Regulation to Implement the International Civil Aviation Organization (ICAO) Non-Volatile Particulate Matter (nvPM) Aircraft Engine Emissions Standards

Lead department	Department for Transport
Summary of proposal	To implement ICAO standards on controlling emissions of nvPM (i.e. carbon or soot) from civil aircraft engines in order to mitigate the environmental impacts of aviation.
Submission type	Impact assessment (IA) – 29 March 2022
Legislation type	Secondary legislation
Implementation date	2023
Policy stage	Final
RPC reference	RPC-DFT-5175(1)
Opinion type	Formal
Date of issue	13 May 2022

RPC opinion

Rating[1]	**RPC opinion**
Fit for purpose	The IA clearly outlines the methodology to calculate the direct costs to business, whilst presenting the caveats to the cost-benefit analysis transparently. The monitoring and evaluation plan should be improved to include how it would intend to improve the evidence base to support and influence future UK and/or international policy.

Business impact target assessment

	Department assessment	**RPC validated**
Classification	Non-qualifying provision (international)	Non-qualifying provision (international)
Equivalent annual net direct cost to business (EANDCB)	£21.8 million	£21.8 million *(2019 prices, 2020 pv)*
Business impact target (BIT) score	N/A	N/A
Business net present value	£0.0 million	
Overall net present value	£0.0 million	

[1] The RPC opinion rating is based only on the robustness of the EANDCB and quality of the SaMBA, as set out in the Better Regulation Framework. RPC ratings are fit for purpose or not fit for purpose.

RPC summary

Category	Quality[2]	RPC comments
EANDCB	**Green**	The IA uses the correct counterfactual for estimating the direct impacts on business. It identifies the direct costs to engine manufacturers and explains why aircraft operators are sensitive to these changes and face direct impacts from the proposal.
Small and micro business assessment (SaMBA)	**Green**	As a non-domestic measure, there is no framework requirement for a SaMBA. The IA includes a short SaMBA section, which would benefit from further detail to show that the identified small businesses are not disproportionately impacted by the proposal and a discussion on any courses of mitigation.
Rationale and options	**Satisfactory**	The IA presents a clear rationale for intervention, citing market failure arguments in relation to the human health and environmental impacts associated with aircraft emissions. As an international obligation, discussion of options is limited but there is a brief consideration on why alternatives or a voluntary approach are likely to be less effective.
Cost-benefit analysis	**Satisfactory**	The cost-benefit analysis is proportionate and draws upon analysis conducted by the Committee on Aviation Environment Protection (CAEP) to approximate the UK impacts. The IA explains the assumptions and caveats, risks and uncertainty in the analysis.
Wider impacts	**Satisfactory**	The IA considers several wider impacts and provides sufficient explanation on why the proposal may have positive impacts on health, innovation and trade. The IA could benefit from a discussion on the impacts on the public sector and proposal's interaction with the government's net zero ambition, given the trade-off with nitrous oxides (NOx) emissions. The IA could elaborate on the risks associated with shifting production to other engine types or with the implementation due to global supply chain issues.
Monitoring and evaluation plan	**Weak**	The Department does not intend to conduct a post-implementation review (PIR), noting that the UK is not able to unilaterally review the regulation but will support the ICAO review, if conducted. It outlines the possible objectives and metrics for success. In absence of a PIR commitment, the Department could specify how it would intend to improve the evidence base to support and influence UK and/or international policy.

[2] The RPC quality ratings are used to indicate the quality and robustness of the evidence used to support different analytical areas. Please find the definitions of the RPC quality ratings here.

Summary of proposal

The UK is a member state of ICAO, which sets international standards to regulate the certification of civil aeroplanes and engines based on their noise and emissions standards.

The proposal seeks to bring UK secondary legislation in line with international standards and maintain international competitiveness of UK industry by providing regulatory certainty. The standards are aimed at reducing nvPM (i.e. carbon or soot) emissions from civil aeroplanes, particularly in the landing and take-off cycle, when they are on or close to the ground. The proposal replaces the previous 'smoke number' standards and include standards for both particle mass and number, and different regulatory limits applicable to new aircraft designs and aircraft already in production.

The IA anticipates that the proposal will incur no additional costs and benefits as UK businesses will comply regardless of domestic regulation and, therefore, presents a business and overall net present value (NPV) of zero. However, as explained below, the IA also uses a constructed alternative counterfactual scenario to produce meaningful analysis on the impacts on UK business of the obligation.

EANDCB

The IA explains that businesses are expected to comply with requirements of the standards regardless of whether it is implemented within domestic legislation by the UK in order to continue trading internationally. As such, the IA estimates that, under the true do-nothing scenario (noted in the IA as "counterfactual A"), there would be no additional impacts on businesses. However, in line with RPC guidance, the IA calculates the EANDCB using a constructed counterfactual ("counterfactual B") to demonstrate the direct impacts on business whereby the UK uniquely and unilaterally implements these standards while the rest of the world does not. This is the recommended approach by the RPC.

The EANDCB includes two groups of monetised direct costs and correctly excludes any transfer or capital/depreciation costs.

The first group of costs include the cost of the technology response required to meet the new standards, which is incurred by engine manufacturers. The IA further notes that familiarisation costs faced by engine manufacturers are due to be expected to be incorporated within the technology response cost. The second group is ongoing costs incurred by aircraft operators, such as spare engine costs, lost revenue, fuel cost and incremental build and maintenance costs. The IA provides a clear explanation for why the impacts on aircraft operators are considered direct and why lost revenue is a suitable proxy to calculate lost profit.

SaMBA

As a non-domestic measure, there is no Better Regulation Framework requirement for a SaMBA. Nevertheless, the IA includes a short SaMBA section. This explains that the international nature of standards does not make it possible for the UK to exempt SMBs. The IA outlines the numbers of businesses affected by the proposal and indicates that there are a very small number of aircraft operators with engines in scope of the regulation that are small businesses. The SaMBA could benefit from further explanation to confirm that these businesses are not disproportionately impacted by the standards and discuss any courses of mitigation.

Rationale and options

The IA discusses the rationale for government intervention citing the negative externalities associated with the human health and environmental impacts of nvPM emissions from aircraft engines. It also briefly discusses why alternatives to regulation or a voluntary approach are unlikely to be effective, concluding that regulation is the best approach to introduce the international standards and, therefore, maintain international competitiveness of UK industry by providing regulatory certainty.

Cost-benefit analysis

The IA outlines its analytical approach and the caveats of using analysis undertaken by CAEP as a basis to give an indication of the scale of costs to UK business. The IA applies the proportion of UK aircraft to global aircraft as a proxy to approximate the impacts to the UK from the CAEP/11 analysis and models three scenarios based on the highest and lowest numbers of aircraft in 2019 to 2021. The IA could consider the suitability of using alternative proxies to demonstrate the UK impacts such as the UK share of the global aerospace turnover.

In addition to the quantified impacts to calculate the EANDCB, the IA provides a qualitative assessment of the unmonetised impacts, including the increase in carbon costs from additional fuel burn, asset value loss, reductions in nvPM emissions and climate warming effects and reduction in capital costs.

Wider impacts

The IA discusses several areas of impacts that the proposal may have and provides a sufficient explanation of why it considers the proposal to have positive impacts on health, innovation and trade. It notes that the proposal is unlikely to have a significant impact on competition due to the global application of the standards. The IA also highlights the indirect impacts of increased costs being passed onto consumers as higher ticket prices or costs for freight services. The IA may wish to explore the impacts of increased flight times to maximise fuel efficiency.

The IA also acknowledges the trade-off of reducing nvPM emissions in engine design with increased emissions of NOx, although this is not quantified. The IA could benefit from discussing how this proposal interacts with the government's net zero ambition or civil aviation initiatives on the development or use of more sustainable aviation fuel.

The IA notes regulations only apply to engines rated 26.7 kilonewtons (kN) of thrust or more and that the standards are due to implemented earlier than initially anticipated. In addition, it flags the risks of aircraft operators switching to cheaper alternatives that meet the new standard or cheaper existing aircraft that were certified pre-standard. However, the IA should consider the likelihood and impact of manufacturers shifting production to engines rated below 26.7kN as well as other global supply chain risks that may impede successful implementation on time. The IA should consider any additional costs to the public sector such as the aviation regulator, to enforce the new standards.

Monitoring and evaluation plan

The IA notes that the Department will not conduct a PIR as it is not possible for the UK to unilaterally review this regulation as it is an internationally agreed standard. It further indicates that it is unlikely that changes will be made to the standard before 2028.

The IA indicates that the UK would provide any relevant technical expertise and data to support an ICAO review, if conducted. It outlines the areas and metrics for success that are likely to be considered by ICAO, noting that these are yet to be determined. In the absence of a PIR, the IA would benefit from discussing any monitoring that the Department intends to do to improve the UK's own evidence base, which may be used to support and influence UK and/or international policy.

Regulatory Policy Committee

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