28 November 2023

HFA Submission for the Aviation Green Paper

The Hydrogen Flight Alliance (HFA) welcomes the opportunity to provide a submission for the White Paper process. The HFA, launched in June 2023 with the attendance of the Hon Mick de Brenni MP, Queensland Minister for Energy, Renewables and Hydrogen, is working collectively to create a collaborative environment to advance hydrogen electric flight in Australia. The founding members, include:

1. Stralis Aircraft
2. Skytrans Airlines
3. Brisbane Airport
4. Gladstone Airport
5. Aviation Australia
6. BOC, a Linde Company
7. H2 Energy Company (h2ec)
8. Griffith University
9. Central Queensland University
10. Queensland University of Technology

The initial focus is to enable Australia's first commercial emission free hydrogen powered flight between Brisbane Airport and Gladstone Airport in 2026. This route will be operated by Skytrans Airlines, the launch partner of Stralis Aircraft, using the 15 seat Stralis B1900D-HE aircraft.

Stralis Aircraft, a member of the HFA, is recognised in the Aviation Green Paper and is an Australian manufacturer of hydrogen-electric propulsion systems working to retrofit existing aircraft, and design new aircraft into the future, alongside other key international leaders such as Airbus, ZeroAvia, and Universal Hydrogen. Queensland based Stralis Aircraft is focused on developing a propulsion system that will produce no harmful emissions, be quieter, and have a reduced direct operating cost compared to other sustainable aircraft solutions, such as Sustainable Aviation Fuel.

Green liquid hydrogen, produced locally from renewable energy sources in Australia, will be used as fuel, which is converted to electrical power using a hydrogen fuel cell. The electrical power feeds a lightweight aerospace electric motor to drive a propeller and deliver thrust to the aircraft.

Green hydrogen plays a crucial role in aviation decarbonisation. Not only can it be used for direct combustion or with fuel cells to power aircraft, but it is used in standard jet fuel and SAF production pathways and is a raw material in power-to-liquid fuels (synthetic fuels).

IATA's Net Zero roadmaps (2023) provide the first detailed assessment of the key steps necessary to accelerate the global aviation sectors transition to net zero by 2050 and provide a critical reference point for policy makers worldwide. The Aircraft Technology Net Zero Roadmap (2023) clearly illustrates Hydrogen as a key energy solution that runs in parallel to Sustainable Aviation Fuel:

“The upcoming aircraft platforms capable of flying long and extra-long-haul flights should be fully or partially powered by SAF, while hydrogen options should be available for mid- and short-range flights in the near future. Commuter flights for very short range should be able to be powered by batteries.”

(p2, IATA Aircraft Technology Roadmap)

In order to meet the challenge, our HFA Action Plan has identified over 32 activities across the following three strategic pillars to advance hydrogen electric flight in Australia:

The HFA has provided feedback on the most relevant sections of the Green Paper based on our work to date and priority action areas. If you have any queries or would like to follow up, please do get in touch.

Best regards,

Dr Emma Whittlesea
Chair, Hydrogen Flight Alliance
ew@stralis.aero

CHAPTER 5: MAXIMISING AVIATION'S CONTRIBUTION TO NET ZERO

1. It would be helpful to provide clarity on 'Net Zero' for Australian aviation in the context of the White Paper, as currently only domestic aviation emissions form part of Australia's accounts, and international aviation emissions are excluded.
2. This is also a critical point to consider as part of the Jet Zero Workplan. Workplan item 3 ('SAF' accounting) should consider whether domestic and international emissions reductions are included and should be renamed 'Emissions Accounting' or similar, to better reflect its scope. It should also account for all emerging fuel types, including hydrogen.
3. Recommend including and recognising international aviation emissions, aligned to the Declaration from the International Aviation Climate Ambition Coalition and the UK Committee on Climate Change recommendation that emissions from the UK's international aviation be formally included. Australia cannot afford to consider any aviation policy as "domestic only" because Australia is the furthest away from other major markets – particularly with regards to tourism (and international/global businesses). However, it is clearly beneficial to separate out domestic and international aviation emissions, as the impact, opportunities and challenges are different.
4. There are three possible energy storage/fuel options that will replace conventional aviation fuel: batteries, hydrogen and SAF. In some cases, more than one option will be utilised in aircraft – that is, hybrid formats. Green hydrogen plays a crucial role in aviation decarbonisation, not only can it be used for direct combustion or used with fuel cells to power aircraft, but it is used in stages of standard jet fuel production, in SAF production pathways, and is a raw material in power-to-liquid fuels (synthetic fuels).
5. The national hydrogen strategy recognises the opportunity for transportation and transitioning to net zero but does not recognise the critical role green hydrogen plays in the hard to abate sector of aviation. Achieving low-cost renewable generation of green hydrogen in Australia, at vast scale, in various forms including liquid hydrogen, is a necessity for decarbonising the aviation sector.
6. IATA's technology net zero roadmap identifies "The two most promising zero-carbon energy solutions for aircraft are hydrogen and batteries" (p9, 2024) and this is echoed by a Working Paper to the 41st session of the ICAO Assembly illustrating the merits and potential of hydrogen as a key building block to achieve aviation decarbonisation, identifying "H2 aircraft are promising" (p2, 2022).
7. "Whether as a feedstock for SAF production or as a fuel in its own right, we can be reasonably confident that there will be a substantial, aviation-driven demand for hydrogen"...."The total demand for hydrogen comprises three distinct components: – Gaseous hydrogen used in the production of SAFs – Gaseous hydrogen, of very high purity, used in fuel-cell powered aircraft – Liquid hydrogen used in fuel-cell powered aircraft and in larger, turbine-powered aircraft." (p16, ARUP, Hydrogen in Aviation)
8. Hydrogen powered aircraft provide a decarbonisation solution for small and medium range markets, predictions of entry-into-service vary, but market entry will be before 2030 (AZEA, 2023). Queensland based Stralis Aircraft are developing Australian manufactured hydrogen-electric propulsion systems and aircraft and will use Australian produced green liquid hydrogen with hydrogen fuel cells in planes for testing from 2024, with the first anticipated flight between Brisbane and Gladstone airports expected by 2026.
9. Aviation (recognising domestic and international) should be included in the Australian Government's Transport and Infrastructure Net Zero Roadmap and Action Plan. Emission reduction targets and supporting policies should be developed separately for different transport segments, the iMOVE CRC *Framework for an Australian Clean Transport Strategy*

(FACTS)[1] identifies hydrogen as a key decarbonisation solution for transportation in Australia, including aviation. It sets near and long-term emissions reduction targets and identifies responsibilities for the different transport sectors and all tiers of government.

10. The [IATA Net Zero Roadmaps] identify hydrogen as a key energy source and technology for aviation and identify policy and finance recommendations, as well as technology and infrastructure timelines for technology commercialisation and uptake. These can be used to inform discussions around sectoral activities and targets.
11. The White Paper and any associated roadmaps or action plans should be evidence based and informed by baseline aviation emissions data and analysis, split by the domestic and international emission accounts.
12. Robust aviation emissions data and understanding can then be used to inform effective and appropriate emissions reduction strategies for Australian aviation, recognising strategies in Europe may not be best suited for Australia as they do not have the same abundant access to renewable energy.
13. Australian aviation needs clarity and robust information on the options for decarbonisation across different aviation sub-sectors, aircraft types, route lengths, and regions, whilst keeping abreast of developments worldwide. The data should inform a clear roadmap and guidance surrounding the opportunities and target areas for reducing emissions, including planning and investment for alternative technologies and fuels.
14. Most aviation services could be serviced by hydrogen-electric and hybrid technologies into the future, and it is estimated that 50% of global air travel CO2 emissions come from flights under 2,200km which could be serviced by companies targeting these emerging technologies (e.g. AirBus, Universal Hydrogen, Stralis Aircraft, ZeroAvia, Dovetail, magniX, Hydrogen Aviation Powerlist 2023).
15. Existing and new policy and regulatory settings should recognise and support domestic production and capability (i.e. supply chain, R&D, storage, refuelling etc) for a range of new and emerging fuels and technologies for aviation, and to facilitate their use, including use of green liquid hydrogen, other forms of green power, and other emerging renewables-based fuels.
16. Hydrogen should be promoted as a complement to SAF in the current time, not as a future fuel. Hydrogen can be utilised on specific regional routes as a means to address other SAF externalities (e.g. feedstock/production volumes). A work plan is needed and would be almost identical to SAF from a program perspective (see Jet Zero Work Plan).
17. There are benefits to recognising new and emerging fuels in the NGER scheme, where the fuel is used, and the level of emissions released. Best practice will require monitoring of systems changes and should be extended to hydrogen and other emerging fuels recognising different fuel properties, associated carbon intensity of that fuel, and the associated emissions from its use. There are different types of SAF and hydrogen that are far from equal; and offer varying degrees of emissions reduction.
18. Sufficient and robust data and information will be needed to support industry and consumer confidence. Similarly, quality standards and sustainability certification will be required for different types of SAF, shades of hydrogen, and sources of power to generate aircraft fuel (e.g. fossil fuel or renewable power). Transparency and reporting of the data, quality standards, and sustainability certification will be important, along with the ability to review and compare similar fuels and/or transport options.
19. Certification and quality assurance schemes and legislation for SAF, needs to consider how the emission intensity of the product can be certified with appropriate transparency and rigour, such as being considered for hydrogen currently in Australia and globally. E.g. The

[1] https://transportfacts.org/wp-content/uploads/2022/06/FACTS-a-Framework-for-an-Australian-Clean-Transport-Strategy-2022.pdf

DCCEEW Guarantee of Origin scheme and the Smart Energy Councils Zero Carbon Certification Scheme

20. There is a need for realism about costs (current and projected) of different fuel options, and a pragmatic analysis on the quantities that will be available domestically, and for use specifically in aviation. Recommend some collective research and mapping of existing, planned, and proposed projects, locations, and volumes for all the different types of SAF and green hydrogen.
21. The policy and regulatory alignment are important, across government and different tiers of government. Policies should differentiate the application of hydrogen in aviation where specific requirements exist in terms of the form of hydrogen, regulations around distribution and re-fuelling etc. For example, renewable energy and hydrogen development and investment policy needs to recognise and plan for domestic demand from aviation. At present, aviation is often not recognised within documented Australian strategies. The focus of both State and Federal strategies tends to be toward fuel exports only; and international-standard models (e.g. Net Zero Australia web: https://www.netzeroaustralia.net.au/publications/) suggest a shift to domestic supply is also warranted.
22. This domestic supply becomes a requirement for Australia to support domestic zero emissions aviation services and to host the many international visitors arriving via zero, or low emissions, aircraft in the future. In terms of domestic hydrogen production and planning, green liquid hydrogen will be critical for the future of domestic and international aviation, for direct combustion, for use with fuel cells in multiple forms of transportation, and for producing some forms of SAF such as PtL.
23. The Australian Jet Zero Council and industry representation is welcomed but seems to be missing representation from those working in emerging zero emission propulsion and emerging technology development, or the research and development community, which is well placed to understand local social, environmental and perception issues. Electric, green hydrogen and emerging propulsion technologies need to be included in the mix alongside and in conjunction with SAF, like the framework for the UK Jet Zero Council.
24. Fossil fuel subsidies (including for aviation) are increasingly questioned in a society working toward net zero and countries are starting to reform fossil fuel subsidies as 2022 saw worldwide subsidies skyrocket to more than USD 1 trillion[2]. Recommend fossil fuel subsidies are reviewed with an intent to ringfence associated monies to invest in new emerging technologies and renewable fuels that support an effective net zero transition away from fossil fuels.
25. Monies and investment, including consumer schemes, that go into one-off offsets, could be better routed through investing in 'insets' and/or net zero projects. For example, R&D for new emerging aircraft technologies and fuels, retrofits, and/or new aircraft that will help transform the BAU and the broader aviation sector toward net zero. Rather than paying for offsets, an airline and/or its customers should invest to retrofit, test, and operate a plane with a hydrogen-electric powertrain that eliminates those aircraft fuel emissions.
26. The strategy around a National Framework for Voluntary Consumer Purchasing of SAF could be expanded to include hydrogen insets, and research on consumers' willingness to pay.

[2] https://www.iea.org/reports/fossil-fuels-consumption-subsidies-2022

CHAPTER 6 – AIRPORT DEVELOPMENT PLANNING PROCESSES AND CONSULTATION MECHANISMS

1. There are many changes, including infrastructure and capability development that will be needed for airports to prepare and to equip for emerging aviation technologies and new fuels, including for electric and hydrogen-electric fixed wing aircraft.
2. To support regional aviation's net zero transition in the context of emerging hydrogen technologies, information in relation to emissions associated with regional airports and/or their associated flight routes would provide insights into focus areas for decarbonisation and high prospective demand centres. These can be mapped to other demand leading to scale in production equipment delivering lower unit costs and earlier adoption.
3. To support regional aviation's net zero transition in the context of emerging hydrogen technologies, policy and regulatory settings could be developed to support "sandbox environments" similar to the UK Civil Aviation Authority Regulatory Sandbox environment.
4. Information on hydrogen infrastructure and investments that will be required at airports, is provided by IATA, ICAO, McKinsey and WEF.
5. The Hydrogen Flight Alliance has identified the following airport related considerations for hydrogen:
    a. Determining requirements, locations, responsibilities and operational procedures for the transport, storage, and handling of hydrogen (gas and liquid) on, in and around the airport. Identify infrastructure needs (buildings, ground, mobile, renewable energy, electrical infrastructure, water) and determine the buffer/safety zones required for hydrogen airside.
    b. Liquid hydrogen shifts operational practice substantially but could be more effective once procedures worked out. For example, dispensing, refuelling, and defueling systems at airports need to be defined e.g., truck, pipe, hydrant, ship, robotic. Liquid hydrogen storage management solutions including venting and boil off gas management, also need consideration.
    c. Mapping and documenting the applicable regulatory requirements, for hydrogen liquefaction, transportation, storage, refuelling, and use at airports.
    d. Airport safety and emergency services requirements, procedures, and equipment to respond to a hydrogen specific incident – define capabilities and competencies required. For an example, see Cranfield's immersive training programme in the UK[3].
    e. Designing and delivering hydrogen safety training, skills development, and clear procedures for aviation stakeholders for safe storage and handling of hydrogen and hydrogen-electric aircraft– licenses required to work safely.
    f. Community and public awareness of hydrogen at airports and its use in aircraft.
    g. What operational and access procedures need to change for hydrogen use and refuelling airside. Airside access approvals if mobile refuelling adopted.
    h. Broader airport strategy, integration, and investment opportunities – ground transport applications. Consider the opportunity for airports as renewable energy, hydrogen, and aviation innovation and intermodal hubs.
    i. Secure broader longer term green hydrogen availability and supply at airports and airport solutions for diversions.
6. There are regional concerns around access to new fuels such as hydrogen and the associated costs. Regional development agencies and associated funding should support airport

[3] https://www.cranfield.ac.uk/-/media/images-for-new-website/research-projects/swee-research-projects/trilema/thomas-budd-trilema-h2-safety-and-training-for-airport-fire-and-rescue-presentation.ashx?la=en&hash=627E0FA505035E541130E09BBF94E73A9D86E883

decarbonisation, and investment in renewable energy, green hydrogen production and broader transport innovation and transition.

7. Recommend the Australian Government's Regional Airport programs and the Regional Investment Framework incorporate renewable energy projects and green hydrogen generation or partnership opportunities, aligned with net zero and emerging electric, hydrogen, hybrid, and other aviation technologies.
8. Renewable energy and hydrogen production requires considerable capital investment on the part of airports and/or partners (especially if production is located at airports). Funding to help enable airports to develop and deliver renewable energy projects would also aide airports to decarbonise quicker and can lead to operational savings or revenue generation. Government support and investment could facilitate innovative systems that can be trialled and tested at or near airports where hydrogen-electric aircraft will be initially deployed.
9. The case for local hydrogen production (at/near airports) could be stronger where supply from other sources is unavailable or constrained. Such an approach would eliminate dependencies on a larger, and arguably less-mature, supply chain and so could accelerate early adoption of hydrogen as fuel. ZeroAvia in the UK and Universal Hydrogen in the US both see the generation and supply of hydrogen (gaseous and then liquefied) as a core component of their business proposition. (ARUP, Hydrogen in Aviation, p22). There will still be mobile distribution and re-fuellers for new fuels like hydrogen, so infrastructure at airports is not essential.
10. A research study and review of hydrogen supply chains and distribution to airports from key production centres in Australia would be helpful (e.g. North Coast Line from Gladstone to Brisbane), especially where the lines are under-utilised and are set up for heavy freight and distribution. Regional opportunities and challenges can then be identified, aligned to projected demand.
11. Airports provide great locations for intermodal hubs, and emerging technology and renewable energy hubs, including regional airports. They can facilitate aviation R&D, emerging technology development, and testing. For an example of an airport as a renewable energy hub, including hydrogen production, see Christchurch Airport's Kowhai Park.
12. In line with the IATA Net Zero Roadmaps for Infrastructure, and the need to develop capability in Australia, consider pilot and demonstration facilities and green hydrogen hubs at airports, to trial advanced and emerging aviation technologies in Australia. Recommend reviewing this ARUP and MBIE report for Pilot Hydrogen Hubs for New Zealand, with the "ambition to be a world leader in the trialling, testing and development of clean energy technologies for aviation, and in the process, build a thriving and innovative clean energy ecosystem in New Zealand" (p7).[4]
13. An international Airport Carbon Accreditation Scheme exists to support and recognise emissions reduction at airports, and many Australian airports are already engaged. Recommend encouragement, recognition, and support for all airports to engage in this program.
14. It is worth noting that electric and hydrogen electric propulsion and aircraft will be quieter than combustion engine aircraft. Transitioning to new cleaner and quieter technologies will help to better manage aircraft noise – a matter of substantial public discourse and discontent in some Australian cities. These technologies also substantially reduce noxious emissions and pollutants.

[4] https://www.mbie.govt.nz/dmsdocument/25936-hydrogen-hubs-at-nz-airports-phase-1-report-pdf

CHAPTER 9: EMERGING AVIATION TECHNOLOGY

1. This chapter and the questions are drone, eVTOL, and AAM focussed, and we would like to see more recognition and coverage of the opportunities and developments for fixed wing aircraft, in terms of new aircraft designs and new powertrain technologies.
2. Electric, hydrogen-electric, hydrogen direct combustion and hybrid powertrain technologies and emerging new aircraft (fixed wing) deserve further attention.
3. Electric and hydrogen electric propulsion and fixed wing aircraft are zero emission but will also be quieter than combustion engine aircraft. Transitioning to new cleaner and quieter technologies will help with social licence and to better manage aircraft noise.
4. The hydrogen aircraft timeframe should be revisited and refined, as it is currently framed as a long-term future 2050 proposition and does not seem to recognise what is currently happening in terms of national and international electric and hydrogen-electric fixed wing aviation technologies and aircraft, see Hydrogen Aviation Powerlist 2023 (specific project examples include AirBus, Universal Hydrogen, Stralis Aircraft, ZeroAvia, Dovetail, magniX).
5. The emerging White Paper and policy settings should recognise the need for early planning and investment: for infrastructure for green hydrogen production, powertrain and aircraft R&D and CASA certification, manufacturing and retrofitting in Australia, and aviation ecosystem preparedness and deployment.
6. Government investment and funds are currently limited in Australia for industry players working on electric and hydrogen-electric emerging aviation and propulsion technology for fixed-wing aircraft that is working towards net zero outcomes. This makes Australia uncompetitive compared to the USA or Europe in this regard. Industry R&D, early design and prototypes, experimental stages, and certification, need financial support, and not just through academic and research funding which can limit and stifle progress and timeliness.
7. Start-ups and innovators in Australia need access to government funding and support, and more broadly non-dilutive funding to facilitate a strong investment environment for emerging technology R&D and manufacturing. Investors actively encourage a move to the U.S. to enable access to non-dilutive funding sources, markets, and a regulatory environment that is being developed to actively support emerging technology roll out.
8. Regional and remote airlines and aviation services are well suited to new and emerging powertrain and aviation technologies. Emerging aviation technologies could help address the "decline in the number of passenger flights to smaller regional locations" that has been attributed to a trend towards the use of larger aircraft, because the efficiency of larger aircraft will be challenged with the emergence of electric and hydrogen-electric fixed wing aircraft over a wide range of route lengths (current projections are up to 3000km and 80 passengers). Existing fleet and aircraft will be able to be retrofitted with hydrogen-electric and electric powertrains, helping to manage and prevent stranded assets.
9. Emerging fixed-wing hydrogen-electric aircraft (such as Stralis SA-1) would improve competition by lowering the barrier to entry for new airlines by reducing the purchase price (per seat) for an aircraft with an operating cost closer to that of a single-aisle. It would also support more point-to-point routes, through lower operating costs, and major airports may become less of a bottleneck. The government could support the creation of new routes and open access between regional airports to incentivise moving traffic away from "slot-constrained airports".
10. Government supported, subsidised or underwritten remote air services and routes, would lend themselves well as test and experimental flight routes and systems for new and emerging aviation and propulsion technologies, as support is already available to run these routes. Recommend integrating criteria and opportunities into future service agreements, to not only help test and develop infrastructure and capability, but to activate the transition.

11. Research is needed to examine the national and regional opportunity of different emerging aviation propulsion and aircraft technologies (fixed wing) for Australia's domestic aviation market, broken down by different aviation sub-sectors and routes.
12. Research is also needed to examine green hydrogen production, use, and cost projections for aviation including infrastructure requirements for different sized airports across Australia from 2024 to 2050.
13. Governments and industry will need to work together to develop community and consumer awareness and education around emerging aviation technologies, including the use of new fuels such as hydrogen in aviation. This extends to the National Framework for Voluntary Consumer Purchasing of SAF, and broadening opportunities for customers and consumers to support 'carbon insets' including hydrogen production and emerging technology development and adoption.
14. Infrastructure and investment will be needed to mobilise and facilitate emerging technologies and new fuels such as green hydrogen:
    a. To secure cost-effective green hydrogen supply and liquefaction for domestic aviation use and storage and distribution at airports across Australia (commencing with those engaged in active experimental trials).
    b. Australian liquid hydrogen transportation, storage, and refuelling solutions developed within Australia.
    c. Determining requirements, responsibilities and operational procedures for the transport, storage, and handling of liquid hydrogen on, in and around the airport, including safety, incident and emergency response capabilities and competencies.
    d. Subsidy or assistance to help facilitate the shift between conventional and hydrogen-electric aircraft technology when it is initially deployed in Australia from 2026, and airlines are retrofitting or replacing aircraft.
15. The regional opportunities presented for Australian domestic hydrogen and renewable energy and fuel production include fuel security and sovereign capability, mitigate supply disruptions, diversify fuels and sources, decrease dependence on imported fuel, local options for fuel production and decarbonisation, generating jobs, and economic development for Australia's regions, and supporting Australia's plan to become a renewable energy superpower.
16. New higher education courses/programs and content for existing programs will be needed to meet the need of emerging technologies in aviation including electric and hydrogen-electric fixed wing aircraft. Include development of micro-credential and short courses, and additional modules or components of existing courses and qualifications to meet the requirements for the new technologies and fuels such as hydrogen.
17. Facilitate Australian institutions to learn from and build partnerships with those leading internationally on training and skills, such as Cranfield University's 'Hydrogen Safety in Aviation' immersive training programme for practitioners[5]. Hydrogen (gas and liquid) safety and handling, training, and skills development will be needed across the aviation ecosystem alongside procedures for airports, pilots, maintenance mechanics and ground handling personnel.
18. Regulatory and approval processes and barriers will need to be overcome at Australian airports, and with CASA for hydrogen aircraft certification and approvals. Risk analysis illustrates regulations, standardisation, permissions, and skills are critical challenges.
19. CASA capability needs to be developed to support and work alongside emerging technology developers, learning from international examples and experiences and working closely with FAA and EASA. The process of experimental flight testing and working towards STC provides a great learning and capability development opportunity for the whole aviation ecosystem,

[5] https://www.cranfield.ac.uk/-/media/files/brochure/hydrogen-safety-in-aviation.ashx

but CASA will need to be sufficiently resourced to provide the necessary support and in a timely manner.

20. CASA and associated compliance policies and regulations will need to consider and incorporate emerging technologies such as hydrogen-electric aircraft. Currently it would be easier for emerging technologies to go to the U.S. or Europe, and that situation needs to change to secure and maintain Australian grown outfits.

CHAPTER 10 – FUTURE INDUSTRY WORKFORCE

1. Set clear targets and a roadmap for emerging technologies and fuels, recognising the roles and opportunities for different aviation sub-sectors, and for the regions across Australia. A clear policy direction with programs that support the transformation will create a strong foundation for investment and development.
2. An existing workforce challenge is low wages, and it is challenging getting maintenance staff and licenced aircraft engineers (LAMEs), this needs to be addressed and employers need to provide better wages to attract people and with the appropriate skills.
3. The manufacturing sector does not exist in Australia for high quality aerospace parts. Whilst there are companies who can do it, there is a distinct lack of competition and options. Industry will regularly go overseas for parts because it's easier and cheaper to get them, so the aerospace manufacturing industry needs supporting and reinvigorating.
4. Develop new higher education courses/programs to meet the need of emerging aviation technologies and new fuels such as hydrogen. TEQSA need to be mentioned on the list.
5. Regional airports currently struggle to attract new employees and apprenticeships, mainly driven by higher wages and competition by larger industries. This is particularly prevalent in mining and resource sector communities around Australia. Accessibility to resources and skilled labour, will only be exacerbated with new technologies and fuels.