



Department
for Transport

Annex A

The Motor Fuel Greenhouse Gas Emissions Reporting Regulations Cost Benefit Analysis

Moving Britain Ahead

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Annex A: Cost Benefit Analysis

- A.1 When responding to the consultation, please comment on the analysis of costs and benefits, giving supporting evidence wherever possible.
- A.2 Please also suggest any alternative methods for reaching the objective and highlight any possible unintended consequences of the policy, and practical enforcement or implementation issues.

1. Executive summary

Introduction

- 1.1 Article 7a of the amended Fuel Quality Directive (FQD) requires transport¹ sector fuel suppliers in EU Member States to reduce the average lifecycle greenhouse gas (GHG) intensity of transport fuels by 6% in 2020 relative to 2010 emissions (which equates to a GHG reduction of 10.4 MtCO_{2e} per year in 2020). We are now proposing to include this target through amendments to the GHG Reporting Regulations. Fuel suppliers have a number of options for meeting this target, including biofuels, low carbon fossil fuels and emissions reduction in ‘upstream’ oil production (e.g. reduced flaring and venting of methane which is often released as a co-product alongside oil).
- 1.2 Suppliers can demonstrate they have met their GHG reduction target by redeeming GHG credits equivalent to the GHG emissions they needed to save. GHG credits are awarded to suppliers for delivering low carbon fuels directly to the market or providing evidence of upstream emission reductions (UERs). Suppliers can also purchase surplus GHG credits from other suppliers. Alternatively suppliers can opt to buyout of their GHG obligation
- 1.3 This consultation looks at six different policy options for imposing a greenhouse gas (GHG) reduction obligation (with a 6% target in 2020) on UK fuel suppliers. The options differ in two key respects: 1) the level of the buy-out price, and 2) whether a greenhouse gas target is set for one year only in 2020 or over a three-year period (2018 to 2020). Please see Table 1 below:

Table 1: Policy options to introduce a GHG emissions reduction obligation

Option	Buy-out price (nominal prices in 2020)	Implementation period	Max pump price impact in 2020 (undiscounted, 2015 prices)	Max policy cost (discounted, 2015 prices)
1a	£7/tCO ₂	1 year	0.03 ppl	£12m
1b	£7/tCO ₂	3 years	0.03 ppl	£13m
2a	£74/tCO ₂	1 year	0.42 ppl	£148m
2b	£74/tCO ₂	3 years	0.42 ppl	£166m
3a	£146/tCO ₂	1 year	0.84 ppl	£293m
3b	£146/tCO ₂	3 years	0.84 ppl	£327m

¹ Fuels used to propel road vehicles, non-road mobile machinery (including inland waterway vessels when not at sea), agricultural and forestry tractors, recreational craft when not at sea and electricity for use in road vehicles are included in the scope of the FQD.

- 1.4 If the cost of compliance through delivering low carbon fuels (or UERs) exceeds the buy-out price, suppliers would be expected to buy-out of their obligation. Therefore the buy-out price effectively determines the maximum cost of the policy and the maximum potential impact on pump prices (as compliance costs are assumed to be passed through to fuel consumers). Three different buy-out levels are considered. Under options 1a and 1b the buy-out price is £7/tCO₂ (2020 nominal prices) which equates to a maximum 2020 pump price impact of 0.03 pence per litre (2015 prices). Options 2a and 2b have a buy-out price of £74/tCO₂ (0.42 ppl) and options 3a and 3b have a buy-out price of £146/tCO₂ (0.84 ppl).
- 1.5 The buy-out price also affects the range of compliance options which will be available to fuel suppliers. The £74/tCO₂ buy-out price in the preferred option is considered to be sufficient to support a wide range of compliance measures including GHG savings from existing upstream emissions reduction (UER) projects, new investments in UER projects and improved biofuel GHG savings. £74/tCO₂ is the central 2020 'non-traded' carbon value (in 2020 prices) which should also ensure consistency with wider government climate policy. In normal circumstances we would expect the buyout at this level to provide a commercial incentive to meet the obligation through acquiring GHG credits.
- 1.6 We have also looked at the possibility of implementing the GHG obligation over a one year period in 2020 (options 1a, 2a and 3a) and over a 3 year period between 2018 and 2020 (options 1b, 2b and 3b). The preferred option (2b) is to implement over 3 years as this will give suppliers time to adapt to new regulations. Setting targets from 2018 will allow investors to recoup any capital costs from new investments over a longer period and enable the government to better assess the merits for any potential extension of a GHG savings scheme beyond 2020.

Summary of impacts

- 1.7 Table 2 in the next page shows a summary of estimated policy impacts. Whilst it is expected that overall suppliers will be able to deliver around three-quarters of their GHG obligations through the supply of biofuels, there is some uncertainty around how suppliers will choose to meet the remainder of their obligations. It has therefore been necessary to model a wide range of potential cost-benefit outcomes.
- 1.8 'Low additionality' scenarios assume limited new (additional) GHG savings result from the policy (for the purposes of the modelling we have made the conservative assumption that there are zero GHG savings in the 'low additionality' scenario) and the 'high additionality' scenario assumes that the policy is 100% effective in delivering GHG savings, which would not have occurred otherwise. This wide range reflects the range of potential compliance options which suppliers have open to them in meeting the target.
- 1.9 Similarly, a wide range of potential costs have been assessed. The maximum potential cost for a given buy-out price has been taken to form the high end of the cost range and the administrative cost of generating a certificate (which is assumed to be £0.12/tCO₂)² has been taken as the low end of the cost range. More detail on how cost-benefit scenarios have been constructed can be found in section 6.
- 1.10 It should be noted that the risk of the suppliers not delivering the 6% GHG reduction target as required by the FQD is higher at lower levels of buy-out price. This is

² Estimate derived from research assessing administrative costs of the EU Emissions Trading System, see https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/47953/895-cost-euets-uk-operators-compliance.PDF

because fewer options for delivering GHG savings in transport will be economically viable at low buy-out prices.

Table 2: Summary of cost benefit analysis outputs (2015 prices)

	Net present cost (£m)	2018 pump price impact (ppl inc VAT) (max)	2019 pump price impact (ppl inc VAT) (max)	2020 pump price impact (ppl inc VAT) (max)	GHG savings (MtCO ₂ e)	Net present benefits (£m)	NPV (£m)
Option 1a (1 year, low buyout)	0.3 to 12	0.00	0.00	0.03	0 to 1.3	0 to 74	-12 to 62
Option 1b (3 years, low buyout)	0.3 to 13	0.00	0.004	0.03	0 to 1.4	0 to 82	-13 to 69
Option 2a (1 year, medium buyout)	0.3 to 148	0.00	0.00	0.42	0 to 2.5	0 to 148	-148 to 136
Option 2b (3 years, medium buyout)	0.3 to 166	0.00	0.05	0.42	0 to 2.8	0 to 165	-166 to 152
Option 3a (1 year, high buyout)	0.3 to 293	0.00	0.00	0.84	0 to 2.5	0 to 148	-293 to 136
Option 3b (3 years, high buyout)	0.3 to 327	0.00	0.09	0.84	0 to 2.8	0 to 165	-327 to 152

2. Full list of questions

For each of the following questions, please set out the reasons for your answers, including the impacts of any alternative that you may propose and any anticipated implications. Please also provide any supporting evidence you may have.

- Q41: Do you agree with our assessment of 'additionality' of GHG savings from upstream emission reduction projects?
- Q42: Are you able to provide any evidence relevant to the assessment of costs, including any evidence on the administrative costs for fuel supplier familiarisation with the requirements of meeting the 6% GHG target required under the FQD?
- Q43: Can you provide evidence on the cost of reporting fossil fuel 'origin' and 'place of purchase' data to the regulator?
- Q44: Do you have any evidence you would like to provide on the costs and benefits associated with the proposed changes to civil penalties?

3. Introduction

Problem under consideration

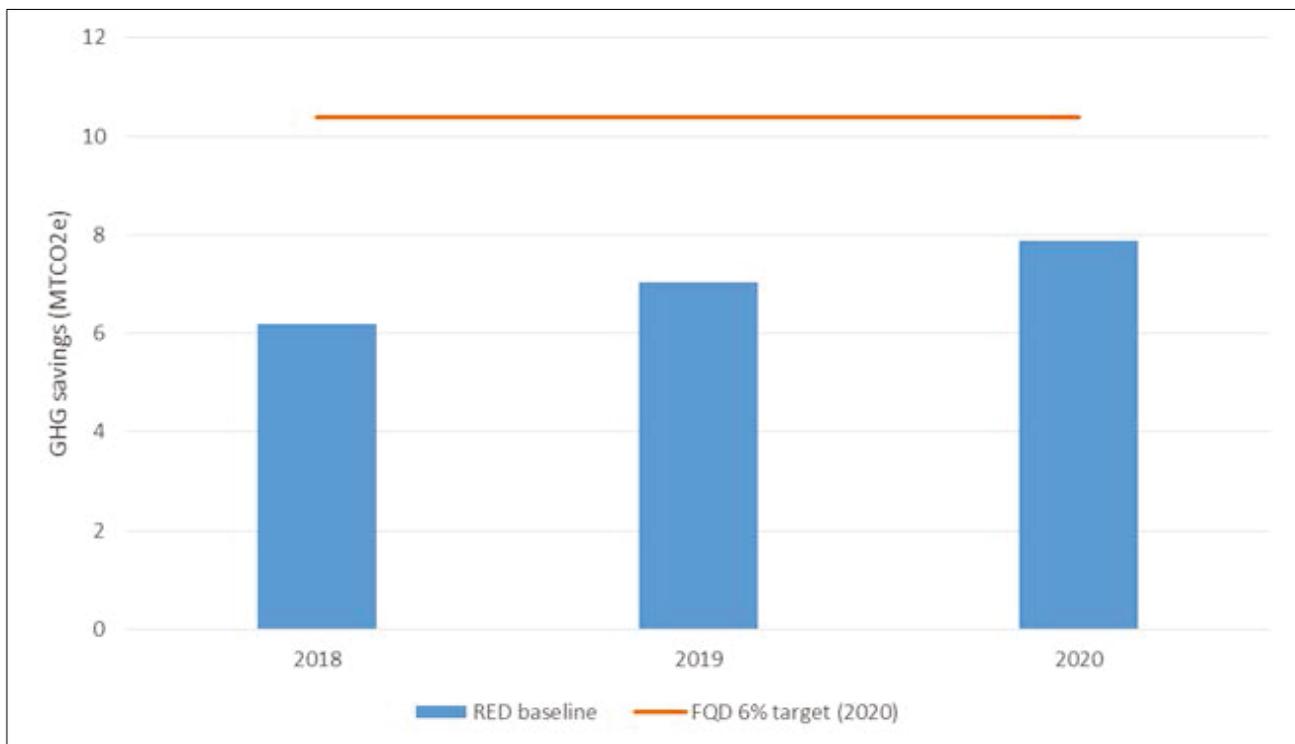
- 3.1 Article 7a of the amended FQD requires transport sector fuel³ suppliers in EU Member States to reduce the average GHG intensity of transport fuels by 6% in 2020 (relative to a 2010 baseline average transport fuel GHG intensity of 94.1 gCO₂/MJ). This equates to a transport sector GHG reduction of 10.4 MtCO₂e in 2020 (or a reduction in average transport fuel GHG intensity of 5.6 gCO₂/MJ).
- 3.2 Fuel suppliers have a number of options for meeting the GHG reduction target. In general, these options can be split into the following categories:
- **Switching to lower GHG energy sources** – alternative transport energy fuels such as biofuels, electricity, natural gas, and liquid petroleum gas (LPG) have lower GHG emissions per unit energy relative to fossil fuels.
 - **Improving biofuel GHG savings** – significant volumes of biofuels are already supplied due to blending targets set under the Renewable Transport Fuel Obligations. These biofuels deliver GHG savings which can be counted towards the GHG target. Improving the GHG saving characteristics of these biofuels (e.g. using less fertiliser on crops, improving efficiency of refining processes, capturing processing plants CO₂ emissions, switching feedstocks) can increase the biofuel contribution towards meeting the GHG target.
 - **Upstream emission reductions (UERs)** – GHG emissions from ‘upstream’ production of fossil fuels such as flaring and venting of methane are a significant component of the emissions associated with transport fossil fuel use. If suppliers are able to demonstrate that they have been responsible for reducing these emissions (e.g. through investments in gas grid infrastructure or liquefaction facilities) they can use this to demonstrate compliance with their GHG reduction target. Suppliers can also submit evidence of UER projects delivered by other suppliers.
- 3.3 Article 7a of the amended FQD also requires transport sector fuel suppliers in EU Member States to report information on the characteristics of the fuel which they supply into the UK transport fuel market, and requires Member States to lay down the rules on penalties applicable to infringements of national provisions adopted to transpose the Directive. These measures and associated impact on fuel suppliers are considered in section 7.

³ Fuels used to propel road vehicles, non-road mobile machinery (including inland waterway vessels when not at sea), agricultural and forestry tractors, recreational craft when not at sea and electricity for use in road vehicles are included in the scope of the FQD.

Renewable Transport Fuel Obligations (baseline)

- 3.4 The Renewable Transport Fuel Obligations (RTFO) requires transport fossil fuel suppliers to supply a given proportion (specified by the RTFO target) of transport energy from renewable sources. Under the preferred option for implementing the proposed amendments to the RTFO (a separate cost benefit analysis on the RTFO is also included as part of this consultation), this target will be met with the supply of approximately 2.8 billion litres of biofuels in 2020 which is estimated to deliver 7.9 MtCO_{2e} of GHG savings (which contributes to 4.5% of the 6% required by the target) towards the 6% GHG reduction target leaving a remainder of 2.5 MtCO_{2e} (the remaining 1.5% of the 6% required by the target) which will need to be delivered through additional measures.

Chart 1: Projected contribution from biofuels supplied under the Renewable Transport Fuel Obligations (RTFO) towards the 6% GHG reduction target



Greenhouse Gas obligation design

- 3.5 In order to comply with the requirements of the FQD, it is proposed that a **GHG obligation** with a **buy-out price** and **certificate trading mechanism** for transport fuel suppliers is put in place.
- **GHG obligation** - under a GHG obligation, each fuel supplier would be legally required to demonstrate that they had delivered a given volume of GHG savings proportional to the quantity of fuel which they supply. Suppliers would receive a GHG credit for each unit (e.g. kilogram) of carbon saved which they could use to demonstrate compliance with the obligation.
 - **Buy-out price** – the buy-out price is a charge which suppliers can opt to pay instead of complying with the GHG obligation through the supply of low carbon

fuels or UERs. If the cost of delivering low carbon fuels or UERs exceeds the buy-out price, suppliers would be expected to buy-out of their obligation. The buy-out price performs two functions: (1) it serves as a compliance enforcement mechanism by effectively acting as a financial penalty for failing to deliver low carbon fuels or UERs; and (2) it limits the overall cost of the obligation as suppliers will opt to pay the buy-out price if the cost of compliance rises above that level.

- **Certificate trading scheme** – a certificate trading scheme will give suppliers flexibility to meet their obligation (i.e. they can buy GHG credits from other suppliers if cost effective). Increasing supplier flexibility in this way should minimise the overall costs of the scheme as individual suppliers facing relatively high compliance costs will be able to reduce costs by buying certificates from those able to reduce emissions at relatively low costs.

4. Policy options

- 4.1 **Option 0 – do nothing** – this baseline scenario assumes that the preferred option for amending the RTFO (which is required by the Renewable Energy Directive), as proposed in a parallel consultation⁴, is implemented. We estimate that changes to the RTFO will deliver 7.9 MtCO_{2e} of the 10.4 MtCO_{2e} savings required by the FQD 6% GHG target in 2020.

Table 3: Breakdown of policy options in relation to buy-out-price and duration

Option	1a	1b	2a	2b	3a	3b
Buy-out-price	Low	Low	Medium	Medium	High	High
Duration	1 year	3 years	1 year	3 years	1 year	3 years

- 4.2 **Option 1a** – a 6% GHG target in 2020 with a low (£7/tCO₂, nominal prices⁵) buy-out price.
- 4.3 **Option 1b** - a multi-year GHG target trajectory (2% in 2018, 4% in 2019, and 6% in 2020) with a low (£7/tCO₂) buy-out price.
- 4.4 **Option 2a** – a 6% GHG target in 2020 with a medium (£74/tCO₂) buy-out price.
- 4.5 **Option 2b** - a multi-year GHG target trajectory (2% in 2018, 4% in 2019, and 6% in 2020) with a medium (£74/tCO₂) buy-out price. **This is the preferred option.**
- 4.6 **Option 3a** – a 6% GHG target in 2020 with a high (£146/tCO₂) buy-out price.
- 4.7 **Option 3b** - a multi-year GHG target trajectory (2% in 2018, 4% in 2019, and 6% in 2020) with a high (£146/tCO₂) buy-out price.
- 4.8 The BEIS 'traded' sector carbon value⁶ (£7/tCO₂ in 2020) has been chosen as the low buy-out price as it reflects the expected carbon price in the EU ETS market where credits from some existing upstream emission reduction (UER) projects are currently traded. The high buy-out price (£146/tCO₂ in 2020) is based upon an analysis of the estimated cost of paying (with capital costs recovered over a one year period) for investment in new UER projects. These upper and lower buy-out price boundaries are intended to capture the range of possible GHG target compliance costs across all potential technology options. In the **preferred option**, the buy-out price has been set in line with the 'non-traded' carbon value. The non-traded carbon values represent the Government's estimate of the marginal global cost of reducing a tonne of carbon in each year consistent with global climate goals. Setting the buy-out price at this level is intended to align the incentives provided through this mechanism with wider government climate change policy.

⁴ 'Renewable Transport Fuel Obligations - Proposed Amendments'

⁵ Note that the buy-out prices for each option do not increase with inflation. In other words, they are fixed in nominal prices but decline in real terms through time.

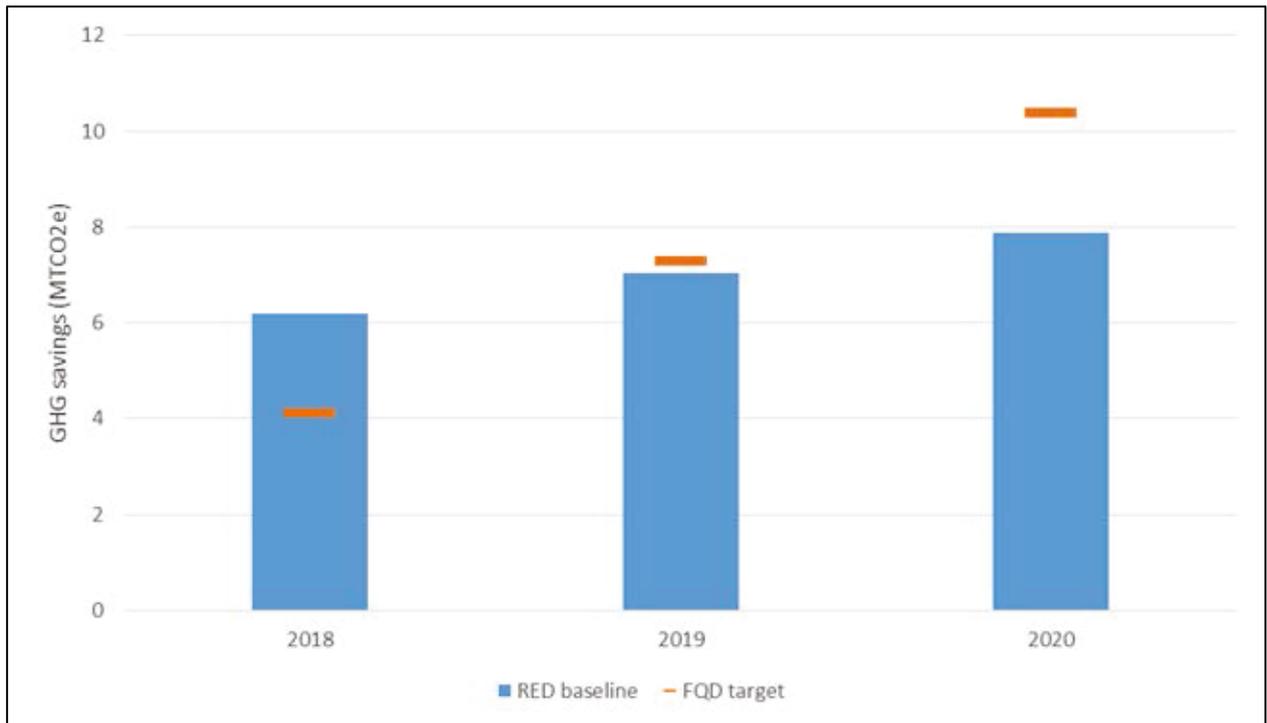
⁶ <https://www.gov.uk/government/collections/carbon-valuation--2>

5. Analytical approach and evidence

Renewable Transport Fuel Obligations - Greenhouse Gas target 'gap'

- 5.1 The key input in determining the potential costs and benefits of implementing a GHG obligation for transport fuels is the gap between the GHG savings required by the GHG target (10.4 MtCO_{2e} in 2020) and baseline GHG savings which are expected to be delivered by the underlying Renewable Transport Fuel Obligations (RTFO) biofuels blending target.
- 5.2 In 2018, our best estimate of RTFO GHG savings is 6.2 MtCO_{2e}. For options 1b, 2b and 3b there is a 2% GHG target in 2018 which equates to 4.1 MtCO_{2e} of GHG savings, so the GHG target is met comfortably through biofuels supplied under the RTFO.
- 5.3 In 2019, our best estimate of RTFO GHG savings is 7 MtCO_{2e}. For options 1b, 2b and 3b there is a 4% GHG target in 2019 which equates to 7.3 MtCO_{2e} of GHG savings, so it is estimated that an additional 0.3 MtCO_{2e} would be required to meet the GHG target for these options.
- 5.4 In 2020, our best estimate of RTFO GHG savings is 7.9 MtCO_{2e}. For all options there is a 6% GHG target in 2020 which equates to 10.4 MtCO_{2e} of GHG savings, so an additional 2.5 MtCO_{2e} is required to meet the GHG target for these options.

Chart 2: Projected contribution from biofuels supplied under the Renewable Transport Fuel Obligations (RTFO) baseline towards the GHG target



5.5 Fuel suppliers have a number of options for complying with a transport fuel GHG obligation as required by the FQD. Options covered in the cost benefit analysis are:

- **existing UERs (non-CDM⁷ accredited)** - these are upstream emissions reduction measures which are already in place and have not been accredited under the Clean Development Mechanism (CDM).
- **existing UERs (CDM accredited)** - these are upstream emissions reduction measures which are already in place and have been accredited under the Clean Development Mechanism.
- **new UERs** - new upstream emission reduction measures (e.g. investments in new methane capture technology in oilfields).
- **improved biofuel GHG savings** - increasing the GHG savings reported for biofuels which are already supplied under the RTFO baseline. For example, biofuel GHG savings can be improved by switching feedstocks, using less fertiliser and using cleaner energy in the processing plant.
- **alternative fossil fuels** - displacing petrol and diesel with less carbon-intensive fossil fuels (e.g. methane).
- **additional biofuels** - supplying biofuels over and above the biofuels which are supplied in the RTFO baseline.

Upstream emission reductions and 'additionality' scenarios

5.6 GHG savings from upstream emissions reduction (UER) projects (i.e. GHG savings from avoided flaring and venting of methane which is produced as a co-product in oil

⁷ The Clean Development Mechanism (CDM) allows emission-reduction projects in developing countries to earn certified emission reduction (CER) credits, each equivalent to one tonne of CO₂. These CERs can be traded and sold, and used by industrialised countries to meet a part of their emission reduction targets under the Kyoto Protocol. Emission Reduction units (ERUs) generated by Joint Implementation (JI) projects are also counted as 'CDM accredited' in this cost benefit analysis.

extraction) are a major potential source of GHG savings for suppliers looking to comply with FQD targets. However, proving that a UER project is 'additional' and has led to genuine GHG savings (i.e. the investment in GHG saving process occurred as a direct result of the financial incentive made available through the policy and would not have occurred otherwise) typically relies on economic/financial assumptions which may be open to debate. The FQD also allows for UER GHG savings from existing investments which may have occurred irrespective of the FQD policy (and therefore may not be considered 'additional'). Options around improving/ensuring additionality of GHG credits will be explored as part of this consultation.

5.7 To take account of the inherent uncertainty around additionality we have carried out a 'high additionality' scenario and a 'low additionality' scenario when evaluating carbon benefits in this cost-benefit analysis. Furthermore, to take account of the different GHG saving characteristics of UER projects, we have split them into three categories (see below) when evaluating carbon benefits in this cost-benefit analysis. The three categories of UER projects we consider are as follows:

- **non CDM-approved UER projects (no GHG savings)** – as these investments have already taken place prior to a financial incentive being available from the FQD, the reported GHG savings for these projects are not considered to be additional.
- **existing CDM-approved UER projects (positive GHG savings)** – although the investment for these projects has already taken place prior to a financial incentive from the FQD, they can be used to demonstrate compliance with the EU Emissions Trading System (ETS). Using them to demonstrate FQD compliance therefore means they cannot be used in the ETS and more carbon savings must be found elsewhere to meet ETS targets.
- **new UER projects (positive GHG savings)** – if the investment in new UER projects takes place directly as a result of the financial incentive from the FQD then the GHG savings can be considered to be additional.

Q41: Do you agree with our assessment of 'additionality' of GHG savings from upstream emission reduction projects?

Costs methodology

- 5.8 As there is significant uncertainty around the options available to suppliers to reduce emissions and the associated costs, a wide range of potential costs have been modelled.
- 5.9 For each option the maximum potential cost has been calculated using the buy-out price. For example, a 6% target in 2020 implies that suppliers will have to deliver 2.5 MtCO₂e savings. If the buy-out price is £10/tCO₂, then the maximum potential cost would be £25 million (i.e. £10 * 2,500,000).
- 5.10 Minimum policy costs vary with assumptions on additionality. Under the 'low additionality' scenario (where we make the conservative assumption that the policy does not generate any 'additional' GHG savings), we assume that the minimum potential compliance cost is determined by the administrative cost of generating a certificate. Under the 'high additionality' scenario (where we assume the policy

generates a high level of 'additional' GHG savings), we assume that the minimum potential compliance cost is determined by the cost of purchasing an EU ETS certificate (which we use to proxy the minimum cost of purchasing savings from CDM-accredited UER projects).

- 5.11 There may also be some familiarisation and compliance costs associated with the implementation of new regulation. We have not estimated these at this stage due to a lack of evidence.

Q42: Are you able to provide any evidence relevant to the assessment of costs, including any evidence on the administrative costs for fuel supplier familiarisation with the requirements of meeting the 6% GHG target required under the FQD?

Benefits methodology

- 5.12 The only benefits that we have sought to quantify are the reduced greenhouse emissions associated with the option relative to the baseline. The change in greenhouse gas emissions in each year has been valued using the non-traded sector carbon values published in the Green Book supplementary guidance on valuing energy use and greenhouse gas emissions for appraisal.⁸
- 5.13 As noted in the section on upstream emission reductions and 'additionality' scenarios, we have looked at 2 different additionality scenarios to reflect the significant uncertainty around the additionality of GHG savings associated with upstream emissions reduction projects.
- 5.14 Potential benefits have only been assessed for the period 2018 to 2020. It is possible that (in the case of capital investment in new upstream emission reduction projects) GHG saving benefits could run further into the future. However, given the significant uncertainty in how suppliers will choose to comply with a GHG obligation we have not been able to quantify these potential benefits.

Key economic variables

- 5.15 For the purposes of this cost benefit analysis, we have assessed the impact of policy options across a three year evaluation period (2018 to 2020) which reflects the maximum duration of the proposed policy options. All costs, prices and benefits are given on a 2015 price base, excepting buy-out prices, which are given as the nominal values which form the basis of revisions to UK legislation. Present value calculations have been discounted to 2016 using the standard 3.5% discount factor given in HM Treasury's Green Book appraisal guidance.⁹

⁸ <https://www.gov.uk/government/publications/valuation-of-energy-use-and-greenhouse-gas-emissions-for-appraisal>

⁹ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/220541/green_book_complete.pdf

6. Impacts of the proposed policy options

Option 1a

Put in place a 6% greenhouse gas target in 2020 with a low (£7/tCO₂ - nominal prices) buy-out price

Table 4: Option 1a, CBA summary

	Net present cost (£m)	2018 pump price impact (ppl inc VAT) (max)	2019 pump price impact (ppl inc VAT) (max)	2020 pump price impact (ppl inc VAT) (max)	Total GHG savings 2018-20 (MtCO ₂ e)	Net present benefits (£m)	NPV (£m)
High additionality	12	0.00	0.000	0.034	1.27	74.1	62.1
Low additionality	0.3 to 12	0.00	0.000	0.034	0.00	0	-12 to -0.3

Table 5: Option 1a, pros/cons

Pros	<ul style="list-style-type: none"> lowest buy-out price therefore lowest potential cost.
Cons	<ul style="list-style-type: none"> least likely to generate 'additional' GHG savings; significant risk of suppliers not delivering the full 6% GHG reductions required due to low buy-out price.

Table 6: Option 1a, expected market impact

	Existing UERs	New UERs	Biofuel GHG savings	Alt fossil fuels	More biofuels
Option 1a	+++	0	0	0	0

Please note, the number of + signs (3 max) indicates assumed likelihood of given abatement pathway being used to achieve GHG target under this policy option.

6.1 It is possible that some GHG credits for existing UER projects could be available at prices below £7/tCO₂. This is on the basis that the investment has already taken place (i.e. no additional costs are incurred other than the administrative cost of

generating a GHG credit). However, it is also possible that competition from other EU Member States (also seeking to meet FQD GHG targets) could drive prices above this level.

- 6.2 It is unlikely that a £7/tCO₂ buy-out price will incentivise investment in new UER projects as investment costs associated with these projects are estimated to be considerably higher than £7/tCO₂.
- 6.3 Similarly, it is considered unlikely that a £7/tCO₂ buy-out price will be sufficient to drive any significant change in biofuel GHG savings attributed to biofuels supplied under the RTFO; any significant increase in the supply of alternative low GHG fossil fuels; or any increase in the volume of biofuels supplied (over and above what is supplied in the baseline).
- 6.4 Having a low buy-out price creates a significant risk of suppliers not delivering the 6% GHG savings required by the FQD as it may result in fuel suppliers opting to pay the buy-out price rather than pay for GHG savings.

Estimated cost

- 6.5 Our central estimate of the additional GHG savings needed to meet the GHG target (over and above the GHG savings which are delivered in the baseline by the RTFO) is 2.5 MtCO_{2e} in 2020.
- 6.6 At a £7/tCO₂ buy-out price, this implies a maximum (undiscounted) cost of £14m in 2020, which equates to an additional 0.03ppl (including VAT) on the pump price. The maximum present value cost (i.e. discounted) estimated for this option is £12m. It is important to note that these cost estimates represent a maximum potential compliance cost for a £7/tCO₂ buy-out price, and that actual costs could come at a lower level if suppliers are able to identify compliance options which cost less than £7/tCO₂.
- 6.7 For the 'low additionality' scenario, we assume that the minimum potential compliance cost is determined by the administrative cost of generating a certificate. We estimate this to be £0.12/tCO₂¹⁰ which implies a maximum (undiscounted) cost of £0.3m in 2020, which has a negligible impact on pump prices. The minimum present value (i.e. discounted) cost under the 'low additionality' scenario estimated for this option is £0.3m.
- 6.8 For the 'high additionality' scenario, we assume that the minimum potential compliance cost is determined by the cost of purchasing an EU ETS certificate (which we use to proxy the minimum cost of purchasing savings from CDM-accredited UER projects). Therefore the minimum cost is equal to the maximum cost and there is no cost range under the 'high additionality' scenario. There is a significant risk under this option that suppliers are unable to acquire GHG credits that cost less than the £7/tCO₂ 'buy-out' price, and so choose to actually 'buy out' rather than pay for emission savings. If this were the case, the Government would accrue revenue to offset the costs from fuel suppliers buying out but would also bear the risk of infraction and any associated fines.

¹⁰ Estimate derived from research assessing administrative costs of the EU Emissions Trading System, see https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/47953/895-cost-euets-uk-operators-compliance.PDF

Estimated benefits

- 6.9 It is likely that with a £7/tCO₂ buy-out price in place, suppliers will either purchase credits from existing UER projects or 'buy out' of their obligation. It is not possible to say to what extent these credits will come from CDM-accredited projects (which we assume generate 'additional' GHG savings) and non-CDM-accredited projects (which we assume do not generate 'additional' GHG savings). It is also possible that a £7/tCO₂ buy-out price could lead to significant levels of buy-out, with suppliers opting to pay the buy-out price rather than delivering GHG savings. For these reasons we take a range of potential GHG savings with 0% 'additional' GHG savings forming the 'low additionality' scenario and 50% GHG savings forming the 'high additionality' scenario. This gives a GHG saving estimate of 0 - 1.27 MtCO₂e in 2020.

Option 1b

Put in place a multi-year greenhouse gas target trajectory (2% in 2018, 4% in 2019, 6% in 2020) with a low (£7/tCO₂ - nominal prices) buy-out price

Table 7: Option 1b, CBA summary

	Net present cost (£m)	2018 pump price impact (ppl inc VAT) (max)	2019 pump price impact (ppl inc VAT) (max)	2020 pump price impact (ppl inc VAT) (max)	Total GHG savings 2018-20 (MtCO ₂ e)	Net present benefits (£m)	NPV (£m)
High additionality	13	0.00	0.004	0.034	1.41	82	69
Low additionality	0.3 to 13	0.00	0.004	0.034	0.00	0	-13 to -0.3

Table 8: Option 1b, pros/cons

Pros	<p>The same as option 1a plus:</p> <ul style="list-style-type: none"> • targets in 2018 and 2019 give suppliers time to adapt to new regulations and allow the government to better assess the merits for potential extension beyond 2020; and • delivers higher GHG emissions savings.
Cons	<p>The same as option 1a plus:</p> <ul style="list-style-type: none"> • targets in 2018 and 2019 slightly increase costs relative to 1a.

Table 9: option 1b, expected market impact

	Existing UERs	New UERs	Biofuel GHG savings	Alt fossil fuels	More biofuels
Option 1b	++	0	0	0	0

Same as for option 1a.

Please note, the number of + signs (3 max) indicates assumed likelihood of given abatement pathway being used to achieve GHG target under this policy option.

Estimated cost

6.11 Our central estimate of the additional GHG saving requirement needed to meet the GHG target (over and above the GHG savings which are delivered in the baseline by the RTFO) is 2.5 MtCO₂e in 2020.

- 6.12 At a £7/tCO₂ buy-out price, this implies a maximum (undiscounted) annual cost of £14 in 2020, which equates to an additional 0.03ppl (including VAT) on the pump price. The maximum present value (i.e. discounted) cost estimated for this option is £12m.
- 6.13 For the 'low additionality' scenario, we assume that the minimum potential compliance cost is determined by the administrative cost of generating a certificate. We estimate this to be £0.12/tCO₂ which implies a maximum (undiscounted) cost of £0.3m in 2020, which has a negligible impact on pump prices. The minimum present value (i.e. discounted) cost under the 'low additionality' scenario estimated for this option is £0.3m.
- 6.14 For the 'high additionality' scenario, we assume that the minimum potential compliance cost is determined by the cost of purchasing an EU ETS certificate (which we use to proxy the minimum cost of purchasing savings from CDM-accredited UER projects). Therefore the minimum cost is equal to the maximum cost under the 'high additionality scenario'.

Estimated benefits

- 6.15 As for option 1a, we assume that (with a £7/tCO₂ buy-out price in place) fuel suppliers will either purchase credits from existing UER projects or buy-out of their obligation. It is not possible to say to what extent these credits will come from CDM-accredited projects (which we assume generate 'additional' GHG savings) and non-CDM-accredited projects (which we assume do not generate 'additional' GHG savings). For this reason we take a range of potential GHG savings with 0% 'additional' GHG savings forming the low scenario and 50% GHG savings forming the high end. This gives a total GHG saving estimate of 0 - 1.41 MtCO₂e over 2019 and 2020.
- 6.16 As with option 1a, there is a significant risk that suppliers are unable to acquire GHG credits that cost less than £7/tCO₂, and choose to 'buy-out', rather than pay for emission savings. If this were the case, the Government would accrue revenue to offset the costs from fuel suppliers buying out but would also bear the risk of infraction and any associated fines.

Option 2a

Put in place a 6% greenhouse gas target in 2020 with a medium (£74/tCO₂ - nominal prices) buy-out price

Table 10: Option 2a, CBA summary

	Net present cost (£m)	2018 pump price impact (ppl inc VAT) (max)	2019 pump price impact (ppl inc VAT) (max)	2020 pump price impact (ppl inc VAT) (max)	Total GHG savings 2018-20 (MtCO _{2e})	Net present benefits (£m)	NPV (£m)
High additionality	12 to 148	0.00	0.00	0.42	2.53	148	0 to 136
Low additionality	0.3 to 148	0.00	0.00	0.42	0.00	0	-148 to -0.3

Table 11: Option 2a, pros/cons

Pros	<ul style="list-style-type: none"> higher buy-out price likely to significantly reduce risk of not delivering the GHG target and generate higher GHG savings relative to option 1.
Cons	<ul style="list-style-type: none"> higher buy-out price increases potential costs relative to option 1; level of buy-out price less likely to be sufficient to incentivise investment in new upstream emission reduction projects than option 3.

Table 12: Option 2a, expected market impact

	Existing UERs	New UERs	Biofuel GHG savings	Alt fossil fuels	More biofuels
Option 2a	+++	+	++	0	0

Please note, the number of + signs (3 max) indicates assumed likelihood of given abatement pathway being used to achieve GHG target under this policy option.

6.17 It is likely that significant volumes of credits for existing UER projects could be supplied at a £74/tCO₂ buy-out price level.

6.18 It is also possible that a £74/tCO₂ buy-out price could incentivise some investment in (relatively low cost) new UER projects. However, uncertainty over certificate prices is likely to diminish investment incentives for these projects.

6.19 Similarly, it is possible that suppliers would be able to deliver increased GHG savings from biofuels supplied under the RTFO for less than £74/tCO₂.

- 6.20 It is unlikely that a £74/tCO₂ buy-out price delivered over a one-year period would be sufficient to incentivise any significant increase in the supply of alternative low GHG fossil fuels or to drive any increase in the volume of biofuels supplied (over and above what is supplied in the baseline).
- 6.21 It is unlikely that an obligation with £74/tCO₂ buy-out price would be sufficient to pay for the supply of additional biofuels.

Estimated cost

- 6.22 Our central estimate of the additional GHG savings needed to meet the FQD target (over and above the GHG savings which are delivered in the baseline by the RTFO) is 2.5 MtCO₂e in 2020.
- 6.23 At a £74/tCO₂ buy-out price, this implies a maximum cost of £170m (undiscounted) in 2020, which equates to an additional 0.42ppl (including VAT) on the pump price. The maximum present value cost estimated for this option is £148m. It is important to note that these cost estimates represent a maximum potential compliance cost for a £74/tCO₂ buy-out price, and that actual costs could come at a lower level if suppliers are able to identify compliance options which cost less than £74/tCO₂. The actual costs of this option would be no greater than under option 1a if there were sufficient compliance options available at a price below the £7/tCO₂ buy-out price to meet the target.
- 6.24 For the 'low additionality' scenario, we assume that the minimum potential compliance cost is determined by the administrative cost of generating a certificate. We estimate this to be £0.12/tCO₂. This implies a minimum (undiscounted) cost of £0.3m in 2020, which has a negligible impact on pump prices. The minimum present value (i.e. discounted) cost under the 'low additionality' scenario estimated for this option is £0.3m.
- 6.25 For the 'high additionality' scenario, we assume that the minimum potential compliance cost is determined by the cost of purchasing an EU ETS certificate (which we use to proxy the minimum cost of purchasing GHG credits savings from CDM-accredited UER projects). This implies a minimum (undiscounted) cost of £14m in 2020, which equates to an additional 0.03ppl (including VAT) on the pump price. The minimum present value (i.e. discounted) cost under the 'high additionality' scenario estimated for this option is £12m.
- 6.26 There remains a risk under this option that suppliers are unable to acquire GHG credits that cost less than the £74/tCO₂ buy-out price, and so choose to 'buy out' of their obligation, but this risk is likely to be significantly smaller than under option 1. If this were the case the Government would accrue revenue to offset the costs from fuel suppliers buying out but would also bear the risk of infraction and any associated fines.

Estimated benefits

- 6.27 Under this option we assume that suppliers can meet their obligation using credits from a range of sources including existing UER projects, new UER projects, alternative fuels and improved biofuel GHG savings.
- 6.28 As there is significant uncertainty over how suppliers will choose to meet the obligation and to what extent GHG savings will be 'additional', we have modelled a wide range of potential benefits. For the high additionality scenario we assume that

100% of GHG savings are additional while the low additionality scenario assumes that 0% of GHG savings under this scenario are actually additional (i.e. all credits come from existing UER projects which are not accredited under the CDM). This gives a GHG saving estimate of 0-2.5 MtCO₂e in 2020.

6.29 Potential benefits have only been assessed for the period to 2018 to 2020. It is possible that (in the case of capital investment in new upstream emission reduction projects) GHG saving benefits could run further into the future. However, given the significant uncertainty in how suppliers will choose to comply with a GHG obligation we have not been able to quantify these potential benefits.

Option 2b

Put in place a multi-year greenhouse gas target trajectory (2% in 2018, 4% in 2019, 6% in 2020) with a medium (£74/tCO₂ - nominal prices) buy-out price

Table 13: Option 2b, CBA summary

	Net present cost (£m)	2018 pump price impact (ppl inc VAT) (max)	2019 pump price impact (ppl inc VAT) (max)	2020 pump price impact (ppl inc VAT) (max)	Total GHG savings 2018-20 (MtCO _{2e})	Net present benefits (£m)	NPV (£m)
High additionality	13 to 166	0.00	0.05	0.42	2.81	165	-1 to 152
Low additionality	0.3 to 166	0.00	0.05	0.42	0.00	0	-166 to -0.3

Table 14: Option 2b, Pros/Cons

Pros	<p>The same as option 2a plus:</p> <ul style="list-style-type: none"> • targets in 2018 and 2019 give suppliers time to adapt to new regulations, spread the costs of any investments and allow the government to better assess the merits for potential extension beyond 2020; and • delivers higher GHG emissions savings.
Cons	<p>The same as option 2a plus:</p> <ul style="list-style-type: none"> • targets in 2018 and 2019 increase costs relative to 2a.

Table 15: option 2b, Expected Market Impact

	Existing UERs	New UERs	Biofuel GHG savings	Alt fossil fuels	More biofuels
Option 2b	+++	+	++	0	0

The market impact is expected to be the same as for option 2a although a longer target 'lead in' period to 2020 could improve incentives for investment in new UER projects as investors could potentially recoup their capital costs over two years instead of one.

Please note, the number of + signs (3 max) indicates assumed likelihood of given abatement pathway being used to achieve FQD target under this policy option.

Estimated cost

- 6.30 Our central estimate of the additional GHG saving requirement needed to meet the GHG target (over and above the GHG savings which are delivered in the baseline by the RTFO) is 2.5 MtCO_{2e} in 2020.
- 6.31 At a £74/tCO₂ buy-out price, this implies a maximum annual cost of £170m (undiscounted) in 2020, which equates to an additional 0.42ppl (including VAT) on the pump price. The (discounted) net present cost estimated for this option is £166m. It is important to note that these cost estimates represent a maximum potential cost for a £74/tCO₂ buy-out price and that actual costs could come at a lower level if suppliers are able to acquire GHG credits which cost less than £74/tCO₂. The actual costs of this option would be no greater than under option 1b if there were sufficient compliance options available at a price below the £7/tCO₂ buy-out price to meet the target.
- 6.32 For the 'low additionality' scenario, we assume that the minimum potential compliance cost is determined by the administrative cost of generating a certificate. We estimate this to be £0.12/tCO₂. This implies a minimum (undiscounted) cost of £0.3m in 2020, which has a negligible impact on pump prices. The minimum present value (i.e. discounted) cost under the 'low additionality' scenario estimated for this option is £0.3m.
- 6.33 For the 'high additionality' scenario, we assume that the minimum potential compliance cost is determined by the cost of purchasing an EU ETS certificate (which we use to proxy the minimum cost of purchasing GHG credits savings from CDM-accredited UER projects). This implies a minimum (undiscounted) cost of £14m in 2020, which equates to an additional 0.03ppl (including VAT) on the pump price. The minimum present value (i.e. discounted) cost under the 'high additionality' scenario estimated for this option is £13m.
- 6.34 As under option 2a, there remains a risk under this option that suppliers are unable to find sufficient GHG credits that cost less than the £74/tCO₂ buy-out price, and so choose to 'buy out', but this risk is likely to be small and significantly smaller than under option 1. If this were the case the Government would accrue revenue to offset the costs from fuel suppliers buying out but would also bear the risk of infraction and any associated fines.

Estimated benefits

- 6.35 As there is significant uncertainty over how suppliers will choose to meet the obligation and to what extent GHG savings will be 'additional', we have modelled a wide range of potential benefits. For the high additionality scenario we assume that 100% of the savings are additional and for the low additionality scenario we assume that 0% of the emissions reductions are additional (i.e. all credits come from existing UER projects which are not accredited under the CDM). This gives a GHG saving range of 0-2.8 MtCO_{2e} in 2019 and 2020. Potential benefits have only been assessed for the period to 2018 to 2020. It is possible that (in the case of capital investment in new upstream emission reduction projects) GHG saving benefits could run further into the future. However, given the significant uncertainty in how suppliers will choose to comply with a GHG obligation we have not been able to quantify these potential benefits.

Option 3a

Put in place a 6% greenhouse gas target in 2020 with a high (£146/tCO₂ - nominal prices) buy-out price

Table 16: Option 3a, CBA summary

	Net present cost (£m)	2018 pump price impact (ppl inc VAT) (max)	2019 pump price impact (ppl inc VAT) (max)	2020 pump price impact (ppl inc VAT) (max)	Total GHG savings 2018-20 (MtCO _{2e})	Net present benefits (£m)	NPV (£m)
High additionality	12 to 293	0.00	0.00	0.84	2.53	148	-145 to 136
Low additionality	0.3 to 293	0.00	0.00	0.84	0.00	0	-293 to -0.3

Table 17: Option 3a, pros/cons

Pros	<ul style="list-style-type: none"> lowest risk of suppliers buying out and UK not complying with GHG target.
Cons	<ul style="list-style-type: none"> highest buy-out price therefore highest potential costs.

Table 18: Option 3a, expected market impact

	Existing UERs	New UERs	Biofuel GHG savings	Alt fossil fuels	More biofuels
Option 3a	+++	++	++	+	+

Please note, the number of + signs (3 max) indicates assumed likelihood of given abatement pathway being used to achieve FQD target under this policy option.

6.36 As with option 2, it is likely that significant volumes of credits for existing UER projects could be supplied at a £146/tCO₂ buy-out price level. The extent to which these credits will be available is unclear.

6.37 It is also possible that a £146/tCO₂ buy-out price could be sufficient to drive some investment in new UER projects which will generate CO₂ savings in 2020 and beyond (as the new UER projects are assumed to remain in place after 2020).

6.38 It is also likely that suppliers would be able to deliver biofuel GHG savings from biofuels supplied under the RTFO for less than £146/tCO₂.

6.39 GHG savings from increased supply of alternative low GHG fossil fuels and savings from an increase in the volume of biofuels (over and above what is supplied in the baseline) could also be supplied for less than £146/tCO₂.

Estimated cost

- 6.40 Our central estimate of the additional GHG saving requirement needed to meet the GHG target (over and above the GHG savings which are delivered in the baseline by the RTFO) is 2.5 MtCO_{2e} in 2020.
- 6.41 At a £146/tCO₂ buy-out price, this implies a maximum annual cost of £336m (undiscounted) in 2020, which equates to an additional 0.84 ppl (including VAT) on the pump price. The (discounted) maximum present value cost estimated for this option is £293m. It is important to note that these cost estimates represent a maximum potential cost for a £146/tCO₂ buy-out price and that actual costs could come at a lower level if suppliers are able to identify compliance options which cost less than £146/tCO₂. The actual costs of this option would be no greater than under option 1a if there were sufficient compliance options available at a price below £7/tCO₂, and no greater than under option 2a if there were sufficient compliance options available at a price below £74/tCO₂, to meet the target.
- 6.42 For the 'low additionality' scenario, we assume that the minimum potential compliance cost is determined by the administrative cost of generating a certificate. We estimate this to be £0.12/tCO₂. This implies a minimum (undiscounted) cost of £0.3m in 2020, which has a negligible impact on pump prices. The minimum present value (i.e. discounted) cost under the 'low additionality' scenario estimated for this option is £0.3m.
- 6.43 For the 'high additionality' scenario, we assume that the minimum potential compliance cost is determined by the cost of purchasing an EU ETS certificate (which we use to proxy the minimum cost of purchasing GHG credits savings from CDM-accredited UER projects). This implies a minimum (undiscounted) cost of £14m in 2020, which equates to an additional 0.03 ppl (including VAT) on the pump price. The minimum present value (i.e. discounted) cost under the 'high additionality' scenario estimated for this option is £12m.
- 6.44 There remains a risk under this option that suppliers are unable to acquire sufficient GHG credits that cost less than the £146/tCO₂ buy-out price, and so choose to 'buy out'. If this were the case the Government would accrue revenue to offset the costs from fuel suppliers buying out but would also bear the risk of infraction and any associated fines. However, due to the high buy-out price this risk is lower than under options 1 and 2. There remains a risk under this option that suppliers are unable to acquire sufficient GHG credits that cost less than the £146/tCO₂ buy-out price, and so choose to 'buy out'. If this were the case the Government would accrue revenue to offset the costs from fuel suppliers buying out but would also bear the risk of infraction and any associated fines. However, due to the high buy-out price this risk is lower than under options 1 and 2.

Estimated benefits

- 6.45 As there is significant uncertainty over how suppliers will choose to meet the obligation and to what extent GHG savings will be 'additional', we have modelled a wide range of potential benefits. For the high additionality scenario we assume that 100% of GHG savings are additional while the low additionality scenarios assume that 0% of GHG savings under this scenario are actually additional (i.e. all credits come from existing UER projects which are not accredited under the CDM). This gives a GHG saving estimate of 0-2.5 MtCO_{2e} in 2020.

6.46 Potential benefits have only been assessed for the period to 2018 to 2020. It is possible that (in the case of capital investment in new upstream emission reduction projects) GHG saving benefits could run further into the future. However, given the significant uncertainty in how suppliers will choose to comply with a GHG obligation we have not been able to quantify these potential benefits.

Option 3b

Put in place a multi-year greenhouse gas target trajectory (2% in 2018, 4% in 2019, 6% in 2020) with a high (£146/tCO₂ - nominal prices) buy-out price

Table 19: option 3b, CBA summary

	Net present cost (£m)	2018 pump price impact (ppl inc VAT) (max)	2019 pump price impact (ppl inc VAT) (max)	2020 pump price impact (ppl inc VAT) (max)	Total GHG savings 2018-20 (MtCO ₂ e)	Net present benefits (£m)	NPV (£m)
High additionality	13 to 327	0.00	0.09	0.84	2.81	165	-162 to 152
Low additionality	0.3 to 327	0.00	0.09	0.84	0.00	0	-327 to -0.3

Table 20: Option 3b, pros/cons

Pros	<p>as option 3a plus:</p> <ul style="list-style-type: none"> targets in 2018 and 2019 give suppliers time to adapt to new regulations, spread the costs of any investments and allow the government to better assess the merits for potential extension beyond 2020; and delivers higher estimated GHG savings than 3a.
Cons	<p>as option 3a plus:</p> <ul style="list-style-type: none"> targets in 2018 and 2019 increase costs relative to 3a.

Table 21: Option 3b, expected market impact

	Existing UERs	New UERs	Biofuel GHG savings	Alt fossil fuels	More biofuels
Option 3a	+++	++	++	+	+

Same as for option 3a.

Please note, the number of + signs (3 max) indicates assumed likelihood of given abatement pathway being used to achieve GHG target under this policy option.

Estimated cost

- 6.47 Our central estimate of the additional GHG saving requirement needed to meet the GHG target (over and above the GHG savings which are delivered in the baseline by the RTFO) is 2.5 MtCO_{2e} in 2020.
- 6.48 At a £146/tCO₂ buy-out price, this implies a maximum annual cost of £336m (undiscounted) in 2020, which equates to an additional 0.84ppl (including VAT) on the pump price. The present value (discounted) cost estimated for this option is £327m. It is important to note that these cost estimates represent a maximum potential cost for a £146/tCO₂ buy-out price and that actual costs could come at a lower level if suppliers are able to acquire GHG credits which cost less than £146/tCO₂. The actual costs of this option would be no greater than under option 1b if there were sufficient compliance options available at a price below £7/tCO₂, and no greater than under option 2b if there were sufficient compliance options available at a price below £74/tCO₂, to meet the target.
- 6.49 For the 'low additionality' scenario, we assume that the minimum potential compliance cost is determined by the administrative cost of generating a certificate. We estimate this to be £0.12/tCO₂. This implies a minimum (undiscounted) cost of £0.3m in 2020, which has a negligible impact on pump prices. The minimum present value (i.e. discounted) cost under the 'low additionality' scenario estimated for this option is £0.3m.
- 6.50 For the 'high additionality' scenario, we assume that the minimum potential compliance cost is determined by the cost of purchasing an EU ETS certificate (which we use to proxy the minimum cost of purchasing GHG credits savings from CDM-accredited UER projects). This implies a minimum (undiscounted) cost of £14m in 2020, which equates to an additional 0.03ppl (including VAT) on the pump price. The minimum present value (i.e. discounted) cost under the 'high additionality' scenario estimated for this option is £13m.
- 6.51 As under option 3a, there remains a risk that suppliers are unable to acquire sufficient GHG credits that cost less than the £146/tCO₂ buy-out price, and so choose to actually 'buy out'. If this were the case the Government would accrue revenue to offset the costs from fuel suppliers buying out but would also bear the risk of infraction and any associated fines. However, this risk is likely to be small and significantly smaller than under options 1 or 2.

Estimated benefits

- 6.52 As there is significant uncertainty over how suppliers will choose to meet the obligation and to what extent GHG savings will be 'additional', we have modelled a wide range of potential benefits. As with option 3a, we assume that fuel suppliers will preferentially purchase credits from existing UER projects. These could be from either CDM-accredited (which we assume generate 'additional' GHG savings) or non-CDM-accredited projects (which we assume do not generate 'additional' GHG savings). However, it is possible that insufficient volumes of these credits will be available, so fuel suppliers may also choose to use credits from other sources (e.g. new UER projects, increased biofuel GHG savings, increased supply of biofuels).
- 6.53 For the high additionality scenario we assume that 100% of these savings are additional, while the low additionality scenarios assume that only 0% of GHG savings under this scenario are actually additional (i.e. all credits come from existing UER

projects which are not accredited under the CDM). This gives a GHG saving estimate of 0-2.8 MtCO₂e in 2019 and 2020.

- 6.54 While the quantified GHG savings are exactly the same as under option 2b, it should be noted that option 3b would deliver higher GHG savings if there were insufficient credits available at a buy-out price of £74/tCO₂.
- 6.55 Potential benefits have only been assessed for the period to 2018 to 2020. It is possible that (in the case of capital investment in new upstream emission reduction projects) GHG saving benefits could run further into the future. However, given the significant uncertainty in how suppliers will choose to comply with a GHG obligation we have not been able to quantify these potential benefits.

7. Greenhouse Gas Reporting Regulations and non-compliance

New supplier reporting

- 7.1 The implementing measure for Article 7a of the amended FQD (Directive 2015/652) requires fuel suppliers to report information on the characteristics of the fossil fuel which they supply into the UK transport fuel¹¹ market. The information requested consists of:
- Origin (feedstock trade name) - The feedstock trade name tells us what type of crude oil has been used to produce the petrol/diesel supplied (e.g. whether the fuel is from conventional or more polluting non-conventional crudes) (Directive 2015/652: Annex I, Part 2, para 2); and
 - Place of purchase - The country and name of the processing facility where the fuel or energy underwent the last substantial transformation. (Directive 2015/652: Annex I, Part 2, para 3).

Cost impact on UK fuel suppliers

- 7.2 Preliminary discussions with industry stakeholders indicate that most UK fuel suppliers already have access to origin and place of purchase data for the fuels which they supply, so these reporting requirements are not expected to place any significant additional burden on fuel suppliers. In addition, the Directive only requires designated fuel suppliers to report information on origin where it is known to them as an importer of crude oil or under arrangements to share information agreed with other suppliers. As suppliers designated to report under the GHG obligation are not required to gather additional information, there is no additional cost beyond the administrative cost of reporting this data to the regulator. Due to a lack of evidence we have not quantified this cost at this stage.

Q43: Can you provide evidence on the cost of reporting fossil fuel ‘origin’ and ‘place of purchase’ data to the regulator?

Please note, we ask further questions on supplier reporting in the consultation document containing our proposed amendments to the GHG Regulations. Please refer in particular to questions Q27 to Q29.

Non-compliance and civil penalties

- 7.3 Member States must, under Article 7a of the amended FQD, lay down the rules on penalties applicable to infringements of national provisions adopted to transpose the Directive. These penalties must be effective, proportionate and dissuasive.

¹¹ Fuels used to propel road vehicles, non-road mobile machinery (including inland waterway vessels when not at sea), agricultural and forestry tractors, recreational craft when not at sea and electricity for use in road vehicles are included in the scope of the FQD.

- 7.4 We propose to make amendments to the civil penalty powers within the GHG Reporting Regulations. These are necessary to enable the Administrator to ensure that the new GHG obligation is met, to deter fraud in respect of applications for GHG credits and to ensure the accuracy of new information to be reported by suppliers, such as on place of purchase and origin of fuels. We propose that the Administrator may issue a civil penalty under the GHG Reporting Regulations to include where:
- a supplier fails to discharge their GHG obligation;
 - a supplier fails to provide, information, as required by the Administrator, as a result of the changes proposed in this consultation, for example, information or evidence relating to the origin and place of purchase of fossil fuel;
 - a supplier fails to ensure that accurate information or evidence is provided either as part of the revocation process for GHG credits or when applying for GHG credits (including, where appropriate, a verifier's report).

Cost Impact on suppliers

- 7.5 We have considered the proportionality of the level of civil penalties, including at a stakeholder workshop in August 2015, and propose that penalties for similar types of breach as are given under the RTFO would be appropriate and proportionate.
- 7.6 We have also considered the risk of non-compliance against the available evidence. As set out in table 22 below, to date there have been a very small number of civil penalties issued by the Administrator over the last 9 years.
- 7.7 We assume that the most likely scenario is that there is 100% compliance with the GHG Reporting Regulations, such that no civil penalties are issued and there are no impacts arising from the enforcement of civil penalties as civil debts. Therefore there are no costs associated with the proposed changes.

Table 22: civil penalties issued to date under the RTFO and GHG Reporting Regulations

Amount	Date imposed	Discharged
£5,000	17/12/2010	Yes
£5,000	17/12/2010	Yes
£50,000	17/12/2010	Yes
£50,000	01/02/2012	No
£50,000	06/03/2013	No
£5,000	30/07/2013	Yes

Source: DfT Biofuels Statistics Report 6 for Year 6

- 7.8 The proposal is not expected to increase the volume of civil penalties issued and therefore is unlikely to increase costs or burdens associated with compliance with the GHG Regulations, as per the proposed amendments. It is not anticipated that the changes proposed in the consultation will lead to an increase in the likelihood of civil penalties being issued, for two main reasons.

- 7.9 Firstly, the Administrator of the GHG Reporting Regulations proactively identifies suppliers that may be obligated under the scheme and provides advice and guidance to those suppliers to ensure they meet the requirements of the scheme.
- 7.10 Secondly, the GHG obligation buy-out price proposed is set at a moderate level but one which will act as a consumer protection mechanism should the cost of acquiring GHG credits be unsustainable.
- 7.11 Chapter 5 of the consultation seeks views on the proportionality of the changes to civil penalties proposed.

Q44: Do you have any evidence you would like to provide on the costs and benefits associated with the proposed changes to civil penalties?

ANNEX I: BASELINE AND TARGET 'GAP' MODELLING

Table A1: FQD Fossil Fuel Emissions Factors

Diesel and petrol (baseline)	gCO ₂ /MJ	94.1
Diesel (reporting)	gCO ₂ /MJ	95.1
Petrol (reporting)	gCO ₂ /MJ	93.3

Table A2: Projected Energy Demand (without RTFO)

	2017	2018	2019	2020
Diesel (million litres)	29,551	29,731	29,724	29,516
Petrol (million litres)	14,875	14,316	13,777	13,334
NRMM (million litres)	5,214	5,214	5,214	5,214
gCO ₂ /mj (average)	94.59	94.61	94.62	94.63
gCO ₂ /mj (target)	88.45	88.45	88.45	88.45
6% FQD Target (MtCO ₂ e)	10.6	10.6	10.5	10.4

Table A3: Projected Energy Demand (with central Renewable Energy Directive compliance scenario¹²)

	2017	2018	2019	2020
Diesel (million litres)	28,202	28,112	27,869	27,401
Petrol (million litres)	14,181	13,588	13,024	12,553
NRMM (million litres)	5,214	5,214	5,214	5,214
Biodiesel (million litres)	1,029	1,295	1,550	1,829
Ethanol (million litres)	768	819	869	920
Methanol (million litres)	38	38	38	38
Biomethane (million kgs)	9	12	15	18
gCO ₂ /mj (average)	91.59	91.02	90.50	89.95
gCO ₂ /mj (target)	88.45	88.45	88.45	88.45
GHG saving shortfall relative to 6% FQD target (MtCO ₂ e)	5.4	4.4	3.5	2.5

¹² More information can be found on proposals to meet the requirements of the Renewable Energy Directive in the Consultation document and cost benefit analysis which are being published alongside this document.

ANNEX II: UPSTREAM EMISSIONS REDUCTION COSTS

Our assessment of Upstream Emissions Reduction project abatement cost is based upon analysis carried out by the International Council for Clean Transportation (ICCT) on behalf of the EU (<http://www.theicct.org/reduction-upstream-greenhouse-gas-emissions-flaring-and-venting>). The first chart below shows estimated UER abatement costs with a 1 year payback period and the second chart shows estimated UER abatement costs with a 10 year payback period.

Chart 3: estimated UER abatement costs with a 1 year payback period

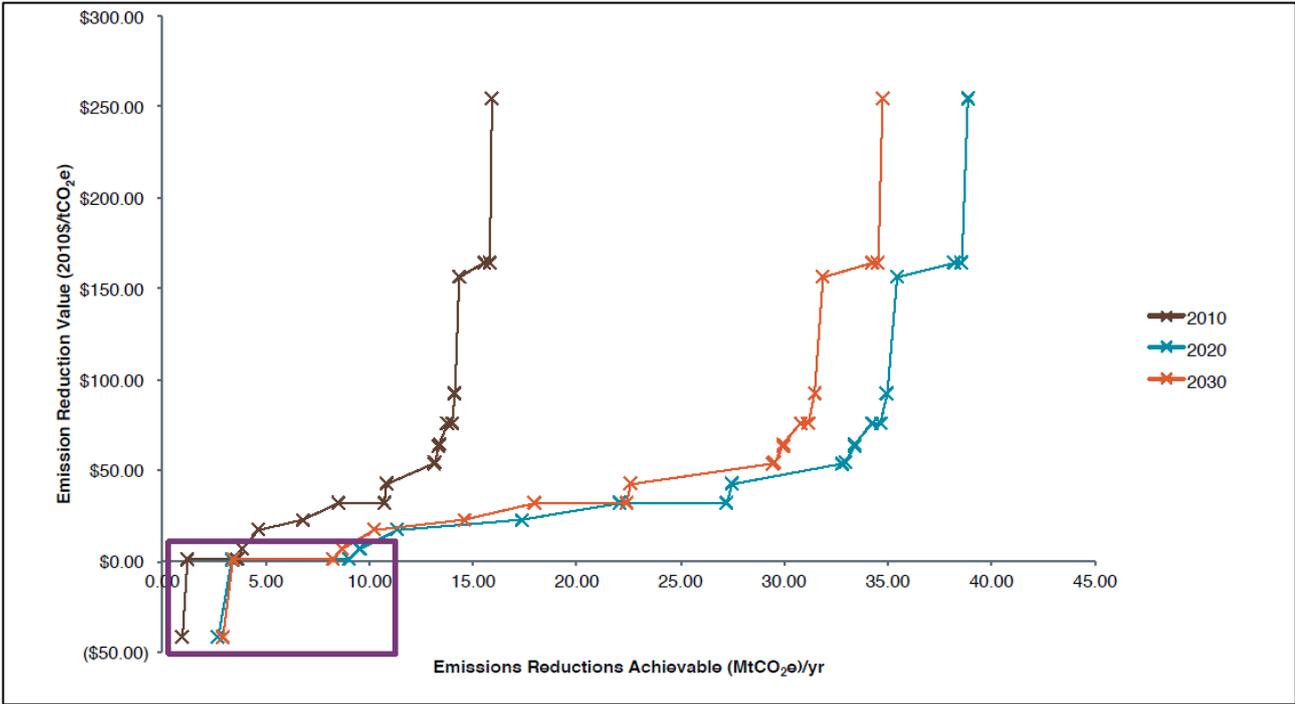


Chart 4: estimated UER abatement costs with a 10 year payback period

