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**Submission on the development of the New Zealand Energy Strategy**

1 Air New Zealand welcomes the opportunity to submit on the Ministry of Business, Innovation and Employment's (**MBIE**) consultations on its energy system discussion documents that will inform the development of the overarching New Zealand Energy Strategy (**Energy Strategy**). We agree with MBIE's objectives for the Energy Strategy:

- Energy affordability and energy equity
- Ensuring that our energy supply is secure and reliable
- Supporting an energy system transition at the pace and scale required to meet our climate change imperatives
- Ensuring that the energy system supports economic development and productivity growth

2 We consider the Energy Strategy should support an efficient transition in line with the above objectives by:

- Considering credible scenarios and pathways to net-zero carbon emissions by 2050 for all major energy end uses, including key transport sectors. For aviation, we believe that both domestic and international aviation energy demands must be part of the analysis.
- Setting national renewable energy targets (spaced through time), rather than disparate targets for individual energy vectors.

- Promoting the use of the most efficient fuels (e.g., in terms of long run abatement cost) for every major energy end use class over time.
- Considering ways to further improve New Zealand's energy resilience.

3 Air New Zealand currently serves 20 domestic destinations, and flies to 30 international ports across Australia, the Pacific Islands, North America and Asia. In FY23, the airline flew more than 15 million passengers, and carried tonnes of exports around the globe and domestically. Before the global pandemic, Air New Zealand's passenger numbers were significantly higher – flying more than 17 million passengers in 2019.

4 As the national airline, Air New Zealand has a critical role in the social and economic success of Aotearoa with respect to domestic and international tourism and travel, and export of Aotearoa's products. Aviation connects Aotearoa to the world and is vital to the basic functioning of our economy, our critical infrastructure and our health system. It is necessary for our exporters to distribute high-value goods to the rest of the world and to import the critical goods and services needed to keep our economy running. It ensures that our people can continue to connect with others at home and abroad, and it is fundamental to the ongoing success of our world-class tourism proposition.

5 Air New Zealand is also committed to playing its part in the global response to the climate crisis. We are committed to decarbonising our operations with the goal of reaching net-zero carbon emissions by 2050. The airline has an interim science-based carbon reduction target which requires a 28.9 percent reduction in carbon intensity by 2030 (from a 2019 baseline). There are few levers available for aviation to decarbonise. Sustainable Aviation Fuel (**SAF**)[1] will play the most significant role – particularly in the long-haul network – because over 80 percent of Air New Zealand's operational energy needs are from long-haul flights. By 2030, Air New Zealand is aiming to be using 10 percent SAF in its overall network. By 2050 next generation aircraft powered directly by electricity and/or green hydrogen are also expected to be critical technologies for reducing carbon emissions, particularly on our domestic network. Supporting the development of, and transition to, these technologies is not something that Air New Zealand can accomplish alone. It will require co-ordination and partnership across multiple sectors both in New Zealand and globally.

6 Our responses to the various consultation documents are outlined in the following paragraphs.

**New Zealand Energy Strategy**

7 The Energy Strategy should consider credible scenarios and pathways to net-zero for all major energy end uses, including key transport sectors while taking into account the need to further improve New Zealand's energy resilience. Policies for fuel sources (renewable electricity,

[1] Sustainable Aviation Fuel is a drop-in replacement for fossil based jet fuel using renewable feedstocks and delivers emissions reductions on a lifecycle basis against fossil fuel equivalents.

woody biomass, fossil gas and so on) need to be considered in this context, so that fuels are put to their most effective uses within the goals for the Energy Strategy.

8 Over the previous 12 months Air New Zealand has experienced multiple disruptions to its fuel supply. The causes of these have been wide-ranging and have been related to; resourcing, asset failures, road transport delays, storage shortages, low stockholding, and most concerningly, fuel quality. New Zealand's energy security and resilience therefore should not be taken lightly as we transition Aotearoa to a more renewable energy system.

9 We further support a national renewable energy target (which we envisage taking the form of individual targets spaced through time), rather than disparate targets for individual energy vectors such as electricity. A renewable energy target encompassing and integrating all forms of energy is a precursor to holistic policy settings that help Aotearoa achieve its decarbonisation goals affordably, equitably, securely, reliably, at pace, at scale and in a way that supports productivity and economic development.

10 A joined-up long term approach to the energy system also requires government to strike the right balance between being prescriptive about how various energy sectors make the transition and establishing and promoting incentives to decarbonise.

11 Aviation, as one of the most hard-to-abate and energy intensive sectors, is an example of the importance of applying scenarios and pathways analysis to determining energy needs. This is because the sector may draw significantly upon numerous fuel sources and energy vectors as it decarbonises – renewable electricity for battery electric aircraft, renewable electricity for green hydrogen, biomass for SAF, renewable electricity for drop-in "eSAF," and so on. The relative contribution of each energy vector will change over time and is affected by wider societal changes and policy choices. For example, our modelling indicates that as much as 850 GWh of renewable electricity may be required for Air New Zealand's domestic fleet decarbonisation in 2035 (green hydrogen production and battery electric aircraft), growing to circa 3 to 6 TWh per annum by 2050.[1] These estimates do not consider the potential electricity demand for green hydrogen used in producing eSAF or the potential electricity demand for capturing atmospheric carbon dioxide to use as an input to eSAF or to mitigate any residual emissions.

12 Despite international aviation currently being outside New Zealand's domestic carbon reduction targets, Air New Zealand encourages the consideration of both domestic and international aviation energy needs within the Energy Strategy. It is anticipated that the treatment of international aviation emissions will evolve in the period to 2050 placing even greater demands on local renewable energy and electricity sources. We note the Climate Change Commission must advise the Government by the end of 2024 whether (and if so, how)

[1] The figures quoted are derived from Air New Zealand's own modelling as well as the report from the New Zealand Hydrogen Aviation Consortium: https://www.h2aviationconsortium.co.nz/.

international aviation and shipping emissions should be included in New Zealand's carbon reduction targets.

13 The Strategy (and specific policies that stem from it) must be designed to promote the use of the most efficient fuels (e.g., in terms of long run abatement cost) for every major energy end use class, thereby helping to avoid decisions that could ultimately prove costly for Aotearoa or hinder the pace of the transition.

14 The Energy Strategy (and related policies) must also be adaptable to change – be it technological, economic, geopolitical, or otherwise. This is necessary to ensure that allocation of fuels to end uses remains broadly efficient over time.

15 Finally, the National Energy Strategy must consider how Aotearoa's energy needs are met from both domestic and international energy sources. Aotearoa could credibly be a major renewable energy exporter and/or importer (e.g., for green hydrogen), and where the country ultimately sits on the import-export continuum could have significant implications for the Energy Strategy objectives.

**Measures for transitioning to an expanded and highly renewable electricity system**

16 We agree that it is conceivable that the "energy only" wholesale electricity market, coupled with just the New Zealand Emissions Trading Scheme (**ETS**) price signal *may* not be sufficient to incentivise new renewable generation and fossil fuel generation retirement at the necessary pace and scale to meet the country's decarbonisation objectives. Air New Zealand's experience from the aviation industry is that the ETS carbon price is insufficient to drive the switch to renewable fuels in and of itself.

17 *However*, unlike aviation, the New Zealand wholesale electricity market (in tandem with the ETS) has delivered investment in new renewable generation over the past decade, as well as significant fossil fuel plant retirements at Ōtāhuhu and Southdown. This has resulted in a national grid that is well over 80 percent renewable today and on track for the mid to high nineties.

18 Private investment in the onshore renewable energy development pipeline is strong. BCG (as cited in MBIE's discussion document) has identified circa 11 GW worth of projects intended to be built against a need of 4.8 GW by 2030. Transpower's connection enquiries currently total circa 28 GW for new wind, solar and geothermal projects, with over a quarter having progressed to the investigation stage or later.

19 Therefore, policy measures to further incentivise new renewable generation and fossil fuel generation retirement should be considered carefully, and interventions should be targeted towards specific issues or market failures that are well-defined and clearly understood.

20 We also observe that private investors in renewable generation appear to be strongly incentivised to commit to new projects by signs of material electricity demand growth. Hard-

to-abate sectors like aviation are potentially a very large (refer paragraph 11 above) source of demand growth. However, such sectors often require government to set clear long-term demand signals to the market such as with incentives, fuel standards, and/or mandates to de-risk and kick-start action to overcome initial commercial, technological, supply chain and regulatory challenges before they can achieve decarbonisation at scale. Initiatives such as the proposed regional hydrogen transition rebate scheme are valuable in this regard, not for just the demand side, but also for the beneficial knock-on effects they create for the supply side. The EU has introduced the ReFuelEU Aviation Regulation that sets targets for a minimum percentage of SAF to be used as a blend with jet fuel in air operations from 2025. This percentage will be gradually increased to stimulate increased production and uptake of SAF. By 2050, the aim is for 70 percent of all fuel supplied in EU Airports to be SAF.

21 We agree with MBIE that growth in intermittent renewables will create an increased need for demand and/or supply flexibility across all time horizons. We need firm capacity to supply power demand when intermittent renewable generation is relatively low and demand is relatively high (such as a cold, still winter night), as described in the discussion document under "Ensuring sufficient firm capacity." Conversely, we need energy reserves on a seasonal scale to supply the country through an extended "dry" period of low hydro lake inflows, as discussed primarily in the section on "Managing slow-start fossil fuel capacity."

22 **Ensuring sufficient firm capacity:** We believe that short term capacity adequacy may be a somewhat manageable problem for the industry. Traditional short-term firming assets such as flexible hydro plant and gas peaking plant will face competition from the entry of distributed and utility scale battery storage as well as distributed and large-scale demand flexibility.

23 Therefore, short term storage solutions deployed at grid scale may not require explicit support. These technologies are adept at meeting brief capacity constraints and will face price signals to do so via elevated and volatile spot prices. Other revenue streams also exist to support battery "value stacking," such as wholesale market ancillary services. Similarly, fossil gas peaking generation will very likely face strong market incentives to operate in a more volatile spot market, as well as to provide energy security in "dry years."

24 **Managing slow-start fossil fuel capacity:** We support notice periods for the closure of major slow-start fossil fuel plant as a means of providing certainty to the market through the prospect of "managed exits". What combination of (renewable) technologies will securely and reliably replace such plant during "dry years" is still the subject of some debate. Depending on how supply and demand dynamics evolve throughout the energy transition, there may be a need for enhanced policy settings and/or market measures to encourage solutions like intermittent renewable "overbuild," geothermal power, seasonal demand flexibility, seasonal storage projects and others to come to the fore.

25 **Large-scale demand flexibility:** We believe large-scale demand flexibility is a means of reducing the costs of firming intermittent renewables. This in turn reduces energy costs for (flexible) electricity users, lowers barriers for intermittent renewable project investments and

can support both short-term capacity and long-term energy adequacy. A sensible starting point to aid such flexibility might be better information and education to support investment decisions on both the generation and demand sides. Initiatives that assist suppliers and users in connecting with each other may also be beneficial, as would projects to address complexities in contracting the output of intermittent renewables.

26 **Transmission networks:** The risk of Transpower investing "too early" in national grid upgrades is now increasingly outweighed by the risk of investing "too late" (and therefore delaying decarbonisation activity), especially given the long lead times in permitting, designing and constructing large transmission projects. We agree with Transpower's sentiment that "a strict market benefit test [for major transmission projects] may not be flexible enough to take into account wider NZ Inc benefits such as Government climate change policy and CO2 emissions."

27 **Distribution networks:** We agree that removing barriers to connecting new demand (e.g., due to inconsistencies in each distributor's business policies, processes and capacity as well as existing regulatory constraints) and improved cost allocation methods that do not inordinately deter "first mover" decarbonisation projects are important priorities to progress. Over the coming decades, airports in both the regions and major centres across Aotearoa will likely be embarking on electricity supply upgrades to varying degrees. Delays to upgrades at these ports may have adverse knock-on effects for aviation decarbonisation and regional productivity and connectivity.

28 **Regulators:** We agree that the statutory objectives of electricity sector regulators should incorporate net-zero objectives. Should such changes be enacted, and given the expectation that the aviation sector will become increasingly coupled (directly or indirectly) to renewable electricity generated in Aotearoa, the regulators may at times need to consider both the domestic and international aviation emissions implications of domestic electricity industry developments. This is because aviation is a sector subject to domestic emissions legislation as well as international agreements governing aviation emissions such as the International Civil Aviation Organisation's Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) and measures to support the global Long Term Aspirational Goal, including a possible global quantitative aspiration on the use of Sustainable Aviation Fuels.

29 **Whole of system:** We strongly encourage all electricity industry actors to consider domestic electricity demand growth potential from direct electric and/or hydrogen aviation, both at domestic and international level as well as the production of eSAF. Whilst such technologies are currently in their infancy, they will make significant strides over the coming decades to 2050 and will bring large demand footprints that the electricity sector should not be blind to.

**Interim hydrogen roadmap**

30 We support the government's broad focus areas as outlined in the discussion document.

31 **Opportunities:** Air New Zealand foresees significant opportunities for green hydrogen in decarbonising the aviation sector in Aotearoa. Our modelling indicates that as much as 15,000-50,000 tonnes of green hydrogen production may be required for Air New Zealand's domestic fleet decarbonisation in 2035, growing to ~60,000-100,000 tonnes per annum by 2050.[1] These estimates do not consider the potential demand for green hydrogen used in producing eSAF.

32 **Challenges:** Conversely, a very hard-to-abate sector like aviation, early in its hydrogen learning curve, faces significant uncertainty as to the extent to which hydrogen aircraft will be available, certified, and capable to fly a variety of missions – much of which depends on technological advancements made by overseas aircraft manufacturers. Naturally, the sector is also very reliant on the ability of the green hydrogen production value chain to scale up to provide fuel supplies reliably. Initiatives such as the proposed regional hydrogen transition rebate scheme are valuable in that they help early adopters overcome the "growing pains" associated with embracing green hydrogen.

33 **Hydrogen's role in the transition:** We agree with MBIE that "hydrogen production from electrolysis uses significant amounts of electricity and is fundamentally less efficient than using electricity directly where possible." It is therefore critical that the country's hydrogen policies (and the National Energy Strategy in general) promotes the use of green hydrogen in the hardest-to-abate sectors that face limited or no alternatives to decarbonise.

34 **Exports:** The government's approach to providing support for green hydrogen exports (or otherwise) must consider the implications for domestic energy/decarbonisation needs and energy security against the economic and international emissions abatement benefits that an export industry may bring. Fuel security is an ongoing concern for Air New Zealand's operation and ensuring New Zealand has enough reserves to adequately respond to any major disruption should be considered in this context. We also agree with MBIE that "we want to ensure the necessary electricity generation and transmission can be consented and built in line with hydrogen [export] production, to avoid compromising decarbonisation in other sectors [domestically]."

35 **Potential for hydrogen supply and demand:** We find it somewhat difficult to comment on MBIE's assessments as the modelling projections are not laid out in sufficient detail to understand projected hydrogen demand at a sectoral level. We are willing to work with MBIE and share details of our own modelling in relation to the aviation sector. As per our comments earlier in this submission, we also reiterate the need for MBIE and other energy industry actors to consider the hydrogen demand potential from not just domestic but also international aviation activities.

[1] The figures quoted are derived from Air New Zealand's own modelling as well as the report from the New Zealand Hydrogen Aviation Consortium: https://www.h2aviationconsortium.co.nz/.

**Gas transition plan issues paper**

36 As we have previously outlined in this submission, we acknowledge the importance of gas in firming renewables whilst renewable alternatives remain scarce and/or less certain, particularly during dry hydrological years.

37 We support biogas as part of the suite of solutions to reduce dependence on fossil gas, but note that biogas feedstocks (e.g., woody biomass) will also have valuable use cases in producing liquid fuel for hard-to-abate sectors like aviation. As outlined previously, we support an Energy Strategy that enables all sectors to deliver net-zero by 2050 and provides direction for such (often scarce) fuel stocks to be put towards use cases where alternatives are limited, very costly or non-existent.

38 We support hydrogen blending initiatives as they support the gas industry's transition whilst also growing the hydrogen economy in Aotearoa.

39 We support further investigation of the costs and benefits of carbon capture and underground (**CCUS**) as part of the gas industry's transition. Captured carbon may also provide valuable carbon feedstocks for other industries and more sustainable fuels such as eSAF.

**Developing a regulatory framework for offshore renewable energy**

40 We refer MBIE to Air New Zealand's April 2023 submission on enabling investment in offshore renewable energy.

**Conclusion**

41 We would be pleased to discuss this submission further with MBIE to aid the development of the National Energy Strategy.