Transport and Infrastructure Net Zero Consultation Roadmap

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Department of Climate Change, Energy, Environment and Water

Response received at:
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Boeing Australia and New Zealand

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Yes

5 First name
Not answered

6 Last name
Not answered

7 Email
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Not answered

9 Who are you answering on behalf of?

Organisation

10 Organisation name

Boeing Australia and New Zealand

11 What best describes you or your organisation?

Not answered

12 What sector do you represent?

Other: "Aviation"

13 What state or territory do you live in?

Australian Capital Territory

14 Postcode

2600

15 What area best describes where you live?

City

16 1. Do you support the proposed guiding principles?

Yes

17 1.1 Please add details to your response.

Boeing supports the five guiding principles outlined by the Department's Roadmap and its subsequent action plan. Maximising emissions reductions, ensuring value for money, maximising economic opportunities, ensuring inclusivity and diversity and remaining evidenced-based are foundational for the aviation transport sector. Boeing recommends a range of other factors be incorporated into policy design, including integrated supply and demand side mechanisms for low carbon liquid fuels and a technology-neutral

approach is based on carbon abatement contributions. Additionally, the design and implementation of key policies for the aviation sector should be of sufficient duration to allow for the development of new industries, such as domestic SAF production. These policies should be underpinned by sustainability criteria which, where possible, aligns with internationally agreed sustainability frameworks to avoid unnecessary cost burdens. Boeing recommends lifecycle assessment (LCA) frameworks should be the foundation for quantifying the competitive emissions intensity of Australian produced Sustainable Aviation Fuel (SAF) in a manner which is feedstock neutral.

18 2. Do you support the use of the avoid-shift-improve framework as a tool to identify opportunities for abatement?

Not answered

19 2.1 Please add details to your response.

Not answered

20 3. Do you agree the development of a national policy framework for active and public transport will support emissions reduction?

Not answered

21 3.1 Please add details to your response.

Not answered

22 4. What should be included in a national policy framework for active and public transport and how should it be developed?

Not answered

23 5. What additional actions by governments, communities, industry and other stakeholders need to be taken now and in the future to ensure the movement of people contributes to transport emissions reduction?

Not answered

24 6.1 What additional actions by governments, communities, industry and other stakeholders need to be taken now and in the future to

ensure that the movement of goods contributes to transport emissions reduction?

Not answered

25 6.2. How would these actions address the identified challenges and opportunities for emissions reduction in the movement of goods?

Not answered

26 7. Do you agree with the proposed net zero pathway for light road vehicles?

Not answered

27 7.1 Please add details to your response.

Not answered

28 8. The Australian Government is currently developing an Australian New Vehicle Efficiency Standard and has already begun to implement actions in the National Electric Vehicle Strategy.8.1 What additional actions by governments, communities, industry and other stakeholders need to be taken now and in the future to reduce light vehicle emissions?

Not answered

29 8.2 How would these actions address the identified challenges and opportunities to reduce light vehicle emissions?

Not answered

30 9. Do you agree with the proposed net zero pathway for heavy road vehicles?

Not answered

31 9.1 Please add details to your response

Not answered

32 10. The proposed pathway for heavy road vehicles relies on a mix of battery electric, hydrogen fuel-cell and low carbon liquid fuels.Rank from 1 to 3, the order in which these should be prioritised for emissions reduction.

Not answered

33 10.1 Please add details to your response. Why did you rank them in that order?

Not answered

34 11. What role should low carbon liquid fuels play in the heavy vehicle decarbonisation?

Not answered

35 12. What additional actions by governments, communities, industry and other stakeholders need to be taken now and in the future to reduce heavy vehicle emissions?

Not answered

36 13. Do you agree with the proposed net zero pathway for rail?

Not answered

37 13.1 Please add details to your response.

Not answered

38 14. The proposed pathway for rail relies on a mix of battery electric, hydrogen fuel-cell and low carbon liquid fuels.Rank from 1 to 3, the order in which these should be prioritised for emissions reduction.

Not answered

39 14.1 Please add details to your response. Why did you rank them in that order?

Not answered

40 15. What role should low carbon liquid fuels play in rail decarbonisation?

Not answered

41 16. What additional actions by governments, communities, industry and other stakeholders need to be taken now and in the future to reduce rail emissions?

Not answered

42 16.1 How would these actions address the identified challenges and opportunities to reduce rail emissions?

Not answered

43 17. Do you agree with the proposed net zero pathway for maritime?

Not answered

44 17.1 Please add details to your response.

Not answered

45 18. The Australian Government is engaging in consultation as part of the development of the Maritime Emissions Reduction National Action Plan and those consultations will also inform the final Roadmap and Action Plan. 18.1 What additional actions by governments, communities, industry and other stakeholders need to be taken now and in the future to reduce maritime emissions?

Not answered

46 18.2 How would these actions address the identified challenges and opportunities to reduce maritime emissions?

Not answered

47 19. Do you agree with the proposed net zero pathway for aviation?

Yes

48 19.1 Please add details to your response.

Boeing supports a primary policy focus on SAF blending and production in the short-term.

Currently SAF is costlier to manufacture than conventional fossil jet fuel and is therefore more expensive to purchase. It is anticipated that as technologies advance, policy settings mature, feedstock volumes increase and economies of scale are achieved that this price differential reduces. Government policies on both the supply and demand side will play a critical role in addressing this price differential, enabling early-stage producers to ensure the economic viability of domestic production. An economic return on policy investment will be achieved though reduced jet fuel imports as well as GDP and jobs growth through new feedstocks and industry.
Boeing supports continued investment in synthetic SAF in the medium term, but also contends ongoing support for biogenic SAF production will continue to be required
Boeing supports the Roadmap's inclusion of investment in synthetic SAF in the medium term, however we also note that investment post 2030 will continue to be required for other SAF feedstocks, including biogenic SAF production. As recommended in the Boeing-CSIRO SAF Roadmap, this should include investment in research and development to reduce the costs and logistical hurdles for biogenic supply chains and the continued scaling of power-to-liquid production.
Boeing supports the roadmap goal of the majority of aviation fuel in Australia being SAF by 2040
Australia is well positioned to achieve this goal with its vast supply of feedstock, strong aviation sector and skilled workforce. However, a suite of integrated and stackable policies will be required to mobilise action in the short-term and set Australia on a path to majority SAF beyond 2040. In a practical sense, this will imply moving from no continuous production to more than 5 billion litres per annum in just 16 years.

49 20. The Australian Government has already engaged in consultation on aviation decarbonisation through the development of the Aviation White Paper and those consultations will also inform final Roadmap and Action Plan.

Not answered

50 20.1 What additional actions by governments, communities, industry and other stakeholders need to be taken now and in the future to reduce aviation emissions?

Not answered

51 21. Do you agree with the proposed net zero pathway for transport infrastructure?

Not answered

52 21.1 Please add details to your response.

Not answered

53 22. What additional actions by governments, communities, industry and other stakeholders need to be taken now and in the future to reduce transport infrastructure emissions and ensure that transport infrastructure is ready for and enables low-emission transport modes?

Not answered

54 22.1 How would these actions address the identified challenges and opportunities to reduce transport infrastructure emissions?

Not answered

55 23. What additional actions by governments, communities, industry and other stakeholders need to be taken now and in the future to ensure the energy mix is ready to support transport emissions reduction?

Not answered

56 24. How should the use of low carbon liquid fuels (LCLFs) be prioritised across different transport modes over time to achieve maximum abatement?

Not answered

57 25. What are the best ways for the Australian Government to work collaboratively with industry, business, governments and communities to implement the proposed pathways?

Not answered

58 25.1 What are good domestic or international examples of partnership and collaboration on transport and transport infrastructure emissions reduction that could inform the final Roadmap and Action Plan?

Not answered

59 25.2 What opportunities can Government leverage to show leadership in Australia and internationally?

Not answered

60 26. What measures and metrics should be used to evaluate the final Transport and Infrastructure Net Zero Roadmap and Action Plan?

Not answered

61 26.1 What other data and evidence could governments use and how could this offer further insights on the pace, scale and location of transport emissions reduction pathways?

Not answered

62 27. Do you have any feedback on the proposed review process?

Not answered

63 28. Do you have any further feedback on the Consultation Roadmap and proposed pathways?

Not answered

64 28.1 Is there anything missing? Are the sections appropriately integrated? Is the Roadmap appropriately ambitious?

Not answered

65 29. Is there any further information or documentation that you wish to be considered with your submission?

Not answered

66 Would you like to upload a document?

Yes

67 Have you removed any identifying information from your submission?

Yes

68 Upload a submission

Boeing Australia - DCCEEW - Transport Net Zero Consultation Roadmap.docx

69 Upload a submission

Not answered

70 Upload supporting file

Not answered

71 Upload supporting file

Not answered

Department of Climate Change, Energy, the Environment and Water's

Transport and Infrastructure Net Zero Roadmap Consultation

Boeing Australia Submission

July 2024

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Overview

This submission is prepared by Boeing Australia in response to the Department of Climate Change, Energy, Environment and Water's request for consultation on the Department's *Transport and Infrastructure Net Zero Roadmap* (the Roadmap). We note that this Roadmap is one of six sectoral plans under development to facilitate Australia's transition towards a net zero economy. Boeing Australia recognises and supports the Australian Government's commitment to decarbonising Australia's transport sector and the importance of policies such as the *Future Made in Australia* initiative in assisting the development of new, low carbon industries and technologies in Australia.

As the Roadmap identifies, transport currently accounts for 21 percent of Australia's greenhouse gas emissions, with this expected to proportionally increase as other sectors decarbonise. A suite of targeted policies will be required to reduce emissions across all areas of transport, including aviation, heavy haulage, rail and marine. Boeing has intentionally structured our response to the Roadmap to concentrate on the issues and opportunities most pertinent to aviation. We note that whilst domestic flights currently account for 9 percent of Australia's transport emissions[1], this is also expected to proportionally increase as other transport sectors, particularly passenger vehicles, decarbonise through hybridisation, electrification and enhanced fuel standards. Like the Roadmap, the insights from the *Boeing-CSIRO Sustainable Aviation Fuel Roadmap*[2] has informed our response along with highlighting Boeing's broader strategic approach to meeting the international aviation sector's long-term aspirational goal of net zero CO_2 emissions by 2050.

Boeing in Australia

Boeing is one of the world's largest global aerospace manufacturers. Boeing develops, manufactures and services commercial aeroplanes, defence products and space systems for customers in more than 150 countries. Our diverse team is committed to innovating for the future, leading sustainability, and cultivating a culture based on our company's core values of safety, quality and integrity.

Boeing Australia represents the broadest portfolio of products and services in Australia's aerospace industry and is one of the company's largest operational footprints outside the United States. With **more than 4,500 employees and a heritage stretching back more than 97 years, Boeing Australia plays an integral role in the region's aerospace and defence industry** as a leader in advanced manufacturing for commercial airplane components, defence systems and sustainment, training and services, research and development, and uncrewed systems. Boeing employees span Australia, New Zealand and the South Pacific, supporting customers regionally and globally.

Boeing has an extensive supply chain to support our programs and operations and continually looks to find ways to engage with and grow Australian industry content in aerospace. We also partner with internationally-recognised and celebrated research organisations, including the CSIRO, as well as Australia's leading universities.

Executive Summary

Boeing supports the five guiding principles outlined by the Department's Roadmap and its subsequent action plan. Maximising emissions reductions, ensuring value for money, maximising economic opportunities, ensuring inclusivity and diversity and remaining

[1] Page 60 of the *Transport and Infrastructure Net Zero Consultation Roadmap*
[2] https://www.csiro.au/en/research/technology-space/energy/sustainable-aviation-fuel

evidenced-based are foundational for the aviation transport sector. Boeing recommends a range of other factors be incorporated into policy design, including **integrated supply and demand side mechanisms for low carbon liquid fuels and a technology-neutral approach** is based on carbon abatement contributions. Additionally, the design and implementation of key policies for the aviation sector should be of sufficient duration to allow for the development of new industries, such as domestic SAF production. These policies should be underpinned by sustainability criteria which, where possible, **aligns with internationally agreed sustainability frameworks** to avoid unnecessary cost burdens. Boeing recommends lifecycle assessment (LCA) frameworks should be the foundation for quantifying the competitive emissions intensity of Australian produced Sustainable Aviation Fuel (SAF) in a manner which is feedstock neutral.

Boeing recommends the following in terms of the development of specific Australian SAF policy initiatives and incentives:

- SAF should be a core policy focus in the short to medium term, given it is an easy drop-in replacement for conventional fossil jet fuel, and is forecast to have the largest carbon abatement contribution for the aviation sector.
- Domestic SAF blending capability should be developed and utilised in the short-term whilst production is being stood up.
- Both supply-side (e.g. incentives, direct government support) and demand-side (e.g. government procurement signals, mandate or low carbon liquid fuel standards) are required to stimulate SAF production and should be part of an integrated suite of policy action.
- Advanced technologies, including electric and hydrogen are important, however they offer proportionally less carbon abatement potential to the aviation sector but require greater infrastructure changes. These technologies will likely be applicable to short-haul flights, on small craft, and in the medium to longer term. Policy design should remain cognisant of these factors.
- Consider acceleration of activities which support the introduction of emerging technologies that contribute to sustainment objectives. This includes the ensuring that the Advanced Air Mobility (AAM) sector is ready for day one safe operations in the 2028/29 timeframe.

Opportunities for decarbonisation in Australia's aviation sector

Boeing believes the future of flight will take an 'everything for zero approach.' Collaborations that foster a diverse portfolio of technologies that mature at different times and be suitable for different aviation segments should be based around four key strategies: (1) fleet renewal; (2) operational efficiency; (3) renewable energy; and (4) advanced technology. Within Australia, the aviation sector will need to be supported by sectoral pathways to decarbonisation that support the transition to net zero. Whilst advanced technologies, including electric and hydrogen, show promise to provide decarbonisation for short-regional distance flights, these opportunities will only be realised over the medium to longer term. Significant investment and infrastructure change will also be required to realise the emissions reductions associated with these abatement measures.

The development of SAF is critical to the effective and timely decarbonisation of the aviation sector. SAF is both an immediate transition fuel and an important part of the longer-term energy mix. As a drop-in replacement for conventional fossil jet fuel, it is compatible with all existing aircraft up to approved blend limits.

From 2030, Boeing has committed that all new aircraft will be 100 percent SAF compatible. SAF can be produced from a wide variety of feedstock, industrial, household or agricultural waste, as well as used cooking oils and fats. Depending on the pathway selected, SAF can reduce emissions across the lifecycle by 80 percent or more compared to fossil jet fuel. SAF can use existing fuel delivery infrastructure, avoiding the need for inefficient bespoke supply chains from the point of origin to an aircraft's wingtip. In the short term, SAF is the most expedient means by which aviation may be decarbonised and also provides the opportunity to achieve broader sustainability outcomes, including those associated with driving more circular economies. Additionally, other low carbon liquid fuels that have ground-based transport application, including renewable diesel, are often a by-product of SAF production.

In the longer-term, advanced technologies, including electric and hydrogen powered aircraft, could play an important and complementary role to SAF in decarbonising aviation and should be a strategic consideration in policy development for the transport sector.

Consultation response

In structuring this response, Boeing has first provided commentary on the five guiding principles proposed by the Government. The proposed Roadmap and timelines for the aviation sector have then been addressed, under the government's outlined short- (2024-2030), medium- (2030-2040) and long-term (2040-2050) timeframes. Boeing notes the recent complementary *Australian Government Consultation on Future Made in Australia: Unlocking Australia's Low Carbon Liquid Fuel Opportunity*, which provided further detail to complement some of the actions highlighted under this Roadmap.

The timing, duration and phased implementation of actions to drive net zero transport outcomes is a key factor. Timely policy action and new-term solutions should be prioritised to give Australia the best chance of meeting its decarbonisation targets. For aviation, this will require a concentration on SAF (as part of broader low carbon liquid fuel policy) in the short term. This will necessitate both supply-side (e.g. incentives, production tax credits) and demand-side (e.g. mandate, low carbon fuel standards) mechanisms in order to stand up a new domestic industry. Significant opportunities across the supply chain are present, with the potential development of new market opportunities for feedstock providers, fuel producers and consumers.

Boeing supports emissions reduction as the core and primary principle of the government's net zero plan for the transport sector. The various other pathways to abatement for aviation can be explored under different scenarios through Boeing's publicly available climate impact model, *Cascade*[3] which provides visual strategies to help reduce emissions for commercial flights. Identifying and pursing optimum decarbonisation initiatives, whilst ensuring these are underpinned by the other four principles will be critical to the implementation of effective policy in the transport sector. Boeing also recommends that the following principles are incorporated into policy development for net zero transport, specifically for the aviation sector.

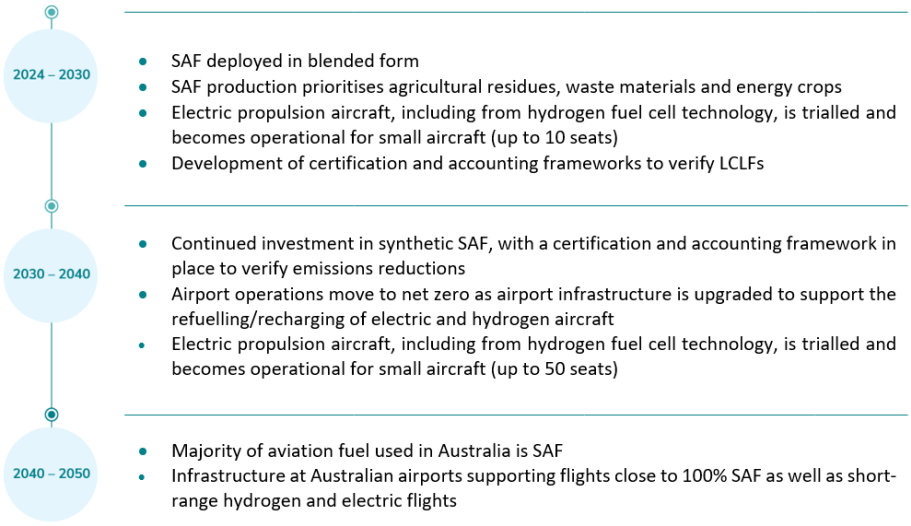
- Integration: Policy should be integrated with relevant mechanisms designed to complement one another. This may necessitate the phasing of initiatives. From the perspective of SAF, for example, this will necessitate the careful design of both demand and supply side policies that integrate efficiently to scale production and uptake.

[3] https://cascade.boeing.com/

- Stability: Policy should be stable, predictable and consistent in implementation in order for the private sector to have the necessary confidence to invest.
- Technology-neutral: The selection of low emissions technologies, alternative fuels, and other initiatives should be based on abatement contribution, rather than targeting a specific technological pathway. For SAF, this enables diverse production pathways and supply chains to develop. Given the range of feedstocks and number of ATSM approved pathways for development, policy should drive broad industry development. Importantly however, whilst policy intent should remain technology neutral, nuanced approaches to application should also be considered. For example, some SAF pathways, such as HEFA production are more mature and potentially require less financial support relative to other approaches.
- Timing and Duration: Policy should be of a sufficient duration to reflect project timelines. This is particularly important for the aviation sector, in which the development of new domestic industries, including for SAF production, is required. Typically, this will be at least 10 years. Excessive delays in policy development will lead to potential SAF feedstocks being sold offshore, potentially facilitating the development of similar industries in other international locations, at the expense of Australia's economic and sustainability opportunities.
- Stackable: Policy support should be "stackable" with other incentives – i.e., allowing credit to be received from multiple reinforcing incentives at the same time.
- Non-dilutive capital: Policies should recognise the needs of pre-revenue companies through access to non-dilutive capital via grants and concessional loans.
- Sustainability Performance: Selecting the most effective policies to link incentives to performance (e.g. higher GHG emission reduction performance should be rewarded in policy design). This is particularly important when considering the role of demand-side mechanisms for SAF, including mandates that should recognise carbon intensity over volume. Robust and transparent sustainability criteria are also key to maintaining social licence around emerging industries, including SAF production. Boeing recommends leveraging internationally agreed sustainability frameworks to reduce unnecessary cost burden for achieving multiple certifications.
- Compliance value: For Low Carbon Liquid Fuels, including SAF, policy design should allow access to a compliance credit market to mediate prices between renewable fuels and fossil fuels by ascribing a compliance value. There are several examples of this globally, including the Low Carbon Fuel Standard in California, USA.
- Customised: Policy should be customised to the unique resources, economic and social factors, political barriers and existing regulatory structure in Australia. This is particularly important for the aviation sector in the immediate term as there is no single path to successful SAF policy implementation.

Response to Proposed Roadmap

Boeing welcomes the government's incorporation of the net zero pathway for aviation in the Roadmap:



Short-term 2024-2030

Boeing supports a primary policy focus on SAF blending and production in the short-term.

Currently SAF is costlier to manufacture than conventional fossil jet fuel and is therefore more expensive to purchase. It is anticipated that as technologies advance, policy settings mature, feedstock volumes increase and economies of scale are achieved that this price differential reduces. Government policies on both the supply and demand side will play a critical role in addressing this price differential, enabling early-stage producers to ensure the economic viability of domestic production. An economic return on policy investment will be achieved though reduced jet fuel imports as well as GDP and jobs growth through new feedstocks and industry.

Boeing recognises the importance of developing a domestic SAF industry, particularly at a time when many countries are seeking to rapidly scale their SAF production potential. The International Civil Aviation Organisation's (ICAO) Third Conference on Aviation and Alternative Fuel[4] (CAAF) agreed that in order to support the sector's long-term aspirational goal, ICAO and its member states would strive to achieve a collective global aspirational Vision to reduce CO_2 emissions in international aviation by 5 percent by 2030 through the use of SAF, lower carbon aviation fuels and other cleaner aviation energies. This aligns with demand goals from several airlines, but also signals future expected demand from international aircraft operators when refuelling in Australia.

Globally the SAF industry is in its early stages. However, this presents significant opportunities, especially for countries like Australia, with the nation holding a range of competitive advantages in terms of industry development. Along with the preponderance of biogenic and other feedstocks, Australia has a strong aviation market and high domestic skill level. Australia is also set to capitalise on its renewable energy potential to become a significant renewable energy and green hydrogen producer. Green hydrogen will continue to be a crucial commodity in refining LCLF, as well as being a necessary feedstock for the power-to-liquid (PtL) SAF development process.

As outlined in the *Boeing-CSIRO SAF Roadmap*, a series of phased recommendations should be designed to build on industry progress over time. These include:

[4] https://www.icao.int/Meetings/CAAF3/Pages/default.aspx

- Consideration of policy frameworks and tools that support domestic distribution and use of certified SAF with a clear long-term support strategy for industry.
- Signalling local demand for SAF across government, commercial and defence users, giving investors certainty to establish new plants.
- Educating consumers on the role and benefits of SAF, building social license for investment and demand for fuels.
- Investing in R&D to support emerging technologies and improve feedstock availability and sustainability understanding.
- Scaling-up of biogenic SAF production in appropriate locations, increasing market supply and driving cost reductions.

The proposed Roadmap prioritises SAF production from agricultural residues, waste materials and energy crops in the short term (2024-2030). Boeing supports this, noting the opportunity to build on initial progress by scaling-up second-generation biogenic feedstock and collection. There is also an opportunity in this time period, however, to continue **developing power-to-liquid production capability through targeted incentives and policy**. Additionally, domestic blending of imported SAF in the immediate term (2024-2025) could provide an important early injection of low carbon liquid fuels into the Australian market, accelerate learnings for blending, infrastructure and fuel delivery, while production capability is built up. Importantly, a robust, comprehensive, and integrated policy framework, that includes both demand signals (including through government procurement or a signalled mandate or standard), and incentives is required to realise the opportunities associated with SAF production.

Boeing supports the inclusion of the development of certification and accounting frameworks as a priority short-term action in the Roadmap. Any Australian policy settings should encourage robust sustainability criteria for SAF and other low carbon liquid fuels. Multiple elements should be taken into consideration when determining the sustainability characteristic of SAF. The ICAO Carbon Offsetting and Reduction Scheme for International Aviation[5] (CORSIA) has established a comprehensive set of sustainability criteria, addressing issues such as life cycle emissions, direct and indirect land use change, water, air and soil considerations, as well as social factors. **Boeing recommends drawing from international standards and aligning and adapting these**, only deviating when absolutely necessary in the Australian context. This is practical and efficient when noting that airlines operate internationally and having to seek multiple certifications for fuel batches would add unnecessary complexity and expense. Complementary supply and demand side policy initiatives should also incorporate emissions and sustainability criteria as fundamental to eligibility and implementation, including but not limited to carbon intensity metrics. Lifecycle assessment (LCA) frameworks should be the foundation for quantifying the competitive emissions intensity of Australian produced SAF in a manner which is feedstock neutral. Domestic production is likely to be competitive from an LCA perspective, resultant from the range of domestic feedstocks and the use of renewable energy in production.

Short-term funding (in the form of grants or direct government investment) could also be considered to support producers to remove other barriers to SAF production through the **funding of a SAF Clearing House[6]**, designed to support Australian industry in the deployment of SAF, that could be delivered in conjunction with research and industry

[5] https://www.icao.int/environmental-protection/CORSIA/Pages/default.aspx

[6] More information can be found at: https://www.safclearinghouse.uk/faqs#:~:text=The%20UK%20SAF%20Clearing%20House%20is%20designed%20to%20support%20UK,many%20producers%20are%20international%20organisations

partners. In place in the United Kingdom and under development in the European Union, SAF Clearing Houses support potential producers to efficiently obtain ASTM[7] standard evaluation, through services including pre-screening, testing, capacity building and report writing.

Boeing also recommends concurrently developing SAF accounting mechanisms to be incorporated as part of the broader suite of policy development. This includes exploring flexible accounting mechanisms that can allow the environmental attributes of SAF to be detached from the physical fuel. Further, being able to recognise scope 1 and scope 3 SAF credits can encourage participation of the corporate sector in helping accelerate commercial deployment of SAF. SAF accounting, including 'book and claim' is being discussed globally including in ICAO's Fuels Task Group and Boeing recommends the Australian Government actively contributes to shaping this discussion. A flexible but robust SAF accounting mechanism could open opportunities for Australia to explore bi-lateral SAF agreements or 'green trade lane' opportunities. This would open up further markets for Australian-produced SAF, whilst also ensuring robust guarantee of origin mechanisms provide certainty over sustainability claims.

The inclusion of a focus on electric propulsion, including from **hydrogen fuel technology, in the short-term is cautiously supported by Boeing**, however several points should be considered. The relative abatement contributions of these technologies will be significantly less than SAF in the short-term. While abatement potential may be substantial in the longer term (beyond 2050) it is important to not disproportionately fund these technologies while commercial SAF development remains immature. Additionally, comprehensive infrastructure changes, including at airports, will be required for electric and hydrogen deployment and must be addressed in cost-benefit abatement analysis. As such, immediate term policy action and investment should be mindful of these issues and target specific use cases, for example small aircrafts and short-haul flights. Nevertheless, ongoing research and development of these technologies is an important complementary measure to SAF to ensure aviation meets long-term decarbonisation goals.

Medium-term 2030-2040

Boeing supports continued investment in synthetic SAF in the medium term, but also contends ongoing support for biogenic SAF production will continue to be required

Boeing supports the Roadmap's inclusion of investment in synthetic SAF in the medium term, however we also note that investment post 2030 will continue to be required for other SAF feedstocks, including biogenic SAF production. As recommended in the *Boeing-CSIRO SAF Roadmap*, this should include investment in research and development to reduce the costs and logistical hurdles for biogenic supply chains and the continued scaling of power-to-liquid production.

Whilst grants or direct government investment, may only be available in the short term (up to 2030), other complementary support mechanisms will be required in the years to 2040. These could include **feedstock-neutral financial stabilisation mechanisms as part of a suite of supply-side policies**. One example that have proved to be effective are Contracts for Difference (CfDs). CfDs have been utilised in various aspects of the energy sector globally, including in low carbon electricity projects in the United Kingdom and in renewable energy programs across Europe.

Ongoing monitoring, evaluation and, if necessary, iteration of policy mechanisms should occur, particularly as a domestic SAF industry matures in the years between 2030-2040. The progress towards decarbonisation goals should be reviewed regularly to ensure

[7] ASTM International, formerly known as American Society for Testing and Materials, is an international standards organization that develops and publishes voluntary consensus technical standards

policies remain targeted and effective. Additionally, global action to drive SAF production and uptake may also affect domestic industry development and policy implementation should remain cognisant of and responsive to such developments.

Boeing supports the ongoing efforts of Australian airports to become operationally net zero, noting the work program being delivered in this space through Australia's Jet Zero Council. Though, whilst investment in airport infrastructure to support hydrogen or electric flight is required, it should be targeted and complementary to investment in driving broadscale SAF uptake.

Long-term 2040-2050

Boeing supports the roadmap goal of the majority of aviation fuel in Australia being SAF by 2040

Australia is well positioned to achieve this goal with its vast supply of feedstock, strong aviation sector and skilled workforce. However, a suite of integrated and stackable policies will be required to mobilise action in the short-term and set Australia on a path to majority SAF beyond 2040. In a practical sense, this will imply moving from no continuous production to more than 5 billion litres per annum in just 16 years.

Given the nascency of alternative propulsion technologies and the need for in-sector decarbonisation rather than offsets, SAF provides the primary lever in both the immediate and longer-term reduction of unavoidable emissions from aviation. The compatibility of SAF with existing and new aircraft, both from a commercial and military perspectives, along with its ability to decarbonise long haul flights is particularly important.

Boeing would support the development of a more detailed set of actions for the longer-term 2040-2050 timeframe in the Roadmap, informed by modelling from our *Cascade* Climate Impact Model and developed through cross industry collaboration. Boeing also recommends that this set of actions include **pursuing a portfolio approach of technologies, including increased commercialisation** of large- scale power-to-liquids productions at locations across Australia.

Conclusion

The government's development of a Transport Net Zero Roadmap is critical to achieving Australia's emissions reduction goals. It also recognises the significant economic, connectivity and social benefits that the sector provides. Boeing welcomes the Government's additional focus on the aviation sector as part of its policy agenda, noting that the policy announcements and intent set by the Government particularly provide a strong foundation for developing a domestic SAF industry.

Boeing supports the five principles proposed to guide the ongoing development and implementation of the Transport and Infrastructure Net Zero Roadmap and Action Plan. We also propose a number of other key considerations to be incorporated, with a particular focus on the aviation sector as one that is potentially more difficult to decarbonise. These include the importance of both integrated short-term and phased longer-term policies that support new industry development and maximise potential economic opportunities for Australia.

Boeing supports the focus on SAF as the most immediate and largest contributing lever to decarbonise aviation transport. In this submission, we have suggested key areas of focus for policy development to support the development of a domestic production industry and the broader uptake of SAF. Boeing also acknowledges the role of other abatement mechanisms, including advanced technologies, however remains cognisant of the additional challenges surrounding their uptake in the short-medium term. Boeing

thanks the Government for the opportunity to provide input into the development of policy for a net zero transport sector and remains committed to ongoing action, including through our continued participation on Australia's Jet Zero Council.