

ISSUE 12

TAKING THE GREEN APPROACH

The global aviation industry contributes to approximately two per cent of the world's carbon dioxide (CO2) emissions today. As air traffic continues to grow at a fast pace globally, tackling the impact of aviation on the environment has become an important priority within the international aviation community. Through various initiatives and ongoing efforts, Singapore has looked at ways to address this issue, both locally and internationally.

The quest for a greener aviation industry shows no signs of slowing down. While the aviation industry continues to develop and invest in clean technology, Singapore is doing its part and taking on initiatives that are both effective and practical in sustaining aviation growth.

AN ECO-FRIENDLY AIRPORT

The opening of Changi Airport Terminal 3 on 9 January 2008 heralded a new era in green airport architecture in Singapore. The first-of-its-kind roof design, consisting 919 intelligent computer-controlled skylights and specially designed butterfly-shaped reflectors, was introduced. The energy-saving skylights allowed soft natural light into the building while keeping the tropical heat out. The high-tech butterfly-shaped reflector panels installed above each skylight responds to the position of the sun and cloud cover conditions so that the optimal amount of natural daylight is directed through the crystal-type glass into the building.

This setup means that less artificial lighting and energy is consumed. Together with a unique air-conditioning system that releases cold air via binnacles rising up from the ground, energy consumption is significantly reduced which also saves costs.

As natural light is used to brighten the inside of the terminal building, lush interior landscaping is now possible. In line with Singapore's reputation as the Garden City, Terminal 3 boasts a vertical garden five storeys high, known as the "Green Wall". Spanning 300 metres across the main building, the "Green Wall" is a tapestry of climbing plants, interspersed with four cascading waterfalls and a hand-carved sandstone art wall display.

In October 2009, Changi Airport's Terminal 3 was awarded the Green Mark Gold. The Green Mark scheme is a national green building rating system to evaluate a building for its environmental impact and performance. Changi Airport was also awarded the inaugural Best Green Service Provider at the Annual Asian Freight and Supply Chain Awards last year.

ASPIRING TO FLY GREEN

The Civil Aviation Authority of Singapore (CAAS) has also been actively exploring efficient air traffic management (ATM) procedures and shorter flight routes to attain significant improvements and fuel savings for airlines. With the application of cutting-edge technology

and enhanced ATM procedures, air traffic congestions have been reduced over the South China Sea (since November 2001) and Bay of Bengal (since October 2002), cutting down at least 50,000 tonnes of CO₂ emissions each year. This has benefitted not only Singapore and the Asia Pacific region, but also flights between Asia Pacific and Europe.

In February 2010, Singapore joined the Asia and Pacific Initiative to Reduce Emissions (ASPIRE) to explore enhancements in ATM procedures and shorter flight routes. ASPIRE was established in 2008, the collaboration has brought together governments, air navigation services providers (ANSP) and airlines in planning and implementing fuel-and cost-saving methods through best practices in ATM. These methods are then promoted through demonstration flights, which see airlines joining in to operate the most eco-friendly flights possible.

CAAS and Singapore Airlines (SIA) worked together on a green flight demonstration. By applying improved ATM methods and taking the shorter flight routes, SQ11, which flew from Los Angeles to Singapore via Tokyo, saved a significant amount of fuel and time and reduced its carbon emissions. This flight was supported by Airservices Australia, Airways New Zealand, the United States (US) Federal Aviation Administration, and the Civil Aviation Bureau of Japan, who helped to ensure that this flight exercise was not disrupted with any unnecessary delays and provided optimal conditions to facilitate greater efficiency in the aircraft's landings and take-offs.

Aircraft flying optimum profiles could potentially achieve better fuel savings at an estimated reduction of 4,000 tonnes of CO₂ emissions a year. To this end, CAAS continues to conduct trials for Continuous Descent Operations (CDO) for a smoother descent profile using minimum power, and achieve greater fuel efficiency and quieter landings for aircraft within the Changi Airport approach airspace. These trials have yielded a total savings of 926 tonnes of CO₂ emissions over a combined period of 14 weeks, or an average 1.2 tonnes of CO₂ emissions saved per flight. This shows that, in its full implementation, the environment can benefit from significant CO₂ reductions.

CENTS AND SENSIBILITY

Besides the potential benefit of significant CO₂ reductions, Singapore's airline sector can also gain from fuel usage savings. For instance, SIA employs a full range of initiatives including a fuel productivity improvement programme, a fleet modernisation programme to operate technologically advanced and fuel efficient aircraft, improved flight operational procedures such as tailored arrivals and CDOs, and efficient route planning procedures to minimise fuel usage. Apart from participating in ASPIRE, SIA also partnered British Airports Authority (BAA), National Air Traffic Services (NATS) and Airbus to improve departure procedures for the Airbus A380 operations from London's Heathrow Airport. It saved an additional 330kg of fuel per flight or one metric tonne of CO₂ emissions on a flight from Heathrow to Changi Airport.

With the rising cost of fuel, this can amount to significant savings for the airline and the travelling public.

LOOKING FOR ALTERNATIVE FUELS

With carbon emissions and fossil fuel depletion high on the agenda for the international aviation community, “alternative fuels” have become the latest buzz words. Rising fuel costs, energy supply security and aviation’s impact on the environment have made alternative fuels a viable solution because it has commercial potential and is, at the same time, a feasible strategy to mitigate the industry’s environment impact. Commercial aviation has thus sharpened its focus on the research and development of alternative fuels in recent years. Fuel derived from biomass such as algae, jatropha and camelina is expected to someday replace the conventional Jet A1 fuel used by aircraft today and is expected to reduce the aviation industry’s carbon footprint by up to 80 per cent in the long run.

The Singapore arm of the European Aeronautics Defence and Space Company (EADS) is on the mission to mass produce biofuel derived from microalgae. While the focus of EADS’ research on biofuels is different in each country, in Singapore, EADS is leveraging the country’s best minds from various sectors to find the best solution in meeting technological requirements for microalgae biofuel development.

GREENER PASTURES AHEAD

The adoption and application of new green initiatives showcase the aviation industry’s clear commitment in reducing aviation’s carbon footprint while advancing aviation. Our local green initiatives and research efforts have exhibited encouraging results thus far, and there are continuing efforts to invest in clean technology and push the boundaries of research for the development of alternative fuels.