

Smart and Sustainable Aviation in the Netherlands

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INTRODUCTION

Royal Schiphol Group (RSG) is a Dutch airport company with an important socioeconomic function. Airports in the Group create value for society and for the economy. Its mission is to connect the Netherlands to the rest of the world as effectively as possible. By doing so, RSG contributes to prosperity and well-being in the Netherlands and elsewhere. It facilitates leading-edge multi-modal connectivity for the benefit of national and regional development, trade, and well-being.

The RSG vision is to safely and seamlessly operate the world's most sustainable hub and regional airports. Sustainability and safety are fundamental principles governing the actions and activities of all aviation and non-aviation activities across the Group. They are also key indicators against which the Group's success and measure performance are measured.

OPERATOR OF THE MOST SUSTAINABLE AIRPORTS IN THE WORLD

Royal Schiphol Group aims to lead by example when it comes to sustainability in the aviation sector. The ambition of the Group is to operate the most sustainable airports in the world. It focuses on four key priorities:

1. Supporting communities
2. Sustainable aviation
3. Energy-positive
4. Circular economy

RSG cares for the well-being of people: its employees, neighbors, passengers, business partners, and future

generations. New and existing employees find it important that Royal Schiphol Group is socially responsible. By caring about its employees and surrounding communities, it attracts talented people who add value to the company and to society as a whole and value RSG as a responsible employer. The Group wants to contribute to healthy living and working environments, including to restoring nature.

In a world where the demand for connectivity will grow, RSG wants to balance the aviation demand responsibly. Its long-term vision is to aim for net zero-carbon international aviation emissions. Since the aviation industry still relies on fossil kerosene, radical innovations and breakthroughs are needed. The Group believes that it can work with the aviation industry, knowledge institutes, and governments, towards a net zero-emissions sector. RSG's starting point for innovation is that it believes that stepping up its joint efforts to achieve sustainable aviation at the global level will improve the balance between airports and communities around them at the local level. The goal is to go beyond 'zero' and create value, which can be given back to the environment and communities in the Netherlands.

AVIATION AND SUSTAINABILITY

There are 7.7 billion people living on earth and it is expected that the world population will increase to 9 billion people by 2050. All these people need basic necessities such as water, food, housing, energy, clothes, work, and transport. However, the resources of the planet are finite. The depletion of the earth's resources is nearing rapidly, while air pollution and other contaminations are increasingly becoming a global issue. Humankind has to respect the planet's limits, so the earth must be treated properly and responsibly in a conscientious fashion.

However, because of human activities, there has been a serious increase in CO₂ emissions, resulting in rising global temperatures. These lead to climate change and deteriorating living conditions in many places around the world.

Worldwide, the demand for aviation doubles every fifteen years. People like to explore the world, travel for business, or meet family and friends. To facilitate this growth, natural resources and materials are needed. The aviation sector is responsible for 2 per cent of the CO₂ emissions at a global level and 7 per cent of the emissions in the Netherlands. This relative share will increase if other sectors of the economy reduce their CO₂ emissions and the aviation sector does not.

In 2009 the aviation industry set the target to reduce CO₂ emissions by 50 per cent in 2050 compared with 2005. The International Civil Aviation Organization (ICAO), the UN body which oversees global civil aviation, is responsible for monitoring the emissions of international aviation. ICAO's member states aim for carbon-neutral growth from 2020 onwards, and an additional 1.5 per cent in energy efficiency each year. To deal with this, the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA), was initiated by ICAO in 2016. CORSIA is a global market-based measure designed to assist in the achievement of the ICAO's aspirational goal of carbon-neutral growth from 2020 onwards.

European Union Emissions Trading Scheme (EU ETS) is another instrument that internalizes the external costs of aviation. The European Commission started EU ETS to reduce emissions in Europe. CO₂ emissions from aviation have been covered by EU ETS since 2012. Airlines that operate flights within/between EU Member States have to monitor, report, and verify their emissions and surrender allowances to offset their emissions. Royal Schiphol Group actively monitors the developments at the European Emission Trading System for aviation and the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA).

The carbon emissions of airport operators are covered in the Paris Agreement (2015). The Paris Agreement states that to keep the circumstances manageable, the rise in temperature should stay well below 2 °C. For the

Netherlands, the following goals have been derived from the Paris Agreement: 49 per cent CO₂ reduction by 2030 compared with 1990 and 95 per cent CO₂ reduction by 2050 compared with 1990. Emissions from domestic flights are part of the national emissions as well, and are therefore covered by the Paris Agreement. The Intergovernmental Panel on Climate Change (IPCC) report (2018) has urged that the emissions should be net zero in 2050 to keep the rise of the temperature at 1.5 °C.

The aviation sector should also strive for net zero emissions in 2050. In the last decade there have been developed multiple policies and measures and these need to be adjusted to come in line with the net zero goal. The awareness that the aviation sector has to do more has already led to several initiatives.

SMART AND SUSTAINABLE ACTION AGENDA

Twenty Dutch transport organizations, including research institutes, knowledge institutes, and Royal Schiphol Group, have joined forces to express their concerns about climate change and the environmental impact of the aviation sector in particular. In 2018, they jointly set up the action agenda 'Smart and Sustainable' with a goal to decrease aviation emissions in the Netherlands to 2005 levels by 2030.

According to the action plan, the aviation sector will consume 5.5 million tons of kerosene in the Netherlands in 2030, if no action is taken, which amounts to 17.3 million tons of CO₂. By pursuing this action plan, CO₂ emissions from air transport in the Netherlands will be approximately at the level of 2005 (11 million tonnes of CO₂) by 2030. Owing to the integrated nature of the plans they will also contribute to the welfare and prosperity of the Netherlands by bringing about an improvement in the human environment at and around airports, as well as the accessibility to airports. The action plans will also generate new insights and foster the development of new markets, such as the production of sustainable aviation fuel. In so doing, the Dutch aviation sector will contribute towards the transition to sustainable energy which will benefit society at large, and will also strengthen the competitive edge of the Netherlands.

The consortium will achieve this reduction by focusing on seven themes:

1. Optimizing flight paths and procedures.
2. Incentivizing the use of cleaner aircraft through airport charges.
3. Greater utilization of sustainable aviation fuel.
4. Radical fleet renewal.
5. Use of international train services and other sustainable modes for short distances.
6. Working towards zero-emission airports.
7. A swift and sustainable journey to and from the airport.

The following paragraphs explain the seven themes of the Smart and Sustainable action agenda, and provide additional background information.

1. Optimizing Flight Paths and Procedures

The Single European Sky (SES) initiative advocates a single, unified European airspace free from national borders that will be able to support the region's long-term aviation capacity needs. Royal Schiphol Group and its European partners actively promote the accelerated introduction of SES, which has the potential to modernize Europe's air traffic control system and drive efficiency across ground processes, aircraft handling and airport use which will result in a decrease of carbon emissions.

2. Incentivizing the Use of Cleaner Aircraft Through Airport Charges

Newer aircraft types are quieter and more fuel-efficient. Better fuel efficiency results in lower CO₂ emissions, thus "cleaner" aircraft. Royal Schiphol Group has built a strong sustainability element into the new airport charges structure at Schiphol. Take-off and landing fees give preference to aircraft that are quieter and more environmentally friendly. RSG views the new structure as a crucial step towards airport charges that directly address environmental impact. The new structure took effect on 1 April 2019 and runs until 31 March 2022. It effectively raises the discount rate for more sustainable aircraft by the difference between the noisiest and most silent categories. Under the new system, airlines pay 180 per cent of the basic rate for take-off and landing fees

for the noisiest, most polluting aircraft by 2021. Take-off and landing charges for the cleanest, quietest aircraft is 45 per cent of the basic rate. This policy also applies to night flights and will be made even more punitive for the noisiest night flight categories. RSG is monitoring the initial implementation phase and will consider a further evolution of the new fee structure for the following charges period.

3. Greater Utilization of Sustainable Aviation Fuel

RSG's vision is that clean aviation is possible. The development of sustainable aviation fuels, both bio kerosene and synthetic kerosene, is an important measure to lower aviation emissions. They have a double positive effect, because their use results in lower emissions of both CO₂ and NO_x, which is better for climate at the global level, and air quality at the local level. Multiple organizations and knowledge institutes are conducting research into the feasibility of sustainable aviation fuels, including feedstock and scale-up opportunities. Via the joint action agenda Royal Schiphol Group committed itself to having 14 per cent sustainable aviation fuels available at its airport locations in 2030. RSG has signed a multi-party agreement to study the production of synthetic kerosene. RSG contributes financially and with know-how. RSG invest financially in the design phase to build a plant for the production of bio kerosene in the Netherlands. The plant is expected to take in operation in 2022. In the coming years, the Group expects an increase in the production of bio kerosene and an acceleration in the development of synthetic kerosene.

4. Radical Fleet Renewal

Radical fleet renewal is another means to reduce emissions. It involves both using newer aircraft types and accelerating the development of hybrid and electric engines. Via the climate round table network on sustainable aviation, Dutch knowledge and research institutes spur innovation, together with the partners in the aviation sector. RSG stimulates research and development and has partnerships with universities and research institutes.

5. Use of International Train Services and Other Sustainable Modes for Short Distances

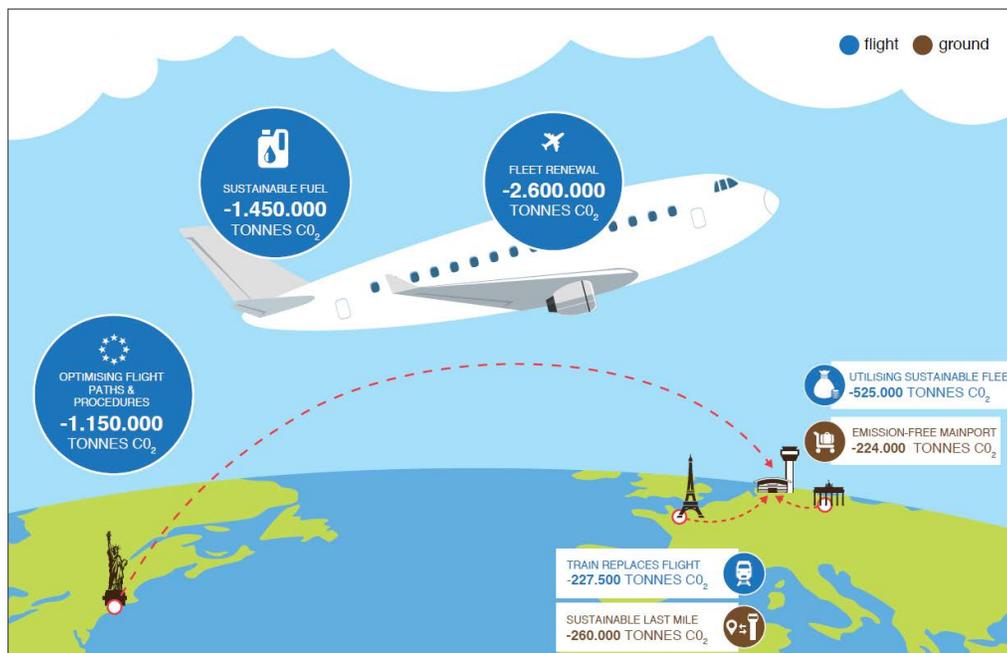
While clean aviation is expected to become a reality, it does not mean that the aviation sector can grow without limits. Royal Schiphol Group has to balance which routes and destinations have added value for people's well-being and the economy. In addition, passengers have their own responsibility to decide whether taking a flight is necessary. Travelling could be avoided by using digital solutions like videoconferencing. On some routes, an alternative mode of transport could be available. The further development of landside transport alternatives such as high-speed trains, autonomous road transport, and Hyperloop systems will increasingly provide options for short-distance journeys. Particularly for short distance trips within Europe, the train could be a good alternative to air travel. Substitution has several advantages: it lowers aviation emissions, helps balance scarce airport capacity, improves connections, reduces travel time, and increases frequencies; the latter two of which will increase the chance that passengers will opt for non-aviation modes of transport. To make substitutions possible, the ease with which customers can buy integrated Air-Rail tickets has to be improved. RSG contributes by improving the seamless journey for passengers using several transport modes. The

extension of Amsterdam's North-South Metro line above ground is another interesting option to further develop Schiphol as a multimodal hub. This development will create space for international trains in the Schiphol tunnel. Furthermore, there are other sustainable alternatives that can be developed further for routes with smaller traveler volumes.

6. Working Towards Zero-emission Airports

Royal Schiphol Group is committed to reach zero-emissions by 2030 without offsetting. This goal means that no carbon and particulates will be emitted while using energy and fuel for the own operations, as well as from related ground operations at airside. RSG runs on Dutch wind power and decreases the use of diesel and natural gas. In the Smart and Sustainable action agenda the goal is that the activities at the entire airport locations should be carbon neutral. At an airport, many activities are operated by third parties. That situation complicates carbon management, since many of the emission sources are not under the control of the airport operator. Other users of airports, including airlines, concessionaires, and ground handlers, must also play an important role in improving overall emissions at airside and landside and the airport operator has a coordinating role.

FIGURE 1: Smart and Sustainable Action to decrease International Aviation Emissions in the Netherlands



7. A Swift and Sustainable Journey To and From the Airport

The journey to and from the airport – the so-called “first & last mile” has a number of disadvantages: it takes time, is sometimes unnecessarily complicated, causes traffic jams, and contributes to CO₂ emissions. Passengers currently choose to travel by car or public transport, but RSG believes that it should be possible to develop alternatives that are more customer-oriented, integrated, energy efficient, and intermodal. Such solutions should also be available for workers in the sector to make commuting more sustainable. The busses that run to and from the airport in the airport region are electric and RSG offers car sharing with electric cars.

FOLLOW UP

This action plan shows that sustainability and economic considerations go hand in hand when it comes to jointly tackling important societal, economic, and sectoral issues. If this action plan is to succeed, however, it is necessary to coordinate the efforts of all involved, because the process is complex. None of the parties has influence over all process elements, and some of the interests, including financial aspects, may be in conflict with one another. All of this demands strong coordination during the development and implementation process, as well as support at the European and global levels for the amendment of existing laws and regulations. The consortium therefore believes that the Dutch government is an essential partner in this process.

The “Smart and Sustainable” action agenda has provided input for the discussions round tables on sustainable aviation. The Dutch government has established five national round tables to investigate how the Netherlands can achieve the goals of the Paris Agreement. The Mobility round table has established a ‘subsidiary’ round table on sustainable aviation. The Ministry of Infrastructure and Water Management leads this round table, in which Royal Schiphol Group actively participates. Recently the Ministry has published a draft Government Agreement on sustainable aviation and the consortium is working towards a net zero emissions goal. The Smart and Sustainable goal for 2030 is the first milestone – to reduce international aviation emissions by 50 per cent by 2050. The short-term focus is to collaborate with partners to investigate, implement, and execute measures from the “Smart and Sustainable” joint action agenda and the climate round table on sustainable aviation. Six months after the launch of the joint action agenda, the consortium published the first update in April 2019. The organization plans to produce a more substantial update on an annual basis.

Besides the partnerships at the national level, Royal Schiphol Group has forged strong ties with (trade) organizations at the European and global level to discuss new developments and regulations. RSG collaborates with airports that have the same sustainability vision and supports airports in becoming more sustainable. The Group believes that by setting ambitious targets, and by leaving the own comfort zone, RSG will arrive at innovations and new insights that will help reach the long term goals. The Group conveys the viewpoint in international forums and articles to raise awareness for sustainability. Global collaboration is a prerequisite to transform the international aviation sector into a sustainable one.