# Renewable Energy

Renewable energy can help reduce carbon emissions inside our operations and from our products and services. For our products, renewable energy can help reduce the carbon intensity of an energy powering our products, such as Sustainable Aviation Fuel (SAF), green hydrogen and batteries. Boeing believes SAF is a necessary lever to decarbonize aviation. However, it will take a "SAF and" approach and not a "SAF or" approach to support the commercial aviation industry's ambition for net zero by 2050. As part of the "SAF and" approach, Boeing continues to advance the viability of other renewable energy carriers and their safe use on aircraft.

For additional information on SAF, please reference the SAF Fact Sheet.

## Creating a decarbonized solution in the UAE

When Boeing was invited to analyze a study that looked at developing SAF in the United Arab Emirates (UAE), the decision to participate was easy and will support the growth of SAF production in the region.

The "Power-to-Liquids Roadmap" report examines the financial, economic and environmental benefits of decarbonizing the country's aviation industry with an emerging SAF technology.

**Boeing's role:** The report was developed by the UAE Ministry of Energy and Infrastructure in collaboration with the World Economic Forum's Clean Skies for Tomorrow Initiative. Boeing participated by offering expertise at the launch event, analyzing the findings and being an active member of the UAE's SAF task force, which is led by the Ministry of Energy and Infrastructure and provides strategic guidance on a range of fuel options, including Power-to-Liquids (PtL), a type of SAF.

**What is PtL?** SAF requires careful attention to detail. There are several pathways to creating PtL (Power-to-Liquid) including the process where renewable electricity, $CO_2$ and water are synthesized into a liquid hydrocarbon, including jet fuel.


The Emirates flight test utilized 18 tons of SAF in one engine of a 777-300ER blended from two producers, Neste and Virent. The flight flew over the Dubai coastline for just over an hour. (Emirates photo)

**Here's how it's made:**

- Electricity is applied to the water ($H_2O$). The hydrogen is collected and the oxygen is set aside.
- The hydrogen is mixed with the carbon dioxide in a reactor until it matures.
- The liquid is removed from the reactor, which results in PtL jet fuel.

**Resources needed:** This PtL relies on two things in the UAE: tapping into the UAE's abundant sources of renewable energy (intense sunshine and sustained winds), as well as its ability to capture carbon dioxide from the air or from point sources such as industrial waste gases.

PtL is considered a significant technology for the UAE to decarbonize aviation. Other countries are also studying PtL to mature the technology and assess how this pathway may help them decarbonize.

**The upshot:** The UAE report shows that it would be ambitious but feasible for the country to produce as much as 11 million tons of PtL SAF by 2050 — equivalent to approximately 70% of national jet fuel consumption.

**It's all about partnerships:** "We collaborate with policymakers across six continents to support the SAF value chain, including its supply, use, certification and life cycle," said Mohammed Al Ghailani, Boeing's sustainability lead for the Middle East and Africa. "We were thrilled to support the UAE's ongoing research into developing a renewable fuel that would be suitable to the region."