Before an Independent Hearing Panel
Appointed by Wellington City Council

In the Matter	of the Resource Management Act 1991
And	
In the Matter	of a Notice of Requirement to designate land for Airport Purposes known as the East Side Area NOR.

Statement of Evidence of **Ken Conway** for Wellington International Airport Ltd

Dated: 5 May 2021

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INTRODUCTION

Qualifications and Experience

1. My name is Ken Conway. I am Head of Environment and Sustainability for Airbiz Aviation Strategies Limited ("**Airbiz**"), a position I have held since 2015. Airbiz is a specialist consultancy group with offices located in New Zealand, Australia, Canada and the UK that advises on the sustainability, planning, safeguarding, design and development of airports, terminal buildings and aviation facilities, and the business of airports.

2. Before Airbiz I held of the following roles with the most recent listed first:

   (a) Associate, Head of Aviation Environment at EC Harris LLP in the UK, 2011-2015;

   (b) Associate Director (Aviation Environment) at AMEC in the UK, 2009-2011;

   (c) Head of Environment and Sustainability at Gutteridge Haskins and Davey Pty Ltd in the UK, 2007-2009;

   (d) Associate at Arup in the UK, 2006-2007;

   (e) Principal and Manager, Environmental Planning and Assessment Group at Maunsell Australia Pty Ltd in Australia, 2004-2006;

   (f) Senior Environmental Planner and Manager, Environment Group at Arup in the UK and Australia, 1999-2004; and

   (g) Environmental Planner at Gutteridge Haskins and Davey Pty Ltd in Australia, 1995-1999.

3. My professional qualifications are as follows:

   (a) Bachelor of Arts (Human Geography). Awarded by Macquarie University, Sydney, Australia in 1995;

   (b) Certified Environmental Practitioner (CEnvP). Awarded by the Environmental Institute of Australia and New Zealand, 2006-2012;

(c) Airport Strategic Planning and Environmental Management Short Course. Awarded by Cranfield University, UK in 2007;

(d) IATA Fuel Efficiency and Conservation (Distinction). Awarded by International Air Transport Association ("**IATA**") at the IATA Training Centre in Geneva in 2014;

(e) IATA Aviation and The Environment (Distinction). Awarded by IATA at the IATA Training Centre in London in 2014; and

(f) IATA Managing Green Airports (Distinction). Awarded by IATA at the IATA Training Centre in Singapore in 2016.

4. I have served on a number of global industry bodies that help shape the sustainability policy of airports. These include:

(a) Airports Council International ("**ACI**") Europe Environment Strategy Committee, 2013-2015;

(b) ACI Asia-Pacific Regional Environment Committee, since 2016;

(c) ACI World Environment Standing Committee, since 2020; and

(d) Editorial Board for the Journal of Airport Management, since 2019.

5. My entire 25-year professional career has been in the field of Environmental Planning and Sustainability. Throughout that time, I have been involved in various airport planning and development projects across five continents. I regularly advise airports on how to tackle some of their most complex challenges, especially those related to aircraft noise, air quality, carbon emissions, energy and resource use, and climate change.

6. I have provided sustainability advice to numerous airports in Australia, Canada, China, Finland, Germany, Hong Kong SAR, Iceland, Ireland, Kenya, Malaysia, New Zealand, Norway, Portugal, the Russian Federation, Singapore, the United Arab Emirates and the United Kingdom. As a result, my experience includes a strong understanding of airport sustainability and environmental issues, locally and internationally.

Code of Conduct Statement

7. While this is not an Environment Court hearing, I nonetheless confirm that I have read the Code of Conduct for Expert Witnesses issued as part of the Environment Court Practice Notes. I agree to comply with the Code and am satisfied that the matters which I address in my evidence are within my field of expertise. I am not aware of any material facts that I have omitted which might alter or detract from the opinions I express in my evidence. I understand that I have an overriding duty to assist the hearing in an impartial manner and that I am not an advocate for the party which has engaged me.

Scope of Evidence

8. Global aviation is under the spotlight when it comes to responding to the existential threat of climate change. According to the Intergovernmental Panel on Climate Change (IPCC), aviation is responsible for between 2-3% of total current global human-induced carbon emissions, with airports accounting for less than 1% of total global share. While this percentage of carbon emissions from aviation has not changed significantly since 1992, aviation's share of global emissions is expected to increase as other sectors decarbonise.

9. It is acknowledged that numerous submissions have been made regarding the NORs raising concerns on climate change. The relevance of such submissions is for others to comment on. Recognising that climate change is a global issue, both airlines and airports have been taking decisive steps to enable the aviation industry to grow sustainably and with less carbon. This is reflected through strong advocacy and leadership with governments and industry as well as significant ongoing investment being committed to research and development into new low carbon technologies and sustainable aviation fuels.

10. My evidence includes explanations of the:

    (a) Global Framework for Climate Action;

    (b) New Zealand Framework for Climate Action and the role of Wellington Airport;

    (c) Aviation Industry response to climate change;

(d) Aircraft technological advancements under development; and

(e) Wellington Airport's carbon reduction commitments and strategies.

EVIDENCE

Global Framework for Climate Action

11. The fight against climate change has delivered important milestones, such as the Kyoto Protocol (1997) and the landmark Paris Agreement (2015). Through these international treaties and driven by the United Nations Framework Convention on Climate Change (UNFCCC), governments across the world have set long-term plans and timeframes to reduce emissions and adapt to the impacts of climate change.

12. Today, 195 countries have signed, and 189 countries have ratified the Paris Agreement. When signing the Paris Agreement, parties committed to keep the increase in average global temperature to well below 2°C (3.6°F) above pre-industrial levels and pursue efforts to limit the increase to 1.5°C (2.7°F).

13. Under the Paris Agreement, each country is responsible to define voluntary Nationally Determined Contributions **("NDCs")**. Even though these NDCs may vary across countries, most have defined intermediate targets for 2030. The most advanced countries (or group of countries) on the sustainability front like the European Union have made long-term commitments to Net Zero Carbon **("NZC")** for 2050 in line with the climate goals of the Paris Agreement and the findings of the IPCC's Special Report published in October 2018.

14. Every five years, each country is required to review and update their NDCs with increasingly more ambitious climate actions to be implemented gradually for each sector based on a wide range of parameters including the technology available, the sector's strategic importance, or the economic impact any new regulations may have for a given sector.

15. New Zealand is one of the few countries to have enshrined into law a NZC goal.

16. In September 2015, the UN General Assembly adopted the 2030 Agenda on Sustainable Development to stimulate action in the areas of critical importance to global society and the environment. This Agenda is framed by 17

overarching Sustainable Development Goals (SDGs) and 169 targets. For airlines and airports, the greatest emphasis tends to be placed on Goals 7 (Affordable and Clean Energy), 8 (Decent Work and Economic Growth), 9 (Industry, Innovation and Infrastructure), 12 (Responsible Consumption and Production) and 13 (Climate Action) although these do vary.

17. Many airports and airlines support the 2030 Agenda on Sustainable Development, contributing to the SDGs of greatest priority to their businesses through their sustainability strategies and programmes. Wellington Airport has identified the SDGs that are most appropriate to its business based on the ability to make contributions and/or to influence change. These are documented in Wellington Airport's 2020 Annual Review.

18. For aviation, all flights are not subjected to the same carbon emissions rules. Indeed, as they are easier to control and do not require bilateral agreements, regulations for domestic flights are typically applied earlier, and tend to be more stringent using tools like Emissions Trading Schemes (ETS). New Zealand airlines were the first in the world to operate under an ETS designed to help reduce greenhouse gas (GHG) emissions from domestic flights. However, carbon reduction measures implemented at the country level vary significantly worldwide. Typical measures usually include carbon or fuel taxes, "cap-and-trade" schemes like the ETS, or minimum blending requirements for the use of Sustainable Aviation Fuel.

19. At the global level, there are no binding commitments for the aviation industry. Instead, individual commitments are being made by a wide range of stakeholders, including airports and airlines, in collaboration with air navigation service providers, aircraft manufacturers and ground handling agents, to manage and reduce their impact on climate change.

20. Through the introduction of a new global Market-Based Measure (**MBM**), the Carbon Offsetting and Reduction Scheme for International Aviation (**CORSIA**), the UN International civil Aviation Organisation (**ICAO**) is addressing the global aviation industry's response by imposing limits on the amount of carbon emitted by international aviation. However, initial participation under CORSIA is on a voluntary basis until 2027. New Zealand along with more than 80 other ICAO member states has volunteered to participate in the initial Pilot and First phases of CORSIA between 2021 and 2027.

New Zealand Framework for Climate Action

21. New Zealand signed the Paris Agreement on 22 April 2016 and ratified the Paris Agreement on 4 October 2016, committing New Zealand to having an emissions reduction target and regularly reporting progress against it.

22. This means New Zealand's commitments to reduce GHG emissions, that are set out in its NDC, will apply from 2021. Under its NDC, New Zealand has committed to reduce GHG emissions by 30% below 2005 levels by 2030. This covers most sectors and their GHG emissions.

23. In May 2019, the *Climate Change Response (Zero Carbon) Amendment Act 2019* was passed into law to provide a framework that New Zealand can develop and implement clear and stable climate change policies to:

    a) Contribute to action under the Paris Agreement to limit average global temperature increase to well below 2°C above pre-industrial levels and pursue efforts to limit the temperature rise to 1.5°C; and

    b) Allow New Zealand to prepare for, and adapt to, the effects of a changing climate.

24. This is an amendment to the *Climate Change Response Act 2002* and sets new domestic GHG emission reduction targets to:

    a) *Reduce net emissions of all GHGs (except biogenic methane) to zero by 2050.*

    b) *Reduce emissions of biogenic methane to 24%–47% below 2017 levels by 2050, including to 10% below 2017 levels by 2030.*

25. The Act amendment established an independent Climate Change Commission (**CCC**) to oversee a 5-year carbon budgeting process and provide evidence-based advice to government to help New Zealand transition to a climate-resilient and low carbon future. The carbon budgets are drafted on a sectoral basis to 2035 whereby all available options for emissions reduction are considered in line with the available technology for doing so.

26. The CCC has been developing draft advice and evidence reports. Finalised advice will be provided to the government by 31 May 2021. It is understood that this will progressively be developed through industry sectors.

27. Wellington Airport has contributed to the CCC's preparation of evidence through the development of advisory positions via submissions by the New Zealand Airports Association, of which it is a member.

28. The CCC recognises that aviation, both domestic and international, is critical to New Zealand's way of life and aviation is therefore a part of all scenarios and pathways to meet the 2050 carbon targets. The challenge to decarbonise aviation is also recognised by the CCC. At this stage, there are no specific requirements defined for the New Zealand aviation industry by either the CCC or government although the CCC's first carbon budgets to 2035 have reflected the New Zealand aviation industry's efficiency gains already realised from fleet renewals, and improvements to airspace and flight operations and infrastructure through collaboration between airlines, airports, and Airways (New Zealand's air navigation service provider).

29. There are currently no specific requirements defined for Wellington Airport or the airlines that operate at the airport by either the CCC or the government.

30. However, the New Zealand aviation industry, including Wellington Airport and other key players including Air New Zealand and other airlines are already taking proactive steps in the development and implementation of appropriate emission reduction responses – not waiting for, but being well prepared for what the CCC and government may require.

31. In developing their strategies and actions, the New Zealand aviation industry and Wellington International Airport Limited (WIAL) have been guided by how global aviation industry associations have addressed the challenge of climate change and reduction of carbon emissions.

Aviation Industry Response to Climate Change

32. In 2008, leaders from across the aviation industry gathered at the Air Transport Action Group's (**ATAG**) Aviation and Environment Summit in Geneva to deliver a strategic vision on how to tackle climate change and other environmental challenges, signing the Commitment to Action on Climate Change.

33. This call to action, one of the first industries to do so at the global level, resulted in three ambitious climate change goals being launched by the International Air Transport Association **(IATA)** in 2009 with the support of

airports, airlines, air traffic navigation service providers and aircraft manufacturers. They are:

(a) Improve fleet fuel efficiency by an annual average of 1.5% between 2009-2020. According to the latest information published by ATAG, between 2009 and 2019 the world's passenger airlines achieved a 2.1% average annual improvement in fuel efficiency. Furthermore, since the launch of IATA's Fuel Efficiency Development Programme in 2004 more than 15 Mt CO_2e has been saved by the world's airlines, the equivalent of US$3.8 billion annually;

(b) From 2020 stabilise, net carbon emissions from international aviation (carbon neutral growth); and

(c) Reduce net aviation carbon emissions by 50% in 2050 relative to 2005 levels.

34. These goals are underpinned by a multi-faceted approach comprising an industry-wide strategy of:

(a) New technology;

(b) Improved operations;

(c) Efficient infrastructure;

(d) A Global Market-Based Measure; and

(e) Sustainable Aviation Fuel.

35. I will now describe these various industry-wide pillars.

New technology

36. According to ATAG, aircraft and engine manufacturers spend an average $15 billion annually in research development to develop more fuel-efficient aircraft.

37. Each new generation of aircraft is approximately 15%-20% more fuel efficient per passenger kilometre than the aircraft it replaces. The key drivers behind these fuel efficiency gains include more fuel efficient engines, improved aerodynamics, lightweight materials plus advanced avionics and blended airframe designs. Since 1990, the CO_2 emissions per passenger has reduced

by 54.3% avoiding an equivalent of 11 billion tCO_2 through these new technologies, improved operations and infrastructure.

38. In 2016, following six years of consultation with governments, the aviation industry and other stakeholders, ICAO adopted the first internationally recognised CO_2 emissions standard. The CO_2 Standard for Aircraft encourages the integration of fuel efficient technologies into aircraft design and development considering propulsion, aerodynamics and weight, but excluding operational aspects.

39. The CO_2 Standard for Aircraft embeds CO_2 emissions into the formal certification process that new aircraft need to pass to enter service into world airline fleets. It forms part of the ICAO environmental standards, which include, for instance, aircraft noise certification.

40. Since 2017, national Civil Aviation Authorities (CAA) have translated the Standard into their respective local legislative frameworks. The CO_2 Standard for Aircraft took effect in 2020. It applies to jet aircraft which have a maximum take-off weight of over 5.7 tonnes (in other words, all commercial jet aircraft and all except the smallest business aviation jets). There is a higher stringency level for jet aircraft over 60 tonnes (which make up over 90% of commercial jet aircraft). In the longer term, there are several alternatives under development to limit the airline industry's reliance on fossil fuels and to facilitate a shift towards emission free aviation, including the emergence of electric and hydrogen powered engines.

41. Along with energy saving measures, the ongoing renewal of aircraft fleets and the introduction of Sustainable Aviation Fuels, electric aircraft can help to reduce GHG emissions in the coming decades and are a viable alternative to the current fossil fuel powered internal combustion engines **("ICEs")**. However, the weight of today's battery units limits the use of battery electric aircraft. With current battery technology being tested by multiple airlines worldwide, there is an expectation that battery electric aircraft will only be initially viable for small commuter aircraft (10 seats and less) flying over short distances.

42. As battery technology improves, the capability of electric aircraft would improve to potentially carry more passengers over longer distances, but there

is no evidence to suggest that battery electric aircraft will be realistic for the majority of the world's airlines until the mid-2030s and beyond.

43. Recognising the current capacity and range limitations of electric aircraft, manufacturers are also developing a hybrid-electric aircraft that could serve more markets. Such aircraft typically use two types of engines: an electric engine for flight phases that require less power like taxiing or cruise whilst a conventional combustion engine with better performance could be used for take-off and landing. Whilst keeping the two engines structure, some other trials are being conducted using both engines at the same time and even using the ICE to recharge batteries in cruising.

44. The hybrid-electric aircraft is as a good option to support the transition towards NZC as other technologies are being developed. Until the next technological breakthrough is observed with aircraft propulsion, this will become a valuable option to limit GHG emissions as it relies on technology that is available today.

45. Because hydrogen is an efficient way to store energy per unit of weight, many see hydrogen aircraft as a longer-term alternative to ICEs. Renewable sources of energy like wind and solar could be converted and stored as hydrogen which would later be used by aircraft engines with a lower operational carbon footprint.

46. Even though some aircraft manufacturers like Airbus believe hydrogen aircraft could be available as early as 2035, there are likely to be limitations on the extent to which liquid hydrogen can be used for aviation. As an unproven technology, safety and performance are the major challenges that hydrogen aircraft must address. National CAAs worldwide will never certify for airworthiness an aircraft that does not meet all mandatory aeronautical safety requirements regardless of the environmental benefits that it may bring to the aviation industry.

47. Liquid hydrogen is more than 3 times less energy-dense than conventional jet-fuel (approximately 10MJ/L vs 35MJ/L for jet-fuel). This means that compromise will have to be made on performance. To become a viable solution for all market segments, hydrogen aircraft will need another breakthrough with the airframe design to compensate the higher volume required to store liquid hydrogen.

Improved operations

48. Meteorological conditions influence the most efficient route that can be flown between two airports. For any given flight between two airports, the most efficient route will likely change every day due to the local atmospheric conditions – temperature and humidity, wind speed and direction and the presence of turbulence. As a rule, not all these factors are known at the exact time of a flight departure and vary along the flight route. The highly variable nature of weather conditions adds to the uncertainty of aircraft flight performance, pilot decisions and flight schedules. The atmospheric state also affects aircraft operational parameters, including speed, weight, climb/cruise/descent rates and configurations all of which impact fuel burn and related emissions.

49. Prior to a flight departure, an airline will typically submit a flight plan to the Air Navigation Service Provider (**ANSP**) to request an air traffic routing to its destination. The filed route, as defined in the Standard Route Document (**SRD**) will specify the route to be flown and airlines will normally use automated optimisation tools to select the most appropriate routing. Standard Instrument Departure (**SID**) routes will be used to connect an airline's departure from an airport to an airway. These airways usually do not coincide with the most direct route. Many ANSPs worldwide are developing new tools based on the latest technology to allow a growing number of aircraft to minimise their fuel consumption.

50. For example, aircraft equipped with satellite-based navigation technology and global positioning systems, pilots can now reduce their fuel consumption as they climb and descend on more optimal flight paths using procedures like Continuous Climb Operations (**CCO**) to climb higher and more quickly, Continuous Descent Approach (**CDA**) to eliminate traditional step-downs separated by intervals of level flight and Performance Based Navigation (**PBN**) using curved approaches. PBN is currently being used at Wellington Airport by aircraft equipped with the onboard technologies mentioned above to better utilise available airspace while also reducing noise for surrounding communities, fuel burn and emissions.

51. During the first six months of PBN trials at Wellington Airport that started in September 2018, a total of 1,400 flights operated on PBN flight paths. Overall,

these aircraft flew 8 km less saving 37 seconds of flight time and approximately 76 kgCO_2e per flight movement.

52. Airport- Collaborative Decision Making (A-CDM) is a tool widely used by European airports to improve the efficiency, punctuality and predictability of air traffic, particularly during block turnarounds. Through the effective sharing of real-time operational data by all airport partners, A-CDM enables airports to make better and more informed decisions on flight schedules, traffic flows and movements to help minimise congestion and delay.

53. Wellington Airport is one of the first airports in Australasia to be implementing A-CDM for all scheduled services integrating it with its Nose-In Guidance System at the aircraft parking areas.

54. In 2016, Eurocontrol assessed the impact of A-CDM at 17 European airports. The total savings reported from the implementation of A-CDM at these airports were based on 2.2 million annual departures and included on average 1-minute less taxi time per movement and a 7.7% fuel burn and CO_2e saving per movement, the equivalent of 102,700 tCO_2e.

55. Some of the benefits of A-CDM are to:

   a) Reduce average outbound taxi times by creating a virtual queue of aircraft ready for departure while still at parked at the gate with their main engines switched off;

   b) Provide pilots with better take-off time estimates allowing them to better plan the second main engine start-up without impacting airport capacity or causing airfield delay;

   c) Make the most of available infrastructure; and

   d) Reduce delays throughout the network allowing airlines to minimise flight durations and reduce emissions both on the ground and in the air.

Efficient airport infrastructure

56. There are many actions airports are already taking to help their airline partners to reduce emissions on the ground:

(a) Improve airfield infrastructure to minimise average inbound and outbound aircraft taxi times and distances. In my experience, a minor taxiway improvement that reduces taxi times by 1-minute could save airlines operating at a medium-sized airport (<150,000 aircraft movements/year) between 35 and 110 kg/CO_2e per movement depending on the aircraft, engine type, piloting, taxiway route and weather conditions. This can be further improved by up to 40% on a per movement basis if an airline implements reduced engine taxiing procedures whilst moving between an aircraft's allocated parking gate to/from the runway.

(b) Equip all contact gates with Fixed Electrical Ground Power and Pre-conditioned Air units so aircraft can do not need to use their onboard Auxiliary Power Units (**APU**). An APU is a small turbine engine installed towards the rear of the fuselage, that provides electrical power for aircraft systems in the flight deck and the cabin, and bleed air to start the main engines usually while aircraft are parked at the gate. Common narrow-body aircraft operated at Wellington Airport like the Airbus A320 or Boeing B738 could save up to 7 kgCO_2e/min depending on the type of APU when plugged into the Fixed Electrical Ground Power network instead of using its APU.

(c) Provide charging stations for airside and landside vehicles and ground service equipment so a wide range of stakeholders, including airlines, ground handlers, passengers and airport workers, can transition their vehicle fleets and ground service equipment to low emission vehicles (**LEVs**).

(d) Encourage the use of active and public transport for passengers and airport workers to travel to/from the airport.

(e) Generate, store and distribute renewable energy onsite and sell onto other airport business partners.

(f) Implement a pricing mechanism ("a levy") that rewards airlines that operate the most fuel-efficient aircraft available in their fleets whilst penalising airlines that operate older, less efficient aircraft.

Sustainable Aviation Fuels

57. Another critical pillar of the aviation industry's decarbonisation roadmap is the use of Sustainable Aviation Fuels (**SAFs**). SAFs were first certified for use in civil aviation in 2009. Since 2011, more than 270,000 scheduled civilian flights worldwide have operated where a percentage of SAFs have been blended into the fuel. SAFs produce typically up to 80% lower CO_2 emissions on a lifecycle basis than conventional (fossil) jet fuel.

58. More than 45 airlines worldwide have used SAF with around 7 billion litres of SAF on order through forward purchase agreements.

59. The benefit of SAFs is observed upstream in the production cycle as they use a variety of feedstocks like cooking oil, animal oils, forestry wastes, algae or domestic wastes (generically referred to as biofuels) that capture carbon earlier in the process before being converted into SAFs.

60. All SAF types considered today are drop-in fuels, i.e., they have very similar physical and chemical properties to conventional jet fuel and can be blended with it over a wide percentage range. SAFs are already incorporated into today's jet fuel and can be used by aircraft engines without any major upgrade to fuel lines. Multiple SAFs are already certified for blending rates up to 50% of biofuels.

61. Norway was the first country in the world to implement a blending mandate for SAFs for civil aviation, coming into effect from 2020. The Norwegian parliament established a target to reach 30% on all flights by 2030.

62. Research is being conducted to understand the impact of blending rates exceeding 50%. Airbus has recently (March 2021) tested the first widebody flight with 100% SAFs on board.

63. SAFs volumes remain residual with less than 0.01% of the global jet fuel demand being from bio-based fuels in 2017 according to the European Aviation Safety Agency. This is primarily due to the higher cost of SAFs in comparison with conventional jet fuel.

64. Multiple countries are introducing blending mandates for the aviation sector. For instance, Norway and Sweden have minimum blending rates in place

today and have made plans to gradually increase these minimum rates to 30% by 2030 for all airlines.

65. There is a consensus in the aviation industry that Sustainable Aviation Fuels remain the most promising alternative to decarbonise all market segments.

66. Back in 2008, Air New Zealand was second airline in the world to successfully complete a flight using SAF, a 50% blend of Jet A-1 and 50% blend of biofuel made from jatropha.

67. Sustainable Aviation Fuel Alliance of Australia and New Zealand (SAFAANZ) was recently established by Bioenergy Australia to provide a collaborative forum, a “think-tank” to advance sustainable aviation fuel production, policy, education and marketing in Australia and New Zealand. Members of SAFAANZ include Air New Zealand, the Bioenergy Association of New Zealand and Scion Research NZ along with Qantas, Virgin Australia and others.

68. In early 2021, both Air New Zealand and Qantas signed significant agreements pledging to explore opportunities to utilise advanced SAFs in support of their respective of NZC commitments.

69. In my opinion, SAFs could become a viable solution for all aviation markets as they do not rely on any significant technological breakthrough and could be used with the existing aircraft, engines, and airport infrastructure.

70. I believe the main challenges for SAFs are economic with the current price difference between SAF versus Jet A-1 being three to four times more expensive per unit along with access to secure sufficient quantities of feedstocks that do not conflict with food production and supply or the availability of land and infrastructure to grow, extract and produce the fuel types.

Global Market-Based Measure

71. In 2016, the International Civil Aviation Organization adopted CORSIA, a global market-based measure to address carbon emissions from international aviation. CORSIA is a global, route-based carbon offsetting scheme to

address carbon emissions and holds airlines accountable for their climate impact.

72. The Pilot and First phases of CORSIA is voluntary, running from 1 January 2021 to 31 December 2026. From 2027, the Second phase will be mandatory for most countries, including New Zealand. Flight emissions will need to be offset if both ‘origin and destination’ states participate in CORSIA.

73. CORSIA applies to all registered international aircraft operators (commercial and private) where their operations emit more than 10,000 tCO_2e/yr. Under CORSIA:

   a) All aircraft operators must monitor, report, and verify their fuel use and carbon emissions on all international flights; and

   b) All aircraft operators will be required to purchase “emissions units” to offset any growth in emissions after 2020.

74. Under CORSIA, airlines must offset all carbon emissions from international flights that exceed 2019 levels (revised baseline year in response to the impact of the COVID-19 pandemic). This will help to stabilise net carbon emissions for aviation and support Carbon Neutral Growth of the industry.

75. New Zealand is participating in the initial voluntary phases that will last from 2021 to 2027. Beyond 2027, New Zealand will be subjected to the CORSIA by default as its Revenue Tonne Kilometres represent more than 0.5% of the world total.

76. In response to the impact of the COVID-19 pandemic on global aviation and threat posed to distorting the baseline for calculating Carbon Neutral Growth, ICAO responded by shifting the baseline. Aviation’s GHG emissions from international operations are not to grow beyond 2019 levels (changed from 2020 levels).

Airline emissions reduction initiatives and commitments

77. Airlines are also implementing emissions reduction measures:

   (a) Airspace efficiency – ANSPs use the latest available technology and software to optimise flight routes and manage air traffic flows to minimise delays and distances flown by aircraft that in turn reduce fuel burn and emissions;

(b) Fleet renewal – As manufacturers use lighter materials and more efficient engines with higher bypass ratios, the average fuel consumption per seat kilometre has reduced by 45% between 1968 and 2014. Between 2009 and 2020, airlines have invested $1 trillion to renew their fleet purchasing 12,000 new aircraft. As more recent aircraft are being introduced by airlines, this trend is expected to continue over the next decades – Air New Zealand operates a relatively young fleet with the average age of aircraft in operation being 7.1 years;

(c) Improve operational efficiency – Reduce the onboard weight of equipment/materials and inflight waste through the application of circular economy principles;

(d) Reduce electricity consumption across ground operations and buildings and where available either purchase renewable electricity or install renewable energy systems;

(e) Upgrade ground service equipment and vehicle fleets to LEVs; and

(f) Purchase carbon offsets to compensate residual emissions supporting local afforestation or reforestation or renewable energy projects to prevent GHG emissions or to absorb and capture atmospheric carbon. Although carbon offsets cannot be used to reach NZC, they remain a valuable tool to reduce emissions in the interim before emerging carbon removal technologies are proven and fully commercialised at scale.

78. Many airlines worldwide recognise that their operations emit significant amounts of carbon and have been implementing many initiatives to reduce their operational footprints. A growing number of airlines are committed to taking action on climate change, leading, advocating and committing to the goal of achieving NZC by 2050. For the airlines operating at Wellington Airport, Air New Zealand, Qantas and Fiji Airways have all made NZC commitments.

Airport operational emissions

79. Airports and airlines operate under different and often challenging conditions that may either enable or prevent them from being able to reduce their own emissions at the same rate and scale. No two airports or airlines are the same which means that there is no ‘one size fits all’ solution to achieve NZC by 2050.

80. Whilst getting to NZC will be a challenge there are many opportunities available to airports and airlines to decarbonise. The basket of measures to be deployed will differ with some sources of emissions being easier to reduce than others. For example, vehicle fleets can be transitioned to 100% electric or low emission types whereas the energy consumption of airport buildings and infrastructure will require access to renewable electricity, ongoing investment in energy efficiency and new low carbon technologies.

81. The *Airport Carbon Accreditation* programme was developed and launched in 2009 by Airports Council International (**ACI**) Europe initially for European airports and went global in 2014. *Airport Carbon Accreditation* is the only voluntary, institutionally endorsed, global carbon management standard for airports. It provides a common framework for active carbon management and relies on internationally recognised methodologies, including the Greenhouse Gas Protocol and ISO14064 to independently assess and recognise the efforts of airports to manage and reduce their carbon emissions.

82. There are currently 340 airports operating out of 74 countries that participate in the programme. Around 45% of annual global passenger passengers are welcomed by accredited airports, and this continues to grow as more airports join the programme.

83. Airports’ greenhouse gases (**GHG**) emissions are categorised into three different scope categories:

    (a) Scope 1 emissions – direct emissions from sources that are owned or controlled by an airport operator (for example, vehicle fleet, onsite power plant, etc);

    (b) Scope 2 emissions – indirect emissions from the consumption of purchased electricity that is generated offsite; and

(c) Scope 3 emissions – indirect emissions from the airport-related services and activities that are not owned or controlled by an airport operator. For example, aircraft emissions from landing and taking-off are Scope 3 emissions.

84. In my experience, airports that embed sustainability at the heart of their corporate strategy, governance and capital investment plans and decisions typically define objectives for Scope 1 and Scope 2 emissions. They also position themselves to work closely with airport partners and passengers to help minimise carbon emissions on the ground from their operations.

85. To reduce Scope 1 emissions, many airport operators worldwide typically purchase LEVs and fuel-switch or electrify any onsite thermal power plants or systems. Today's technology allows airports to significantly cut their Scope 1 emissions providing they can invest in such technologies (i.e., EV, EV chargers, onsite thermal energy storage and electrification of CHP plants, etc.).

86. Heavy-duty vehicles (fire-fighting trucks, etc.) are harder to convert into LEVs as the technology available today forces operators to compromise on their operations (shorter range, longer charge time durations). However, trials conducted in a wide range of countries prove that this technology is improving which will ultimately lead to a higher uptake for heavy-duty LEVs at airports.

87. Depending on their location climate, geography and the electricity grid's carbon emissions factor (amount of carbon released into the atmosphere to produce a given quantity of energy), an airport's carbon footprint is primarily driven by the amount of electricity it purchases from offsite generation sources to light, heat and cool buildings. Airport emissions at the global level can be typically broken down as follows:

(a) 20% Scope 1 emissions

(b) 80% Scope 2 emissions.

88. To reduce Scope 2 emissions, airport operators typically reduce their power consumption at the source and produce their own electricity onsite from renewable sources.

89. In my experience, onsite renewable energy generation and distribution across the airport using solar photovoltaic **("Solar PV")**, geothermal and biomass are the most practical and a proven solutions available for airport operators to produce zero carbon electricity while also strengthening the airport's energy security and resilience.

Wellington Airport's Carbon Reduction Commitments and Strategies

90. WIAL has committed to emissions reductions via initiatives aligned to those at the national level - Wellington Airport is working towards reducing its absolute Scope 1 and Scope 2 carbon emissions by 30% (below a FY17 baseline) by 2030.

91. Strategies to achieve this target include:

(a) Ongoing replacement of vehicles and ground service equipment with electric or low emission hybrid alternatives - WIAL vehicle fleet already uses EVs and has installed EV charging stations across the airport for third parties;

(b) Future electrification of the natural gas heating system in the main terminal building;

(c) Increased renewable electricity in the New Zealand grid mix - As the electricity produced in New Zealand has a relatively low carbon emissions factor (currently 101 gCO_2e/kWh) in comparison to countries like Australia (approximately 810 gCO2e/kWh for New South Wales), Wellington Airport has access to relatively low-carbon electricity to power its buildings, and facilities. The carbon emissions factor of New Zealand's electricity grid should reduce even further as a result of a recent pledge made by the government for 100% of electricity to be generated by renewables by 2030. Wellington Airport along with many other businesses will greatly benefit from this transformative change to New Zealand's energy sector;

(d) Avoiding the unnecessary use of back-up power generators unless required for emergency situations;

(e) Use of refrigerants with low to zero Global Warming Potential (GWP);

(f) Reducing energy demand and improving building energy efficiency and performance through use of advanced control systems to provide near real-time, integrated view of our building performance and replacement of all halogen lightbulbs across the airport with LED technology;

(g) Adopting energy efficient and sustainable construction techniques and practices into the design and delivery of our capital projects; and

(h) Investing in permanent native forestry, biodiversity and sustainability projects in New Zealand to support the absorption and storage of carbon emissions, improve ecosystem health and increase access to renewable energy.

92. Wellington Airport has reduced emissions by 22% against a FY17 baseline.

93. Although not under the direct control or influence of WIAL, the major airline operator at the airport, Air New Zealand is also pursuing an ambitious carbon reduction agenda, that contributes directly to the decarbonisation of its operations at Wellington Airport.

94. Air New Zealand is the largest carrier operating at Wellington Airport in terms of traffic volumes. By collaborating with the airports across their route network and passengers, Air New Zealand has been able to reduce their operational environmental impacts and have plans to continue their efforts over the decades ahead:

(a) 1.8% average annual improvement in fuel efficiency between 2009 and 2020 through operational measures and fleet renewal with CO2e per RTK down to 0.75 kgCO_2e;

(b) Operating on more efficient flight routes with the support of Airways – i.e., PBN at Wellington Airport;

(c) Saving 15,084 tCO_2e through Carbon Reduction Programme (2019 figures)

(d) Reducing weight onboard and inflight waste by recirculating products that would otherwise be sent to landfill;

(e) Using more efficient ground power units during aircraft block turnarounds;

(f) Transitioning vehicle fleets to 100% EVs where 55% of the vehicle fleet is currently EV;

(g) Offsetting voluntarily with emission reduction units generated from permanent native forestry projects in New Zealand through FlyNeutral and also from emission reduction units generated from biodiversity and sustainable energy projects in New Caledonia, Australia and China; and

(h) Committing to achieve NZC by 2050.

CONCLUSION

95. I understand that people are concerned by the impacts of climate change and that more extreme weather is likely to have widespread repercussions for societies around the world. I recognise that climate change is a significant global issue and do believe that decisive action must be taken this decade to reduce carbon emissions and the related threat posed by climate change. Any delay or inaction will lead to more frequent and intense adverse weather impacting the way we live, distorting the natural balance of ecosystems, and for airports potentially damaging infrastructure and disrupting business continuity.

96. I also believe the aviation industry is committed to addressing climate change and has made tremendous progress over the past decades to decouple growth from emissions and reduce its operational environmental footprint. In acknowledging aviation's past achievements in tackling climate change, there is still much to be done to drive the necessary global transition to a low carbon future and strengthen the preparedness of airports and airlines in a climate that is changing. Maintaining the status quo is not an option. Through leadership, strong partnerships and cross-industry/sector collaboration, airports and airlines can develop and implement a range of measures leveraging advances in technology, operations and SAFs to cut their emissions. Through the implementation of measures detailed in this Statement and the emergence of others, I am confident that aviation is well-placed to manage growth with less carbon in the decades ahead.

97. The pace and extent of decarbonisation will be influenced by many factors but as the global economy and aviation charts a recovery beyond the COVID-19 pandemic, governments, industry and public expect more to be done to reduce the impacts of climate change and the carbon emissions that contribute to global warming. Aviation is already doing its bit with efforts to be further ramped up and for Wellington Airport, sustainability is already embedded into its business DNA and forms a key pillar of its future growth and operational plans.

98. As aviation continues to make significant progress on decoupling growth sustainably from carbon emissions through new technology, innovation and transformative shifts to renewable power and fuels, I am also confident that society will continue to be the beneficiary of the many global cultural and economic benefits that aviation can deliver.

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Ken Conway

5 May 2021