2, estimated at £3.9m (present value). Adding this to cost of the grant £1.2m (present value)[16] gives a net cost to Government of £5.1m (present value).

Net cost to the UK

Summing the net benefit to industry of £8.6m (present value) and net cost to government of £5.1m (present value) provides an estimate of the net benefit to the UK of Option 1 of £3.5m (present value).

Net welfare benefit

Adding the estimated environmental benefit of £393.9m (present value) to the net cost to the UK of £3.5m (present value) **gives a net welfare benefit of £397m (present value)**. A full breakdown of the calculations is given in Annexe 2.

Option 2 compared to Option 1

Options 1 and 2 have been compared to a 'do nothing' counterfactual, however doing nothing would not be feasible under EU legislation. The minimum required under the EU ETS Directive is given by Option 1. **The net benefit of Option 2 compared to the minimum feasible option in net present value terms is £90.3m.**

Qualitative benefits

There will be a benefit to the Government in terms of increased certainty that the UK will meet its carbon budgets and commitments under the Kyoto protocol. In addition, the installation of the N_2O abatement kit will help safeguard up to 80 permanent full-time equivalent jobs in the UK nitric acid production sector and may benefit the UK security of supply of nitric acid and resulting fertilisers and other industrial

[16] The grant in Option 2 comes from a fund that that will terminate in 2011. For Option 1, we have assumed comparable funding would be available from alternative sources.

chemicals (in relation to such supplies moving outside of the EU ETS where emissions control may be less certain).

Risks and uncertainties

The carbon values used in the calculations for net present value of both options are very sensitive to fossil fuel prices. The above estimates are based on the DECC central fossil fuel price scenario.[17]

As mentioned earlier, there are uncertainties surrounding the anticipated level of N_2O emissions in Phase II and III following the installation of the abatement technology. That is, there is a risk the technology may not be fully operational by the start date of the opt-in and uncertainty over the level of emissions reductions the technology will deliver.

EU allowance prices out to 2020 could vary significantly from those forecast should the EU, for example, move to a tighter emissions reduction target. Also, any change in the Euro to Pounds Sterling exchange rate will impact on the cost to UK installation of purchasing allowances.

One-In-One-Out consideration

Option 1 is implementing legislation in accordance with the minimum requirements under the EU ETS directive. As such it is considered outside of scope of the “one-in-one-out” assessment as part of the reducing regulation agenda.

Option 2 (the preferred option) goes beyond this minimum requirement. However as noted in this Impact Assessment, the only business likely to be affected is estimated to face a net benefit of £16.6m as a result of this policy and the marginal net benefit to them compared to option 1 is £4.3m. Therefore this policy is considered a “zero-in” under the one-in-one-out assessment.

Specific impact tests

The options are not expected to have an adverse impact on competition and are not expected to disproportionally impact on small firms.

<u>Competition assessment</u>

The proposed opt-in is based on the precedent set by the Netherlands and Austria in their Article 24 applications and the proposed benchmarks are consistent with these applications. As the expansion of the EU ETS scope (to include nitrous oxide emissions from nitric acid productions for all Member States) comes into effect from the start of Phase III, any potential impacts on competition from a UK opt-in would be relatively short lived compared to previous applications. Given previous Article 24 applications

[17] Please see: www.decc.gov.uk/en/content/cms/statistics/projections/projections.aspx

assumed the opt-in did not result in the distortion of competition on the internal market, it is very unlikely the UK opt-in will have an adverse effect on competition.

Nitric acid production is classified under NACE 2415 – Manufacture of fertilisers and Nitrogen compounds. This sector is provisionally considered to be at risk of carbon leakage based on the criteria set out by the commission. Therefore in Phase III, installations in this sector will be entitled to 100% of the Community-wide benchmarked allowances for free. Given our current assumptions on the proposed benchmark for the sector and N_2O emissions projected in Phase III (following abatement), UK installations will receive a free allocation beyond what they require for compliance alleviating any competition concerns related to carbon leakage.

This is based on the simplified assumption that free allowances serve to reduce pass through rates. Although, this contradicts the principle of opportunity cost pass through, where firms have the incentive to pass on costs irrespective of whether they receive free allowances, it does provide the opportunity for firms in competitive industries to use free allowances to offset their carbon costs and defend market share.

Given the Commission's assessment that nitric acid production is at risk of leakage, we have assumed carbon costs are not passed on to GrowHow's consumers. In the case where there is some cost pass through, there would be a net transfer from the consumer to GrowHow, plus an overall deadweight loss resulting from a decrease in demand for GrowHow's products.

Small firms impact test

Given the opt-in is assumed to impact on only one large operator in the UK, there will be no disproportional effect on small businesses in the nitric acid production sector. Nitric acid is used as an input in the manufacture of fertilisers and other industrial chemicals, which is then purchased by firms of varying size.[18] As explained above the nitric acid production sector is considered at risk of carbon leakage and so there will likely be limited opportunities for this sector to pass on the carbon cost to small firms.

[18] None of the immediate customers for nitric acid are SMEs and reflects the nature of the chemicals production they are involved in. However, some indirect customer's (such as farmers using fertilizer manufactured using nitric acid) may well be SMEs.

Annexes

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

Annex 1: Post Implementation Review (PIR) Plan

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

Basis of the review: [The basis of the review could be statutory (forming part of the legislation), it could be to review existing policy or there could be a political commitment to review];
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?]
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]
Baseline: [The current (baseline) position against which the change introduced by the legislation can be measured]
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]
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]
Reasons for not planning a PIR: [If there is no plan to do a PIR please provide reasons here] No post implementation review is planned for this policy, as a successful unilateral N2O opt-in is anticipated to start 1st April 2011 and run until the end of Phase II (i.e. 31st December 2012). From 2013, when Phase III starts, both N2O and CO2 emissions from nitric acid production will be included across the EU on a mandatory basis. In addition, we are already required to publish annual reports for the European Commission on the application of the EU ETS Directive 2003/87/EC (see Article 21). These reports cover the implementation of Member State unilateral opt-ins of additional gases and activities into the EU ETS, and include: - a description of the rules which govern the unilateral inclusion (e.g. which activities, gases, time periods and installation sizes are covered). - for each installation included in the EU ETS during the year the activity, greenhouse gas, annual emissions, and allocation for all the years of the trading period.

Annexe 2: Annual breakdown of benefits and costs

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Total	Transition	Average annual
Option 1 - Undiscounted														
Costs to Industry														
Estimated cost of abatement			£10,500,000											
Admin costs - Recurring				£7,700	£7,700	£7,700	£7,700	£7,700	£7,700	£7,700	£7,700	**£61,600**		
Additional maintenance				£10,000	£10,000	£10,000	£10,000	£10,000	£10,000	£10,000	£10,000	**£80,000**		
Total			**£10,500,000**	**£17,700**	**£17,700**	**£17,700**	**£17,700**	**£17,700**	**£17,700**	**£17,700**	**£17,700**	**£10,641,600**	**£10,500,000**	**£17,700**
Cost to Government (considered as transfers)														
Reduction in Phase II auction revenues														
Reduction in Phase III auction revenues				£573,418	£582,019	£590,750	£599,611	£608,605	£617,734	£627,000	£636,405	**£4,835,543**		
RDA grant				£1,340,000										
Claw back of grant				£0										
Total				**£1,913,418**	**£582,019**	**£590,750**	**£599,611**	**£608,605**	**£617,734**	**£627,000**	**£636,405**	**£6,175,543**		**£771,943**
Benefits to Industry (considered as transfers)														
Free allocation for PII														
Cost of PII compliance														
Surplus free allowances for PII														
Free allocation for PIII				£5,212,892	£5,291,086	£5,370,452	£5,451,009	£5,532,774	£5,615,766	£5,700,002	£5,785,502	**£43,959,482**		
Cost of PIII compliance				£2,647,056	£2,686,762	£2,727,064	£2,767,969	£2,809,489	£2,851,631	£2,894,406	£2,937,822	**£22,322,199**		
Surplus free allowances for PIII				£2,565,836	£2,604,324	£2,643,388	£2,683,039	£2,723,285	£2,764,134	£2,805,596	£2,847,680	**£21,637,283**		
RDA grant				£1,340,000										
Claw back of grant				£0										
Total				**£3,905,836**	**£2,604,324**	**£2,643,388**	**£2,683,039**	**£2,723,285**	**£2,764,134**	**£2,805,596**	**£2,847,680**	**£22,977,283**		**£2,872,160**
Net benefit to industry			**-£10,500,000**	**£3,888,136**	**£2,586,624**	**£2,625,688**	**£2,665,339**	**£2,705,585**	**£2,746,434**	**£2,787,896**	**£2,829,980**	**£12,335,683**	**-£10,500,000**	**£2,854,460**
Benefits to UK - Additional allowances for UK														
Surplus allowances minus reduction in Government auction revenue				**£1,992,418**	**£2,022,304**	**£2,052,639**	**£2,083,428**	**£2,114,680**	**£2,146,400**	**£2,178,596**	**£2,211,275**	**£16,801,740**		**£2,100,217**
Environmental benefits														
NTS reduction in emissions				£58,428,000	£59,292,000	£60,156,000	£61,020,000	£61,992,000	£62,856,000	£63,828,000	£64,800,000	**£492,372,000**		
Total				**£58,428,000**	**£59,292,000**	**£60,156,000**	**£61,020,000**	**£61,992,000**	**£62,856,000**	**£63,828,000**	**£64,800,000**	**£492,372,000**		
Total benefits			**£0**	**£60,420,418**	**£61,314,304**	**£62,208,639**	**£63,103,428**	**£64,106,680**	**£65,002,400**	**£66,006,596**	**£67,011,275**	**£509,173,740**		**£63,646,717**
Net benefits			**-£10,500,000**	**£60,402,718**	**£61,296,604**	**£62,190,939**	**£63,085,728**	**£64,088,980**	**£64,984,700**	**£65,988,896**	**£66,993,575**	**£498,532,140**		**£62,316,517**

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Total	Transition	Average annual
Option 1 - Discounted														
Costs to Industry														
Estimated cost of abatement			£9,801,750											
Admin costs - Recurring				£6,945	£6,710	£6,483	£6,264	£6,052	£5,847	£5,649	£5,459	**£49,409**		
Additional maintenance				£9,019	£8,714	£8,420	£8,135	£7,860	£7,594	£7,337	£7,089	**£64,168**		
Total			**£9,801,750**	**£15,964**	**£15,424**	**£14,903**	**£14,399**	**£13,912**	**£13,441**	**£12,986**	**£12,548**	**£9,915,327**		
Cost to Government (considered as transfers)														
Reduction in Phase II auction revenues														
Reduction in Phase III auction revenues				£517,166	£507,172	£497,411	£487,784	£478,364	£469,107	£460,030	£451,148	**£3,868,181**		
RDA grant				£1,208,546								**£1,208,546**		
Claw back of grant				£0								**£0**		
Total				**£1,725,712**	**£507,172**	**£497,411**	**£487,784**	**£478,364**	**£469,107**	**£460,030**	**£451,148**	**£5,076,727**		
Net Benefits to industry														
Free allocation for PII														
Surplus free allowances for PII														
Free allocation for PIII				£4,701,508	£4,610,652	£4,521,921	£4,434,396	£4,348,760	£4,264,612	£4,182,091	£4,101,342	**£35,165,282**		
Cost of PIII compliance				£2,387,380	£2,341,244	£2,296,187	£2,251,743	£2,208,258	£2,165,529	£2,123,626	£2,082,622	**£17,856,590**		
Surplus free allowances for PIII				£2,314,128	£2,269,408	£2,225,733	£2,182,652	£2,140,502	£2,099,083	£2,058,466	£2,018,720	**£17,308,693**		
RDA grant				£1,208,546								**£1,208,546**		
Claw back of grant				£0								**£0**		
Total				**£3,522,674**	**£2,269,408**	**£2,225,733**	**£2,182,652**	**£2,140,502**	**£2,099,083**	**£2,058,466**	**£2,018,720**	**£18,517,239**		
Net benefit to industry			**-£9,801,750**	**£3,506,710**	**£2,253,984**	**£2,210,830**	**£2,168,254**	**£2,126,590**	**£2,085,642**	**£2,045,479**	**£2,006,173**	**£8,601,911**		
Benefits to UK - Additional allowances for UK														
Surplus allowances minus reduction in Government auction revenue				**£1,796,962**	**£1,762,236**	**£1,728,322**	**£1,694,869**	**£1,662,138**	**£1,629,976**	**£1,598,436**	**£1,567,573**	**£13,440,511**		
Environmental benefits														
NTS reduction in emissions				£52,696,213	£51,667,049	£50,651,352	£49,639,770	£48,725,712	£47,732,846	£46,830,604	£45,936,720	**£393,880,266**		
Total				**£52,696,213**	**£51,667,049**	**£50,651,352**	**£49,639,770**	**£48,725,712**	**£47,732,846**	**£46,830,604**	**£45,936,720**	**£393,880,266**		
Total benefits			**£0**	**£54,493,175**	**£53,429,285**	**£52,379,674**	**£51,334,639**	**£50,387,850**	**£49,362,823**	**£48,429,039**	**£47,504,293**	**£407,320,777**		
Net benefits			**-£9,801,750**	**£54,477,211**	**£53,413,861**	**£52,364,770**	**£51,320,240**	**£50,373,938**	**£49,349,381**	**£48,416,053**	**£47,491,745**	**£397,405,450**		

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Total	Transition	Average annual
Option 2 - Undiscounted														
Costs to Industry														
Estimated cost of abatement	£10,500,000											**£10,500,000**		
Admin costs - Recurring		£13,800	£7,700	£7,700	£7,700	£7,700	£7,700	£7,700	£7,700	£7,700	£7,700	**£83,100**		
Additional maintenance		£10,000	£10,000	£10,000	£10,000	£10,000	£10,000	£10,000	£10,000	£10,000	£10,000	**£100,000**		
Total	**£10,500,000**	**£23,800**	**£17,700**	**£17,700**	**£17,700**	**£17,700**	**£17,700**	**£17,700**	**£17,700**	**£17,700**	**£17,700**	**£10,683,100**	**£10,500,000**	**£18,310**
Cost to Government (considered as transfers)														
Reduction in Phase II auction revenues		*£6,105,426*	*£7,160,986*									***£13,266,411***		
Reduction in Phase III auction revenues				*£573,418*	*£582,019*	*£590,750*	*£599,611*	*£608,605*	*£617,734*	*£627,000*	*£636,405*	***£4,835,543***		
RDA grant		*£1,340,000*										***£1,340,000***		
Claw back of grant		*-£96,835*										***-£96,835***		
Total		***£7,348,591***	***£7,160,986***	***£573,418***	***£582,019***	***£590,750***	***£599,611***	***£608,605***	***£617,734***	***£627,000***	***£636,405***	***£19,345,120***		**£1,934,512**
Benefits to Industry (considered as transfers)														
Free allocation for PII compliance		*£6,105,426*	*£7,160,986*									***£13,266,411***		
Cost of Phase II compliance		*£1,703,786*	*£2,305,791*									***£4,009,577***		
Surplus free allowances for PII		*£4,401,639*	*£4,855,195*									***£9,256,835***		
Free allocation for PIII				*£5,212,892*	*£5,291,086*	*£5,370,452*	*£5,451,009*	*£5,532,774*	*£5,615,766*	*£5,700,002*	*£5,785,502*	***£43,959,482***		
Cost of Phase III compliance				*£2,647,056*	*£2,686,762*	*£2,727,064*	*£2,767,969*	*£2,809,489*	*£2,851,631*	*£2,894,406*	*£2,937,822*	***£22,322,199***		
Surplus free allowances for PIII				*£2,565,836*	*£2,604,324*	*£2,643,388*	*£2,683,039*	*£2,723,285*	*£2,764,134*	*£2,805,596*	*£2,847,680*	***£21,637,283***		
RDA grant		*£1,340,000*										***£1,340,000***		
Claw back of grant		*-£96,835*										***-£96,835***		
Total		***£5,644,805***	***£4,855,195***	***£2,565,836***	***£2,604,324***	***£2,643,388***	***£2,683,039***	***£2,723,285***	***£2,764,134***	***£2,805,596***	***£2,847,680***	***£32,137,283***		**£3,213,728**
Net benefit to industry	***-£10,500,000***	***£5,621,005***	***£4,837,495***	***£2,548,136***	***£2,586,624***	***£2,625,688***	***£2,665,339***	***£2,705,585***	***£2,746,434***	***£2,787,896***	***£2,829,980***	***£21,454,183***	***-£10,500,000***	**£3,195,418**
Benefits to UK - Additional allowances for UK														
Surplus allowances minus reduction in Government auction revenue		-£1,703,786	-£2,305,791	£1,992,418	£2,022,304	£2,052,639	£2,083,428	£2,114,680	£2,146,400	£2,178,596	£2,211,275	**£12,792,163**		**£1,279,216**
Environmental Benefits														
NTS reduction in emissions		£42,525,000	£57,564,000	£58,428,000	£59,292,000	£60,156,000	£61,020,000	£61,992,000	£62,856,000	£63,828,000	£64,800,000	**£592,461,000**		
Total		**£42,525,000**	**£57,564,000**	**£58,428,000**	**£59,292,000**	**£60,156,000**	**£61,020,000**	**£61,992,000**	**£62,856,000**	**£63,828,000**	**£64,800,000**	**£592,461,000**		**£59,246,100**
Total benefits	£0	£40,821,214	£55,258,209	£60,420,418	£61,314,304	£62,208,639	£63,103,428	£64,106,680	£65,002,400	£66,006,596	£67,011,275	£605,253,163		**£60,525,316**
Net benefits	-£10,500,000	£40,797,414	£55,240,509	£60,402,718	£61,296,604	£62,190,939	£63,085,728	£64,088,980	£64,984,700	£65,988,896	£66,993,575	**£594,570,063**		**£59,457,006**

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Total	Transition	Average annual
Option 2 - Discounted														
Costs to Industry														
Estimated cost of abatement	£10,500,000											**£10,500,000**		
Admin costs - Recurring		£13,334	£7,188	£6,945	£6,710	£6,483	£6,264	£6,052	£5,847	£5,649	£5,459	**£69,931**		
Additional maintenance		£9,662	£9,335	£9,019	£8,714	£8,420	£8,135	£7,860	£7,594	£7,337	£7,089	**£83,165**		
Total	**£10,500,000**	£22,996	£16,523	£15,964	£15,424	£14,903	£14,399	£13,912	£13,441	£12,986	£12,548	**£10,653,096**		
Cost to Government (considered as transfers)														
Reduction in Phase II auction revenues		£5,899,062	£6,684,780									**£12,583,843**		
Reduction in Phase III auction revenues				£517,166	£507,172	£497,411	£487,784	£478,364	£469,107	£460,030	£451,148	**£3,868,181**		
RDA grant		£1,294,708										**£1,294,708**		
Claw back of grant		-£93,561										**-£93,561**		
Total		£7,100,209	£6,684,780	£517,166	£507,172	£497,411	£487,784	£478,364	£469,107	£460,030	£451,148	**£17,653,170**		
Benefits to Industry (considered as transfers)														
Free allocation for PII compliance		£5,899,062	£6,684,780									**£12,583,843**		
Cost of Phase II compliance		£1,646,198	£2,152,456									**£3,798,654**		
Surplus free allowances for PII		£4,252,864	£4,532,325									**£8,785,189**		
Free allocation for PIII				£4,701,508	£4,610,652	£4,521,921	£4,434,396	£4,348,760	£4,264,612	£4,182,091	£4,101,342	**£35,165,282**		
Cost of Phase III compliance				£2,387,380	£2,341,244	£2,296,187	£2,251,743	£2,208,258	£2,165,529	£2,123,626	£2,082,622	**£17,856,590**		
Surplus free allowances for PIII				£2,314,128	£2,269,408	£2,225,733	£2,182,652	£2,140,502	£2,099,083	£2,058,466	£2,018,720	**£17,308,693**		
RDA grant		£1,294,708										**£1,294,708**		
Claw back of grant		-£93,561										**-£93,561**		
Total		£5,454,010	£4,532,325	£2,314,128	£2,269,408	£2,225,733	£2,182,652	£2,140,502	£2,099,083	£2,058,466	£2,018,720	**£27,295,028**		
Net benefit to industry	-£10,500,000	£5,431,015	£4,515,802	£2,298,164	£2,253,984	£2,210,830	£2,168,254	£2,126,590	£2,085,642	£2,045,479	£2,006,173	**£16,641,932**		
Benefits to UK - Additional allowances for UK														
Surplus allowances minus reduction in Government auction revenue		-£1,646,198	-£2,152,456	£1,796,962	£1,762,236	£1,728,322	£1,694,869	£1,662,138	£1,629,976	£1,598,436	£1,567,573	**£9,641,858**		
Environmental Benefits														
NTS reduction in emissions		£41,087,655	£53,735,994	£52,696,213	£51,667,049	£50,651,352	£49,639,770	£48,725,712	£47,732,846	£46,830,604	£45,936,720	**£488,703,915**		
Total		£41,087,655	£53,735,994	£52,696,213	£51,667,049	£50,651,352	£49,639,770	£48,725,712	£47,732,846	£46,830,604	£45,936,720	**£488,703,915**		
Total benefits		£39,441,457	£51,583,538	£54,493,175	£53,429,285	£52,379,674	£51,334,639	£50,387,850	£49,362,823	£48,429,039	£47,504,293	**£498,345,773**		
Net benefits	**-£10,500,000**	£39,418,461	£51,567,015	£54,477,211	£53,413,861	£52,364,770	£51,320,240	£50,373,938	£49,349,381	£48,416,053	£47,491,745	**£487,692,677**		