

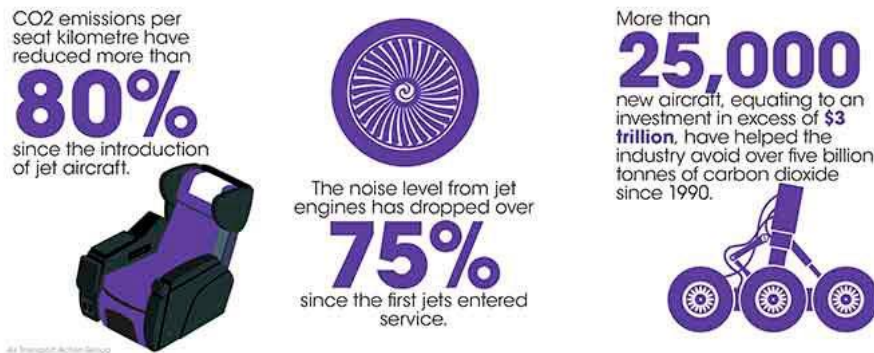
Improving Operations Delivers Green Benefits

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While aviation looks to the upcoming ICAO Assembly for a global market-based measure for carbon emissions, environmental improvements in daily operations continue apace



Fuel efficiency is improving about 2% a year, well ahead of the average 1.5% improvement targeted through 2020.

And though a global offsetting scheme needs to be agreed at the forthcoming ICAO Assembly, if aviation is to achieve the next milestone of carbon-neutral growth from 2020, operational and

technological enhancements that drive fuel efficiency will continue to play a significant role in the industry's environment strategy.

Better operational practice and new technology are two of four industry pillars on climate action, alongside positive economic measures and improved infrastructure.

Last year, the Air Transport Action Group worked with IATA and other associations to publish a set of efficiency case studies by the industry, Aviation Climate Solutions. "The case studies show the wide variety of climate action across the sector," says ATAG Executive Director, Michael Gill. "Carbon emissions reduction projects by over 400 organisations in 65 countries are represented. But this is only a snapshot of the projects underway. The most impressive realisation is the sheer amount of collaboration between industry partners, helping to drive efficiency. Action is taking place in all parts of the world: not only at large organisations, but also through partners in emerging economies."

Airline innovation

Many roads lead to better fuel efficiency. Lufthansa and Israel Aerospace Industries have developed the TaxiBot aircraft tug, for example, that gets an aircraft to its departure position without using the main engines, saving fuel, noise, and emissions. It has been in regular operation at Frankfurt Airport since February 2015.

Meanwhile, Croatia Airlines aligned its potable water use with demand resulting in annual fuel savings equating to about 40 tonnes of carbon dioxide (CO₂) per A319/A320 while cabin reconfigurations have similarly reduced aircraft weight and fuel use, cutting CO₂ by 80 tonnes per year per aircraft.

South African Airways takes fuel efficiency seriously, according to Tlali Tlali, Manager of Media Relations. "We remain keen to implement new measures aimed at promoting more fuel efficient methods in our operations," he says. "We always place a lot of emphasis on fuel efficiency and empower our crew to be innovative within the boundaries of the regulated fuel policy while not compromising flight safety in the process."

Singapore Airlines notes several fuel efficiency projects in its 2014-2015 Sustainability Report. Its A380s have adopted new operational procedures at London's Heathrow Airport and it has also instigated tailored arrivals and continuous descent approaches elsewhere; measures that are saving fuel while maintaining safety. It has also been working with its OEM partners to tweak engine performance, lessen aircraft drag, and minimize aircraft weight.

NASA technology

Electric vehicles on the ground, new generation aircraft in the air—the day-to-day business of flying has scrutinized and tweaked just about every aspect of performance.

The next phase of development continues this exciting progress. The EU's Clean Sky Joint Undertaking (CS JU) program recently demonstrated an "all electrical aircraft" (AEA), for example, using an ATR 72 prototype. The technologies used on the AEA were jointly developed by ATR's shareholder Finmeccanica, Liebherr, and Thales as well as other CS JU partners.

Alessandro Amendola, ATR's Senior Vice President Engineering, says that "contributing to developing and deploying new technologies for the greener aviation of tomorrow is a key part of ATR's identity."

Meanwhile, NASA has completed its Environmentally Responsible Aviation (ERA) project, that could help cut airline fuel use in half. Jaiwon Shin, NASA's Associate Administrator for Aeronautics Research has claimed that the technologies identified by ERA could amount to \$255 billion in operational savings between 2025 and 2050.

Eight integrated technology demonstrations were completed by ERA researchers, including tiny embedded nozzles that blow air over the surface of the vertical tail fin. This proved aircraft could fly with smaller tails, reducing weight and drag.

Composite materials that reduce an aircraft's weight as much as 20%, morphing wing technology that allows an aircraft to seamlessly extend its flaps, and a hybrid wing body concept were also studied.

Engine improvements have focused on the redesign of the compressor stage of a turbine engine, an advanced geared turbofan jet engine, and an improved design for a jet engine combustor, which is where the fuel burns and the CO₂ and nitrogen oxides are created.

Partnerships

As the manufacturers' work on engine development illustrates, airlines cannot maximize fuel efficiency on their own. As has been the case from the outset of the industry's environment strategy, the aviation value chain has important contributions to make.

Airport Collaborative Decision Making (A-CDM) typifies the widespread collaboration. Information sharing should cut down on such delays as unnecessarily long taxiing times or extended waits at the runway for take-off. It is estimated in the European Aviation Environment Report 2016 that A-CDM could save 12–36kg of fuel in the taxiing phase per flight.

A-CDM follows a defined set of steps so that airline, airport and air navigation service provider (ANSP) get important arrival and departure information at the same time. This allows the different organisations involved in a flight to adjust schedules and resources as appropriate while the improved efficiency potentially brings capacity benefits too. A-CDM was pioneered in Europe, where it is hoped there will be a minimum of 42 A-CDM airports by 2019, but has been given a global reach through ICAO guidance material.

In terms of airspace, a new system called iTEC—installed at UK ANSP NATS' Prestwick Centre—typifies the modernization that is slowly taking hold. iTEC will reduce aircraft fuel burn and emissions by enabling the future introduction of free route airspace above 28,000 feet. Trajectory-based operations mean that an airline's preferred routing can be applied wherever possible.

iTEC entered limited operational service in late January 2016 with a view to be fully operational by the summer. The system is initially being used to control aircraft in Scotland's upper airspace sectors, but will be rolled out across the entire NATS operation at Prestwick and Swanwick Centres over the next five years. Alastair Muir, NATS Operations Director at Prestwick Centre says iTEC will help NATS become "more flexible, efficient and resilient with big benefits for our airline customers." So though the aviation world is understandably concentrating on bringing the bigger picture into focus at the next ICAO Assembly, the brush strokes still count. These details help identify aviation's commitment to the environment in the public arena and ensure fuel efficiency remains central to the industry's culture.

Global Offsetting Scheme Update

ICAO's global aviation dialogues (GLADs)—a series of regional outreach and education sessions—took place in March 2016 as negotiations continue toward the adoption of a global climate agreement for air transport.

Air Transport Action Group (ATAG) Executive Director, Michael Gill, says that the GLADs were a vital tool to help build consensus among governments. "The development of a global carbon offsetting scheme for aviation is crucial if aviation is to meet its climate obligations, while also continuing to meet the economic and connectivity growth desired by many countries around the world," he notes. "The successful Paris Agreement on climate change provided positive momentum for discussions at ICAO, which already has its own mandate and well-established program for addressing aviation and climate change."

The GLADs are part of over two years of intense discussions, with negotiators trying to find the balance between environmental and political acceptability.

Ahead of the GLADs, the ICAO Secretariat published a draft proposal for the design of a global market-based measure in the form of an offsetting scheme, which Gill believes marked "a significant and welcome step" that delivers fresh impetus to discussions.

"We urge governments to keep in mind the principles of simplicity, environmental integrity, cost-effectiveness and the need to avoid market distortion as they shape the agreement," Gill concludes. "While we understand the political sensitivities of these talks, the industry would like to see an agreement with broad coverage of aviation emissions."
