



Defence Business

The path to net zero emissions

Four critical next steps

By Grant McDonald



Decarbonization is front and centre in defence circles. Militaries are without question heavy emitters of greenhouse gas (GHG) emissions. New estimates suggest the world's militaries account for 5.5 percent of global emissions.¹

The significant growth in global military spending over the past two decades – to more than US\$2.1 trillion in 2021² – makes decarbonization in the A&D sector extremely challenging, although not impossible. Without action, the industry will continue to significantly contribute to global carbon dioxide emissions by 2050.

The pressure is on global militaries to develop decarbonization transition plans. It's more than likely that transition plans will soon be mandatory across many of the developed economies. Aerospace and defence (A&D) manufacturers also face growing pressure from governments, including defence departments, as well as airline customers, investors, employees and other stakeholders. As a result, they are developing decarbonization strategies to try and mitigate GHG emissions and achieve their net zero targets.

Emission reduction across the entire A&D value chain will be essential to decarbonize the sector. Elements of the value chain primarily include improving product quality through enhanced program management, increasing process efficiency to reduce costs, and designing and ultimately manufacturing “greener” aircraft and defence equipment for end-use customers.

Much work is already underway in both the public- and private- sector to improve accountability and adopt common standards for accounting, reporting, and reducing emissions. The industry has four key levers that will drive GHG emissions reduction: improving energy efficiency, using

sustainable aviation fuel (SAF), developing alternative technologies, and utilizing carbon offsets.

Many companies are procuring renewable energy contracts and reducing their power consumption to reduce emissions. The transition to net zero also encompasses a wide range of other environmental, social, and governance (ESG) issues, such as sustainable products and services, customer health and safety, waste and recycling and impact on communities.

A Four-Point Plan

Here in a nutshell are the key next steps for the A&D sector on its path to net zero emissions:

First, quantify and analyze the organization's emission profile across the full value chain, including scope 3, by partnering and collaborating with suppliers and industry coalitions. Scope 3 or indirect emissions account for almost 70 percent of total A&D sector emissions and occur during the operations or use of the manufactured equipment and systems of various components. They are not produced by the company itself, and not from assets owned or controlled by them.

Second, work with all tiers of suppliers and encourage them to set their own emission-reduction targets.

Third, develop fuel-efficient aircraft and ensure SAF is both technically and commercially viable.

Fourth, invest in cleaner technologies to drive decarbonization in the sector.

To reduce emissions, the OEMs are already investing in developing new aircraft and electric/hydrogen-powered

¹ Conflict and Environment Observatory, “Estimating the Military's Global Greenhouse Gas Emissions,” November 2022

² Statista

engines, with one major aircraft manufacturer recently reaffirming plans to introduce a hydrogen-powered commercial aircraft by 2035.³ In a public-private partnership, NASA and another major aircraft manufacturer recently announced they will work together to build, test, and fly an emission-reducing single-aisle aircraft, with the first test flight set to take place in 2028.⁴

Several countries are also planning to introduce fuel-efficient and electric / hydrogen-powered military aircraft to decarbonize their fleets. For example, the Royal Air Force in the U.K., which wants to become the world's first net zero air force by 2040, recently flew a RAF Voyage, the military variant of an Airbus A330 – powered entirely by 100 percent SAF.⁵

SAF is seen as the fastest way to decarbonize without having to significantly modify aircraft or supply infrastructure. Depending on the feedstock and technologies used to produce it, biofuels can reduce lifecycle carbon emissions on average by up to 80 percent compared to the conventional jet fuel it replaces.⁶ The U.K. government in 2020 revised its aviation fuel standards for military aircraft to add SAF up to

a 50 percent level to jet fuel, similar to what's allowed in the commercial airline industry.⁷

Last year the Canadian aviation industry joined forces to create the Canadian Council for Sustainable Aviation Fuels (C-SAF) to accelerate the deployment of SAF in Canada.⁸ All countries, however, will face challenges in how to meet ambitious SAF targets in jet fuels due to limited availability of feedstocks. SAF may be the fast option. But more needs to be done to move the dial.

The keys to a successful decarbonization journey include stakeholder collaboration, true commitment, an appropriate level of investment, and a well-defined and informed transition plan.

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³ Airbus, "Airbus reveals hydrogen-powered zero-emission engine," Nov. 30, 2022

⁴ Bloomberg, "Boeing Hints New Jet It's Testing With NASA Could Replace 737 Max," Jan. 25, 2023

⁵ U.K. Government, Ministry of Defence, "Royal Air Force completes world-first sustainable fuel military transporter flight," Nov. 18, 2022

⁶ Ibid

⁷ Ibid and IATA

⁸ Canadian Council for Sustainable Aviation Fuels

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