AIR NEW ZEALAND

20 June 2023

Climate Change Commission
Level 21, 1 Willis Street
WELLINGTON 6011

AIR NEW ZEALAND SUBMISSION ON THE CLIMATE CHANGE COMMISSION'S 2023 DRAFT ADVICE FOR CONSULTATION

1. Air New Zealand welcomes the opportunity to submit on the Climate Change Commission's (the **Commission's**) 2023 draft advice on the Government's second emissions reduction plan (the **ERP**).

2. Air New Zealand is supportive of a national strategy for decarbonising the New Zealand economy, accompanied by appropriate policy settings and investment, and is committed to playing its part in the global response to addressing climate change.

Air New Zealand's decarbonisation targets

3. Air New Zealand has a net-zero 2050 target and a 2030 carbon reduction target endorsed by the Science-Based Targets initiative. The 2030 target is aligned with a 1.5°C warming scenario[1] and requires a 28.9 percent reduction in carbon intensity by 2030.[2]

4. Air New Zealand has a range of levers available to it to achieve this ambitious target. Some of these levers, including the fleet the airline deploys, the network it flies and the way it operates its aircraft are within the control of the airline. Other levers, including access to sustainable aviation fuel (**SAF**), cannot be realised by Air New Zealand alone. Reaching the 2030 target will be dependant on policy support and appropriate demand signals to access sufficient volumes of credible SAF in North America and the Asia Pacific region. It is strategically important to Air New Zealand to work with the New Zealand Government to unlock access to SAF in New Zealand.

New Zealand's aviation obligations

5. New Zealand is subject to the International Civil Aviation Organization's (**ICAO**) long-term aspirational goal for international aviation of net-zero carbon emissions by 2050. ICAO modelling suggests that SAF will be the primary technology deployed to achieve this target.[3] Laying the foundation for domestic production of SAF and an import supply chain in the second ERP, will demonstrate New Zealand's commitment to its international obligations, align New Zealand with its peers in the international climate community, and set New Zealand up for success in achieving its longer-term international obligations. This will be particularly important if a decision is made to include international aviation emissions in New Zealand's domestic emission reduction targets in the intervening period.

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[1] Science-Based Targets Initiative. 2023. *Technical Report: The SBTi Interim 1.5°C Sector Pathway for Aviation* (online). Available here.

[2] Carbon intensity is measured as the greenhouse gas emissions per Revenue Tonne Kilometre (**RTK**). RTK is a measure of passenger and cargo payload carried by Air New Zealand. This goal requires the airline to reduce the carbon intensity associated with the "well-to-wake" emissions from the jet fuel it uses – these are the entire life cycle emissions of the jet fuel. This includes emissions from the combustion of jet fuel in flight (scope 1 emissions) as well as the upstream emissions generated by the production and distribution of that jet fuel (known as scope 3, category 3 emissions). The target is measured against a 2019 baseline.

[3] ICAO Committee on Aviation Environmental Protection. 2022. *Report on the Feasibility of a Long-Term Aspirational Goal (LTAG) for International Civil Aviation CO2 Emission Reductions* (online). Available here.

An important period for aviation

6. The second emissions budget period from 2026 – 2030, is an important period for Air New Zealand and the New Zealand aviation sector. It will be the critical period to embed the required technologies and lay the foundation for more widespread and rapid progress from 2030 to 2050. Globally, it is envisaged that SAF (both biomass derived and Power-to-Liquid) and next generation aircraft concepts (battery electric, hybrid and hydrogen fuel cell) will develop, commercialise and begin scaling in this period to support the sectors decarbonisation from 2030. Development, commercialisation and scaling of these technologies in New Zealand will only be possible with policy support.

7. It is important that New Zealand follows Europe, the United Kingdom, and the United States of America by providing an enabling policy environment for decarbonisation in the aviation sector. An enabling policy environment will allow decarbonisation technologies to be established and accessed in New Zealand and the corresponding emissions reductions recognised in New Zealand's greenhouse gas inventory. A lack of policy direction in the second ERP period will compromise New Zealand's ability to realise emissions reductions from aviation as Air New Zealand will be forced to uplift SAF in offshore ports where it is available.

Air New Zealand is supportive of the draft advice as it relates to aviation

8. Air New Zealand is supportive of the Commission's draft advice as it relates to aviation decarbonisation. We welcome the Commission's recognition of the important role SAF will play in the period, including the need for a SAF mandate to send a demand signal to the global market, recognition of the value created by domestic production of SAF and the need for biomass to be prioritised for hard to abate sectors (like aviation).

9. We also welcome the Commission's recognition of next generation aircraft entering into service on the domestic network from 2030 and the need to update the regulatory framework in the second ERP.

10. Air New Zealand proposes the following amendments and additions would further strengthen the draft advice as it relates to aviation:

    - **Recommendation 1:** Aviation should not be classified as part of the freight sector. Aviation should be recognised as a sub-part of transport with its own **aviation specific targets**. Implementation of a cohesive and coordinated **strategy** for the aviation sector that considers both **domestic and internationa**l emissions and a national roadmap to net-zero in 2050 is recommended.

    - **Recommendation 2**: Air New Zealand agrees the New Zealand Emissions Trading Scheme (**NZETS**) must be **complemented by other mechanisms** and **interventions** that incentivise investment and choices, such as taxation, grants and subsidies. As a hard to abate sector, aviation decarbonisation will not be incentivised through the NZETS alone. Aviation is a clear example of where complementary policies alongside the NZETS must be implemented.

    - **Recommendation 3**: Given the importance of establishing access to continuous supply **SAF** in the period, we recommend greater and more granular actions relating to the **importation** and **domestic production** of high integrity SAF in New Zealand in the period.

We recommend waste **biomass is prioritised** for hard to abate sectors with limited abatement alternatives and we recommend the Commission apply more thought to the role of **green hydrogen** as an input to Power-to-Liquid SAF in the period. **These recommendations are outlined in further detail in appendix 1 (SAF) and appendix 3 (renewable electricity and green hydrogen)**.

- **Recommendation 4**: New Zealand is well suited to **next generation aircraft** technologies. Air New Zealand has an aspiration to begin replacing its Q300 domestic fleet with lower emission novel propulsion alternatives from 2030. Realising this goal requires access to sufficient volumes of **additional renewable electricity**, a suitable **transmission** and **distribution system**, a functioning **green hydrogen industry** and fit for purpose **regulations** designed for novel propulsion aircraft concepts. Designing and implementing appropriate regulations in time for these new aircraft, will require greater capability and resource than those available today. The second ERP period will require significant development to occur across all these areas. We recommend the Commission **reconsider the role of green hydrogen** in the period for hard to abate sectors. **Specific recommendations are outlined in further detail in appendix 2 (next generation aircraft) and appendix 3 (renewable electricity and green hydrogen)**.

- **Recommendation 5**: As a hard to abate sector, green hydrogen is likely to be a key energy source for aviation, both as a feedstock for **Power-to-Liquid SAF** and for **novel propulsion aircraft concepts**. During the ERP period more focus, planning and action must occur to begin delivering the required scaling of renewable electricity generation and distribution and the associated green hydrogen infrastructure. **Specific recommendations are outlined in appendix 3 (renewable electricity and green hydrogen)**.

11. Air New Zealand notes the Commission's modelling suggests that New Zealand could meet its 2050 target if outbound international aviation emission were included in domestic targets. If international aviation emissions are included in the domestic target in the period, there would be an even greater need for a viable SAF supply to be established as soon as possible.

12. Air New Zealand supports Government coherence and coordination. In particular, Air New Zealand notes the importance of bipartisan and enduring support for climate action, both mitigation and adaptation, and the second ERP. This will provide certainty for the significant investment decisions and commitments that need to be made to meet decarbonisation targets.

13. We welcome further constructive discussion on the content of this document and look forward to working with the Government as it implements the Commission's final advice. Should you require further specific information on the above, please contact Jenny Sullivan (jenny.sullivan@airnz.co.nz).

Ngā mihi

Kiri Hannifin
Chief Sustainability Officer

Appendix 1: Sustainable aviation fuel recommendations

1. Sustainable aviation fuel (**SAF**) will be the primary mitigation technology used by the aviation sector in the period and will be a key enabler for Air New Zealand in progressing towards its 2030 science-based carbon reduction target.

2. In the period, Air New Zealand expects to uplift SAF in markets where it is mandated to do so and where it can enter into offtake agreements at competitive prices while adhering to its internal sustainability criteria. SAF uplifted in international ports will not be recognised in New Zealand's national inventory but will be recognised by Air New Zealand.

3. Establishing access to SAF in New Zealand in the period is fundamental to longer term progress towards New Zealand's 2050 aspirations and to provide New Zealand with some energy security. Accessing SAF in New Zealand in the period will be done via importation of the physical product to New Zealand, domestic production and via emerging global "Book and Claim" platforms.

4. We note that ICAO's CORSIA regime in its current form is unlikely to "significantly increase" demand for SAF as currently noted in the draft advice. The introduction of SAF specific mandates globally are more likely to be the primary drivers of global SAF demand in the ERP period.

Sustainability criteria important to mitigate risk of damaging outcomes

5. Not all SAF is created equally. Sustainability criteria must be embedded and regulated throughout New Zealand's development of a SAF industry. Strict sustainability criteria must be attached to feedstocks, life cycle emissions reduction and supply chains. This is important for the environment, the climate and to maintain the social licence to use these fuels in New Zealand.

6. Internationally, debate as to the sustainability of certain feedstocks is continually evolving. We encourage the Commission to recommend the Government engage on the global decision making on the sustainability of feedstocks. This is critical to ensure upmost integrity of the standards and to ensure the sustainability credentials of New Zealand's unique feedstocks are recognised (as appropriate).[4]

7. The evolving debate as to which feedstocks are considered sustainable presents a significant risk for SAF producers. Feedstock is the most expensive component of SAF production, and so certainty as to feedstock cost, supply, and acceptability is central to any investment in SAF production. Transparent and clear sustainability criteria will be essential to encourage investment in domestic SAF production. This will also be important for assessing and securing the supply of SAF produced in other jurisdictions.

[4] Air New Zealand notes the risk to feedstock supply in New Zealand from the Roundtable for Sustainable Biomaterials, which has proposed putting strict limits on the use of woody biomass from post-harvest residues. Air New Zealand and Scion have been engaged on this issue and welcome further engagement. Notwithstanding, Air New Zealand fully supports independent third-party certification of feedstock supply chain sustainability and see this certification as an important component underpinning the success of a domestic SAF industry.

Establishing a SAF specific mandate

8. In the first Emissions Reduction Plan, the Government committed to implement a SAF mandate. The Government committed to deliver the policy recommendations on the design of a SAF mandate by December 2022.[5] This has not yet been delivered and it is uncertain whether the policy recommendations will be completed in 2023.

9. Given the importance of a suitable mandate being in place in the period, we note the primary considerations that should be contemplated in the policy design process.

10. A SAF-specific mandate is required as soon as possible to provide the certainty of demand and economies of scale required for investment in domestic SAF production and imported SAF supply.

11. Any mandate must apply to all aviation fuel uplifted in New Zealand regardless of destination. This is required to achieve the economies of scale for domestic production and imported supply, and to prevent competitive distortions arising.

12. Alongside a SAF-specific mandate, additional policies, incentives and investment are essential to support the establishment of a SAF industry in New Zealand and to close the commercial gap with fossil jet fuel. This includes policies to prioritise biomass feedstock for SAF production. A SAF mandate alone will not make SAF commercially viable.

13. The mandate design should incentivise access to and scaling of Power-to-Liquid SAFs and blend diversification. In this respect we reference the United Kingdom's SAF mandate design as an example.[6] The United Kingdom's proposed mandate includes a fixed portion of the mandate applying to Power-to-Liquid SAF.

14. SAF would need to achieve a minimum carbon intensity reduction compared to fossil jet fuel in order to be eligible for the mandate. The mandate should be designed to incentivise SAF with the lowest carbon intensity. We recommend a minimum 60 percent carbon intensity reduction compared to fossil jet fuel (equal to a maximum carbon intensity of 35.6 gCO2e/MJ) should be introduced for all fuel types.

15. The mandate design should provide a relief mechanism in the event eligible SAF cannot be sourced. However, access to this mechanism should be limited to prevent strategic non-compliance. A supplier using a relief mechanism would discharge their obligation without any reduction in emissions. As such, the policy design should ensure it is only used in limited circumstances. The United Kingdom's SAF mandate design uses a buy-out mechanism as a relief mechanism.[7]

16. Air New Zealand endorses the approach to SAF mandates adopted by the UK and the European Union.

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[5] Ministry for the Environment. 2022. *Aotearoa New Zealand's first emissions reduction plan: Table of actions*. Wellington: Ministry for the Environment.
[6] United Kingdom Department for Transport. 2023. *Pathway to net zero aviation: Developing the UK sustainable aviation fuel mandate* (online). Available here.
[7] Ibid.

The role of incentives and interventions

17. The US has taken a different approach to accelerating the supply of SAF by introducing a comprehensive suite of State and Federal incentivisation support to address the price premium SAF commands relative to fossil jet fuel. Under the Biden administration's SAF Grand Challenge, an aspirational policy to produce 3 billion gallons of SAF in the US by 2030 has been set.[8] This goal is supported by a blender's tax credit of up to USD $1.75/gallon under the Senate's Inflation Reduction Act and well as layers of other State incentives.

18. These incentives have resulted in the majority of SAF produced globally being exported to the US to access the subsidies and the most cost-effective access to SAF for airlines being SAF sourced from the US. While the current SAF blending limitation of 50 percent must be taken into account,[9] Air New Zealand is able to uplift some SAF from the US ports it flies to. This will help the airline access cost effective SAF commercially in the short term but does not provide longer term domestic resilience. It also creates competitive distortions in the aviation market as US based carriers have access to the most cost effective (and abundant) volumes of SAF.

19. Alongside mandates, the EU have incentives enabled via the EU Emissions Trading Scheme. The United Kingdom have signalled the consideration of interventions and incentives, following the Phillip New report detailing the importance of interventions to operate alongside the mandate.[10]

20. Air New Zealand supports the role of a mandate to send a clear demand signal to the market, but also sees a role for incentives to sit alongside the mandate to address the price premium SAF commands. This could primarily operate as a blender's tax credit in a similar manner to the support offered in the US, albeit with stronger sustainability criteria controls. The introduction of a complementary incentive system would also smooth the impact of competitive distortions arising from unilateral policy decisions globally and would help direct supply of SAF to New Zealand.

21. Air New Zealand notes that the Climate Emergency Response Fund, the Low Emissions Transport Fund or the International Visitor Levy could all provide proximate sources of funding for such an incentive.

Importation of SAF to New Zealand

22. Until SAF is produced domestically, accessing physical SAF in New Zealand (voluntarily or via a mandate) will rely on importation of SAF. Importation of SAF is expected to be the primary source of domestic SAF volumes in the first half of the ERP period.

23. Any incentive introduced should apply to imported SAF as well as any domestically produced SAF.

24. It is important that imported SAF is classified correctly, to ensure New Zealand and the user of the SAF gets the correct recognition and the NZETS operates correctly. Customs and Excise representatives must be empowered to code SAF separately from fossil jet fuel. This currently

[8] The White House. 2021. *FACT SHEET: Biden Administration Advances the Future of Sustainable Fuels in American Aviation* (online). Available here.
[9] SAF can be blended at different levels with limits of 10 percent to 50 percent, depending on the feedstock and how the fuel is produced. More detail here.
[10] Phillip New. 2022. *Developing a UK Sustainable Aviation Fuel Industry - Independent Report* (online). Available here.

does not occur. Without the appropriate recognition and classification at the border, the benefits of SAF will not be recognised in the NZETS or in New Zealand's national greenhouse gas inventory.

Support domestic resilience through local production of SAF

25. Air New Zealand in partnership with the New Zealand Government, has announced it will proceed to the second phase of a detailed feasibility study considering the viability of domestically produced SAF.[11] The second phase of the study will involve Lanza Jet and Fulcrum Energy considering the viability of SAF production in New Zealand using woody biomass and municipal solid waste as feedstocks respectively.

26. As well as supporting aviation emission reductions (and indirectly supporting New Zealand's trade and tourism industries), domestic production of SAF would have wide ranging benefits for New Zealand and the broader economy. Domestic SAF production would create green employment opportunities in regional New Zealand, it would provide New Zealand with a greater degree of energy security, it would provide an end-of-life solution for traditional waste products (including slash and debris from forestry), improve air quality and it would create exportable intellectual property for New Zealand.

27. Part of the viability consideration will include identification of policy measures that could be implemented to make domestic production feasible. We strongly encourage the Commission and the Government to engage in this process and support the required policy interventions as options arise.

28. As part of this study, it is anticipated that further clarity regarding access to biomass in the economy will be required. We recommend a hierarchy of use cases be urgently established as part of the broader bioeconomy development to inform this process. This hierarchy must consider priority access to biomass resources for hard to abate sectors where alternatives (such as electrification) are not possible. Commercial feasibility should not be the sole driver of access to biomass, particularly where electrification is possible.

29. If domestic SAF production is considered viable, there are mechanisms that can help to de-risk first of a kind plants. We encourage the Commission to consider the role of capital grants, low interest loans and favourable tax treatment for first of a kind plants.

30. We note that the United Kingdom Government has invested in the development of eight domestic SAF plants and established a £165m Advanced Fuels Fund designed to support domestic SAF production projects through to commercial-scale production. The United Kingdom has a public ambition to have at least five commercial-scale SAF plants under construction domestically by 2025.[12]

Support PTL SAF in the period

31. The global supply of biomass derived SAFs are constrained by limits to sustainably sourced bio-feedstocks. As such, it is important to diversify feedstocks and support a wide range of SAF

[11] Ministry of Business, Innovation and Employment. 16 June 2023. *Studies fuel investigation into sustainable air travel* (online). Available here.
[12] United Kingdom Government. 2022. *Advanced Fuels Fund (AFF) competition winners – Transparency data* (online). Available here.

technologies. For the aviation industry to reach its collective net-zero 2050 target, Power-to-Liquid (**PTL**) SAF will be required in commercial volumes, scaling from 2030.

32. PTL SAF is created from water and captured CO2 (from point sources or captured directly from the atmosphere) and is converted into a liquid SAF using renewable electricity, electrolysers, and a Fischer-Tropsch synthesis. Theoretically there are no feedstock constraints for PTL SAF. Research conducted by the Mission Possible Partnership suggests the supply potential for global renewable electricity generation exceeds projected PTL SAF demand.[13] The production cost of PTL SAF is around 3–9 time the average historical jet fuel price but is expected to drop to around 2.0–4.5 times by 2030.[14] Currently, 85 percent of the cost of PTL SAF production stems from hydrogen production and the related renewable electricity generation.[15] Accessing commercial volumes of PTL SAF from around 2030 is critical in the aviation sector's progress towards net-zero 2050.

33. Given the cost of PTL SAF compared to other SAF technologies, it will need support to get to market. In the second ERP period, the Commission is encouraged to support New Zealand's domestic production of PTL SAF.[16] Production of PTL SAF can primarily be supported by reducing the cost and increasing the supply of additional renewable electricity, and supporting the affordable production of green hydrogen. This is further discussed in appendix 3.

34. Creating a demand signal for PTL SAF via a SAF mandate (similar to the proposed UK SAF mandate) is also supported by Air New Zealand.

Approve Book and Claim system aligned with global best practice

35. Book and Claim systems allow the environmental attributes of SAF to be separated from the physical SAF product. Based on Renewable Energy Certificates, Book and Claim systems (that have been designed with appropriate safeguards) offer great opportunity to New Zealand in the ERP period, given the lack of SAF production in the Asia Pacific region.

36. While Book and Claim systems continue to evolve, the RSB Book and Claim system is emerging as the agreed front runner.[17] It is expected that organisations will be using Book and Claim to address scope 1 and scope 3 emissions from the beginning of the ERP period. Uptake in New Zealand will largely rely on Governmental recognition of the application of Book and Claim.

37. Air New Zealand hopes to use Book and Claim systems to access SAF to address its scope 1 emissions and to potentially utilise Book and Claim to pass scope 3 emissions reductions to customers.

38. Air New Zealand recommends monitoring the development and global endorsement of Book Claim systems to ensure New Zealand does not fall behind in the acceptance of these systems for accessing SAF supply.

[13] Mission Possible Partnership. 2022. *Making Net-Zero Aviation Possible – An industry backed, 1.5°C aligned transition strategy* (online). Available here.
[14] Ibid.
[15] Ibid.
[16] Channel Infrastructure. 31 Oct 2022. *Channel Infrastructure and Fortescue Future Industries progress scoping study for Green Hydrogen Production at Marsden Point* (online). Available here.
[17] Roundtable on Sustainable Biomaterials. 2023. *RSB Book & Claim Manual, version 2.0* (online). Available here.

Appendix 2: Next generation aircraft

1. New Zealand is ideally suited to advance the global development of novel propulsion aircraft concepts, due to its largely renewable grid and its high portion of short-range routes.

2. Air New Zealand has established a work programme designed to accelerate the development of next generation aircraft technologies[18] and the infrastructure required to make these a reality for commercial aviation in New Zealand.

3. Air New Zealand has aspirational goals that are relevant to the ERP period. The airline aims to fly the first commercial demonstrator flight from 2026; and hopes to begin replacing the Q300 domestic fleet with a more sustainable aircraft – likely green hydrogen or battery hybrid systems from 2030.

4. The draft advice notes "*The introduction of zero or low emissions aircraft – for example, battery electric or hydrogen fuel – is anticipated in Aotearoa New Zealand during the third emissions budget, servicing short or medium haul routes. It is important that regulations are developed during the second emissions budget to enable this*". Air New Zealand supports this acknowledgement but encourages the Commission to revisit deployment timeframes to align with Air New Zealand's next generation aircraft programme and to provide more targeted recommendations to help the airline stay on track to meet these ambitious goals.

5. A suitable regulatory environment is not the only area that requires significant focus in the period. Ensuring the required infrastructure is in place to operate these new aircraft in a timely manner will be critical to their success. This means not only new physical infrastructure at airports, such as hydrogen storage tanks and battery charging stations, but also great amounts of renewable electricity to ensure that these new technologies reduce the sector's emissions but not at the expense of the broader economy's transition to a low emissions future. Advice regarding renewable electricity generation, distribution and green hydrogen production is included in appendix 3.

6. Air New Zealand is part of the Aviation Hydrogen Consortium alongside Airbus, Fortescue Future Industries, Hiringa Energy, Fabrum and Christchurch Airport. The Consortium have been actively investigating the role and size of aviation hydrogen demand in New Zealand. It is recommended the Commission engage with members of the Consortium on this topic to enhance the Commission's final advice.

Enabling aviation value chain infrastructure

7. The operation of next generation aircraft will require new infrastructure value chains. It is expected New Zealand will require a system for battery-electric concepts and one for hydrogen concepts. These systems will include a range of new value chain partners that are not currently part of the aviation ecosystem. These new value chains will need to coexist with the infrastructure required for SAF and traditional fossil jet fuel.

[18] Next generation aircraft technologies encompass battery electric concepts, hybrid concepts and hydrogen fuel cell concepts.

8. In the ERP period, the domestic aviation sector will need to develop new procedures for acquiring energy, safely storing the energy, processing the energy, and distributing it to the aircraft.[19]

9. The level of investment required in airport infrastructure to support next generation aircraft is expected to be significant. Policy support to de-risk investment in such infrastructure should be supported in the ERP period.

10. The aviation sector should be able to apply to or access funding from the Government Investment in Decarbonising Industry (**GIDI**) Fund, the Climate Emergency Response Fund (**CERF**) or the Low Emissions Transport Fund (**LETF**). In some cases, aviation is excluded from accessing these relevant and proximate funds.

11. The United Kingdom Government, via its Department for Transport, the Jet Zero Council and the Aerospace Technology Institute have established a £685m research and development fund to support zero emission flight.[20] We encourage the Commission to consider the role of research and development funding in this area, given the New Zealand aviation sectors' engagement on this issue, the potential for the technology to support the reduction of emissions from domestic aviation and New Zealand's suitability for advancing the global development of novel propulsion flight.

Fit for purpose regulations and standard operating procedures

12. Collaboration across the aviation value chain will be required to understand the policy and regulatory framework required to support the development and operation of next generation aircraft in New Zealand. The pace of the aircraft development remains steady. It is important that the Civil Aviation Authority, as the aviation regulator in New Zealand, matches the pace of technology innovation. It is possible that the implementation of a fit for purpose regulatory system, could be the limiting or deciding factor for the scaling of new aircraft technology in New Zealand.

13. Regulatory settings will need to implemented in the ERP period. While globally it is expected regulation will evolve with the technology, Air New Zealand's aspiration to fly a commercial demonstrator aircraft from 2026 will require the current regulatory settings to be designed and updated in advance of Air New Zealand's commercial demonstrator programme.

14. As a starting point, the commercial demonstrator aircraft and future next generation aircraft will need to be developed within the current regulatory environment which urgently requires additional resource and capability in order implement the regulatory change required to safely deploy these novel propulsion aircraft. While certification is expected to be granted offshore, New Zealand will need to adapt operator rules and look to mobilise greater resources to ensure type certification acceptance can be fast tracked where possible.

15. A regulatory and safety framework will be required for the operation of next generation aircraft in New Zealand and the ground handling equipment specific to these aircraft. Further workplace and health and safety regulations will also need to be developed.

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[19] For more detail, refer to Target True Zero. 2023: *Delivering the Infrastructure for Battery and Hydrogen-Powered Flight*. Page 11. Available here.
[20] United Kingdom Government. 2023. *ATI Programme strategic batch: expression of interest June 2023* (online). Available here.

Appendix 3 – Renewable electricity and green hydrogen recommendations

1. It is recommended that the Commission place greater weight on the central role that green hydrogen will play in decarbonising aviation – both as a feedstock in the production of PTL SAF and as an energy source for novel propulsion aircraft.

2. Air New Zealand is part of the Aviation Hydrogen Consortium alongside Airbus, Fortescue Future Industries, Hiringa Energy, Fabrum and Christchurch Airport. The Consortium have been actively investigating the role and size of aviation hydrogen demand in New Zealand. It is recommended the Commission engage with members of the Consortium on this topic.

3. Achieving commercial viability of hydrogen for aviation in New Zealand is largely dependent on:

    - The cost of renewable electricity generation and transmission to green hydrogen plants.
    - The cost of fossil-based aviation fuel – including the cost of compliance under the NZ ETS or other mechanisms that price CO2e emissions.
    - Ongoing improvements in the efficiency and cost of producing, storing, distributing, and using green hydrogen (liquid and gaseous).
    - Building national green hydrogen demand to increase economies of scale, decrease infrastructure and production costs, and meet the step-up in demand over time.
    - Continued development in aviation use cases – primarily the production of PTL SAF, and the performance and efficiency of hydrogen fuelled aircraft technologies.

4. The development of the domestic hydrogen aviation ecosystem requires new policies and regulation in the ERP period. An enabling policy environment has the potential to allow the industry to achieve commercial success and remain competitive while also meeting emissions reduction targets. A sound regulatory environment (including associated standards) will ensure the industry operates consistently, safely and cleanly.

Renewable electricity generation

5. Aviation hydrogen uses cases will produce significant renewable electricity demand. Greater recognition of the scale of this aviation sector demand is required. In its 2021 advice, the Commission advised on the volume of new generation required and the potential mix of generation sources. However, this analysis underestimates the volume of additional renewable generation that will be required by 2050 to support the decarbonisation of the aviation sector.[21] It is recommended that the Commission update its existing electricity demand forecasts. Air New Zealand would be willing to share data to inform this process.

6. The existing National Policy Statement on Renewable Electricity Generation and the National Policy Statement on Electricity Transmission each need to be updated to better enable the development of sufficient renewable electricity generation and associated transmission infrastructure to meet the required aviation energy needs.

7. Air New Zealand is supportive of policies and mechanisms that will unlock faster and more certain development of renewable electricity generation and transmission services. The length of time that it takes to plan and develop new generation projects and associated transmission upgrades in New Zealand means that developers require certainty ahead of green hydrogen

[21] Climate Change Commission (NZ). 2021. *Ināia tonu nei: a low emissions future for Aotearoa.*

production being confirmed. Policies and mechanisms to encourage and enable development could include:

- Contracts for difference to provide certainty of cashflow to developers of new projects. This is a strategy used by Governments in other countries to encourage new renewable generation, notably the United Kingdom.[22]
- Power Purchase Agreements supplying the New Zealand Government to provide certainty of cashflow to new projects.
- The implementation of Renewable Energy Zones that can enable efficient and coordinated investment in generation and transmission.
- Development of new funding model(s) for Transpower to more efficiently plan, invest and deliver strategic transmission infrastructure that better enables rapid decarbonisation by supporting demand growth and renewable generation development. The current structure may limit the speed of transmission infrastructure development, which in turn constrains the development rate of new generation.
- A review of the electricity industry to ensure it is structured in a manner that encourages the development of new generation at the pace that will be required. The current structure benefits generators where supply constraints keep wholesale market prices at relatively high levels.

8. Transmission and local lines upgrades across New Zealand should occur in lockstep with the scaling of renewable electricity generation.

Regulation and standards

9. Aviation is a global industry where international regulations and standards play an important role. In some cases, New Zealand regulations simply need to endorse the use of international regulations or standards. In other cases, New Zealand specific regulations and standards will be needed.

10. It is recommended the Commission endorse the development of a national policy statement for green hydrogen to guide developers of projects and consenting agencies on best practice.

11. It is also recommended that green hydrogen certification standards are implemented to provide certainty to the aviation sector and to customers that hydrogen of appropriate quality is being used. These standards are likely to be aligned internationally.

12. A thorough review of all regulations and standards relevant to the safe use of hydrogen in aviation and a programme of work developed to ensure appropriate regulations and standards are in place ahead of when they are needed is warranted.[23]

Hydrogen production

13. An enabling policy and regulatory environment will accelerate the production and scaling of green hydrogen by de-risking the investment and by creating certainty.

[22] United Kingdom Government. 2022. *Contracts for Difference – Policy Paper* (online). Available here.
[23] In 2022, the Ministry for Business, Innovation and Employment engaged PwC to prepare a report on hydrogen standards and regulations (PwC. 2022. *New Zealand Hydrogen Regulatory Pathway*). While no aviation participants were consulted, the report identified 44 Acts and 93 Regulations and Rules that may be relevant to hydrogen. The list included the Civil Aviation Act 1990.

14. It is recommended the Commission encourage the implementation of a green hydrogen production credit scheme to de-risk and underwrite the revenue stream for green hydrogen producers.

15. Internationally, incentives and tax credits are supporting the scaling of the green hydrogen industry. In the US, the Inflation Reduction Act grants renewable electricity and clean hydrogen production plants a production tax credit of 2.6 cents per kWh and up to USD$3 per kg of hydrogen, respectively, for the first 10 years of operation.[24]

16. The EU's Green Deal Industrial Plan offers a fixed premium per kg to green hydrogen producers, with a first auction starting in 2023 with an indicative budget of €800M.[25] The RePower EU plan, includes an objective to boost hydrogen production and imports up to 20mt by 2030, supported by an additional €3 billion to support production (sourced from EU emissions trading scheme proceeds).[26]

17. In its 2023 Budget, the Australian Government announced AUD$2 billion in funding for a new Hydrogen Headstart programme to support the scale up of the country's green hydrogen sector.[27] It is expected that this will be implemented as a credit per kilogram on the price of production. Hydrogen Headstart is also expected to provide support for development of infrastructure.

Additionality standards

18. Given the aviation sector's potential wall of demand for green hydrogen, we recommend the Commission advise on additionality standards for the production of green hydrogen.[28]

[24] The International Council on Clean Transportation. 2023. *Can the Inflation Reduction Act unlock a green hydrogen economy?* (online). Available here.
[25] European Commission. 2023. *Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions. A Green Deal Industrial Plan for the Net-Zero Age* (online). Available here.
[26] European Commission. 2022. *Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions. REPowerEU: Joint European Action for more affordable, secure and sustainable energy* (online). Available here
[27] The Hon Chris Bowen MP, Minister for Climate Change and Energy and Senator the Hon Jenny McAllister, Assistant Minister for Climate Change and Energy. 2023. *Hydrogen Headstart to power new jobs & industry* (online). Available here.
[28] Additionality can be defined as renewable energy that would not have been available to the grid in the absence of power demand from the hydrogen plant in question. Additionality rules ensure that the production of green hydrogen does not divert energy from existing power applications, which would likely be replaced with some fossil energy sources leading to increased emissions.