

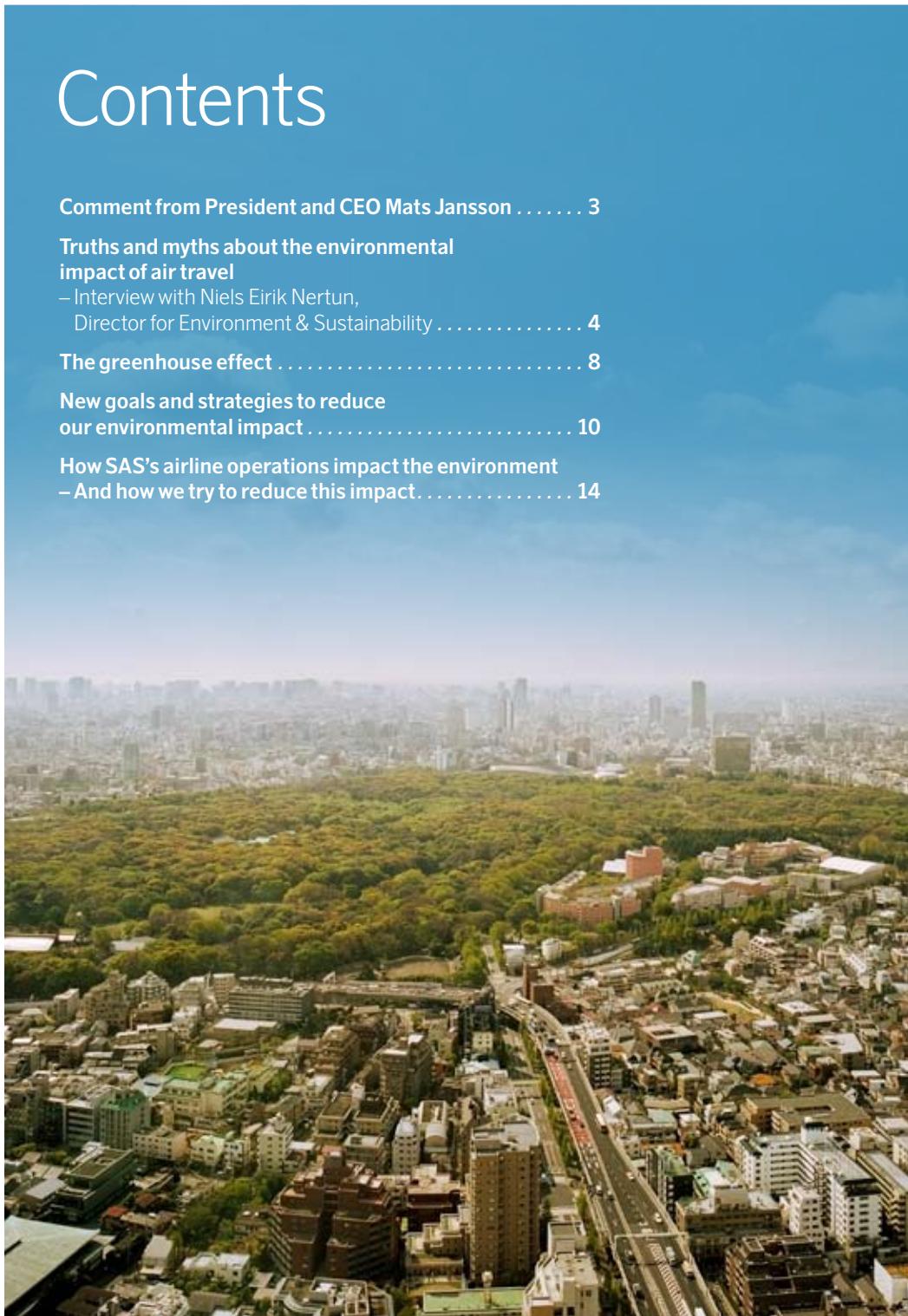
Can I fly with a clear environmental conscience?



SAS Group

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We're reducing our climate impact for long-term, responsible traffic growth

Climate change is high on many agendas. SAS welcomes a serious debate on the future of air transport in a sustainable society. A debate that takes into account all the factors, both positive and negative, from a financial, social and environmental perspective.

For us in Scandinavia, air transport is a natural part of a modern infrastructure. We live on the periphery of the map in a sparsely populated region with long distances. For businesses, personal contacts and recreation, air travel is often the only realistic alternative.

We take climate change with the utmost seriousness. Despite that air transport accounts for 2–3 percent of greenhouse gas emissions, the industry has agreed on a vision of zero emissions by 2050. If we are to succeed, it will require action in many areas, from a new generation of aircraft and engines to new routines in our day-to-day work.

SAS has formulated a new strategy for sustainability work with clearly defined goals and activities. Our aim is to be in the forefront in the airline industry in this regard.

The first step on the road to the vision of zero emissions is to reduce greenhouse gas emissions by 20 percent by 2020 regardless of traffic growth. An important element in the strategy is to benefit from new, improved aircraft and engines as we update our fleet. Scheduled to be available around 2015 or soon thereafter, they will provide 25–30 percent lower fuel consumption than the best the market can offer today. We also



have high hopes for the results of current research and development on alternative fuels. Moreover, we need political willingness, particularly within the EU, to create more efficient routes and facilitate green approaches.

We want you to be able to fly with us with a clear conscience, confident that SAS is doing its utmost to minimize the impact of air travel on our climate.

Welcome on board!

Mats Jansson

Truths and myths about the environmental impact of air travel

In the debate on the environment, air transport has played a prominent role as a symbol of the harm unnecessarily being done to our climate. The message is usually “fly less and help to significantly reduce emissions”. How realistic is this and to what extent would a dramatic change in today’s travel habits have a serious impact? So says Niels Eirik Nertun, who is responsible for the SAS Group’s sustainability work:

Why is air transport often put in a corner in the environmental debate?

“Air transport accounts for 2–3 percent of carbon dioxide emissions on a global basis, which is fairly small compared to many other industries and other modes of transportation. Because of growth in air travel, however, the air transport industry will not be able to offset the increase in emissions with current technology. The fact that air transport has become something of a symbol is partly our own fault, I feel, due to the industry’s lack of preparedness to address climate change. We haven’t succeeded in getting our message through effectively. There are other aspects as well. One is that air transport traditionally has been limited to the industrialized world. Today much of the growth is in the developing countries, where the public and businesses can utilize infrastructure that had previously been available only to rich countries. Consequently, global restrictions on air transport to limit its climate impact would mostly hurt those who previously couldn’t afford or weren’t able to fly and in places where air travel is critical to economic development.”

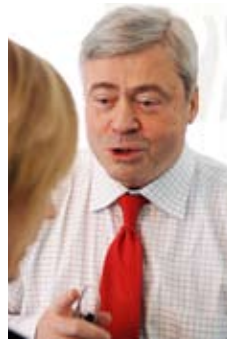
So what is the message?

“Air transport negatively impacts the envi-

ronment. SAS and the entire industry will take its share of responsibility according to the Polluter Pays Principle. According to SAS’s eco-political vision, this applies to all modes of transportation, which implies total competition-neutrality regarding environmental and sustainability issues. SAS’s goal is to reduce carbon dioxide emissions by 20 percent by 2020 and reach zero emissions by 2050. The industry has also accepted the vision of zero emissions by 2050. In purely concrete terms, this means we need improved technology including alternative fuels that make it possible to reduce greenhouse gas emissions.”

How will you get it done?

“The most important element is a fuel-efficient aircraft fleet. This is why the entire industry is waiting for the next generation of aircraft and engines that have been



Niels Eirik Nertun



Environmental policy

- SAS will contribute to sustainable development by optimizing resource use and minimizing its environmental impact in all its operations.
- SAS’s environmental goals are based on constant improvement and on each subsidiary setting specific targets and working to reach them.
- SAS will seek to use renewable energy.
- SAS will have an environmental program as good as or better than leading industry competitors’ that attracts customers and capital.
- SAS’s environmental goals and activities are to be coordinated and harmonized with other production, quality and financial targets.

announced by leading manufacturers. These aircraft are expected to be commercially available around 2015. Another important element is biofuels, where alternatives are already available and will reach the market in the near future. The expected high price of oil is a critical factor. A third is more efficient use of air routes, airports, etc., what we call Air Traffic Management (ATM). This entails a number of measures both large and small. Some require approval from the highest political level to overcome cross-border obstacles. Others can be taken care of by airlines themselves. The latter include green approaches, fuel savings programs, speed reductions, etc. ATM programs can reduce fuel consumption by 10–12 percent compared to current levels, with a corresponding reduction in CO₂ emissions.”

Flying at high altitudes. Is the impact on the climate greater the higher up emissions are released?

“That’s a common misconception. The truth is that the altitude makes no difference as far as CO₂ emissions are concerned. Emissions in the air or on the ground have the same impact. The big problem is that carbon dioxide stays in nature for a long time, sometimes up to 100 years and therefore has the greatest significance. There are other types of emissions aviation has to alleviate as well. This includes nitrogen oxides and contrails. We take responsibility through cost effective measures, based on scientific facts.”

SAS recommends emission trading. Why?

“We feel that a trading scheme is the most cost-effective way to reduce emissions and reach our current political and environ-

mental goals. Making air transport part of a trading scheme is also a direct result of the Kyoto Protocol, which serves as the basis for all trading in emission credits.”

Wouldn’t taxes and fees work just as well?

“The EU’s own calculations show that taxes and fees have little impact on slowing demand. They do, however, increase costs for airlines, which affects ticket prices and has undesirable economic and social consequences.”

The age of SAS’s aircraft fleet is often brought up in the analysis of the company’s future. Any comment?

“SAS’s aircraft fleet has the same average age as most other European airlines – around 12 years, but the MD-80s are nearing an average age of 20. They have to be replaced with aircraft with better environmental performance. The current strategy is to wait for the next generation of aircraft. This means that we are sacrificing the short-term benefits of a quick replacement for the positive, long-term effects. An aircraft has a useful life of about 30 years, and its age doesn’t necessarily affect its environmental performance.”

Does a future rise in fuel prices affect SAS’s thinking?

“All sustainability work has economic consequences. SAS’s position is that effective environmental and sustainability work contributes to improved financial results and make the company more competitive in the marketplace. The investment in new aircraft isn’t just a question of reducing emissions and helping the environment. Right now two aspects are a concern. One is the price of fuel, though that’s essentially cost-neutral. All airlines are affected.



New generation of aircraft. SAS has ordered 12 CRJ900 regional jets with the best environmental performance in their class. The first aircraft was delivered in December 2008.

In a future emission trading scheme low emissions are an advantage. Those with the most modern aircraft are affected to a lesser extent, however. The other aspect is that both Boeing and Airbus are beginning to stretch their timetables. This could mean a delay of two or three years before the new aircraft can be placed in service. This situation, together with the on-going recession, with a slowdown in demand, could affect the thinking of airlines, including SAS.”

Describe the relationship between air transport and other modes of transportation?

“All of them are needed, and an optimal combination is the best solution for both travel and the environment. For long distances, there are no realistic alternatives to air transport. The important thing is that all modes of transportation take their share of responsibility for sustainable development. In that respect, I would say that the aviation indus-

try has made considerable progress in terms of recognizing and accepting its impact. At the same time, the industry is prepared to take its share of responsibility. The goals are tough but realistic. In general, air transport is a highly fuel-efficient mode of transportation. Measured in terms of passenger/km, a modern aircraft consumes the same amount of fuel as a diesel-powered passenger car with a driver and one passenger.”

Can customers fly with SAS with a clear conscience?

“Yes. In addition, customers can buy carbon offsets for their travel. Today they are made for all businesses trips undertaken by SAS’s staff. Carbon offsets are available to all our major customers through agreements, and many have such a clause. When the air transport adopts an emissions trading scheme in 2012, SAS will automatically take over the responsibility for carbon offsets.”

The greenhouse effect

SAS's biggest impact on the environment is from carbon dioxide emissions. This gas contributes heavily to the greenhouse effect. In recent years SAS has managed to increase production while at the same time reducing greenhouse gas emissions. The goal in the years ahead is just as ambitious.

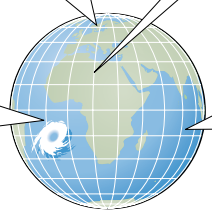
Impact of widening greenhouse effect

The **greenhouse effect** is a natural phenomenon and a necessary condition for life on Earth. Without it, the surface of the earth would be 35°C colder than it is at present.

In addition to higher temperatures, Scandinavia and Northern Europe can expect more intense winter storms, higher precipitation and recurring floods.

Extreme drought could affect large swaths of Africa and North America. Deserts will spread.

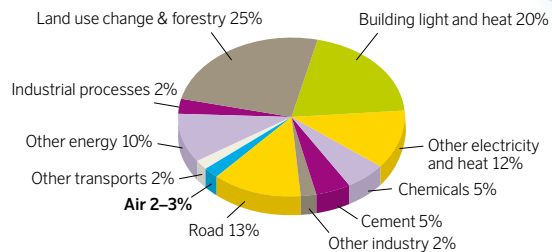
Tropical storms and hurricanes could become more frequent.



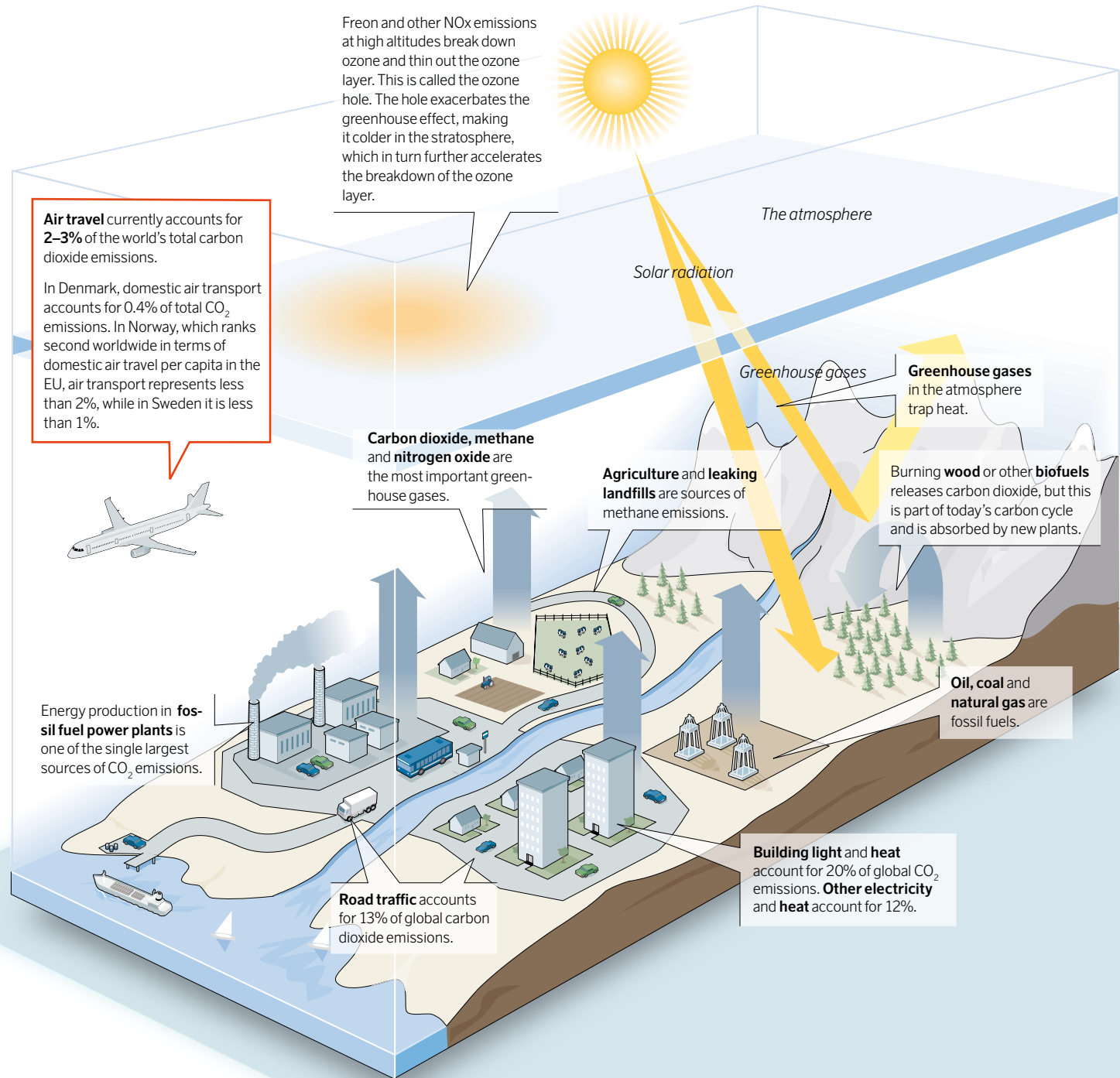
IPCC predicts a further increase in the average global temperature of 1.4–5.8°C by 2100.

Limited contribution of air travel to the greenhouse effect

Global CO₂ emissions



Source: IPCC



New goals and strategies to reduce our environmental impact

The overall objective of SAS's sustainability work is to create long-term appreciation in shareholder value and help the Group reach its goals. Every investment in sustainable development should yield financial results. On this basis the Group reformulated its goals in 2007 within the framework of the Strategy 2011 strategic plan.

Environmental targets

In line with IATA's vision, the overarching long-term goal for SAS's environmental work is to have zero emissions. Zero emissions for air transport will be realized by 2050.

Principal strategic targets

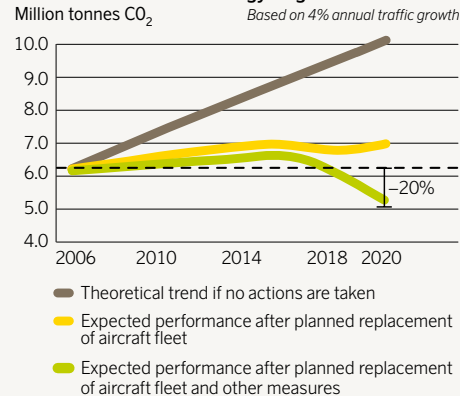
- 20% lower emissions by 2020 including traffic growth
- 50% lower emissions per unit produced by 2020

Goals for 2008–2011

SAS aims to:

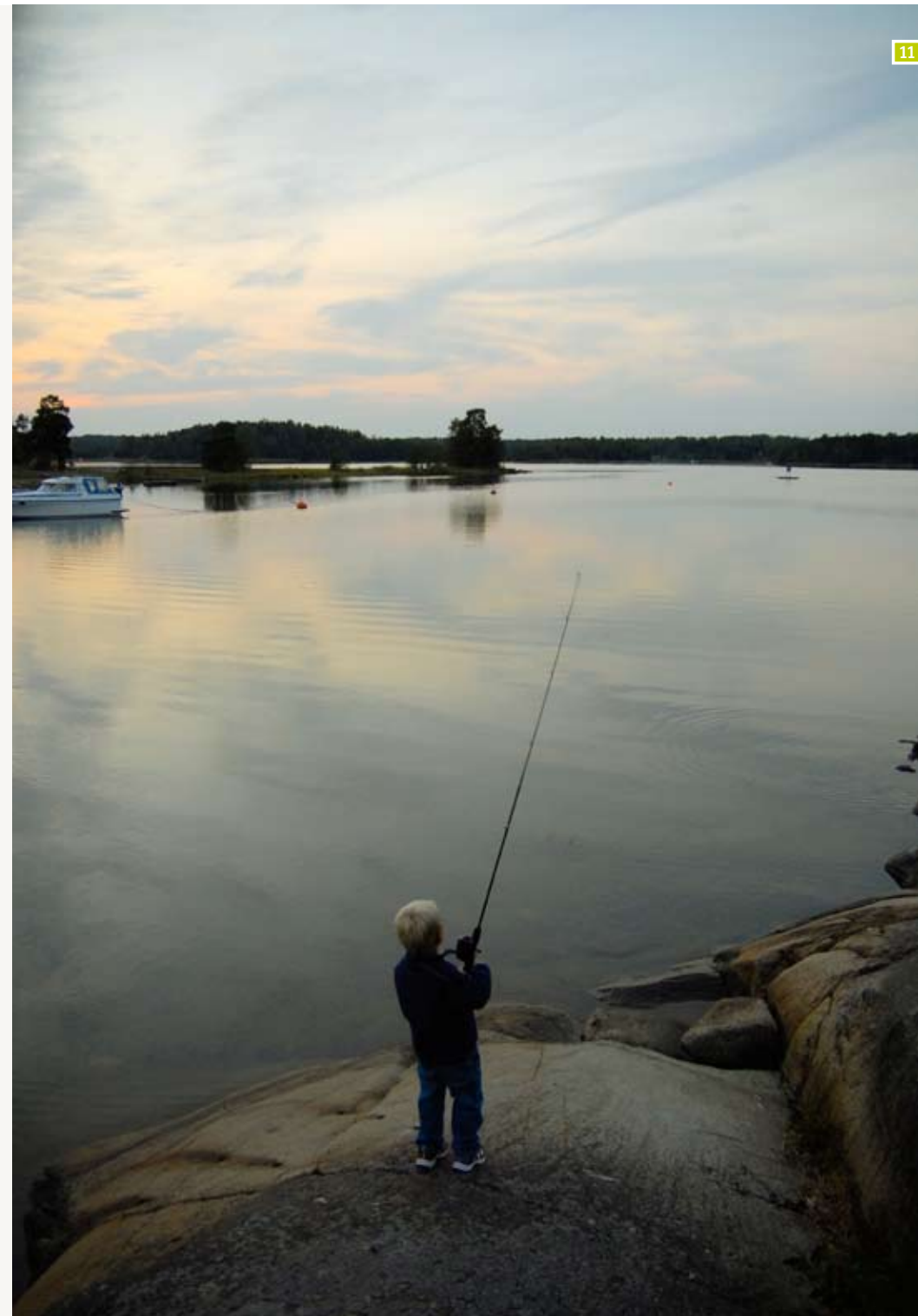
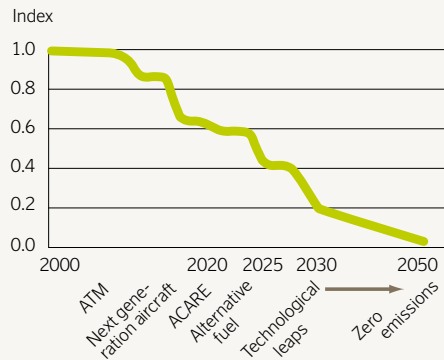
- Be seen as the most environmentally conscious airline in Europe
- Have ISO 14001 certified environmental management systems
- Have the industry's most efficient fuel saving program
- Be among the first airlines to blend in alternative fuel when it is approved and commercially available
- Have a long-term plan for its aircraft fleet that leads to a significant reduction of greenhouse gas emissions
- Have reached the target for SAS's eco-efficiency index.

SAS's environmental strategy targets for 2020

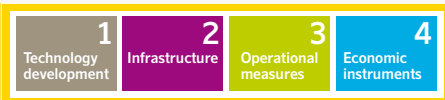


SAS endorses IATA's vision for air transport to eliminate all greenhouse gas emissions by 2050. This vision will be realized through a number of measures.

Relative environmental impact and SAS/IATA's vision of zero emissions



SAS's environmental work rests on four main pillars.



Technology development

Through AEA, SAS participates in the Advisory Council for Aeronautics Research in Europe (ACARE), which comprises representatives of the EU, researchers, the aviation industry, airport owners and aviation industry bodies. ACARE's target is 50% lower CO₂ emissions, 80% lower NO_x emissions and noise levels cut in half for new aircraft by 2020, compared with 2000.

New aircraft and engines

The next generation of aircraft is expected to offer fuel savings of 25–30% compared with today's. At the same time, the Group will be able to consolidate its balance sheet and probably arrange better financing than with a faster replacement.

Besides fuel consumption, engine development is important to reduce noise pollution.



The poisonous shrub *Jatropha curcas* is being tested as an alternative jet fuel.

Winglets

Equipping part of SAS's fleet of Boeing 737s with winglets is another technical solution



that can help to lower fuel consumption and emissions. Depending on the length of the flight, winglets cut fuel consumption by 1–5%.

Alternative fuels

Since 2000 the SAS Group has helped to support research on synthetic jet fuel made from biomass. SAS has an on-going dialog with Airbus/Boeing, engine manufacturers and Swedish Biofuels aimed at developing and testing alternative jet fuels. Along with Boeing, Honeywell and a number of airlines, SAS, formed a group in September 2008 working for accelerated development of renewable aviation fuels. Development is focused on biological materials that are socially, ethically and environmentally sustainable and don't compete with food resources.

Infrastructure 1 2 3 4

A coordinated European air traffic control system would reduce the environmental impact by approximately 12%. Although the Single European Sky program has launched a number of projects, including in Scandinavia, it is critical that the program is accelerated in order to achieve the targets of the industry and the EU. SAS is drawing attention to this on every relevant occasion.

Operational measures 1 2 3 4

Fuel saving program

SAS has established an extensive fuel saving program consisting of more than 50 projects that together will ensure that established targets are met, including in areas such as training, communication, aircraft weight and balance, punctual departures and route planning. Jet fuel accounts for 20–25% of the SAS Group's total costs. Relative fuel consumption will be reduced by 3% before year-end 2008 and by a total of 6–7% by 2011, thereby creating the airline industry's best fuel saving program.

Green approaches and Eco Cruise

A collaborative project with LFV, the Swedish Civil Aviation Administration, called green approaches will also reduce fuel consumption; see further on page 14. More than 2,000 green approaches have been made at Arlanda Airport. The goal is to introduce them at all airports where possible. In inter-continental traffic a breakthrough came in 2007 when the EU and U.S. agreed to test green approaches on transatlantic services. SAS is the only European airline participating in these trials. For green approaches to be used on a larger scale requires a number of preparations regarding air traffic control and cooperation and coordination between the cockpit and air traffic control.

Another current measure is called Eco Cruise, which entails a reduction in speed to reduce holding patterns on approach. Green approaches are part of this.

A slightly lower than normal air speed can also reduce fuel consumption. For example, tests on flights between Oslo and Bergen show that carbon dioxide emissions can be



The first green approaches on transatlantic services took place in December 2007 with an Airbus A330.

reduced by 420 kg by cutting the speed from 860 to 780 km/hr.

Economic instruments 1 2 3 4

After a lengthy negotiating process, a decision was reached in 2008 to include air transport in the EU's emissions trading scheme from 2012. SAS has supported the scheme from the start. Although every aspect isn't positive, SAS feels it is the only way to create a system that doesn't thwart competition and which has a built-in environmental perspective. To avoid conflicts that limit the impact of the scheme, the EU must overcome a major challenge to convince companies outside its boundaries to participate.

How SAS's airline operations impact the environment

— and how we try to reduce this impact

Ninety-five percent of the SAS Group's environmental impact is from flights: noise and fuel consumption. We are working on a range of fronts to reduce our total impacts. By 2011 all companies in the SAS Group will be ISO 14001 certified.

Environmental impact in the air



Winglets offer environmental benefits

Equipping the tips of an aircraft's wings with winglets reduces wind resistance and fuel consumption. They aren't always available as standard equipment and sometimes we have to pay extra for them.

SAS is becoming quieter

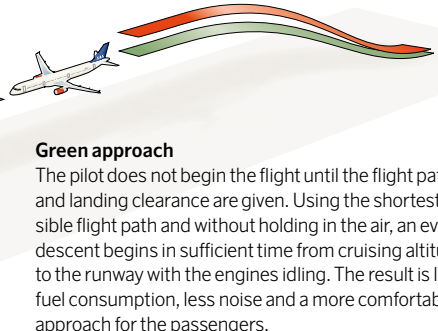
Noise is an environmental problem. Aircraft produce the most noise on takeoff. In the last 30 years noise levels have been reduced by 90 percent. We try to reduce noise by changing takeoff and landing routines and demanding quieter engines from manufacturers.

Best possible engines

We are putting pressure on engine manufacturers to produce engines with less impact on the environment. As a result, the majority of our aircraft are equipped with engines with the best possible environmental performance. The heat formed from combustion in the engine builds nitrogen oxide from the nitrogen and oxygen in the air. Our Boeing 737NGs are equipped with engines (DAC) with more efficient combustion to reduce NO_x emissions.

Green approach

The pilot does not begin the flight until the flight path and landing clearance are given. Using the shortest possible flight path and without holding in the air, an even descent begins in sufficient time from cruising altitude to the runway with the engines idling. The result is lower fuel consumption, less noise and a more comfortable approach for the passengers.



Environmental impact on board

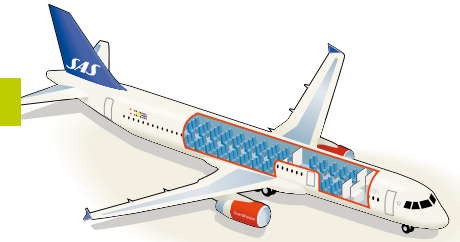
Plastics or glass: That is the question

Water and energy are needed to wash normal plates and silverware, but they also make a meal more pleasant. Disposable silverware and containers made of paper and plastics weigh less, but produce more waste. We have therefore decided to design real silverware, plates and containers that weigh as little as possible and to use recyclable or combustible disposable packaging.

Lavatory waste

For hygienic reasons the water tanks onboard our aircraft are cleared with chlorine, and a special antiseptic liquid is added to the water in the toilets.

We make sure that the wastewater is recovered and processed by a water treatment plant.



Efficiently prepared food

We are constantly encouraging our suppliers to reduce their environmental impact.

We therefore demand that flight kitchens reduce water and energy consumption as well as unsorted waste.

Quenching thirst

Besides coffee and tea, which is brought on board in powder form in bags, aircraft are loaded with large quantities of mineral water, beer and other beverages every year. We sort empty packaging and recycle it whenever possible.

Environmental impact on the ground

Maintenance of aircraft

Aircraft often undergo maintenance in hangars. Their engines are checked and the aircraft are washed. The wastewater contains cleaning solvents, oil and heavy metals. We have switched from solvent-based to water-based paints to prevent poisons from mixing with the wastewater. To control the process, we are also building our own treatment facilities adjacent to the hangars.

Energy-efficient vehicles

The service and support vehicles we use at airports have electric-, diesel-, natural gas- or gas-powered engines.

We always try to use the most environmentally friendly vehicles available. The aim is for all company vehicles to be green vehicles.

Buildings

The SAS Group has achieved good results saving energy in its buildings. Energy consumption is based on renewable sources whenever practical and economically feasible.



Deicing chemicals

During the winter aircraft are deiced before takeoff using glycols, which are recovered. SAS is conducting development work on this issue and continues to search for alternative technologies. Until then a system is being tested with electronic control of glycol content which has led to a substantial reduction.

Yes, you can

fly with a clear environmental conscience. We hope this brochure proves that.

We accept that air transport accounts for 2–3 percent of global carbon dioxide emissions and we fully take responsibility for reducing them despite anticipated traffic growth.

To reach the industry's and our own vision of zero emissions by 2050, we are planning to take extensive measures, including use of the latest technology in terms of aircraft and engines, being among the first to introduce alternative fuels, promoting better infrastructure in the air and using economic instruments such as emissions trading. It is a tough but necessary road to take.

In addition to what SAS does, you can contribute yourself by buying carbon offsets for your flight. The money goes straight to certified renewable energy projects through *The CarbonNeutral Company*. Learn more about carbon offsets and contact us regarding major customer contracts at www.sasgroup.net/sustainability or speak with your Key Account Manager.

Welcome on board!

SAS Group

SE-195 87 Stockholm, Sweden

Telephone +46 8 797 00 00

www.sasgroup.net



SAS Environmental Program