Fuel efficiency at the Lufthansa Group – Cutting costs and protecting the environment

Using fuel as efficiently as possible in flight operations is one of the central objectives of the Lufthansa Group. The activities in this area interlink ecological and economic necessities: The more the airline reduces its kerosene consumption, the greater the positive environmental effects and the cost savings.

The aviation industry has taken on a big job in terms of climate protection and set itself ambitious goals. It plans to improve average fuel efficiency by 1.5 percent per year up to 2020 and thus to slow down the increase in CO₂ emissions accordingly. From 2020, CO₂-neutral growth should then be achieved. In the long term, aviation’s net CO₂ emissions are to be reduced by half by 2050, compared with 2005. The basis for realizing climate-neutral growth by 2020 is the industry’s established four-piller strategy, which interlinks an array of diverse environmental measures (see illustration on page 71). Its scope comprises technical progress, improved infrastructure, operational measures and economic measures.

Project “Fuel Efficiency” – Progress and activities 2011

In October 2009, Lufthansa German Airlines launched the project “Fuel Efficiency” in an effort to reduce kerosene consumption in flight operations and thus to lower costs sustainably in times of continuously increasing fuel prices. “Fuel efficiency is a very important part of our strategy,” emphasizes Jürgen Starck, Project Manager Fuel Efficiency at Deutsche Lufthansa AG until the end of March 2012. The ratio “specific fuel consumption” was the first non-monetary variable to be included in the process of operating Group planning, a fact that underlines the importance of fuel efficiency as an issue.

Lufthansa German Airlines

In 2011, Lufthansa German Airlines chiefly concentrated on reducing the weight of its aircraft further, advancing measures related to air traffic control in cooperation with DFS Deutsche Flugsicherung and Eurocontrol, and optimizing procedures in flight operations. In addition, certain technical measures and adaptations in the area network/ground yielded further fuel savings.

Reducing aircraft weight

For example, following comprehensive test runs, Lufthansa German Airlines in cooperation with Lufthansa Cargo will use a lightweight container that saves 14 kilos per unit when compared with previous models (see sections on Lufthansa Cargo in this article). Another 230 kilos can be saved on Airbus A340-300s by removing extra tanks that are not needed for the route distances flown by Lufthansa. In addition, the removal of an unused towing fitting on the nose gear of the A340-300 reduces the aircraft’s weight further. One kilo less on all aircraft of Lufthansa German Airlines saves 30 tonnes of kerosene per year, according to the latest calculations.
On the ground, Lufthansa always aims at avoiding long taxiing times during phases with high traffic volumes. For example, in coordination with network management, the company brought forward its flight from Philadelphia to Frankfurt by 45 minutes to shorten the taxiing time. The pay-off: the engine running time on the ground was shortened by 18 minutes.

**Flight operations / Air traffic management**
In the Gulf region, on the routes Riyadh to Doha and Riyadh to Muscat, Lufthansa pilots can now request new and up to 15 minutes shorter routings and thus save up to 2 tonnes of fuel per flight. Between Hamburg and Munich, the removal of certain altitude restrictions by DFS Deutsche Flugsicherung means that flights can now be operated higher and fuel can thus be conserved. In close cooperation with DFS, Lufthansa CityLine has also optimized its flight routings and now includes “partly restricted areas” in its flight planning.

**Technical optimizations**
At the technical level, for example, small but effective changes on the Boeing 737’s landing flaps lead to improved aerodynamics. As a result, fuel can be conserved during a flight’s climbing and cruising phases. Lufthansa has fully refitted two aircraft as part of a trial to obtain reference data.

Furthermore, Lufthansa has developed “Fuel Reporter,” a software that analyzes the influences of different parameters on fuel consumption and automatically generates relevant ratios and reports. In this way, a long-term standard is applied for data, formulas and reports. The program uses data from flight operations that previously had to be collated manually. It saves time and allows more detailed, more frequent analyses. This application makes it possible to obtain important data at a glance.

Another advantage of Fuel Reporter is that trends in fuel consumption and the parameters that influence it can be detected early on – enabling the experts to react more quickly. In addition, they can track the effects of newly introduced conservation measures more readily. Currently, Lufthansa German Airlines and the regional airlines are already working with Fuel Reporter. Other Group airlines are planning to introduce the software.
SWISS

SWISS already operates one of the most fuel-efficient fleets in the industry. Independently of that fact, the experts at this Lufthansa Group company continue to identify and realize further kerosene conservation potentials. For example, SWISS pilots are encouraged to exit the runway after landing with only one engine running whenever the situation allows. This "single engine taxiing" helps avoid an estimated 1,500 tonnes of CO₂ per year. Beyond that, all of the airline’s pilots received the brochure “Best Practice in Fuel Management.” In the framework of the Single European Sky ATM Research Program (SESAR), SWISS developed a new approach procedure in cooperation with the air traffic control authority Skyguide and Flughafen Zürich AG at Zurich Airport. Called “Greener Wave,” it helps manage more effectively the first flight bank in the early morning hours. The assigning of defined time slots has replaced the previously used principle of “first to arrive, first to land.” The flights optimized and the holding patterns averted in this manner mean that emissions of up to 1,800 tonnes of CO₂ per year can be avoided. A video about the new approach procedure “Greener Wave” is available at www.swiss.com

SWISS WorldCargo, the freight division of SWISS, will also replace its aluminum containers with a lighter version by 2015. The weight reduction realized in this manner lowers not only costs but also fuel consumption and emissions.

Austrian Airlines

In 2011, Austrian Airlines also implemented numerous measures to reduce the weight aboard its aircraft. This included the installation of new, lighter seats on the aircraft of its Airbus A320 and Boeing 737 fleets. As a result, the weight per seat declined by 1.5 to 5 kilos and the annual fuel consumption by 1,650 tonnes of kerosene. The airline has achieved a further weight reduction by reducing the fuel reserves for each flight to an appropriate level. And on long-haul routes, optimum loading of aircraft helps conserve kerosene.

Furthermore, Austrian Airlines had winglets installed at the wingtips of its Boeing 767s. This step alone helps avoid 8,800 tonnes of CO₂ emissions per year.

Lufthansa Systems

More entertainment, less weight

Lufthansa Systems sets a new standard with its wireless in-flight entertainment solution (IFE) BoardConnect. Designed as intranet aboard the aircraft, the new solution uses a radio network in accordance with the established WiFi standard to replace the costly, weighty wiring of each individual seat. Its key elements are a server and several access points throughout the cabin. Passengers access the server’s contents via their own laptops, smartphones and tablet PCs. Alternatives are WiFi-based fitted screens or mobile devices that the airlines provide for their passengers.

Avoiding many kilometers of cabling and other types of equipment implies a significant weight reduction. In the case of an Airbus A340-600 with 380 seats, this amounts to about 900 kilos, which corresponds to a fuel savings of 47 tonnes per aircraft and year. The savings becomes even bigger when no screens are installed in the seat backs of certain subfleets. Airlines also avoid significant installation and maintenance costs, and they benefit from the added revenue potential of electronic sales onboard. This makes BoardConnect a classic example of how ecological and economic interests can be meaningfully interlinked.

Electronic Flight Bags ease environmental burdens

More and more airlines worldwide are introducing Electronic Flight Bags (EFB). These “electronic pilot’s cases” largely replace printed route maps, briefing documents and technical manuals in the cockpit. With “Lido/FlightBag” Lufthansa Systems offers one of the leading EFB solutions in the market. EFBs offer a number of important advantages: By avoiding heavy manuals, they save airlines weight and thus fuel in everyday operations. They are up-to-date at all times because they are always fed with the latest data before take-off. Most importantly, they do away with the need for the regular printing and distributing of paper documents to each aircraft in the fleet. In this way, paper consumption is also significantly reduced.
Lufthansa Cargo

Lufthansa Cargo has introduced its own internal Fuel Efficiency program, comprising 52 points to reduce the Cargo fleet's kerosene consumption. Even before an aircraft takes off, the most diverse measures take place on the ground to help save fuel. This includes regular engine washes and aircraft loading that takes into account the optimum center of gravity. The latest weather data and maps also facilitate fuel management as well as the planning of optimized flight procedures, variable speeds and altitudes.

In addition, Lufthansa Cargo has tightened the control of aircraft weight in the framework of a “Weight Watchers” program. For example, the airline operates four MD-11Fs that were converted from passenger to freight aircraft some time ago. The company recently removed the telephone equipment that is no longer needed on these freighters. Merely taking a telephone receiver weighing 350 grams off the aircraft yields a total savings of 3.5 tonnes of kerosene per year. “This example shows how quickly grams can turn into tonnes, given about 15,000 to 16,000 flights per year,” says Wolfgang Raebiger, Director of Flight Operations at Lufthansa Cargo AG.

Water reserves reduced

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More efficient engines and aerodynamic wings

In the air, developments such as more efficient engines, aerodynamic wings, nanotechnology in aircraft paint and new composite materials help ensure that the aircraft of Lufthansa Cargo consume as little kerosene as possible. At the same time, the pilots of the air freight service provider learn kerosene-conserving flying as early as during their initial training. These techniques include the Continuous Descent Approach (CDA), which means continuously decreasing altitude flown at reduced engine thrust. The pilots can also reduce fuel consumption by the optimized use of flap settings during approach and the intelligent deployment of thrust reversal.

In addition, by 2015 Lufthansa Cargo will replace 5,000 of the currently used standard aluminum containers, weighing 80 kilos a piece, with lighter containers featuring side walls that are partly made of honeycombed polypropylene. The weight savings of these lower-deck containers, which are used to transport passenger baggage and freight shipments, comes to almost 19 percent. Comprehensive tests between 2008 and 2011 also showed that the use of these alternative materials entails fewer repairs. Calculated to the movements of all Lufthansa aircraft, replacing the container fleet will result in a total savings of about 2,180 tonnes of kerosene and thus about 6,800 tonnes of CO₂ per year. Once this switch is accomplished, Lufthansa and the other Group companies will together operate one of the world’s largest lightweight container fleets.
Environmental measures: Efficient at all levels

The companies of the Lufthansa Group strive continuously to reduce the environmental effects of their business activities. Through the example of Lufthansa Cargo, the following infographic shows the highly complex and diverse activities and the many savings achieved to steadily improve the environmental balance sheet in the air and on the ground.

On the ground

- Lightweight containers
- Fuel management
- Flight altitude / Aerodynamic drag
- Weight and balance
- Continuous Descent Approach (CDA)

During the flight

- Fuel management
- Flight altitude / Aerodynamic drag
- Weight and balance
- Continuous Descent Approach (CDA)
- Winglets lower kerosene consumption during flight,