

Greening the engine lifecycle



CFM focuses on protecting the environment throughout the entire engine lifecycle.

From initial design and materials selection, to manufacture, support and end-of-life, environmental awareness is an integral part of how we do business.

When a CFM engine reaches end-of-life, 97 percent of its parts are recyclable.

Technologies for the next generation

With customers facing even more daunting challenges in the future, in 2008 CFM launched LEAP-X, a new-generation turbofan engine derived from the technology development program LEAP56. Through LEAP-X, CFM is developing and testing technologies that will make our next engine even more environmentally friendly.

Compared to the current Tech Insertion standard, LEAP-X will reduce specific fuel consumption by up to 16 percent, NOx emissions by 60 percent, and noise by 10 – 15 decibels. Of course, our new engine will uphold CFM's reputation for industry-leading reliability and maintenance costs.

TAPS COMBUSTOR

Within the scope of LEAP, CFM is developing a next-generation Twin-Annular Pre-Swirl (TAPS) combustor, which premixes the fuel and air before they enter the combustor. This pre-swirling creates a leaner mixture and minimizes the residence time of the hot fuel and air in the combustor, thus reducing NOx emissions by 60 percent compared to the ICAO CAEP/6 limits that took effect in 2008.

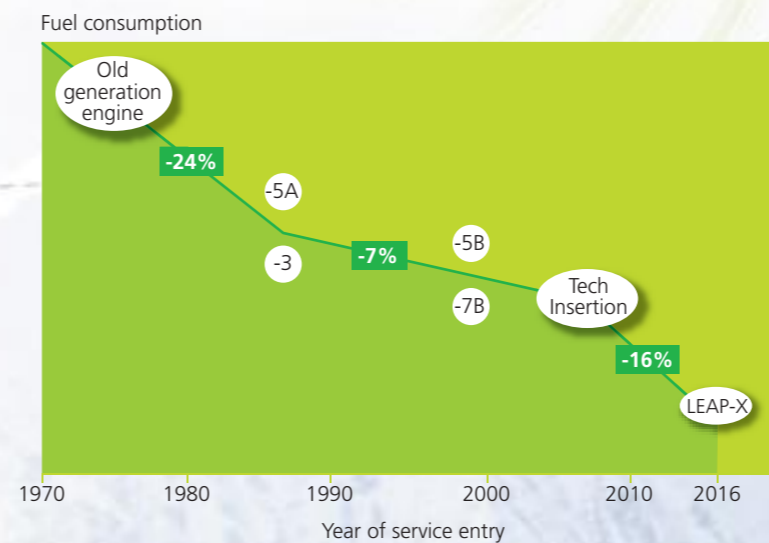
ALTERNATIVE FUELS

CFM engineers are charting new territory with the testing of alternative fuels. In 2007, CFM carried out two series of ground tests of CFM56 engines using biofuels, as well as conducting a test flight using these fuels. Compared to current jet fuels, this type of biofuel could reduce CO₂ emissions by as much as 80 percent. In early 2009, CFM supported the first test of a commercial airplane using a 50% biofuel partially made of algae and jatropha plants.



Our most recent upgrade is the Tech Insertion standard, which enhances the performance of our CFM56-5B and -7B engines.

More than 160 operators worldwide are already reaping the benefits of CFM Tech Insertion engines: lower fuel consumption, longer on-wing life, lower maintenance cost and reduced emissions (20 to 30 percent less NOx) – that's the equivalent, for each takeoff/landing cycle, of eliminating the NOx released by more than 350 passenger vehicles idling for an hour.



CFM56-3 for 737 Classic family (1984)
CFM56-5A for A320 family (1988)
CFM56-5B for A320 family (1994)
CFM56-7B for 737 NG family (1997)

Environmental and operational benefits

CFM's advanced technologies help the environment while also offering customers significant operational benefits.

By refitting just 20 aircraft with Tech Insertion engines, an airline can save about \$786,000 in annual fuel costs (based on jet fuel at \$4/gallon) compared to the base CFM56-5B or -7B models.

Furthermore, CFM56 Tech Insertion engines will reduce customers' maintenance costs by as much as 12 percent, because of longer-life components and extended time on-wing. By designing engines that anticipate evolving environmental regulations, we help our customers minimize penalties and landing fees at airports around the world.



Meeting -and exceeding- environmental standards

CFM engines are among the quietest and cleanest engines flying, thanks to state-of-the-art technology. Over the last three decades, we have continuously improved these technologies to stay at the cutting edge.

Current generation single-aisle aircraft powered by CFM56 engines are significantly quieter and more fuel-efficient than those delivered in the 1990s and early this century.



CFM and its parent companies, GE and Snecma, have made the environment a top priority.

In Europe, CFM and Snecma are working to meet the ambitious objectives set by ACARE (Advisory Council for Aeronautics Research in Europe's) for 2020. ACARE's goals are to reduce noise and CO₂ emissions by 50 percent and NOx emissions by 80 percent, in relation to a year 2000 baseline.

A corporate commitment to the environment



GE's own ecomagination initiative, launched in 2005, sets some very ambitious goals for the company by 2012, including: doubling investment in cleaner technologies, reducing greenhouse gas emissions by 30 percent, and improving the energy efficiency of operations by 30 percent.

As a founding member of the Air Transport Action Group (ATAG), CFM signed the Aviation Industry Commitment to Action on Climate Change during the 2008 ATAG environmental summit. ATAG is an independent coalition of organizations and companies that recognize their environmental responsibilities as leaders of the aviation industry.

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THE POWER OF FLIGHT

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cfm (Environmental Values)



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