

Title: Impact Assessment on Implementing amendments to the Aviation EU Emissions Trading System in UK Regulations IA No: BEIS001(F)-18-HBE RPC Reference No: N/A Lead department or agency: Department for Business, Energy and Industrial Strategy (BEIS) Other departments or agencies: Department for Transport (DfT)	Impact Assessment (IA)
	Date: 07/03/2018
	Stage: Final
	Source of intervention: EU
	Type of measure: Secondary legislation
	Contact for enquiries: aviationeuets.consultation@beis.gov.uk
Summary: Intervention and Options	RPC Opinion: Not Applicable

Cost of Preferred (or more likely) Option				
Total Net Present Value	Business Net Present Value	Net cost to business per year (EANDCB in 2014 prices)	One-In, Three-Out	Business Impact Target Status
- £405m	£490m	- £70m	Not in scope	Not a regulatory provision

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

The UK believes that global action is the most effective way to reduce the greenhouse gas emissions from aviation. The broad problem under consideration is how action at European level can tackle aviation emissions cost effectively, while also facilitating the implementation of the Global Market-Based Measure (GMBM) that comes into effect from 2021 and aims to tackle aviation emissions at the global level. Regulation (EU) 2017/2392, from here on referred to as “amendments to the Directive”, amends the EU ETS Directive 2003/87/EC to continue the current limitations of scope for aviation activities and to prepare to implement a global market-based measure from 2021. The amendments to the Directive extend the current derogation from full scope, whereby only flights between states within the European Economic Area (EEA) are covered by the system, rather than all flights arriving at or departing from EEA aerodromes, until the end of 2023. The derogation would otherwise have expired at the end of 2016. This would mean aviation operators would have to surrender allowances for 2017 emissions in 2018, in accordance with a full scope scheme, rather than an intra-EEA scope. Government intervention is therefore necessary to tackle aviation emissions whilst facilitating the implementation of the GMBM and to ensure UK regulators have the appropriate powers to implement the provisions of the agreed amendments.

What are the policy objectives and the intended effects?

The UK’s overarching policy objective is to address the growing level of aviation emissions. The UK believes taking action at the global level provides the best chance to keep international aviation emissions at a level consistent with limiting the global temperature increase to well below 2 degrees Celsius. Therefore, the wider objective of this intervention is to create the conditions to facilitate the implementation of a GMBM for aviation emissions. The specific objective of this intervention is to ensure UK domestic law is consistent with EU law, and to provide clarity and legal certainty for regulators, aircraft operators, and other relevant stakeholders.

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

In this IA, the Do Nothing option is that neither EU Regulation; nor the changes to existing UK Regulations, are introduced: i.e. the scheme reverts to full scope. This scenario has been used as the baseline against which the costs and benefits of the Policy Option are assessed in this IA.

The Policy Option that has been assessed in this IA is that the amendments to the Directive enter into force on 29 December 2017 and the UK amends its domestic regulations so they are consistent.

The key changes brought about in UK legislation will be: intra-EEA scope extended until the end of 2023; the exemption for non-commercial operators emitting less than 1,000 tonnes CO₂/year is extended until 2030; and simplified procedures are introduced for operators with intra-EEA scope emissions of less than 3,000 tonnes CO₂/year. A further key element of the amendments to the Directive that will not require changes to UK domestic regulation is the reduction in the Aviation EU ETS cap via a linear reduction factor (LRF) from 2021. In addition, the European Commission is required to review the Directive within 12 months of the rules on the GMBM being adopted in ICAO. This may result in a change to the regulation in question.

Outside of the scope of the Policy Option: The amendments to the Directive also included an amendment that will make allowances issued by the UK from 1 January 2018 invalid for compliance in the EU ETS, pending clarity on compliance by UK operators after the UK withdraws from the EU. The objective of this amendment was to protect the environmental integrity of the EU ETS in the event of a UK departure from the System in March 2019. In response to this amendment, the Government brought forward the 2018 EU ETS compliance deadlines to before the date of EU Exit. As a result, allowances issued by the UK from January 2018 will continue to be valid for compliance with the EU ETS. As this affects all EU ETS sectors, not just aviation, the amendment was addressed separately and therefore is not included in the Policy Option assessed in this IA.

No further options have been identified since it is necessary for the UK to amend the existing UK Regulations, as otherwise the UK would be in breach of its obligations for UK law to be consistent with EU law. Hence, only one Policy Option has been assessed in this IA.

Will the policy be reviewed? Yes. If applicable, set review date: 2023				
Does implementation go beyond minimum EU requirements?		No		
Are any of these organisations in scope?	Micro Yes	Small Yes	Medium Yes	Large Yes
What is the CO ₂ equivalent change in greenhouse gas emissions? (Million tonnes CO ₂ equivalent)	Traded: 73*		Non-traded: 0	

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

Signed by the responsible Minister: _____ Date: _____

* Reflects change in EU ETS emissions. Given the international coverage of the EU ETS, changes in emissions cannot be attributed to the UK with certainty.

Description: The amendments to the Directive enters into force on 29 December 2017; the UK amends its domestic regulations so they are consistent.

FULL ECONOMIC ASSESSMENT

Price Base Year 2017	PV Base Year 2017	Time Period Years 7	Net Benefit (Present Value (PV)) (£m) ²		
			Low: - 1,155	High: 490	Best Estimate: - 405

COSTS (£m)	Total Transition (Constant Price) Years	Average Annual (excl. Transition) (Constant Price)	Total Cost (Present Value)
Low	N/A	N/A	195
High	N/A		110
Best	N/A		145
			1,155
			650
			895

Description and scale of key monetised costs by ‘main affected groups’

Compared with the Do Nothing option, the key monetised costs under the Policy Option estimated in this IA are (i) the reduction in the environmental benefits of Aviation EU ETS between 2017 and the end of 2023 due to the required abatement across the EU ETS being reduced (best estimate of total environmental costs £705 million in PV terms); and (ii) the reduction in Government’s EU Aviation Allowance (EUAA) auction revenues between 2017 and the end of 2023 owing to a reduction in the number of aviation allowances auctioned (best estimate of total costs to Government £190 million in PV terms).

Other key non-monetised costs by ‘main affected groups’

Compared with the Do Nothing option, there may be some additional costs in the form of lost charges and revenues for regulators and verifiers respectively due to the extension of the exemption for non-commercial operators; the new simplified procedures; and the reduction in scope of the Aviation EU ETS under the Policy Option. There may, however, be some offsetting benefits in the form of lower operating costs to these regulators and verifiers. These are not likely to be significant and have not been estimated in this IA.

Given that the derogation is only being extended to 2023 and we expect the review to mean that changes to the Aviation EU ETS will be in effect after that date, impacts beyond 2023 have not been monetised. The application of the LRF is expected to increase the number of allowances aircraft operators will be required to purchase while reducing government revenue as both the number of free and auctioned allowances fall. Further, the exemption for small emitting non-commercial operators is expected to increase emissions.

¹ Estimates are rounded to the nearest £5 million and may not sum due to rounding.

² Benefits minus costs.

BENEFITS (£m)	Total Transition (Constant Price) Years		Average Annual (excl. Transition) (Constant Price)	Total Benefit (Present Value)
Low	N/A	N/A	0	0
High	N/A		185	1,145
Best Estimate	N/A		80	490
Description and scale of key monetised benefits by ‘main affected groups’				
<p>Compared with the Do Nothing option, the key monetised benefits under the Policy Option that are estimated in this IA are the reduction in compliance costs for aircraft operators between 2017 and 2023, owing to the reduction in the volume of allowances they would need to purchase to comply with Aviation EU ETS (best estimate of total benefit £490 million in PV terms).</p>				
Other key non-monetised benefits by ‘main affected groups’				
<p>Compared to the Do Nothing option, the Policy Option will more broadly create conditions that would facilitate the implementation of the GMBM; the GMBM is expected to result in significant environmental benefits which have not been estimated. Further, given that the derogation is only being extended to 2023, and we expect the review to mean that changes to the Aviation EU ETS will be in effect after that date, impacts beyond 2023 have not been monetised. The application of the LRF is expected to reduce emissions. Small emitting non-commercial operators will benefit from the continuation of the exemption to 2030.</p> <p>There may also be some savings to some aircraft operator’s administrative costs, e.g. through the introduction of simplified procedures for operators with intra-EEA emissions of less than 3,000 tonnes, which have not been monetised.</p>				
Key assumptions/sensitivities/risks			Discount rate (%)	3.5
<p>1) The estimates of the monetised costs and benefits are sensitive to the assumptions made, and the other aspects of the methodology used in this IA, and should be interpreted as indicative estimates of the order of magnitude of these costs and benefits.</p> <p>2) The main assumptions and sensitivities relate to the way in which estimated caps and emissions for “UK flights” in scope of Aviation EU ETS under each scenario have been derived, and the carbon prices that have been used in this analysis.</p> <p>3) A key limitation is that, given the uncertainty until the implementation rules are agreed in ICAO, the GMBM is not taken into account in any of the analysis presented in this IA.</p> <p>4) Another key limitation is that, given a further review will be undertaken by the European Commission, there is considerable uncertainty regarding the impacts that the Aviation EU ETS will have in practice after this review.</p>				

BUSINESS ASSESSMENT (Policy Option)

Direct impact on business (Equivalent Annual) £m:			Score for Business Impact Target (qualifying provisions only) £m:
Costs: 0	Benefits: 70	Net: 70	Not in scope

Evidence Base (for summary sheets)

This final stage Impact Assessment has been prepared after considering the seven responses to the consultation which ran between Friday 8 December 2017 and Friday 5 January 2018. Respondents either agreed with the Government approach or welcomed the EU regulation being implemented. A detailed breakdown of responses to each question is set out in the Government response, published alongside this Impact Assessment.

Consequently, the methodological approach in this Final Stage Impact Assessment remains unchanged. The only change since the Consultation Stage Impact Assessment is to reflect updates to Government's GHG Appraisal Guidance, published on 2 January 2018;³ and to the estimated emissions from UK flights in scope of the Aviation EU ETS under both the Policy Option and Do Nothing scenario.

1. Background

Aviation emissions

1. Aviation accounted for approximately 2% of global CO₂ emissions in 2015.⁴ European aviation sector CO₂ emissions have increased by around 80% between 1990 and 2014, and are forecast to grow by a further 45% by 2035.⁵ Measures to tackle aviation emissions are being pursued by governments, the International Civil Aviation Organisation (ICAO) and the EU, as well as by the aviation industry.
2. Market-Based Measures (MBM) such as emissions trading, have the advantage over other potential measures as they can guarantee specific environmental outcomes (i.e. by capping of CO₂ emissions). The market-based approach also allows emission reductions to take place where the cost of the emissions reduction is lowest, thus lowering the overall costs of combating climate change.

Aviation EU ETS

3. In 2008, the EU added aviation to the scope of the EU ETS. The Directive to include aviation in the EU ETS (2008/101/EC) entered into force on 2 February 2009, and aviation was fully included from 1 January 2012.⁶
4. The Directive initially included in scope all flights into or out of aerodromes in the EEA (e.g. a flight between New York and London), known as "full scope".
5. In response to opposition to this scope, and in order to promote a broader international agreement at ICAO, the EU legislated to temporarily reduce the

³ <https://www.gov.uk/government/publications/valuation-of-energy-use-and-greenhouse-gas-emissions-for-appraisal>;
<https://www.gov.uk/government/collections/carbon-valuation--2>

⁴ <http://www.ataq.org/facts-and-figures.html>

⁵ European Aviation Environmental Report: <https://ec.europa.eu/transport/sites/transport/files/european-aviation-environmental-report-2016-72dpi.pdf>

⁶ Available here: <https://www.eea.europa.eu/policy-documents/directive-2008-101-ec>

scope of the Aviation EU ETS to only include flights between EEA aerodromes (known as “intra-EEA scope”) for the 2012 compliance year under the “Stop the Clock” decision. It was subsequently agreed that the intra-EEA scope should be extended from 2013 to 2016. The full scope would then automatically resume in 2017, subject to a European Commission-led review in 2016 to take account of developments at the 2016 ICAO Assembly.

Carbon Offsetting and Reduction Scheme for International Aviation (CORSA)

6. At the 39th ICAO Assembly in October 2016, 191 states agreed to implement a Global Market-Based Measures (GMBM) known as the Carbon Offsetting and Reduction Scheme for International Aviation (CORSA).⁷ Coming into effect in phases from 2021, this GMBM will require aircraft operators to offset the CO₂ emissions that exceed their established baseline with the aim of delivering ICAO’s goal of carbon neutral growth for the sector from 2020. The detail of how the scheme will be implemented is currently being developed, with the final package of implementation material expected to be agreed by summer 2018.

2. Problem under consideration and rationale for intervention

7. The UK believes that global action is the most effective way to reduce the greenhouse gas emissions from aviation. The problem under consideration in this IA is how action at European level can tackle aviation emissions cost effectively, while also facilitating the implementation of the GMBM that comes into effect from 2021.
8. This requires a careful balance to be struck to maintain the effectiveness and environmental integrity of the Aviation EU ETS, whilst ensuring its broad acceptability to non-EU states. To this end, the amendments to the Directive will continue the derogation to intra-EEA scope for the Aviation EU ETS between 1 January 2017 and 31 December 2023, alongside a number of other changes.⁸ Otherwise a revision to full scope (so called “snap back”) would occur, which could create an uncertain policy landscape for operators, reignite international opposition to the system, and potentially hinder on-going ICAO negotiations on the implementation of the CORSA.
9. Government intervention is therefore necessary to reduce the greenhouse gas emissions from aviation, while also facilitating the implementation of the GMBM that comes into effect from 2021.

⁷ https://www.icao.int/environmental-protection/Pages/A39_CORSA_FAQ2.aspx

⁸ <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32017R2392&from=EN>

3. Policy objectives

10. The UK's overarching policy objective is to address the growing level of aviation emissions. The UK believes taking action at the global level provides the best chance to keep international aviation emissions in line with the goal of limiting the global temperature increase to 2 degrees Celsius above pre-industrial levels. Therefore, the objective of this intervention is to create the conditions to facilitate the implementation of a GMBM for aviation emissions. Further by ensuring UK domestic law is consistent with EU law, the Government will provide clarity and legal certainty for regulators, aircraft operators, and other relevant stakeholders.

4. Description of options

11. Under the Do Nothing option, neither the amendments to the Directive nor the changes to existing UK Regulation are introduced and the Aviation EU ETS returns to full scope for 2017 emissions onwards. This would require aircraft operators to surrender allowances for emissions from all flights arriving at or departing from EEA aerodromes in 2017 by the compliance deadline of 30th April 2018. This scenario has been used as the baseline against which the costs and benefits of the Policy Option are assessed in this IA.

12. The Policy Option considered in this IA is that the amendments to the Directive enter into force on 29 December 2017 and the UK amends its domestic regulations so they are consistent.

13. No further options have been identified since the UK must take action to amend its domestic regulations so that they are consistent with the EU law. Hence, only one Policy Option has been assessed in this IA.

4.1 Principal features of the amendments to the Directive

Scope

14. Between 2017 and the end of 2023, the Aviation EU ETS will cover emissions from flights between two EEA aerodromes (i.e. intra-EEA flights).⁹ The surrender deadline for the first year of compliance with this regulation is 30th April 2018.

15. All aircraft operators which emit above the exemptions thresholds (see below – “Provisions for small aircraft operators”) for the scheme, irrespective of their nationality, will be required to ensure that they surrender sufficient carbon allowances to cover their emissions on intra-EEA flights.¹⁰

⁹ This includes flights between an aerodrome in the EEA and offshore installations of EEA countries that are outside territorial waters, such as oil and gas platforms

¹⁰ As specified by the European Commission, aircraft operators are entitled to use international credits in the form of Certified Emission Reductions (CERs) and Emission Reduction Units (ERUs) for up to 1.5 % of their verified emissions during the period from 2013 to 2020. These credits represent emissions reductions undertaken internationally.
https://ec.europa.eu/clima/policies/ets/credits_en

16. Emissions from flights between the EEA and the rest of the world (including Overseas Territories outside the EEA and Outermost Regions)¹¹ will not be included in the EU ETS between 2017 and the end of 2023. However, these flights and their emissions still have to be considered by the operator and relevant regulator to determine if an operator is or is not captured by the EU ETS.

Review to determine future rules on intra-EEA flights

17. A review will be undertaken by the European Commission within 12 months of the rules on the CORSIA being adopted in ICAO to consider whether the Aviation EU ETS should be amended based on how the CORSIA is being developed and implemented. If so, the Commission may bring forward proposals to do so. Given the uncertainty over the results of such a review, this IA does not consider its impact in the analysis.

Provisions for small aircraft operators

18. Non-commercial operators emitting less than 1,000 tonnes CO₂ per annum, based on their global emissions, will continue to be exempted from the EU ETS until 2030 under both the Do Nothing and Policy Option.

19. In order to further reduce administrative burdens, the Policy Option removes of the requirement to verify emissions for aircraft operators with intra-EEA emissions less than 3,000 tonnes of CO₂ per year if they use a small emitters tool to determine their emissions. This is in addition to the existing provision for operators with full scope emissions lower than 25,000 tonnes CO₂ per annum to use the small emitters tool which applies under both the Do Nothing and Policy Option.

Allocation of allowances, auctioning and the special reserve

20. The percentage of allowances to be freely allocated remains at 82% of the total quantity of aviation allowances to be issued. The number of free allowances to be received by each eligible aircraft operator each year will be fixed at 2016 levels from 2017 to 2020, whereby the cap is reflective of the previous reduction in scope.¹²

21. The number of allowances to be auctioned during the 2017-2020 period remains at 15% of the total quantity of aviation allowances to be issued. However, the Commission has been mandated to carry out a study on the ability of the aviation sector to pass on the costs of required allowances for EU ETS compliance and offsetting units for the GMBM, as part of its wider review in 2019, with a view to

¹¹ Please note flights between two aerodromes in the same Outermost Region will be included.

¹² This 'reduced scope' cap is calculated as a proportion of the 'full scope' cap on the basis of the intra-EEA's share of flights by distance, measured as tonne kilometres. The European Commission have confirmed that this is approximately 39 million EU Aviation Allowances each year.

coming forward with a proposal to increase the proportion of allowances that will be auctioned.

22. The amount of allowances set aside in the “special reserve” for fast growing aircraft operators and new entrants, remains unchanged at 3% of the cap as defined in Article 3c of the EU ETS Directive.

Post 2020

23. A Linear Reduction Factor (LRF) will reduce the Aviation EU ETS cap year on year, subject to review, in line with other stationary EU ETS sectors from 1 January 2021.

Summary

24. In summary, compared to the Do Nothing option, the key changes to the Aviation EU ETS under the Policy Option are as follows:

- i. The limited geographic scope of the Aviation EU ETS, covering flights that depart and arrive at aerodromes within the EEA, will continue until the end of 2023 (the limited scope would otherwise have ended at the end of 2016);
- ii. The LRF will be applied to the Aviation EU ETS cap from 2021 (the Aviation EU ETS cap would otherwise have remained constant);
- iii. The exemption for non-commercial operators emitting less than 1,000 tonnes CO₂ per annum will continue to the end of 2030 (it would otherwise have ended at the end of 2020);
- iv. Aircraft operators with emissions of less than 3,000 tonnes CO₂ per annum on intra-EEA flights will benefit from simplified verification procedures; and
- v. The European Commission will undertake a review within 12 months of the rules on the CORSIA being adopted in ICAO, including on the possibility of increasing the proportion of allowances to be auctioned.

Other provisions

- a) From 2021, upon expiry of the Kyoto Protocol, the distinction between EU Aviation Allowances (EUAAAs) and EU Allowances (EUAs) will be removed. Currently only the aviation sector can use both EUAAAs and EUAs, whereas stationary sectors can only use EUAs for compliance purposes;
- b) Revenues from auctioning of allowances should be used to tackle climate change in the Union and in third countries, fund research and development for mitigation and adaptation, including in the areas of aeronautics, air transport and sustainable alternative aviation fuels and to reduce emissions through low-emissions transport;

- c) By 1 January 2020 the Commission is required to issue updated analysis of the non CO₂ effects of aviation, and if appropriate, bring forward a legislative proposal on how best to address those effects. and
- d) The European Commission is empowered to adopt provisions for the monitoring, reporting and verification of emissions for the purpose of implementing CORSIA within the EEA.

25. Points (b), (c) and (d) in this list will not directly result in any impacts on the UK, and are therefore not assessed for impacts or mentioned further in this IA.

26. The amendments to the Directive also included an amendment that could have made allowances issued by the UK from 1 January 2018 invalid for compliance in the EU ETS. The objective of this amendment was to protect the environmental integrity of the EU ETS in the event of a UK departure from the System in March 2019. In response to this amendment, the Government brought forward the 2018 EU ETS compliance deadlines to before the date of EU Exit.¹³ As a result, allowances issued by the UK from January 2018 will continue to be valid for compliance with the EU ETS.¹⁴ As this affects all EU ETS sectors, not just aviation, the amendment was addressed separately and therefore is not included in the Policy Option assessed in this IA.¹⁵

5. Impacts of the Policy Option

27. This IA monetises the impacts of the Policy Option, relative to the Do Nothing option, between 1st January 2017 and 31st December 2023. Impacts beyond 2023 have not been monetised as the derogation is only being extended to 2023 and we expect the review to mean that changes to the Aviation EU ETS will be in effect after that date.

28. This IA monetises the continued exclusion of CO₂ emissions from extra-EEA flights, the application of the LRF and the extended exemption for non-commercial operators.

29. Monetary impacts presented in this IA have been rounded to the nearest 5 million. Allowance prices (table 3); international credit prices (table 4); and carbon appraisal values (table 7) have been rounded to the nearest pence. Quantities of allowances and tonnes of carbon have been rounded to the nearest million.

30. Table 1 below provides an overview of the key stakeholder groups the Policy Option is likely to effect. The discussion of the identified impacts is structured as follows:

¹³ https://www.legislation.gov.uk/ukxi/2017/1207/pdfs/ukxi_20171207_en.pdf

¹⁴ https://ec.europa.eu/clima/news/update-safeguard-measures-eu-emissions-trading-system-2018-following-adoption-uk-law_en

¹⁵ <https://www.gov.uk/government/consultations/bringing-forward-eu-emissions-trading-system-2018-compliance-deadlines-in-the-uk>

Table 1: Key stakeholder groups affected

Stakeholders	Likely or potential impacts
Aircraft operators	<ol style="list-style-type: none"> 1. Cost to aircraft operators of purchasing allowances for compliance (monetised benefit between 2017 and the end of 2023, non-monetised after the end of 2023) 2. Reduction in the administrative costs for aircraft operators (non-monetised)
UK Government	<ol style="list-style-type: none"> 3. UK Government’s auctioning revenues from EUAAs (monetised cost between 2017 and the end of 2023, non-monetised after the end of 2023)
Society	<ol style="list-style-type: none"> 4. Environmental impacts from CO₂ emissions (monetised cost between 2017 and the end of 2023, non-monetised after the end of 2023)
Consumers	<ol style="list-style-type: none"> 5. Air fares (non-monetised)
UK regulators	<ol style="list-style-type: none"> 6. Costs and revenue to UK regulators (non-monetised)
Verifiers	<ol style="list-style-type: none"> 7. Costs and revenue for verifiers (non-monetised)

5.1 Monetised and non-monetised costs and benefits

Impacts on aircraft operators

31. This section assesses two separate impacts on aircraft operators. The first relates to the changes in the total cost of purchasing allowances and the second relates to changes in administrative costs for operators.

32. In order to estimate the change in the cost of purchasing allowances, a number of assumptions have been made. These are summarised below, and are outlined in greater detail in Annex 1.

- **Timing:** the quantified impacts on the costs to aircraft operators of purchasing allowances for compliance relates solely to flights undertaken between 1 January 2017 and 31 December 2023.
- **Flights in scope:** this IA assesses the impact of the Aviation EU ETS on flights departing from UK aerodromes, and flights arriving at UK aerodromes from non-EEA countries: these flights are referred to as “UK flights”.
- **Emissions in scope:** gross CO₂ emissions from UK flights are based on DfT’s latest emission forecasts for flights departing UK

aerodromes.¹⁶ A number of assumptions have been made to estimate the gross CO₂ emissions from UK flights in scope of Aviation EU ETS under the Policy Option and Do Nothing scenario. In order to take account of the impacts of exemptions for commercial aircraft operators (with emissions below 10,000 tonnes CO₂) and non-commercial aircraft operators (with emissions below 1,000 tonnes CO₂), the estimates of the gross CO₂ emissions from UK flights have been reduced accordingly.

- **Aviation EU ETS Cap:** the analysis applies an indicative cap for the UK flights covered by the Aviation EU ETS. As 15% of the Aviation EU ETS cap is auctioned each year, the indicative cap for UK flights is assumed to equal the UK's estimated EUAA auction volumes, divided by 15% under each scenario.
- **LRF:** under the Policy Option, the LRF reduces the Aviation EU ETS cap each year from 1 January 2021 in line with the other sectors in the EU ETS. Based on the European Council's 2030 conclusions, the analysis reduces the Aviation EU ETS cap each year from 2021 at a linear rate of 2.2% of its 2020 level.¹⁷ Table 2 demonstrates how this is applied in the analysis.

Table 2: Impact of the Linear Reduction Factor on the Aviation EU ETS Cap

	2017	2018	2019	2020	2021	2022	2023
Annual Aviation EU ETS Cap, relative to 2017	100%	100%	100%	100%	97.8%	95.6%	93.4%

5.1.1 Change in the cost to aircraft operators of purchasing allowances (monetised benefit)

33. This impact is appraised firstly by estimating the quantity of allowances that need to be purchased by aircraft operators under the Do Nothing option and the Policy Option, before applying the relevant allowance prices to assess the cost of compliance in each option.

Estimating the quantity of allowances that need to be purchased

34. As the Policy Option is estimated to reduce the gap between the CO₂ emissions from UK flights in scope of the Aviation EU ETS and the volume of allowances allocated for free in comparison to the Do Nothing option, it is estimated to reduce the number of allowances that aircraft operators will need to purchase for

¹⁶ DfT (2017) UK Aviation forecasts

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/653821/uk-aviation-forecasts-2017.pdf

¹⁷ https://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/https://ec.europa.eu/clima/sites/clima/files/ets/revision/docs/detailed_qa_en.pdf

compliance purposes in relation to UK flights between 1 January 2017 and 31 December 2023.

35. To comply with the EU ETS, aircraft operators must surrender EUAAs or EUAs equal to their verified emissions in scope of the Aviation EU ETS. Allowances may be either purchased at auction (auctioned EUAAs account for 15% of the cap) or from the secondary market (EUAs and EUAs). These are then valued using short-term traded carbon values for modelling purposes that reflect the financial cost of purchasing EU ETS allowances (table 3).
36. Allowances are also gained via free allocation (82% of the cap), or are allocated from the “special reserve” for fast growing aircraft operators and new entrants (3% of the cap). The analysis assumes that the whole of the special reserve is allocated to aircraft operators.
37. Alternatively, until the end of 2020, operators may exchange international credits for EUAAs to cover up to 1.5% of their emissions.¹⁸ These are valued at forecast CER prices (table 4). When international credits are projected to be cheaper than EUAAs or EUAs, operators are assumed to use their entire 1.5% entitlement. As the EU does not currently envisage continuing use of international credits after 2020, our analysis assumes that from 2021 international credits may not be exchanged for EUAAs or EUAs.¹⁹
38. Therefore, for both the Do Nothing option and the Policy Option, the quantity of allowances to be purchased by aircraft operators for UK flights is calculated as the volume of emissions to be covered by allowances (98.5% of the in scope emissions from UK flights to 2020; 100% from 2021); plus the volume of international credits to be purchased (1.5% of emissions in scope to 2020, given these prices are projected to be below allowance prices); less the volume of allowances allocated for free (85% of the aviation cap, including the special reserve).
39. Table 5 presents the estimated fall in the volume of allowances aircraft operators will need to purchase to comply with the Aviation EU ETS as a result of the Policy Option.

Cost of purchasing allowances

40. The costs of purchasing units for compliance are simply the quantity of units that need to be purchased multiplied by their price. As outlined in paragraph 35, operators may purchase EUAAs and EUAs,²⁰ valued using short-term traded carbon values for modelling purposes. Table 3 below presents these prices

¹⁸ https://ec.europa.eu/clima/sites/clima/files/transport/aviation/docs/faq_aviation_2013-2016_en.pdf

The term “international credits” in this context refers to Certified Emission Reductions (CERs) and Emission Reduction Units (ERUs).

¹⁹ https://ec.europa.eu/clima/policies/ets/credits_en

²⁰ From 2021, the Policy Option allows full interchangeability between EUAs and EUAAs. Until that date, the prices of EUAAs will be at most as high as those of EUAs given that aircraft operators are able to use EUAs for compliance, and the prices of both will be equal so long as there is sufficient demand for EUAAs. In reality, uncertainty and low demand may make EUAAs cheaper than EUAs until the two are fully interchangeable from 2021.

For reasons of proportionality, it is assumed that the prices of EUAAs and EUAs are equal, and we do not assess the impacts of allowing the stationary sector to purchase EUAAs.

under three scenarios. The central scenario represents our best estimate of carbon prices. The assumptions used in the low scenario represent an extremely pessimistic scenario with continued oversupply in the carbon market, resulting in a carbon price of zero.

Table 3: Allowance prices (short term traded modelling values), in real 2017 £/tCO₂²¹

	2017	2018	2019	2020	2021	2022	2023
Low scenario	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Central scenario	4.13	4.19	4.37	4.56	4.76	4.94	6.44
High scenario	4.79	6.51	7.92	9.83	12.67	16.21	20.23

41. Operators may also exchange international credits to cover up to 1.5% of their emissions. These are valued using CER prices, sourced from the Intercontinental Exchange (ICE) and presented in Table 4.²²

Table 4: CER prices, in real 2017 £/tCO₂

	2017	2018	2019	2020
Central	0.33	0.33	0.33	0.33

42. The change in estimated compliance costs are presented in Table 5 below. The central carbon price scenario reflects our best estimate, while values under low and high carbon price scenarios are presented as sensitivities using different allowance price projections.

²¹ <https://www.gov.uk/government/publications/updated-short-term-traded-carbon-values-used-for-modelling-purposes-2017>

²² Estimates downloaded from the Intercontinental Exchange as of 30/01/2017. We have used data on futures emissions prices to estimate the price of CERS between 2017 and 2020

Table 5: Estimated costs to aircraft operators of purchasing allowances and international credits for compliance²³

	2017	2018	2019	2020	2021	2022	2023	Total
Allowances Required for Compliance (Millions of allowances)								
<i>Do Nothing option (Millions of allowances)</i>	20	22	22	23	23	23	24	156
<i>Policy Option (Millions of allowances)</i>	5	5	5	6	6	6	6	40
Net Change in Allowances Required (Millions of allowances)	-14	-17	-17	-17	-17	-18	-17	-117
Net Change in Purchase Value of Allowances Required (real, discounted 2017 £m)								
<i>Low Scenario</i>	0	0	0	0	0	0	0	0
<i>Central Scenario</i>	-55	-65	-65	-65	-70	-75	-90	-490
<i>High Scenario</i>	-65	-100	-120	-145	-190	-240	-290	-1,145

Note: Totals may not sum due to rounding.

43. Table 5 shows that under the Policy Option, aircraft operators save money by having to purchase fewer allowances. In the central carbon price scenario, the Policy Option reduces total aircraft operators' compliance costs by an estimated £490 million between 2017 and 2023. Impacts on individual operators will vary by the proportion of their flights that are extra-EEA.

44. It should be noted that the overall impact on an aircraft operator will depend upon whether it chooses to pass on any of the costs and benefits of the Policy Option to its customers. This IA has not assessed the impact of this second-order effect.

5.1.2 Reduction in the administrative costs for aircraft operators (non-monetised)

45. The Policy Option may also reduce administrative costs for aircraft operators, or introduce new one-off familiarisation costs. As the impacts will likely be a magnitude smaller than the benefits of purchasing fewer allowances, these impacts not been monetised in this IA and have instead been discussed qualitatively.

Extension of the exemption for non-commercial aircraft operators

²³ For the purposes of this IA, it is assumed that the costs to an aircraft operator of purchasing allowances for compliance in relation to a flight are incurred in the same year as the flight is undertaken. Note that international credits covering up to 1.5% of an aircraft operator's emissions may be exchanged for EUAAs to comply with the Aviation EU ETS.

46. The Policy Option extends the exemption for non-commercial aircraft operators emitting less than 1,000 tonnes CO₂ per annum from 2020 to 2030. Based on 2016 data, the Environment Agency (EA) estimates that around 310 UK administered aircraft operators would continue to be exempt from the Aviation EU ETS as a result. The number of aircraft operators affected by this exemption is not expected to change substantially in future years, although it should be noted that there is no relevant quantitative evidence currently available.
47. The benefits of the exemption are estimated at approximately £4,570 per year per aircraft operator. PWC estimated the average price of verification for small emitters at £1,120 per year.²⁴ In addition, aircraft operators must also pay the EA an annual subsistence charge, which for operators emitting below 50kt per year is £2,550.²⁵ Drawing on the results of the PWC study, the EA proposes that the remaining administrative costs for affected aircraft operators would be around £900 per year; this amount is lower than the related estimates in the PWC study and is intended to be a conservative assumption. Other than the subsistence charge, estimates are subject to uncertainty and are likely to vary between aircraft operators.²⁶

Simplified procedures

48. The Policy Option also introduces simplified reporting procedures for aircraft operators with emissions lower than 3,000 tonnes CO₂ per annum from intra-EEA flights. They may now use the small emitters tool approved under Commission Regulation (EU) No 606/2010 to determine their emissions, removing the requirement for these operators to use verification services.
49. As noted above, PWC has estimated that the price of verification for an aircraft operator per year is on average £1,120 for small emitters. Data from the ETS Support Facility (which populates the Small Emitters tool) currently costs £340 per year.²⁷ This indicates that the savings per aircraft operator could be in the region of £780 per year for an aircraft operator that would not buy this data under the Do Nothing option. Figures are subject to uncertainty and are likely to vary between aircraft operators.
50. Again using 2016 data, the EA estimates that around 23 UK administered aircraft operators could use the new simplified procedures. The actual benefits will depend upon take-up and changes in the number of eligible operators, over both of which there is uncertainty.

²⁴ PWC (2014) ETS Aviation small emitters: Cost assessment of applying EU ETS on aviation small emitters and analysis of improvement potential by simplifications, alternative thresholds and alternative means of regulation, Page 25, Table 12 https://ec.europa.eu/clima/sites/clima/files/transport/aviation/docs/report_ets_aviation_small_en.pdf

²⁵ <https://www.gov.uk/guidance/eu-ets-charges>

²⁶ Given the PWC study quotes 2013 figures, a £1=€1.18 exchange rate is used in line with historic exchange rates sourced from the Bank of England. Values are then adjusted for inflation and expressed in 2017 prices using BEIS appraisal guidance. <http://www.bankofengland.co.uk/boeapps/iadb/Rates.asp>

<https://www.gov.uk/government/publications/updated-energy-and-emissions-projections-2017>

²⁷ In line with the approach used in the 2017 Energy and Emissions Projections, the cost of the ETS Support Facility has been converted from euros using a £1=€1.18 2017 exchange rate.

<https://www.gov.uk/government/publications/updated-energy-and-emissions-projections-2017>

Familiarisation costs

51. Aircraft operators and verifiers will need to invest some resource to familiarise themselves with the amendments that are being made to the Aviation EU ETS under the Policy Option. However since these businesses will already be familiar with the current Aviation EU ETS requirements in force between 2013 and 2016, and the Policy Option largely represent a continuation of these requirements, any familiarisation costs are expected to be negligible in comparison to the other impacts of the Policy Option on these businesses.

5.1.3 Impacts on UK government auction revenues (*monetised cost*)

52. A proportion of the allowances purchased by aircraft operators will be from government auctions of EUAAs. This represents a transfer within society: i.e. the benefit to aircraft operators purchasing fewer EUAAs at auction will exactly cancel out the cost to government from receiving a lower EUAA auction revenue. As we have already presented the net change in allowances purchased in section 5.1.1, this section estimates the change in auction revenues for the UK Government.

53. The proportion of allowances to be auctioned each year remains at 15% of the Aviation EU ETS cap. As illustrated in table 2, this cap will be reduced from 2021 due to the LRF due to the Policy Option.

54. EUAA auction revenues are estimated by multiplying the UK's estimated EUAA auction volumes by allowance prices (see Table 3), valued using short-term traded carbon values for modelling purposes. Table 6 below presents estimates of the change in EUAA auction revenues between the Do Nothing option and the Policy Option. The central scenario reflects our best estimate; low and high scenarios are presented as sensitivities.

Table 6: Estimated EUAA auction revenues for the UK Government

	2017	2018	2019	2020	2021	2022	2023	Total
Auctioned Allowances (Millions of allowances)								
<i>Do Nothing option (Millions of allowances)</i>	7	7	7	7	7	7	7	50
<i>Policy Option (Millions of allowances)</i>	1	1	1	1	1	1	1	6
Net Change in Auctioned Allowances (Millions of allowances)	-6	-6	-6	-6	-6	-6	-6	-44
Net Change in the Value of Auction Revenues (real, discounted 2017 £m)								
<i>Low Scenario</i>	0	0	0	0	0	0	0	0
<i>Central Scenario</i>	-25	-25	-25	-25	-25	-25	-35	-190
<i>High Scenario</i>	-30	-40	-45	-55	-70	-85	-105	-435

Note: Totals may not sum due to rounding.

55. The Policy Option is estimated to reduce EUAA auction revenues for UK government by £190 million in real 2017 terms (present value) between 2017 and 2023.
56. The estimated revenues presented above are not official UK revenue forecasts. The UK's Office for Budget Responsibility (OBR) and HM Revenue & Customs (HMRC) use a different methodology when calculating the revenue effects of costing changes in EU ETS policy, including the use of a different forecast of EUA prices (this IA uses BEIS's short-term traded carbon values for modelling purposes instead of the figures used by the OBR in official forecasts) and use of estimates of the change in EUAA auction volumes as a result of the policy change.
57. Any official analysis of the impact of this policy on the Exchequer will employ OBR methodology, and will be subject to scrutiny by the OBR. It is possible that revenue impacts calculated using OBR methodology could be significantly different to those presented above.

5.1.4 Impacts on the environment (monetised cost and non-monetised benefits)

58. Under both the Do Nothing option and the Policy Option, emissions from UK flights are estimated to exceed the indicative UK Aviation EU ETS cap.²⁸ This means that, on aggregate, aircraft operators will likely have to purchase allowances from other parts of the EU ETS, who at some point will have to make emission savings in order to sell those allowances. We acknowledge that some of these allowances may come from the pool of allowances that are currently in circulation and hence may not require emissions savings, therefore this is a modelling assumption that simplifies market behaviour for the purpose of this IA.
59. The volume of aviation emissions in excess of the indicative cap are estimated to be larger under the Do Nothing option than under the Policy Option. Thus the impact of the Policy Option is to reduce the level of emissions in excess of the indicative cap, meaning fewer emission savings need to occur across the EU ETS over the appraisal period. This loss of emission savings results in a net cost to society.
60. As per BEIS supplementary Green Book guidance, these changes in emissions are valued using short-term traded carbon appraisal values. Unlike short-term traded carbon values that reflect the financial cost to aircraft operators for purchasing EU ETS allowances, previously used in our estimates for cost of compliance (section 5.1.1) and auction revenues (section 5.1.3), carbon values for appraisal purposes reflect the value of carbon based on a specific set of assumptions with respect to the move from the end of Phase III of the EU ETS (ending 2020) to a fully functioning and comprehensive global carbon market by 2030.²⁹ Beyond 2030, these carbon values reflect the costs required to limit

²⁸ Paragraph 32 describes how we have estimated both the emissions from UK flights, and the indicative UK Aviation EU ETS cap.

²⁹ Consequently these values should not be considered as "forecasts" of future prices and BEIS accepts no responsibility for any outcomes arising from the use of these figures.

global temperature increases to 2 degrees centigrade above pre-industrial levels.

61. Table 7 presents the short-term traded carbon appraisal values used to model the environmental impacts of the Aviation EU ETS.

Table 7: Short term traded carbon appraisal values, in real 2017 £/tCO₂³⁰

	2017	2018	2019	2020	2021	2022	2023
Low scenario ³¹	0.00	0.00	0.00	0.00	3.97	7.91	11.83
Central scenario	4.13	4.19	4.37	4.56	12.05	19.53	26.99
High scenario	4.79	6.51	7.92	9.83	20.76	31.69	42.63

62. The environmental impacts of the Policy Option are estimated by multiplying the change in CO₂ emissions with the short-term traded carbon appraisal values (see Table 7). Table 8 presents the estimated change in environmental benefits between the Do Nothing option and the Policy Option. These results only reflect the impacts of the changes to the Aviation EU ETS and do not account for the impact of ICAO's CORSIA scheme, which will apply from 2021. The central scenario reflects our best estimate; low and high scenarios are presented as sensitivities.

Table 8: Environmental benefits of the Aviation EU ETS³²

	2017	2018	2019	2020	2021	2022	2023	Total
Emission Savings due to the Aviation EU ETS (MtCO₂e)								
<i>Do Nothing option (MtCO₂e)</i>	12	15	15	16	16	16	17	102
<i>Policy Option (MtCO₂e)</i>	5	5	5	5	5	5	5	34
Net Change in Emission Savings (MtCO ₂ e)	-8	-10	-10	-11	-11	-11	-11	-73
Value of the Net Change in Emission Savings (real, discounted 2017 £m)								
<i>Low Scenario</i>	-40	-65	-75	-95	-195	-300	-385	-1,155
<i>Central Scenario</i>	-35	-40	-40	-45	-115	-185	-245	-705
<i>High Scenario</i>	0	0	0	0	-40	-75	-105	-220

³⁰ <https://www.gov.uk/government/publications/updated-short-term-traded-carbon-values-used-for-uk-policy-appraisal-2017>

³¹ As described in paragraph 76, the High Net Present Value values the estimated increase in environmental costs under the Low carbon appraisal scenario, while the Low Net Present Value values the estimated increase in environmental costs under the High carbon appraisal scenario.

³² For the purposes of this IA, it is assumed that the environmental benefits in relation to a flight are incurred in the same year as the flight is undertaken.

Note: Totals may not sum due to rounding. The increase in the net emissions from these flights represents a cost to society, and thus carries a negative sign.

63. Our central estimate of the value of the increase in CO₂ emissions between 2017 and 2023 is £705 million, reflecting a cost to society.

5.1.5 Impacts on air fares (non-monetised)

64. This IA does not attempt to quantify the impact on air fares, as the Policy Option is expected to only have a small impact, compared to the Do Nothing option. For example, under the assumption that aircraft operators pass on 100% of the financial costs of purchasing allowances and the opportunity costs of using free allowances to passengers, the DfT's Aviation Forecasts 2017 estimate the carbon costs per passenger per flight at under 1% of air fares on average across all flights departing from UK aerodromes in 2017, and under 5% of air fares on average in 2023 under the Do Nothing option.³³

5.1.6 Impacts on UK regulators (non-monetised)

65. There are two regulators (or competent authorities) in the UK with responsibility for administering and enforcing the Aviation EU ETS: the EA for England and the Scottish Environment Protection Agency (SEPA).³⁴

66. The Policy Option reduces the number of operators administered by the competent authorities, particularly the EA. This results in a fall in the regulators' income. Based on 2016 data, the EA estimates that extending the exemption for non-commercial small emitters to 2030 would remove around 310 UK administered aircraft operators from the full scope Aviation EU ETS. In addition, the continuation of the intra-EEA scope would mean around four additional operators would be exempt from the Aviation EU ETS, as these operators only currently perform extra-EEA flights.

67. Although regulators' income will decline, the net impact will depend on the extent of the fall in their costs. Compared to the Do Nothing option, the EA expects its ongoing costs to decline by less than its revenues under the Policy Option.

68. Given that the overall impacts on the UK regulators will be very small in comparison to the impacts monetised in this IA, the impacts on UK regulators have not been monetised on the grounds of proportionality.

5.1.7 Impacts on verifiers (non-monetised)

³³ DfT (2017) UK Aviation forecasts, Annex B, Table 54

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/653821/uk-aviation-forecasts-2017.pdf

³⁴ The regulators responsible for administering and enforcing the EU ETS in Wales and Northern Ireland (Natural Resources Wales and the Chief Inspector, respectively) are not believed to be responsible for regulating any aviation operators in 2017.

69. As part of the requirements of the Aviation EU ETS, emissions reports submitted by aircraft operators must be independently verified (unless a specific exemption applies). These verification services are provided by verification companies, which are in turn regulated by the UK Accreditation Service (UKAS) or the equivalent in other EU Member States.
70. Compared to the Do Nothing option, UK verifiers and UKAS will be impacted by the Policy Option as a result of the a) the continuation of the reduction in scope between 2017 and the end of 2023; b) the extension of the exemption for non-commercial operators emitting less than 1,000 tonnes of CO₂ per year from 2020 to 2030; and c) the removal of the requirement to verify emissions for aircraft operators with intra-EEA emissions less than 3,000 tonnes of CO₂ per year.
71. In particular, compared to the Do Nothing option, there would be a reduction in both the total number of flights in scope and the number of aircraft operators in scope under the Policy Option. This will consequently reduce the level of emissions data requiring verification and also the number of potential clients (aircraft operators) for verifiers. Verification companies are therefore likely to experience a reduction in their revenues from verifying emissions reports submitted by aircraft operators.
72. Consequently, it is reasonable to assume that the verification industry will be impacted negatively by the Policy Option as compared to the Do Nothing option. However, the net impact on verification companies is uncertain and will depend upon a range of factors, including the extent to which resources that would have been used to verify emissions reports submitted by aircraft operators under the Do Nothing option are redeployed under the Policy Option and the extent of any transition costs that arise. No evidence is available on the most likely alternative use of these resources and the likely transition costs. Therefore, it is not possible to provide accurate points of estimate on the costs to verifiers.
73. The impacts on individual verifiers may vary, based a range of factors such as the extent to which a verifier's clients are small emitters and the extent to which a verifier's clients have extra-EEA flights.
74. Given that the overall impacts on verifiers are considered to be small in comparison to those impacts that have been monetised in this IA, they have not been monetised on the grounds of proportionality.

5.1.8 Overall net impact

75. The overall net impact of the Policy Option as compared to the Do Nothing option is estimated as the monetised benefits (a reduction in compliance costs for aircraft operators) less the monetised costs (the increase in environmental costs and reduction in EUAA auction revenues).
76. Table 9 below provides overall net impacts under three scenarios:
- The Central NPV scenario uses the estimated reduction in compliance costs and revenues under the Central allowance price scenario (table 3) and the

estimated increase in environmental costs under the Central carbon appraisal value scenario (table 7).

- The Low Net Present Value (NPV) scenario values the estimated reduction in compliance costs and revenues under the Low allowance price scenario (table 3), and the estimated increase in environmental costs under the High carbon appraisal scenario (table 7) so as to produce a low NPV (i.e. a high estimate of costs & low estimate of benefits).
- Conversely, the High NPV scenario values the estimated reduction in compliance costs and revenues under the High allowance price scenario (table 3) and the estimated increase in environmental costs under the Low carbon appraisal scenario (table 7) so as to produce a high NPV (i.e. a low estimate of costs & high estimate of benefits).

Table 9: Overall net impacts, in real, discounted 2017 £m

	2017	2018	2019	2020	2021	2022	2023	Total
Central Scenario: Benefits								
<i>Net Reduction in the Purchase of Allowances (table 5)</i>	55	65	65	65	70	75	90	490
Central Scenario: Costs								
<i>Value of the Net Fall in Emission Savings (table 8)</i>	35	40	40	45	115	185	245	705
<i>Net Fall in Auction Revenue (table 6)</i>	25	25	25	25	25	25	35	190
Central Scenario: Net Impact (Benefits – Costs)								
	-5	-5	-5	-5	-70	-140	-185	-405
Low Scenario: Net Impact (Benefits – Costs)								
	-40	-65	-75	-95	-195	-300	-385	-1,155
High Scenario: Net Impact (Benefits – Costs)								
	35	60	70	90	85	80	75	490

Note: Totals may not sum due to rounding.

77. The estimated net present value of the Policy Option ranges from - £1,155 million to £490 million, with a central estimate of - £405 million.

78. The low scenario reflects a situation where allowance prices are low, while the cost of carbon emissions is high. As an illustration, this may reflect a situation where a surplus of allowances means prices are low, while it simultaneously becomes difficult to meet climate targets. This may be due to weak growth in the sectors covered by the EU ETS, while growth in the rest of the global economy results in higher global emissions. As a result, forgone emission savings have a higher cost than under the central scenario. However allowances would be relatively less expensive, meaning the benefit to businesses having to purchase fewer allowances is reduced relative to the central scenario.

79. The high scenario reflects a situation where allowance prices are high, while the cost of carbon emissions is low. As an illustration, this may reflect a situation

where growth in the sectors covered by the EU ETS pushes up allowance prices, while carbon savings in other sectors of the global economy mean it becomes easier to meet climate targets, reducing the cost of carbon emissions. In contrast to the low scenario, this means that the foregone emission savings have a lower cost to society, while aircraft operators save more money relative to the central scenario from the benefit of no longer being required to purchase allowances to cover emissions from extra-EEA flights.

5.2 Conclusion

80. Our best estimate is that the Policy Option will result in a Net Cost to the UK between 2017 and 2023. This impact is driven mainly by the estimated impact of increased emissions which outweighs the estimated benefits to aircraft operators from needing to purchase fewer allowances to comply with the Aviation EU ETS. However, a key limitation of the analysis is that it does not monetise the benefits of the Policy Option creating conditions to facilitate the implementation of the GMBM, which is expected to result in significant environmental benefits.

5.3 Risks and Limitations

81. The key risks and limitations are as follows:

- The values used for allowance prices and carbon appraisal. The change in CO₂ emissions in the EU ETS are assumed to be equal to the 2017 short term carbon appraisal values. These values are sensitive to economic growth, fuel prices, and subsequent demand for allowances. The prices of EUAAs and EUAs are assumed to be equal to BEIS's short-term traded carbon values for modelling purposes. The impact of the Policy Option becomes increasingly negative as the carbon appraisal values increase, relative to the allowance prices.
- The estimates of the monetised costs and benefits presented in this IA are sensitive to the assumptions made to estimate the CO₂ emissions from UK flights in scope of Aviation EU ETS under the Policy Option and Do Nothing scenario. For example, several assumptions have been made to estimate the breakdown of the total CO₂ emissions from international flights departing from UK aerodromes between a) flights to EEA countries and b) flights to non-EEA countries.
- The indicative Aviation EU ETS cap for UK flights that are covered by the Aviation EU ETS is assumed to be equal to the UK's estimated EUAA auction volumes divided by 15%.

5.4 Direct costs and benefits to business calculations

82. The EU ETS, on account of being classified as an environmental tax for the purposes of Better Regulation, is out of scope of the Business Impact Target.

For the sake of completeness, however, a brief description of direct costs and benefits to businesses resulting from the Policy Option as compared with the Do Nothing option has been presented below.

83. Of all the monetised costs and benefits considered, the reduction in the costs to aircraft operators of purchasing allowances for compliance (Table 2) is the only monetised impact that directly relates to businesses. As described previously, the Policy Option involves a reduction in the costs to aircraft operators of purchasing allowances for compliance of **£490 million** in PV terms between 2017 and the end of 2023 (2017 Price Base Year, 2017 Present Value Base Year) under the central scenario as compared to the Do Nothing option.
84. This is estimated to result in an Equivalent Annual Net Discounted Cost to Businesses (**EANDCB**) of - **£70m per year** between 2017 and the end of 2023 (2015 Price Base Year, 2014 Present Value Base Year).
85. It should be noted that these estimates only relate to the reduction in the costs of purchasing allowances to comply with the Aviation EU ETS. Other impacts have not been quantified on grounds of proportionality.

5.5 Wider impacts:

Small and Micro Business Assessment

86. It is estimated that there were 150 micro businesses (1-9 employees) and 60 small businesses (10-49 employees) in the passenger air transport sector in the UK; and 55 micro businesses and 20 small businesses in the freight air transport and space transport sector in the UK at the start of 2016.³⁵
87. Under the Do Nothing option, there is a de minimis exemption for commercial operators – with either fewer than 243 flights per period for three consecutive four month periods, or flights with total annual emissions lower than 10,000 tonnes CO₂ per year. In addition, non-commercial operators emitting less than 1,000 tonnes CO₂ per annum based on total emissions (full-scope EU ETS) are temporarily exempted from the EU ETS until 2020. Furthermore, aircraft operators (whether commercial or non-commercial) emitting less than 25,000 tonnes of CO₂ per year benefit from simplified procedures.
88. Under the Policy Option, there will be two key changes. Firstly, the exemption for non-commercial operators emitting less than 1,000 tonnes CO₂ per annum based on total emissions (full scope EU ETS) will be extended from 2020 to 2030. Secondly, aircraft operators with emissions lower than 3,000 tonnes CO₂ per annum from intra-EEA flights will also benefit from the removal of the requirement to verify emissions if they use a small emitters tool to determine their emissions.

³⁵ The Department for Business, Innovation & Skills (2016) Business population estimates 2016
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/559220/bpe_2016_detailed_tables.xls

89. The benefits of these changes in terms of the reduction in the administrative costs for aircraft operators compared to the Do Nothing option are discussed qualitatively in section 5.1.2. Furthermore, the extension of the exemption for non-commercial operators from 2020 to 2030 will reduce the costs to aircraft operators of purchasing allowances; this is taken into account in the analysis of the reduction in the costs of purchasing allowances between 2017 and 2023 (see section 5.1.1 for further details). Given that small and micro businesses operate in air transport sectors (see Paragraph 86), it is expected that a proportion of the benefits of the Policy Option will accrue to small and micro businesses.
90. Furthermore, although no statistics on their numbers are available, it is recognised that this measure has the potential to impact adversely on micro and small businesses that operate in the emissions verification market.
91. The UK must take action to amend its domestic regulations so that they are consistent with the amendments to the Directive. The UK therefore has very limited scope to further reduce the burdens on small and micro businesses.
92. The one factor that has been identified where there could potentially be scope to further reduce the burdens on small and micro businesses is that Member States can implement their own simplified procedures for non-commercial aircraft operators, “as long as such procedures provide no less accuracy than the small emitters tool provides”. The EA does not envisage a simplified scheme that could provide the same degree of data integrity as Eurocontrol data but at a lower cost, both to the operator and the Competent Authority. Therefore, the UK does not currently intend to introduce further simplified procedures, but it will keep this under review. In the event that further simplifications are implemented, these could offer further benefits for small and micro businesses.

5.6 Equality Impact Tests

93. An Equality Impact Assessment has not been completed for this IA given the limited scope of what is being amended within the Greenhouse Gas Regulations.

5.7 Human Rights Test

94. In respect of the European Convention for the Protection of Human Rights and Fundamental Freedoms, no issues arise.

5.8 Competition Assessment

95. The Competition Assessment is attached at Annex 2.

6. Summary and preferred option with description of implementation plan.

96. Taking all the impacts into account, the Policy Option is the preferred option. The Do Nothing option would result in a revision in the coverage of the Aviation EU ETS to include extra-EEA flights. This could create an uncertain policy landscape for operators, reignite international opposition to the system, and potentially hinder on-going ICAO negotiations on the implementation of the CORSIA

97. The Policy Option ensures that the Aviation EU ETS continues to operate in an effective manner whilst ensuring broad acceptability with non-EU countries, thus creating the conditions to progress the implementation of the CORSIA in 2021. The amendments to the Directive also contain a number of exemptions and simplified provisions which reduce the administrative burden on low emitting operators and the competent authorities.

98. Looking ahead, the amendments to the Directive require the European Commission to undertake a full review within 12 months of the CORSIA rules being agreed to consider its being implemented and what action should be taken on intra-EEA flights post-2020. The UK is fully supportive of an open and comprehensive review. We expect that the CORSIA rules will be adopted in ICAO in 2018 and hence this policy will be reviewed by the European Commission in 2019.

99. The key milestones for the implementation of the Regulations are as follows:

- The UK undertook a formal public consultation on the amended UK Greenhouse Gas Regulations 2012. This concluded on 5 January 2018.
- This IA has been published alongside the Government's response to the consultation.

Annex 1: Further detail on approach for estimating changes to the total cost of purchasing allowances

A1.1 Introduction

This annex provides further detail on several aspects of the approach used to estimate changes to the total cost of purchasing allowances. Section A1.2 sets out a definition of UK flights, following the way in which EUAA auction revenue is shared by Member States. A1.3 then provides an overview of how DfT has estimated emissions relating to UK flights that are in scope of Aviation EU ETS under each scenario, before A1.4 outlines how the UK's share of the Aviation EU ETS cap was estimated. This is followed by a discussion of the assumptions the analysis has made on the link between the emissions in scope of the Aviation EU ETS and the price of allowances in A1.5.

A1.2 Defining “UK Flights”

For the purposes of the analysis in this IA, the reduction in the costs to aircraft operators of purchasing allowances to comply with the Aviation EU ETS has been assessed for flights departing from UK aerodromes, and flights arriving at UK aerodromes from non-EEA countries; these flights are referred to as “UK flights” in this IA. This approach has been taken because the best available evidence on the share of the Aviation EU ETS cap accounted for by UK aviation is the UK's share of EU Aviation Allowances (EUAA) auction volumes. This in turn is based on the above definition of UK flights. This approach is also in line with the DfT's Aviation Appraisal guidance which treats the impacts on all aircraft operators undertaking flights to and from the UK equally, regardless of their nationality.¹

Under the Do Nothing option, all UK flights would be covered by the Aviation EU ETS. In contrast, under the Policy Option, only those flights between UK aerodromes to EEA countries will be covered by the Aviation EU ETS. A key difference between the Do Nothing option and the Policy Option is therefore that flights between UK aerodromes and non-EEA countries will no longer be covered by the Aviation EU ETS.

Under the Aviation EU ETS, there are also a number of exemptions for certain types of flights. Except where noted in the IA, these exemptions have not been taken into account in the analysis in the IA on proportionality grounds.

A1.3 Emissions from UK Flights covered by the Aviation EU ETS

The gross CO₂ emissions from UK flights covered by the Aviation EU ETS under the Do Nothing option and the Policy Option have been estimated based on the DfT's

¹https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/638633/TAG_unit_a5.2_aviation_appraisal_dec_2015.pdf

latest 2017 emissions forecasts for flights departing from UK aerodromes.² As the majority of the gross CO₂ emissions from UK flights are not covered by the Aviation EU ETS under the Policy Option and the CORSIA is not taken into account in any of the analysis presented in this IA, the gross CO₂ emissions from UK flights under the Policy Option are based on the DfT's zero carbon price sensitivity test forecast.^{3,4} In addition, given that DfT's aviation forecasts show that the level of the carbon price only has a very small impact on the gross CO₂ emissions from UK flights between 2017 and 2023, gross CO₂ emissions from UK flights are assumed to be equal under both the Do Nothing option and the Policy Option as a simplifying assumption. These estimates are produced via the following approach:

- It is assumed that the gross CO₂ emissions from individual UK flights and consequently the level of abatement in relation to these flights are the same under both the Do Nothing option and the Policy Option.
- Under the Policy Option, it has been assumed that the treatment of the territories of Member States that are part of the EEA, the outermost regions of the EU and the (overseas) countries and territories of Member States that are not part of the EEA will be in line with the guidance provided by the European Commission on the 2013-2016 Regulation⁵.
- The outputs available from the DfT aviation model for passenger flights do not provide the necessary level of disaggregation as the estimates of the total CO₂ emissions from international passenger flights departing from UK aerodromes are generally aggregated at the regional level, and some of these regions contain both EEA and non-EEA countries. So, for the purposes of this IA, DfT has undertaken additional analysis⁶ to estimate the breakdown of the total CO₂ emissions from international passenger flights departing from UK aerodromes between a) flights to EEA countries and b) flights to non-EEA countries.⁷

² DfT (2017) UK Aviation forecasts

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/653821/uk-aviation-forecasts-2017.pdf

³ This sensitivity test forecast is built off a baseline of no new runways and the central demand case.

⁴ On the grounds of proportionality, the estimates of the gross CO₂ emissions from UK flights used in this IA do not include the residual adjustment that is made to reconcile the estimates produced by DfT's Aviation model with the estimates in the National Atmospheric Emissions Inventory, and the estimated emissions from ground auxiliary power units (APUs).

⁵ https://ec.europa.eu/clima/sites/clima/files/transport/aviation/docs/faq_aviation_2013-2016_en.pdf

⁶ Where a model region contains both EEA and non-EEA countries, the DfT has produced disaggregated estimates of the total CO₂ emissions from international passenger flights departing from UK aerodromes to each country within a region for the purposes of this IA. In order to do this, the estimated total CO₂ emissions from international passenger flights departing from UK aerodromes to a given region have been disaggregated to the country level based on estimates of the percentage of the total passengers travelling to the region that travel to each country on average between 2010 and 2015. This approach assumes that the estimated share of aviation passenger is a good proxy for the share of aviation CO₂ emissions. It also assumes that the average percentage estimated between 2010 and 2015 is a representative estimate and that this will stay constant in the future. To the extent that these assumptions do not hold in practice, these simplifying assumptions will contribute to the uncertainty around the results.

⁷ For the purposes of this analysis, the definition of flights to EEA countries is intended to include flights to the territories of Member States that are part of the EEA (e.g. Gibraltar), which are assumed to be included in the scope of the Aviation EU ETS under the Policy Option; and the definition of flights to non-EEA countries is intended to include flights to outermost regions of the EU (e.g. Canary Islands), and flights to the territories of Member States that are not part of the EEA (e.g. Greenland), which are assumed to be excluded from the scope of the Aviation EU ETS under the Policy Option. Such flights have been captured

- The DfT aviation model does not provide estimates of the CO₂ emissions from international flights arriving at UK aerodromes. So, as a simplifying assumption, it has been assumed that the total CO₂ emissions from international passenger flights arriving at UK aerodromes from non-EEA countries is equal to the estimated total CO₂ emissions from international passenger flights departing from UK aerodromes to non-EEA countries.⁸
- Flights by dedicated freight aircraft (freighters) are modelled in less detail in the DfT aviation model, so a simplified approach has been used to split the estimates of the CO₂ emissions from international freighter flights departing from UK aerodromes between a) flights to EEA countries and b) flights to non-EEA countries.⁹ In addition, as a simplifying assumption, it has been assumed that the total CO₂ emissions from international freighter flights arriving at UK aerodromes from non-EEA countries is equal to the estimated total CO₂ emissions from international freighter flights departing from UK aerodromes to non-EEA countries.¹⁰
- The estimates of the gross CO₂ emissions from UK flights have been reduced to take account of the impacts of exemptions for commercial aircraft operators with emissions below 10,000 tonnes CO₂ (which applies in all years under both the Do Nothing option and the Policy Option) and non-commercial aircraft operators with emissions below 1,000 tonnes CO₂ (which applies in 2017 to 2020 under the Do Nothing option, and in all years under the Policy Option) using estimates of the proportion of the total CO₂ emissions from all flights covered by the full scope of the Aviation EU ETS in 2012 that would fall under these exemptions.¹¹

A1.4 Indicative Aviation EU ETS Cap for UK Flights

The indicative Aviation EU ETS cap for UK flights that are covered by the Aviation EU ETS under the Do Nothing option and the Policy Option has been estimated using European Commission estimates of the UK's EUAs auction volumes under each scenario. As 15% of the Aviation EU ETS cap is auctioned each year, the

where this is practical. However, data limitations may mean that not all such flights are captured. To the extent that this is the case, this will contribute to the uncertainty around the results.

⁸ In addition, for the same reason, the CO₂ emissions from passenger flights arriving at UK aerodromes from Gibraltar are assumed to be equal to the CO₂ emissions from passenger flights departing from UK aerodromes to Gibraltar. Flights between the UK and Gibraltar arriving at and departing from UK aerodromes are assumed to be included in the Aviation EU ETS under both the Do Nothing option and the Policy Option.

⁹ The DfT's aviation model provides estimates of the total CO₂ emissions from international freighter flights departing from UK aerodromes but does not include data on the destinations of these flights. Therefore, as a simplifying assumption, it has been assumed that the proportion of the total CO₂ emissions from international freighter flights departing from UK aerodromes that is accounted for by flights to destinations in the EEA is the same as has been estimated for international passenger flights. To the extent that this assumption does not hold in practice, this simplifying assumption will contribute to the uncertainty around the results.

¹⁰ Given limitations regarding how the CO₂ emissions from freighter flights are modelled in the DfT aviation model, no attempt has been made to take the CO₂ emissions from freighter flights arriving at UK aerodromes from Gibraltar into account on proportionality grounds.

¹¹ Table 1, page 4 and Table 25, page 41, ETS Aviation small emitters, 2014, PWC (prepared for the European Commission): http://ec.europa.eu/clima/policies/transport/aviation/docs/report_ets_aviation_small_en.pdf

indicative cap for UK flights covered by the Aviation EU ETS for each scenario is assumed to be equal to the UK's estimated EUAA auction volumes divided by 15%.

Furthermore, the Policy Option applies an annual LRF from 1 January 2021 in line with the LRF currently applicable to the other sectors in the EU ETS. As outlined in section 1.1, the analysis reduces the Aviation EU ETS cap each year from 2021 at a linear rate of 2.2% of its 2016 level.¹²

A1.5 Assumptions on Allowance Prices

By reducing the level of “effort” required to meet the Aviation EU ETS cap (i.e. the difference between business as usual emissions and the number of issued EUAAs) as compared to the Do Nothing option, the Policy Option would also, in theory, have some impact on the price of allowances.¹³ However, for the purposes of the analysis in this IA any such change in the price of allowances has not been taken into account on proportionality grounds. The absolute value of the change in the total EU ETS cap as a result of moving from the Do Nothing option to the Policy Option represents less than 0.3% of the total EU ETS cap (including both stationary and aviation sectors) in 2017. This change in the cap is likely to be accompanied by a similar change in emissions, thereby implying a small change in the level of “effort” required to meet the cap.

Further, assuming that the Policy Option does not cause a significant change in abatement costs as compared to the Do Nothing option, any resulting impacts on the price of allowances is not expected to be significant. For this reason the same allowances prices has been used under both the Do Nothing option and the Policy Option. This simplifying assumption implies that there would be no impact on stationary EU ETS operators or on government revenues from auctions of EUAs.

¹² https://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/ec/145356.pdf

¹³ In theory, there could also be a very small impact on the price of international credits resulting from a change in the quantity demanded by aviation operators but this effect will be negligible. Thus we exclude it from our analysis for proportionality.

Annex 2: Competition Assessment

A2.1. Introduction

Section A2.2 discusses the impacts of the Aviation EU ETS on competition under the Do Nothing option. The approach to assessing the impacts of the “Policy Option” on competition as compared to the Do Nothing option is explained in Section A2.3 and a detailed overview of the potential impacts of the “Policy Option” on competition is presented in Section A2.4.

Section A2.5 provides our assessment of the scale of potential impacts of the “Policy Option” on competition. A key factor is that, given that allowance prices are expected to increase over time, EU ETS costs incurred by aircraft operators are expected to increase over time on a per-passenger basis. Consequently, EU ETS costs to aircraft operators are expected to grow in significance as a percentage of average air fares over time. It is therefore likely that the significance of any impacts on competition in the aviation sector arising from the changes to the Aviation EU ETS under the “Policy Option” would increase over time.

That said, the fact that a review will be undertaken by the European Commission means that there is considerable uncertainty regarding the impacts that the Aviation EU ETS will have on competition in practice after the review. Furthermore, it should be noted that this competition assessment doesn’t take into account the impacts that the CORSIA will have on competition after its entry into force, which will further influence the impacts that Aviation EU ETS will have on competition in practice, since this is outside of the scope of this IA.

A2.2. Do Nothing option

Under the Do Nothing option (see Paragraph 11), it is expected that the Aviation EU ETS would have a range of impacts on competition. For example:

- Other things being equal, the Aviation EU ETS increases the competitiveness of more fuel-efficient aircraft operators compared to less fuel-efficient aircraft operators because the costs of compliance with the Aviation EU ETS (in terms of the purchase of allowances) are related to the volume of emissions;
- Other things being equal, the allocation of free allowances to incumbent aircraft operators increases the competitiveness of incumbent aircraft operators compared to new entrants because new entrants from 1 January 2015 will not be able to receive any free allocation until 2021, and hence new entrants will have to cover a larger proportion of the cost of their emissions in this period; and
- Other things being equal, the Aviation EU ETS reduces the competitiveness of direct flights between EEA aerodromes and non-EEA aerodromes (e.g. a direct flight from London to Beijing) and trips via a connection at an EEA hub (e.g. a trip from Edinburgh or New York to Beijing via a connection in London) compared to competing direct flights between two non-EEA aerodromes (e.g.

a direct flight from New York to Beijing)¹⁴ and competing trips via a connection at a non-EEA hub (e.g. a trip from London or New York to Beijing via a connection in Dubai)¹⁵. This is because the former would incur higher costs of compliance with the Aviation EU ETS than the latter. For example, competing flights that do not arrive into or depart from an EEA aerodrome would incur no costs of compliance with the Aviation EU ETS.

Annex 2 of the UK's IA for 'The Aviation Greenhouse Gas Emissions Trading Scheme Regulations 2010'¹⁶ contains more details on the impacts of the Aviation EU ETS on competition under the Do Nothing option.

A2.3. Approach taken for this competition assessment

Compared to the Do Nothing option, the impacts of the "Policy Option" (see Paragraph 12) on competition have been taken into account by addressing the following questions in line with the Green Book supplementary guidance on completing competition assessments in IAs¹⁷.

- Would the Policy Option directly limit the number or range of suppliers?
- Would the Policy Option indirectly limit the number or range of suppliers?
- Would the Policy Option limit the ability of suppliers to compete?
- Would the Policy Option reduce suppliers' incentives to compete vigorously?

It is not considered that the "Policy Option" would directly limit the number or range of suppliers as none of the relevant factors apply. For example, the "Policy Option" would not involve the award of exclusive rights to supply. Furthermore, it is not considered that the "Policy Option" would reduce suppliers' incentives to compete vigorously as none of the relevant factors apply. For example, the "Policy Option" would not require or encourage the exchange between suppliers, or publication, of information on prices, costs, sales or outputs.

With regards to the question of whether the "Policy Option" would indirectly limit the number or range of suppliers, or limit the ability of suppliers to compete, it is recognised that the Aviation EU ETS theoretically has the potential to significantly raise the costs of new suppliers relative to existing suppliers, of some existing suppliers relative to others, or of entering or exiting an affected market; and the potential to substantially influence the price(s) a supplier may charge. This would

¹⁴ For example, the competitiveness of a trip from New York to Beijing which is made via an EEA hub (London) would be reduced compared to a direct flight between New York and Beijing.

¹⁵ For example, the competitiveness of a direct flight from London to Beijing would be reduced compared to a trip from London to Beijing which is made via a non-EEA hub (Dubai); and the competitiveness of a trip from Edinburgh to Beijing which is made via an EEA hub (London) would be reduced compared to a trip from Edinburgh to Beijing which is made via a non-EEA hub (Dubai).

¹⁶ DECC / DfT (2010) Impact Assessment of Second Stage Transposition of EU Legislation to include Aviation in the European Union Emissions Trading System (EU ETS)
<http://webarchive.nationalarchives.gov.uk/20110317211020/http://www.decc.gov.uk/assets/decc/Consultations/euetsaviationsecondstage/909-ia-second-stage-transposition-euets.pdf>

¹⁷ HM Treasury (2013) Green Book supplementary guidance: competition
<https://www.gov.uk/government/publications/green-book-supplementary-guidance-competition>

depend crucially on the significance of EU ETS costs relative to the other costs incurred by aircraft operators.

Therefore, the following approach has been taken in this IA. Firstly, a summary of the potential impacts of the “Policy Option” on competition that have been identified is presented in Section A2.4. Secondly, our assessment of the likely scale of potential impacts of the “Policy Option” on competition is provided in Section A2.5. It should be noted that the scale of the potential impacts is crucial in determining whether the “Policy Option” would have a significant impact on competition in the aviation sector in practice.

A2.4. Overview of the potential impacts of the Policy Option on competition

A summary of the identified potential impacts of the “Policy Option” on competition is presented below. Depending on the significance of EU ETS costs, it should be noted that the scale of these impacts could theoretically range from having a negligible impact on competition to a very significant impact on competition. As noted above, our assessment of the likely scale of these impacts is provided in Section A2.5.

A2.4.1. Reduction in scope of Aviation EU ETS

Under the “Policy Option”, the Aviation EU ETS will have an intra-EEA scope until 31 December 2023. We have identified a number of potential impacts on competition from reducing the scope of the Aviation EU ETS.

- As flights between EEA aerodromes and non-EEA aerodromes (‘extra-EEA flights’) will now be out of scope of the Aviation EU ETS until 2024 and airlines operating these flights will continue to no longer incur EU ETS costs in relation to these flights in this period, competition in the market for extra-EEA flights will be impacted relative to the Do Nothing option.
- Firstly, by exempting extra-EEA flights from the Aviation EU ETS, the “Policy Option” would eliminate many of the impacts of the Aviation EU ETS on competition in the market for extra-EEA flights that would exist under the Do Nothing option for the duration of the exemption. For example:
 - there will be a reduced competitive advantage for more fuel-efficient aircraft operators compared to less fuel-efficient aircraft operators, as well as for incumbent operators compared to new entrants;
 - there will be an increase in the relative competitiveness of direct flights between EEA aerodromes and non-EEA aerodromes (e.g. a direct flight from London to Beijing) compared to competing trips via a connection at a non-EEA hub (e.g. a trip from London to Beijing via a

connection in Dubai) or any competing direct flights between two non-EEA aerodromes;¹⁸ and

- there will be an increase in the relative competitiveness of trips between non-EEA aerodromes via a connection in an EEA hub (e.g. a trip from New York to Beijing via a connection in London) compared to competing direct flights between two non-EEA aerodromes (e.g. a direct flight from New York to Beijing) and competing trips via a connection at a non-EEA hub (e.g. a trip from New York to Beijing via a connection in Dubai).
- Secondly, we have identified that, under an intra-EEA scope, there would be an increase in the relative competitiveness of direct flights between EEA aerodromes and non-EEA aerodromes (e.g. a direct flight from Edinburgh to Beijing) and trips between two EEA aerodromes via a connection at a non-EEA hub (e.g. a trip from London to Athens via a connection in Zurich) compared to competing trips via a connection at an EEA hub (e.g. a trip from Edinburgh to Beijing via a connection in London or a trip from London to Athens via a connection in Frankfurt respectively). This is because the former will be out of scope of the Aviation EU ETS and will not incur EU ETS costs, but the latter will still be partially in scope of the Aviation EU ETS and still incur some EU ETS costs (e.g. the Edinburgh to London leg of a trip from Edinburgh to Beijing via a connection in London would still be in scope of the Aviation EU ETS).
- In addition, we have identified that, under an intra-EEA scope, the Aviation EU ETS would continue to increase the relative competitiveness of flights between an EEA aerodrome and a non-EEA aerodrome via a connection at a non-EEA hub (e.g. a trip from Edinburgh to Beijing via a connection in Dubai) compared to competing trips via a connection at an EEA hub (e.g. a trip from Edinburgh to Beijing via a connection in London), although this could be less than under the Do Nothing option. Again, this is because the former will be out of scope of the Aviation EU ETS and will not incur EU ETS costs, but the latter will still be partially in scope of the Aviation EU ETS and still incur some EU ETS costs as above.
- Further to the previous paragraph, the European Commission's 2013 IA¹⁹ discusses the risks that, under an intra-EEA scope, there would be distortions of competition as feeder flights from EEA aerodromes to EEA hubs (e.g. the Edinburgh to London leg of a trip from Edinburgh to Beijing via a connection in London) would be included in the Aviation EU ETS but feeder flights from EEA aerodromes to non-EEA hubs (e.g. the Edinburgh to Dubai leg of a trip from Edinburgh to Beijing via a connection in Dubai) would be exempt; and

¹⁸ This does not appear to be relevant for the UK but might be a factor for other EEA countries.

¹⁹ European Commission (2013) Impact Assessment

https://ec.europa.eu/clima/sites/clima/files/transport/aviation/docs/swd_2013_430_en.pdf

concluded that there are no significant risks of serious distortions to competition at current carbon prices. The European Commission's 2017 IA²⁰ also looked at the impacts on competition from the use of hubs outside the EEA and concluded that the risks are negligible.

- The European Commission's 2013 IA also discusses the risks that, under an intra-EEA scope, there would be distortions to competition between tourist destinations, particularly within the Mediterranean area (e.g. between flights to North Africa or Turkey which are exempt from the Aviation EU ETS and flights to EEA destinations in the Mediterranean area which are included in the Aviation EU ETS). Again, the European Commission concluded that there are no significant risks at current carbon prices. The European Commission's 2017 IA also looked at the impacts on competition between tourist destinations and reached the same conclusion.
- Furthermore, with regards to the market for intra-EEA flights, airlines operating solely in the EEA have previously raised concerns that, under an intra-EEA scope, foreign or UK airlines that operate both extra-EEA and intra-EEA flights may be able to cross-subsidise tickets on intra-EEA flights, causing them a competitive disadvantage on intra-EEA flights. It is noted that the European Commission's 2006 IA²¹ concluded that, regardless of the scope of the Aviation EU ETS, additional cross-subsidisation is unlikely to occur.

A2.4.2. Exemptions and simplified procedures for small operators

Under the "Policy Option", the exemption for non-commercial operators emitting less than 1,000 tonnes CO₂ per annum based on total emissions (full-scope EU ETS) will be extended from 2020 to 2030; and aircraft operators with emissions lower than 3,000 tonnes CO₂ per annum from intra-EEA flights will benefit from simplified procedures. This could potentially impact on competition by reducing the costs for aircraft operators that benefit from these provisions compared to those aircraft operators that do not.

A report completed by PWC for the European Commission in 2014²² includes some analysis of the impacts of potential exemptions for non-commercial aircraft operators and simplifications for small emitters on competition. The findings in the report suggest that these changes could theoretically result in market distortions. For example, the report identifies that an exemption for non-commercial operators

²⁰ European Commission (2017) Impact Assessment
<http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52017SC0031&from=EN>

²¹ European Commission (2006) Impact Assessment of the inclusion of aviation activities in the scheme for greenhouse gas emission allowance trading within the Community
https://ec.europa.eu/clima/sites/clima/files/transport/aviation/docs/sec_2006_1684_en.pdf

²² PWC (2014) ETS Aviation small emitters: Cost assessment of applying EU ETS on aviation small emitters and analysis of improvement potential by simplifications, alternative thresholds and alternative means of regulation
https://ec.europa.eu/clima/sites/clima/files/transport/aviation/docs/report_ets_aviation_small_en.pdf

could raise the costs of participating in a fractional ownership scheme compared to owning a private aircraft, although it concludes that the impact on the market would be minimal as other factors are more important.

A2.4.3. Changes to free allocation

Under the Do Nothing option, the number of free allowances issued to aircraft operators from 2021 would be recalculated as part of a new benchmarking exercise using tonne-kilometre data for 2018. In contrast, under the Policy Option, our understanding is that this benchmarking exercise will not happen in 2018. Therefore, until a new benchmarking exercise is undertaken, maintaining the previous allocation of free allowances has the potential to increase the competitiveness of any aircraft operators who would otherwise had their share of free allowances reduced, and reduce the competitiveness of any aircraft operators who would otherwise had their share of free allowances increased. Prior to collecting the tonne-kilometre data, it is difficult to predict the size of any impacts on the quantities of free allowances that will be issued to individual aircraft operators. However, in theory, this change can be expected to benefit the competitive position of incumbent operators compared to new entrants.

A2.4.4. Changes to the Aviation EU ETS cap

Under the Do Nothing option, the Aviation EU ETS cap would remain constant. In contrast, under the “Policy Option”, the LRF is applied to the Aviation EU ETS cap from 1 January 2021, which means that the cap is reduced at a linear rate each year and consequently the quantity of allowances allocated to aircraft operators for free would also decline each year. By increasing the financial costs to aircraft operators of complying with the Aviation EU ETS, it is expected that the change in the cap would strengthen the impacts of Aviation EU ETS on competition in many cases. However, to the extent that the free allocations received by aircraft operators’ represent differing percentages of their CO₂ emissions in scope of Aviation EU ETS, the reduction in the cap would also reduce any competitive advantage to aircraft operators whose free allocation accounts for a relatively higher proportion of their CO₂ emissions, and conversely reduce any competitive disadvantage to aircraft operators whose free allocation accounts for a relatively lower proportion of their CO₂ emissions.

A2.5. Scale of potential impacts of the Policy Option on competition

It is considered that the significance of EU ETS costs relative to the other costs incurred by aircraft operators is a key determinant of whether the “Policy Option” would result in a significant impact on competition in the aviation sector.

Under the “Policy Option”, the reduction in the scope of Aviation EU ETS applies to the end of 2023. Given likely allowance prices in the period to 2023, the available evidence indicates that ETS costs are only likely to account for a small percentage of air fares in the period to 2023. For example, under the assumption that aircraft

operators pass on 100% of the financial costs of purchasing allowances and the opportunity costs of using free allowances to passengers, the DfT's Aviation Forecasts 2017²³ estimate the carbon costs per passenger per flight at under 1% of air fares on average across all flights departing from UK aerodromes in 2017 and under 5% of air fares on average in 2023 under the Do Nothing option. It is therefore considered unlikely that the changes to the Aviation ETS under the "Policy Option" would have a significant impact on competition in the aviation sector in the period to 2023.

In the longer-term, any impacts on competition from the changes under the "Policy Option" that would continue to apply after this date appear likely to increase in significance over time as the available evidence indicates that EU ETS costs are expected to increase in significance as a percentage of air fares over time. However, as noted previously, the fact that a review will be undertaken by the European Commission means that there is considerable uncertainty regarding the impacts that the Aviation EU ETS will have on competition in practice after the review. In addition, as noted previously, this assessment doesn't take into account the impacts that the CORSIA will have on competition after its entry into force, which will further influence the impacts that Aviation EU ETS will have on competition in practice.

²³ DfT (2017) UK Aviation forecasts, Annex B, Table 54
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/653821/uk-aviation-forecasts-2017.pdf