

# Reducing emissions

The single most effective initiative to reduce emissions from aviation is to operate a fleet of efficient aircraft. Since 1960 the aviation industry has reduced its noise footprint by approximately 90 percent and fuel consumption is down by around 80 percent per passenger kilometer, thus also reducing CO<sub>2</sub> and NOx emissions.

## “Green” approaches and landings

Norwegian is engaged in several projects in both Norway and Sweden to secure a sustainable aviation industry. “Green” approaches, or Continuous Descent Approaches (CDAs), are designed to reduce overall emissions during the final stages of the flight. The descent profile is planned to ensure a continuous glide slope towards the runway, enabling the engines to run at idle during most of the descent phase of the flight. All Norwegian pilots are trained in procedures and behaviors to increase environmental focus and reduce fuel consumption.

## Winglets

All of Norwegian's 800s are fitted with winglets, a tailfin-like extension of each wingtip that reduces drag. The effect is a reduction in fuel consumption, as the same lift and speed is created with less engine thrust. Winglets are most effective at cruising speeds, where they reduce fuel consumption by as much as 3-5 percent.

## Weight reductions

Norwegian is committed to keeping aircraft weights to a minimum, thereby reducing emissions. This can be achieved both by simple measures such as tailoring the amount of water on board to expected need, and more advanced measures such as investing in weight-efficient carbon brakes. Norwegian was the first European airline to operate 737s with carbon brakes.

## Electronic manuals in the cockpit

EFB, Electronic Flight Bag, is a new electronic information and calculation system installed in the cockpit of all Norwegian aircraft. The system enables pilots to perform their tasks more efficiently and safely. The new electronic system replaces virtually the entire hard-copy operating hierarchy. Weight, balance and performance calculations at take-off and landing no longer need to be performed manually, and the use of paper is reduced by 80-90 percent. Calculations indicate a reduction in annual carbon emissions of approximately 17,000 tons.

## Engine and aircraft wash

Air contains contaminants such as dust, pollen and dirt. With the tremendous amount of air running through an aircraft engine, these particles, together with soot from fuel combustion, form a coating inside the engine which over time reduces efficiency. Norwegian runs a special engine wash program on each aircraft 2-3 times per year. Engine wash enhances air flow and reduces internal drag within the engine.

Norwegian's aircraft are also regularly cleaned and polished externally, reducing drag. The use of detergents and chemicals is subject to a stringent set of requirements, and waste is sorted and recycled after use.

The combined effect of engine and aircraft washing is a decrease in fuel consumption, reducing carbon emissions by approximately 16,000 tons per year.

## Waste sorting and recycling

Norwegian participates in a variety of projects to increase the rate of waste sorting and recycling. On-board waste is sorted and recycled in cooperation with the airports and subcontractors. Profits from the redemption of bottle deposits are transferred to charitable organizations such as Unicef and the Red Cross.

IT equipment is collected by Fair, an organization that deletes and formats discs and re-uses the equipment.

The Group complies with official government strategy on waste by, wherever possible, preventing waste from being generated, minimizing the amount of waste-containing materials hazardous to the environment, promoting waste sorting, enhancing energy consumption, and ensuring that hazardous materials are properly handled.

## **De-icing**

Winter operations in Scandinavia are subject to challenging weather conditions. The removal of ice, frost and snow from the aircraft is a prerequisite for maintaining safe operations. De-icing fluid contains glycol depending on temperature and weather conditions.

Traditionally, a standard mix covering all weather conditions is used. This mix is comparable to the standard windshield washer fluid used on cars, not necessarily optimal for the prevailing weather conditions. In order to reduce the consumption of concentrated fluids containing glycol, Norwegian, in cooperation with ground handling companies, has invested in de-icing trucks which can adjust the ratio of the mixture according to weather-dependent requirements.

The state-of-the-art trucks are also equipped with pneumatic snow removers, further reducing the need for de-icing fluid. Compared to conventional de-icing equipment, the reduction in glycol use is in the area of 60-65 percent.

## **Cooperation with other stakeholders**

Norwegian is active in several environmentally oriented projects in the Scandinavian countries. In Norway the Group is involved in a project involving Avinor (government-controlled airport operator) and the Confederation of Norwegian Enterprise (NHO) to promote a sustainable aviation industry. The primary goal is to identify and implement actions that will reduce the environmental footprint of the industry, making it carbon neutral by 2050.

In Sweden the Group is involved in a project named "Green Flights," involving the [Swedish Civil Aviation](#) Authority and other actors in Swedish aviation.

## **Emissions Trading Scheme**

With effect from 2012, EU and EEA countries will include aviation in the EU Emissions Trading Scheme (EU ETS). In brief, EU ETS requires all emitters to surrender one emissions allowance for every ton of carbon emitted. Allowances must be bought in the open market, and are in limited supply. More emissions equal higher cost for the emitter, in line with the "polluter pays" principle, which is fully endorsed by Norwegian.

The EU ETS is designed so that it favors efficient operators measured in terms of emissions per passenger, and incentivizes the entire industry to focus even more on reducing emissions.

Contrary to national and regional "green taxes," which distort international competition and are often imposed based on a per passenger or aircraft weight basis and not on actual emissions, the EU ETS is designed to provide an effective incentive to reduce actual emissions. The scheme includes all carriers operating within or to the EU, irrespective of nationality or point of origin.