EMISSIONS REDUCTION ASSURANCE COMMITTEE

REVIEW OF THE AVIATION METHOD

6 March 2019
1 EXECUTIVE SUMMARY

This report outlines the findings of the review of the Carbon Credits (Carbon Farming Initiative—Aviation) Methodology Determination 2015 (the method).

In undertaking the review, the Committee considered feedback obtained from the public consultation from 20 August to 18 September 2018. Two confidential submissions were received. The Committee also considered reports and public statements by airlines and publicly available statistics on aviation energy intensity. The Committee examined developments in agreements for international aviation emissions and their potential impact on domestic aviation.

No abatement has been contracted under the method. The Committee found the aviation industry has strong commercial incentives to reduce fuel costs, and there are a range of existing approaches to increase energy efficiency and reduce emissions.

Table 1. Review findings

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2 BACKGROUND

2.1 Committee to undertake reviews

The functions of the Emissions Reduction Assurance Committee include periodic reviews of methods and undertaking public consultation in relation to such reviews (see section 255 of the Carbon Credits (Carbon Farming Initiative) Act 2011 (the Act)). The Emission Reduction Fund White Paper suggests methods should be reviewed at least once every four years.

The Minister decides whether or not methods should be varied, having regard to the advice of the Committee. If the Minister decides the method should be varied, the Minister must seek the Committee’s advice on whether the proposed variation meets the offsets integrity standards.

The Carbon Credits (Carbon Farming Initiative) Act 2011 (the Act) requires the Committee to have completed its review of whether crediting periods provided by a method should be extended before the first registered project under that method has commenced the final year of its crediting period. The due date of the crediting period extension review for the aviation
method is 3 September 2021. The Committee will consider the crediting period for the method in due course to allow relevant consultation with industry to occur closer to the due date of the review.

2.2 The method

The method was made on 13 February 2015 following consultation with a technical working group and the Clean Energy Regulator, a public consultation process and commissioning of an independent technical assessment. Fleet renewal was deemed not eligible due to concerns that associated emissions reductions were likely to occur in the ordinary course of business.

One project has been registered under the method. No contracts have been entered into with the Clean Energy Regulator, and no carbon credits have been issued under the method.

2.3 Eligible activities

The method provides for crediting emissions reductions achieved through a reduction in the emissions intensity of air transport (i.e. emissions per unit of transportation service). The method only covers air travel service that occurs domestically not international flights. A broad range of activities are eligible under the method, including installing ground power units to reduce aircraft fuel burn in transit, replacing on-board components with lighter weight alternatives and improving terminal procedures to reduce on-ground movements.

Each activity undertaken must be reasonably expected to reduce emissions from the aircraft, or from its auxiliary equipment. Auxiliary equipment includes vehicles or other mobile equipment used to help power or operate the aircraft, such as tugs, tractors or ground power units.

Examples of eligible activities for an aviation project include:

- replacing on-board components with lighter-weight alternatives
- altering aircraft structure to improve aerodynamics
- increasing the use of bio-derived jet fuel, or substituting with low carbon alternatives.
- installing ground power units or eligible renewable electricity generation equipment to power aircraft and their auxiliary equipment
- changing terminal procedures to shorten taxi length or duration.

2.4 Abatement calculations

The method calculates emissions reductions by comparing the emissions intensity of an aircraft before and after the implementation of activities to reduce emissions.

Emissions intensity ‘service units’ are used to calculate abatement, with different service units used for the different phases of each aircraft's operation i.e.: transit, taxi, take-off, cruise, descent and taxi (see Figure 1). The use of service units allows the calculated abatement to account for increased or decreased aircraft usage.
One year of historical fuel use and service data must be available for each aircraft included in the project, disaggregated by flight phase and route. The method includes several options for collecting this data. The eligible abatement for an aircraft is the sum of abatement across all its operating phases in a reporting period.

2.5 **Review process**

The Committee’s review focused on method’s compliance with the offsets integrity standards and usability of the method for project proponents.

In performing its functions, the Committee seeks to balance environmental integrity with the need to encourage abatement activities. Excessive conservatism in the attempt to ensure environmental integrity will obstruct project uptake and potentially exclude the cheapest forms of abatement. Insufficient conservatism could result in the issuance of credits of questionable integrity. While a balance must be struck, where there is uncertainty, the Committee errs on the side of conservatism. This is consistent with the offsets integrity standards, which require all estimates, projections and assumptions in methods to be conservative.\(^1\)

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\(^1\) Section 133(1)(g) of the *Carbon Credits (Carbon Farming Initiative) Act 2011.*
The Committee did not evaluate aspects of the Emissions Reduction Fund or the Act that extend beyond the scope of the method, such as reverse auction arrangements or contracting. These broader aspects of the fund were outside the scope of this method review.

The review process consisted of:

- a public consultation period from 20 August to 18 September 2018 where two confidential submissions were received
- views were sought from the aviation industry including major and regional airlines, and through discussions with the Clean Energy Regulator and the Department of Infrastructure, Regional Development and Cities
- analysis of data and information on the aviation industry and fleet performance.

3 CONFORMITY WITH THE OFFSETS INTEGRITY STANDARDS

The review evaluated compliance with the offsets integrity standards in the Carbon Credits (Carbon Farming Initiative) Act 2011 (the Act).

3.1 Abatement is unlikely to occur in the ordinary course of events

International developments

Australia’s aviation sector largely relies on international developments in aircraft technology and design, engine, avionics and air traffic control technologies, along with alternative fuel technologies. Developments in these areas are driven by commercial imperatives in the industry, the availability and cost of new technologies, and by emerging International Civil Aviation Organisation (ICAO) requirements. Examples of ICAO initiatives include

- a new aircraft emissions standard applying to new aircraft type designs from 2020 and to aircraft designs already in production as of 2023
- the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) and
- initiatives for improvement in aircraft and fleet operating practices.

Not all Australian airlines will be subject to CORSIA. Those airlines that are captured by CORSIA requirements will only be required to offset their emissions from specific flights which are determined by their origin and destination. Domestic flights including those forming part of an international journey will not be captured by CORSIA requirements.

The ICAO initiatives for operating standards are expected to be introduced as guidance and best practice rather than enforceable standards. Adoption of such measures is expected to apply to both domestic and international aviation and lead to greater energy efficiency in both sectors. Similarly, ICAO emissions standards for new aircraft will flow through to improvements in emissions intensity for domestic flights.
Energy Efficiency activities

Fuel accounts for around a third of airline operating costs, and fuel costs fluctuate in response to international events. This creates a strong financial incentive for airlines to increase the efficiency of their operations.\footnote{Vaishnav, Parth, 2016, “ICAO’s Market Based Mechanism: Keep it Simple”, Carbon and Climate Law Review 10, 120-126, http://cclr.lexxion.eu/article/CCLR/2016/2/9v} In addition to hedging against fuel price increases, major Australian airlines have energy efficiency initiatives and monitoring programs to manage their fuel costs. There is also some evidence that demand for airline travel is not responsive to fuel prices.\footnote{See, for example, Mazraati, M. and Alyousif, O., 2009, “Aviation fuel demand modelling in OECD and developing countries: impacts of fuel efficiency”, OPEC Energy Review, Blackwell.}

The new aircraft emissions standards being developed by ICAO will apply to international aviation as well as to the majority of aircraft used in domestic aviation. By 2028 those in-production aircraft that do not meet the standard will no longer be able to be produced unless their designs are modified. Over time, the standards are expected to deliver significant improvements in energy efficiency across the international and domestic airline industry.

Due to these factors the Committee considers that energy efficiency activities with low percentage abatement involving existing aircraft would be likely to occur in the ordinary course of business. Consequently, to ensure credited abatement is additional, the Committee considers the eligibility requirements and calculations should be varied to exclude energy efficiency activities.

Fleet renewal

The Committee concluded that fleet replacement should continue to be excluded from the method. The method does not credit abatement from aircraft fleet renewal as it is likely this activity would occur in the ordinary course of events. The Committee noted that energy efficiency and emissions reductions are only two of the criteria taken into account by the industry when evaluating new aircraft purchases. The value of the emissions credits available under the method would be insignificant proportion of the investment cost of a new aircraft and would be unlikely to affect investment decisions. Other considerations in fleet decisions may include:

- the stage of aircraft lifecycle, and whether the costs and risks of continuing to deploy older aircraft are justified
- aircraft characteristics, such as passenger and freight capacity
- marketing and passenger amenity benefits from upgraded aircraft
- fleet strategies, such as market expansion.

Alternative fuels

The Committee considers that biofuel switching is not likely to occur in the ordinary course of events. The Committee noted while activities in this area are being trialled they are at an early
stage for the Australian aviation industry, and biofuel is not currently in sustained, widespread commercial use for domestic flights. Examples of trials include:

- Virgin Australia announced in September 2018 it had trialled delivery of sustainable aviation fuel through Brisbane airport’s fuel supply system
- Qantas announced in January 2018 it had operated a dedicated biofuel flight between the United States and Australia.

To ensure biofuel activities continue to provide additional abatement in future, the method could incorporate a declaration by a Chief Financial Officer or equivalent that the emissions reductions as a result of a project under the method would not have occurred in the ordinary course of events. A range of factors could affect whether biofuel use in the Australian domestic aviation industry becomes business as usual in future such as:

- development and commercialisation of new biofuel production pathways and technologies for aviation
- changes in the relative prices of sustainable aviation biofuels compared to conventional fuels.

3.2 **Estimations are measurable and capable of being verified**

The method determines net abatement by calculating the change in emissions intensity of an individual aircraft during an individual phase of operation. Abatement calculations are based on direct measurements and the Department’s published emissions factors. Calculations can therefore be measured and verified.

The method accounts for all phases of aircraft operation, and for use of ground power by aircraft on the tarmac. In this way, the abatement calculations account for emissions from fuel and electricity consumption likely to occur as a result of a project.

3.3 **Abatement must be eligible carbon abatement from the project**

The Act defines eligible carbon abatement as abatement that results from carrying out the project, and is able to be used under Australia’s climate change targets under the Kyoto Protocol and its successors.

The method provides carbon abatement that is able to be used under Australia’s climate change targets because:

- changes in emission levels resulting from projects under the method would be reflected in the national inventory
- the inventory is the basis for determining Australia’s compliance with its international emissions reduction commitments (in conjunction with Australia’s holdings of eligible carbon units).

The method includes a range of requirements to ensure that abatement is due to the project rather than to other factors, including:

- measurement requirements ensure abatement accurately reflects the amount of fuel combusted
• the method adjusts for changes in emissions intensity for each phase of operation, ensuring that use of ground power sources is taken into account

• the method includes a newness requirement to exclude existing energy efficiency programs within airlines, and excludes aircraft replacement activities, as there are many other drivers for aircraft replacement.

3.4 The method is supported by clear and convincing evidence and estimates, projections and assumptions are conservative

The Committee found that the abatement calculations account for changes in service levels for each phase of flight, adjusting for emissions intensity. Calculations are conservative as external factors are taken into account when determining abatement from a project.

The Committee noted that the calculations could be more specific to project interventions so that abatement as a result of projects can be calculated more accurately.

The method bases calculations on the difference between fuel and electricity consumption in the baseline and project scenarios, adjusted for output or service levels. All emissions from fuel and electricity use related to a project are accounted for in the method calculations, including the substitution of aviation fuels with ground power for aircraft on the tarmac.

Finding 1

The method only complies with the offsets integrity standards for projects that reduce emissions by replacing conventional aviation fuels with biofuel blends. Energy efficiency activities should be excluded from the method eligibility as abatement from energy efficiency projects would be likely to occur in the ordinary course of events.

To ensure biofuel activities continue to provide additional abatement in future, the method should be varied to include a declaration by a Chief Financial Officer or equivalent that the emissions reductions resulting from project activities would not have occurred in the ordinary course of events.

4 CALCULATIONS

The potential to improve the energy efficiency of existing aircraft is constrained by issues like safety and reliability requirements and the limited structural changes possible. As such the energy efficiency activities under the method have relatively small emissions reductions, which require accuracy in the calculations to detect.

Other factors that can have an effect on emissions also need to be taken into account and excluded from the abatement calculations. Such as: freight volumes, air traffic control interventions, ambient conditions and luggage weight.

The current method calculates abatement based on simple energy intensity for each flight phase, where the relatively small abatement signal from energy efficiency projects is not able to be detected. The result is that projects are not able to generate abatement under the current method from energy efficiency activities.
Alternative calculation approaches

The Committee found there is potential for abatement calculations to be adjusted to enable sufficient accuracy to determine the abatement due to project activities, and/or to simplify the calculation and measurement requirements. Potential alternative calculation approaches may include:

- modelled approaches, if they are sophisticated enough to account for a large number of variables and can be implemented at a reasonable cost
- deemed approaches, for example based on information from original equipment manufacturers, if they are capable of being verified sufficiently.

The Committee noted sophisticated modelling approaches with sufficient accuracy to isolate the abatement from small energy efficiency improvements could involve substantial measurement, analysis and verification costs. These costs could potentially exceed the value of abatement credits.

As aviation emissions are affected by a range of variables, deemed approaches would be subject to a high level of uncertainty and would be unlikely to be sufficiently accurate or conservative. Deemed approaches would also be unlikely to be measurable or verifiable. The Committee found even if improved calculation approaches could address the issues set out above, the energy efficiency activities should be excluded from the method due to additionality concerns.

The current method does not account for any increases in emissions based on a stated assumption that any increases in emissions intensity were caused by factors unrelated to the project. In theory this means a project could receive credits over the project's crediting period even if emissions intensity increased on aggregate over that period. For example, the calculations might show increases in emissions intensity over six annual reporting periods and emissions intensity reductions in only one year. In this case the increases would be neglected and credits would be given for the single reporting period where calculations showed a reduction in emissions.

The Committee considers the method should be varied to account for increases in emissions intensity by carrying them over into subsequent reporting periods. This would make the method more conservative and more consistent with more recent methods such as the Industrial Electricity and Fuel Efficiency method.

The Committee noted the details of the calculations would also need to be varied to allow the lifecycle emissions impact of biofuel switching activities to be more accurately calculated (see section 5).

5 TREATMENT OF BIOFUEL SUBSTITUTION ACTIVITIES

The Committee found the method could be updated in line with the lifecycle assessment approach in the Carbon Offsetting Scheme for International Aviation, which has been developed since the method was first agreed.

Currently the method applies an emissions factor to biofuels from the National Greenhouse and Energy reporting framework which is close to zero, and does not reflect lifecycle emissions from
the biofuel production pathway. The Committee noted a lifecycle emissions approach could provide a more accurate and conservative basis for calculation of emissions per litre of alternative fuels compared to conventional fuel.

Developing a lifecycle emissions calculation approach will need to account for different feedstocks, regional factors, production technologies and possibly transport emissions. Ideally, any lifecycle assessment approach should ensure compatibility with approaches used in international aviation, but the Committee considers it would need to take a regional approach. The Committee also notes that a lifecycle assessment approach could apply to other emissions reduction fund methods that allow for biofuels substitution activities. The Committee will consider this through reviews of those methods (for example Land and Sea Transport). The final calculation approach will need to be conservative, taking into account the uncertainty of the estimates, and particular caution is needed when considering land use change calculations.

While the Committee is aware of early developments in electrically powered aircraft and the potential for aircraft to be powered by hydrogen fuel cells in future, these technologies have not reached the level of commercial readiness or safety approvals appropriate for the Emissions Reduction Fund. Although these emerging technologies are unlikely to be retrofittable to existing aircraft, the Committee could consider the eligibility of these technologies in a future review of the method.

| Finding 2 | For project activities involving substitution of conventional fuels with biofuels, calculations should be varied to better account for lifecycle emissions reductions and to account for increases in emissions. |

6 USABILITY OF THE METHOD

The Committee noted the following.

- Offsets integrity considerations mean that fleet replacement is excluded, so the method can only be used for marginal energy efficiency activities with small abatement percentages.

- Calculations are not able to separate the abatement from the noise for the marginal energy efficiency activities covered by the method.

- Costs of data collection, data analysis and record keeping may exceed the value of abatement credits obtainable from energy efficiency activities.

- Airlines may be able to obtain better financial returns by undertaking the same energy efficiency activities without registering under the method and incurring compliance costs.

The Committee noted that adjustments to the calculations to better reflect the lifecycle impact of biofuel usage would contribute to usability of the method by providing consistency with CORSIA. Adjusting the calculations to exclude energy efficiency activities may also enable the calculations to be simplified. For example, the method may no longer need to include electricity consumption.