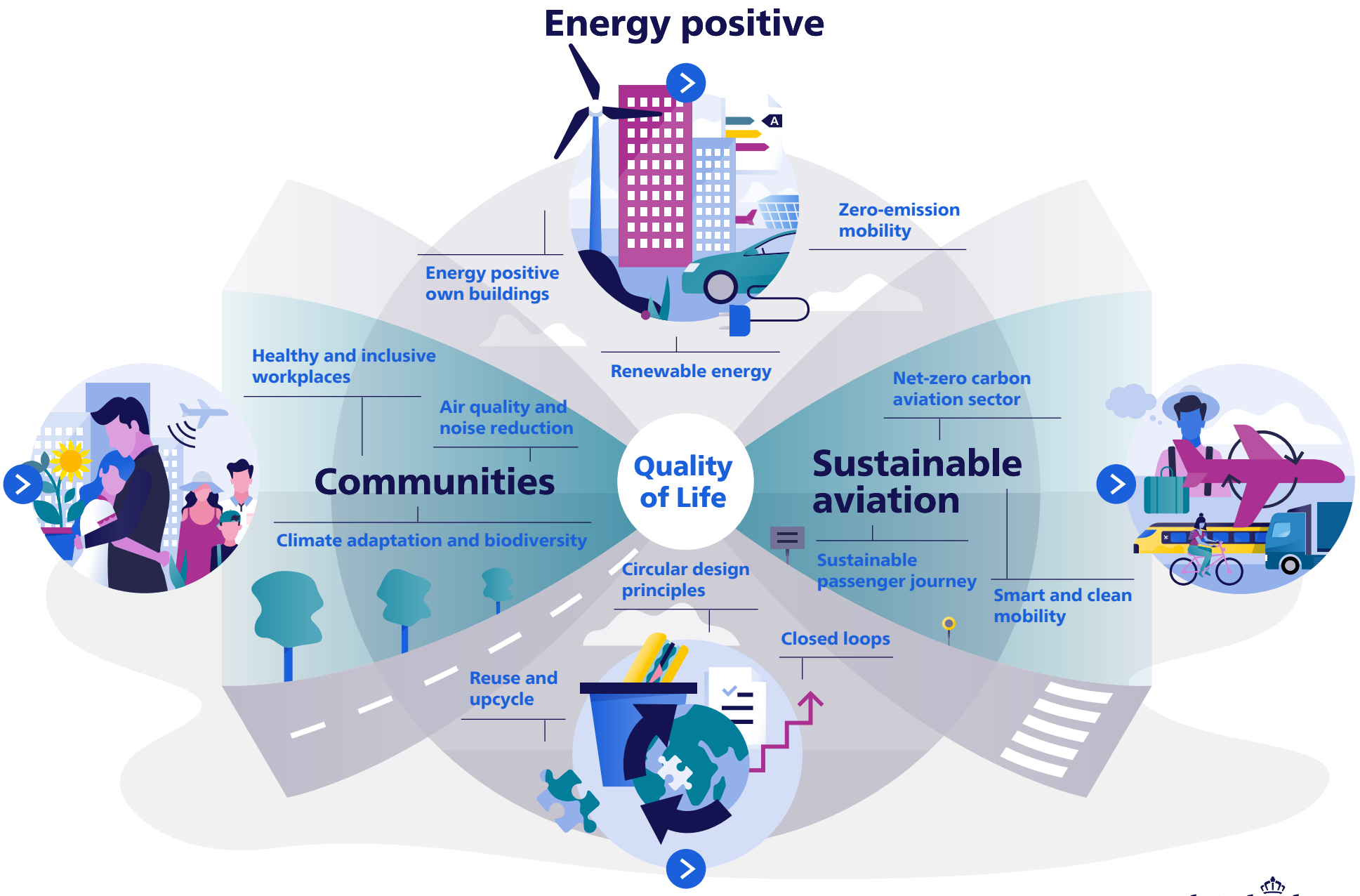
Sustaining your world

Vision and strategy towards the most sustainable airports

Schiphol Group



Schiphol Group

Introduction

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Foreword

In a world where demand for connectivity continues to grow, at Royal Schiphol Group we want to ensure air travel develops responsibly by balancing the needs of air passengers with those of society at large. Safeguarding both the planet and the opportunity to travel for future generations will require decisive action from all stakeholders.
Our ambition is to create the world's most sustainable and high-quality airports. We work towards zero-emissions and zero-waste operations for our own activities. Ultimately, we aim to function as a energy-positive, fully circular organisation.

Decarbonising aviation will prove far more challenging than greening our own operations and, as an airport operator, we are also actively involved in this objective. After all, a significant reduction in aviation emissions is the only way to continue connecting our passengers with the rest of the world. To this end, we are playing a leading role in driving sustainability across the aviation sector, starting with the use of of sustainable aviation fuels (SAF).

Our sustainability agenda is ambitious and requires us to continue collaborating closely with the wider aviation industry, as well as with governments, passengers, NGOs and other stakeholders. The global nature of aviation requires a shared route to decarbonisation. As a frontrunner in the aviation industry, we encourage others to learn from our experience – just as we learn from others.

Our Vision 2050 guides the development of our airports over the coming decades. A key enabler in achieving this vision is our 'Most Sustainable Airports' strategy (first published in 2018). It outlines the detailed actions we are undertaking to achieve our 2030 and 2050 goals. I am very pleased to share some of our existing successes in this update, while highlighting our sustainability targets and ambitions for the years ahead and our efforts to achieve them.

I am also excited about the road ahead. As we work to emerge stronger from the crisis, we have an opportunity to achieve a better balance between the needs of our customers, local communities, other stakeholders and wider society. We are on track to achieve our zero-emission and zero-waste targets across own operations by 2030, while I also see clear momentum as we build towards sustainable aviation.

To prevent destructive consequences of climate change, we accelerate where we can, to achieve scale in our transformation as soon as possible. This requires unprecedented collaboration across the aviation ecosystem and with governments. Target setting, policy and regulation, carbon pricing, innovation, industry investments and consumer behaviour have to reinforce each other.
Counting on the shared commitment of many dedicated colleagues, partners and other stakeholders, I am optimistic that we can accelerate on the path to more sustainable journeys.

Dick Benschop
President & CEO, Royal Schiphol Group

Royal Schiphol Group aims to operate the most sustainable and high-quality airports in the world. By 2030, we will become zero-emissions and zero-waste airports for own operations.

For international aviation, we are targeting net-zero-carbon aviation by 2050, with a key interim goal of reducing in-sector carbon emissions to 2005 levels, or lower, by 2030.

Executive summary

Royal Schiphol Group wants to operate the world's most sustainable airports. We aim for zero-carbon emissions and zero-waste from our own operations by 2030. We actively support and advocate for accelerated decarbonisation of the aviation value chain, in order to realise net-zero-carbon emissions for the sector by 2050. Ensuring future generations enjoy the same kinds of travel opportunities requires all stakeholders to take the steps needed to safeguard our planet.

Schiphol Group's Vision 2050 is structured around three pillars: Quality of Life, Quality of Network and Quality of Service. It is built on the belief that – today and in the future – maximising the societal value of aviation requires Schiphol Group to carefully balance Quality of Life and Quality of Network while maintaining Quality of Service and ensuring safe operations and a robust organisation at all times.

Most sustainable airports

A key element in our vision is operating the world's most sustainable and high-quality airports. Schiphol Group is strongly committed to this ambition because climate change is one of the most severe challenges that our planet is facing. Significant changes are needed to live within the planetary boundaries. Policies and solutions are required to prevent and reduce further emissions (mitigation) and to cope with the evolving climate change impacts (adaptation).

'Sustaining Your World' elaborates on our vision for Quality of Life and outlines our ambitious and comprehensive sustainability strategy in more detail. We aim to lead by example, focusing our efforts on four themes: Energy positive; Sustainable aviation; Circular economy and Communities.

We have formulated specific short- and medium-term targets for the four themes, while our airports in the Netherlands have each developed a tailored roadmap with airport-specific actions to achieve our common objectives based on the same principles. The roadmaps set out our actions to deliver improvements in our own airport operations. Additionally, it guides our efforts with partners, communities and the wider aviation value chain to realise our ambition to create the world's most sustainable and high-quality airports.

Our key goals at a glance

Schiphol Group's actions are guided by continuously developing (inter)national regulations and policies. An overview of key elements in our regulatory framework is included in the appendix. We aim to ensure that our own operations are zero-carbon and zero-waste by 2030, which means we aim to achieve a 100% reduction for our Scope 1 and 2 emissions. These targets are well ahead of the UNFCCC Paris Agreement and the Dutch Climate Act.
Our Scope 3 emissions from airline customers are a key issue. These Scope 3 emissions, of departing aircraft, include emissions during the entire flight to any destination worldwide. This results in a Scope 3 aviation share of over 90% of our combined Scope 1, 2 and 3 emissions. We are targeting net-zero-carbon aviation by 2050 – in line with the UNFCCC Paris agreement and IPCC-recommendations.

For 2030, the Dutch Agreement on Sustainable Aviation and the coalition agreement for the government stipulate a target to reduce aviation emissions in 2030 to the level of 2005. We will comply with this target, which provides a national ceiling for aviation emissions. It is our ambition to help achieve deeper reductions in the 2030 timeframe and beyond.

Table 1 presents our CO_2-reduction goals and other targets for 2030 and 2050. Subsequently we present an overview of the measures we are taking, for each of the four themes, to achieve our goals.

	2030 target[1]	2050 target[1]	Scope	Category	2019 tCO_2 emisisons[4]	Share
Energy positive	Zero-emissions airports	Energy positive airports	1 2 3	■ Own buildings, vehicles, other ■ Electricity ■ Ground support equipment, commuter traffic and business travel own employees	22,741 116,421 41,710	0.2% 0.9% 0.3%
	In line with external targets	In line with external targets	3 3	■ International participations ■ Scope 1 WTT-emissions	127,832 20,568	1.0% 0.2%
	CO_2-emissions reduction in line with Dutch climate agreement	Net-zero-carbon buildings at our airport locations	3	■ Buildings owned by third parties	100,446	0.8%
Sustainable aviation	International aviation CO_2-emissions at 2005 level or lower	Net-zero-carbon aviation sector	3	■ Aircraft emissions from full flight	11,938,635	93.4%
	Surface access CO_2-emissions reduction in line with Dutch climate agreement	Net-zero-carbon surface access	3	■ Surface access	404,904	3.2%
Circular economy	Zero-waste airports	Circular airports	3 3	■ Waste[3] ■ Construction materials[3]	3,664 1,239	0.0% 0.0%
Communities	Improved balance between communities and airports	Maintain a good living and working environment around airports				N/A

1) Targets apply to all Schiphol Group airports in the Netherlands, unless otherwise indicated
2) Schiphol Group location based emissions, 2019. Market-based emissions overview is included in the appendix
3) This figure likely underestimates upstream emissions, as we are improving our data management on surface access, materials and waste
4) CO_2 emissions are likely to reflect 1/3 of the climate impact of aviation. The non-CO_2 emissions are not quantified yet, because further reflection on how to best address non-CO_2 climate impacts is required. Please refer to page 35 for more information.

Table 1

Key targets and emissions shares in 2019.

Our progress so far

Collaboration with partners and suppliers, as well as the full engagement of our people, is essential to achieve lasting results. Our role in furthering sustainability has shifted from facilitating to collaborating and guiding or even directing. We encourage suppliers to improve their impact on social and environmental topics across the entire value chain. As partners, we must all step up our efforts to support each other as we work towards our wider goals. The growing alignment between our sustainability goals and those of our business partners is encouraging and helpful.

Reducing CO_2 is central to our approach, also because shifting from fossil fuels to other energy sources goes hand in hand with reducing other emissions such as nitrogen (NOx), Ultra Fine Particles (UFP), non-CO_2 climate forcers and substances of very high concern (SVHC).

Based on our performance to date, we are well on our way to realising our 2030 targets. Looking forward, we are aware that there is still much to do. Our results to date and our ongoing efforts underline a high sense of urgency and awareness of the need to achieve our sustainability goals.

The overview below provides a brief overview of our actions to achieve our 2030 goals and 2050 ambitions on the four themes. More detailed information can be found in this report and on **our website**.

Energy positive

Our pathway towards our energy-positive goals includes:

- Energy-positive own buildings: phasing out natural gas and improving energy efficiency
- Zero-emissions mobility: phasing out fossil fuels for own vehicle fleet and for ground-support equipment
- Renewable energy: solar power generation at own airport locations

Highlights

- Natural gas consumption in our buildings has already halved since 2010, mainly by installing Aquifer Thermal Energy Storage (ATES).
- All buses operating between aircraft and terminals at Schiphol and Rotterdam The Hague Airport are electric. Eindhoven Airport and Lelystad Airport have no buses.
- Emissions from ground-support equipment (GSE) have been declining since 2018. At Eindhoven Airport, over 65% of GSE is already zero emission. Even without the impact of COVID-19 on aviation demand, overall emissions decline as they are replaced with electric alternatives.
- Solar panels are installed at all our airports, including a 14MWp solar farm at Rotterdam The Hague Airport.
- Our current emissions from natural gas and other fossil fuels (Scope 1 and 2 plus commuter traffic and business trips of own employees in Scope 3) have been offset by Gold Standard and VCS projects since 2012. We regard offsets as an interim solution, and our zero-emission 2030 goal does not include any offsets. Our expected emissions reduction of over 90% by 2030 (see Figure 1) exceeds the national targets of the Dutch Climate Act and the latest IPCC recommendations.

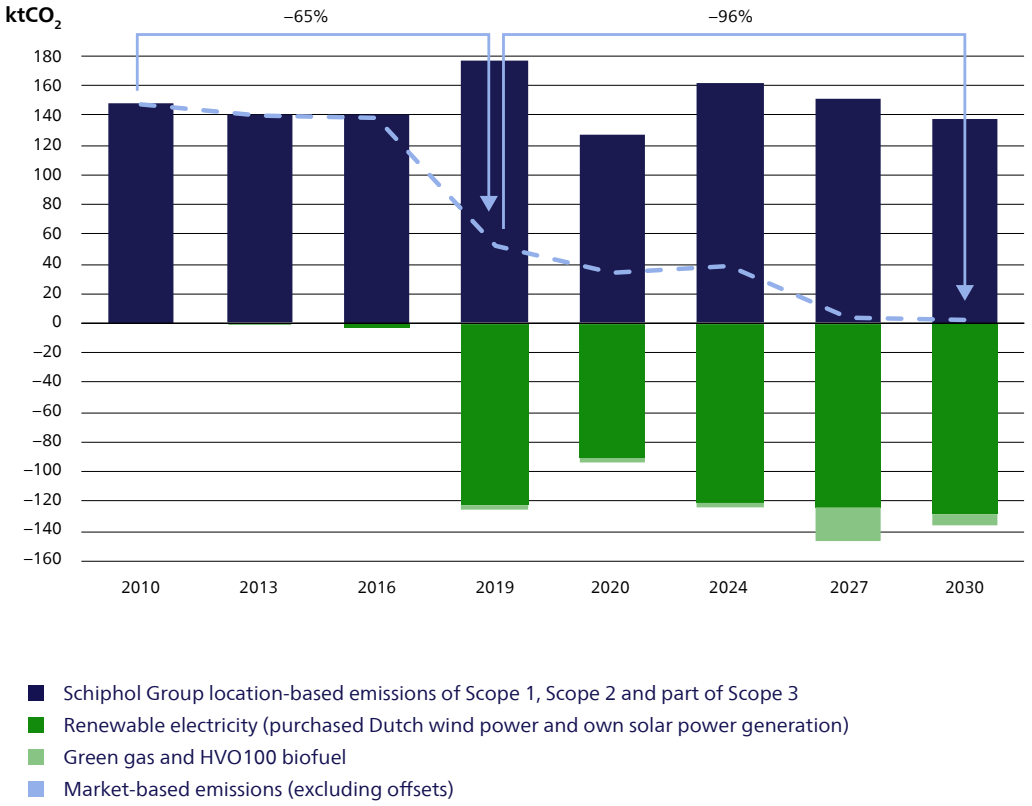


Figure 1
Schiphol Group CO_2 emissions 2010-2030 within 'zero emissions airports 2030' target of 'Energy positive' theme. Includes Scope 1 and 2, plus ground-support equipment, employee commuting and business travel (Scope 3). 2010-2017 data includes Schiphol Airport and Eindhoven Airport. 2018-2030 data also includes Rotterdam The Hague Airport and Lelystad Airport Figures for 2021 onwards include projections.

Sustainable aviation

Our pathway towards our sustainable aviation goals includes:

- Net-zero-carbon-emissions aviation: stimulating fleet renewal to reduce emissions through more efficient aircraft; introducing sustainable aviation fuels (SAF) at scale at our airports as soon as possible, reaching 14% SAF or more by 2030; stimulating innovation to introduce zero-emission aircraft (battery electric, hydrogen); and optimising airside procedures
- Smart and clean mobility: stimulating and incentivising clean, efficient transport modes for passengers and commuters
- Sustainable passenger journey: informing passengers about sustainability and offering sustainable options during their airport visit

Highlights

- Airport charges for airlines include a differentiated structure that rewards the use of quieter, cleaner aircraft. At Schiphol Airport, aircraft with an inferior environmental performance pay airport charges that are up to five times higher. Rotterdam The Hague Airport and Eindhoven Airport have a similar degree of differentiation within their airport charges structure.
- In 2022, we introduced a financial incentive of € 15 million for airlines refuelling SAF at Schiphol Airport.
- In 2022, we will open an experience centre at Schiphol Airport to educate passengers about sustainable aviation and offer opportunities to purchase SAF for their flights. Rotterdam The Hague Airport recently launched the 'Fly on SAF' programme.
- Many corporates are motivated to reduce their environmental footprint. Together with our partners, we are investigating how to facilitate the trend of using SAF for business travel and to make SAF available for individual passenger journeys as well.
- We have advocated for a national and European SAF blending mandate. We now advocate for a higher than 5% SAF blending mandate in Europe by 2030, as proposed by the European Commission in the 'Fit for 55' proposals.
- Schiphol Group is an early stage co-investor in a SAF refinery being developed by SkyNRG in the Netherlands and contributes financially to two Dutch start-ups, Zenid and Synkero, which are working to advance the research and development of synthetic kerosene through direct air capture.
- We are part of innovation partnerships channelled through various consortia and programmes, such as TULIPS and Bright Sky.
- Schiphol Group is one of the founding members of the Clean Skies for Tomorrow (CST) partnership and is active in the Mission Possible Partnership. CST has published several research reports, including on SAF feedstocks, the scalability of production capacity for sustainable aviation fuels and the potential price impact of scaling up the use of SAF.

Mission possible

Given that aviation will continue to grow globally, we work on scalable decarbonisation solutions. With an increasing supply of SAF and upcoming propulsion innovations, decarbonisation is expected to accelerate from 2030 onwards. Ultimately, aviation will achieve the same net-zero goal by 2050 as applicable to all industries. Through the combined efforts of the aviation sector, governments and other stakeholders, we can reach these goals.

Schiphol Group is an international frontrunner in pushing the envelope for sustainable aviation. We contribute to international advocacy focused on policy shaping and standard setting, as well as on research and development in the field of SAF and hydrogen, and other measures required for decarbonising aviation. We accelerate our efforts where possible within the (inter) national ecosystem consisting of multiple parties like governments, investors, fuel suppliers, OEMs, knowledge institutes and airlines.

The Dutch aviation sector is committed to reducing in-sector carbon emissions to 2005 levels, or lower, by 2030. The 2030 goal is an important step towards realising net-zero-carbon emissions by 2050. The most important measures to reach this goal include 14% SAF, fleet renewal and the optimisation of airspace. Furthermore, as part of the 'Fit for 55' proposals, the European Commission has introduced a series of measures that

include the strengthening of the EU ETS (and phasing out of free credits), a progressive SAF blending mandate and a tax on kerosene.

EU ETS was applied to approximately 60% of flights facilitated by Schiphol Group's Dutch airports in 2019. Acting as a cap-and-trade system, the EU ETS limits the number of emission allowances issued, and thereby constrains the total amount of emissions of the sectors covered by the system. In effect, ETS allowances put a price on carbon emissions. Because free ETS allowances will be phased out, the emission reductions in the aviation sector will follow a more steep CO_2 reduction curve in line with the Fit for 55 goals.

We will reach the Dutch 2030 goal of reducing emissions to 2005 levels, or lower, assuming at least 5% SAF, according to 'Fit for 55', in combination with fleet renewal (Figure 2, scenario EU 'Fit for 55'). With a 14% SAF blend, as per the Dutch Agreement on Sustainable Aviation, we can exceed the Dutch goal for 2030 (scenario Agreement Sustainable Aviation).

The graph also provides an aspirational scenario displaying the expected emissions in the event of a 30% share of SAF in the Netherlands. Whether this scenario is within reach depends on various elements, including financial and policy support from governments, investments to expand production capacity, and research and development.

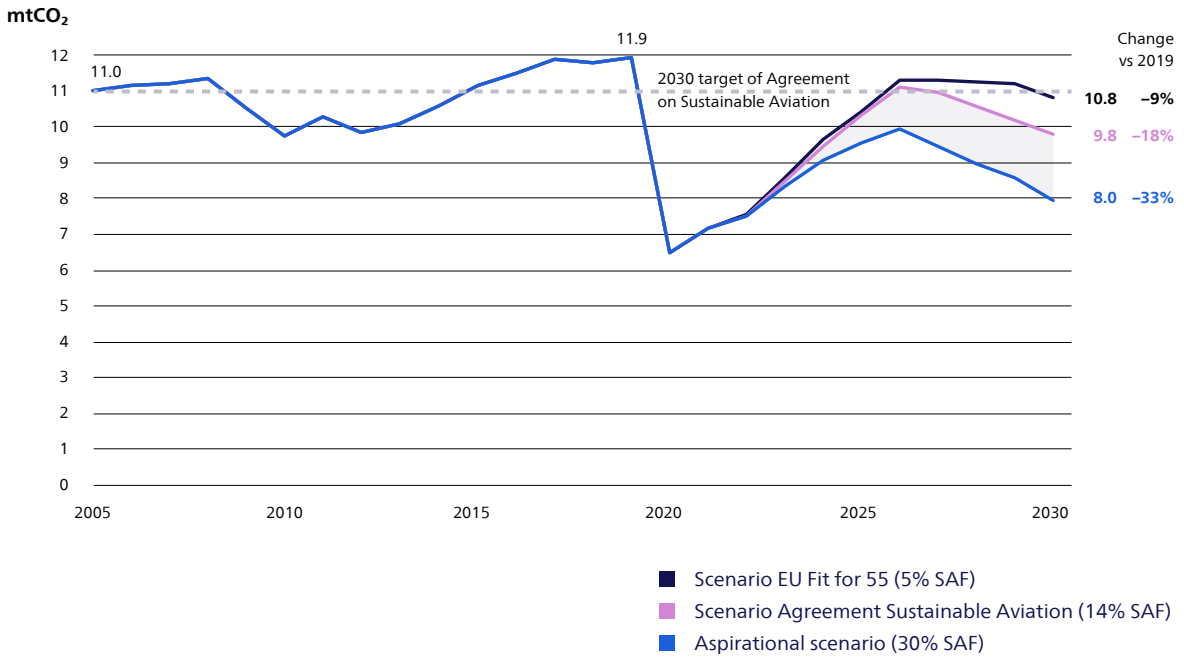


Figure 2
Schiphol Group CO_2 emissions scenarios in megatons from aviation in the Netherlands (Scope 3b), location-based. The positive impact of airspace optimisation has yet to be incorporated in each scenario, since it has yet to be seen whether European governments will agree on this before 2030. In our trajectory, we have taken flight movements published in the Civil Aviation Policy Memorandum 2020-2050 as our baseline. The basis for the calculations is 500,000 flight movements at Schiphol, 10,000 at Lelystad Airport, 41,500 at Eindhoven Airport and 19,000 at Rotterdam The Hague Airport. These technical calculations do not necessarily reflect policy assumptions. The non-CO_2 emissions are not included in this graph. Please refer to page 35 for more information.

Schiphol Group facilitates and integrates zero-emission mobility into contracts and partnerships. Most taxis to and from the airports are electric at Schiphol Airport and Rotterdam The Hague Airport and charging facilities for electric cars are offered at all airport locations. Stimulating cycling by offering safe bike roads is also a key aspect. In addition to minimising our impact on the environment, Schiphol Group wants to create a sustainable passenger journey, inspired by the need to think and take action together. We offer more local food and products in the shops and restaurants. With partners, we take an active position in preventing human and wildlife trafficking.

Circular economy

Our pathway towards our Circular economy goals includes:

- Circular design principles: designing to enable reuse of materials and reduce materials needed
- Reuse and upcycle: minimising, separating and upcycling waste streams
- Closed loops: reusing materials in high-value, next-life applications

Highlights

- The Circular Economy is a developing and evolving theme. Circular principles are applied in several construction projects. The extension of parking building P1 and the mortuary at Schiphol are designed for disassembly.
- 60% of the original asphalt on the Polderbaan runway, Parking area P3 (both at Schiphol Airport), the taxiway at Rotterdam The Hague Airport and the runway at Lelystad Airport was reused during maintenance.
- Sound-absorbing panels from the temporary bus gates at Schiphol Airport are being used in the reclaim hall at Eindhoven Airport.
- We are currently improving the data quality and availability, including embodied carbon, to quantify our impact, including benefit tracking of our efforts.

Communities

Our pathway towards our Communities goals includes:

- Air quality improvement and noise reduction: improving living areas by lowering environmental impact and maintaining constructive dialogues to ensure the well-being and support of our neighbours
- Healthy and inclusive workplaces: empowering our strongest asset – our inclusive, diverse and motivated workforce
- Climate adaptation and biodiversity: creating resilient airports and improving biodiversity

Highlights

- Improving local air quality and reducing noise disturbance are areas we are continuously working on. Phasing out fossil fuels is an important measure to improve local air quality and together with sector partners we are investigating other measures and procedures. Actions are set out in the action plans for **UFP** and **NOx**.
- Together with sector partners measures from the "**Minder Hinder plan**" are being executed. The Notifly app and the 'Burenapp' at Schiphol and Eindhoven Airport provide accurate flight information in real time.
- Many colleagues have left the sector due to the COVID-19 crisis and its impact on the aviation sector. At the same time, more than 250 people with difficulty accessing employment found jobs via Aviation Community Schiphol.

Our mission: Connecting Your World

Royal Schiphol Group is an airport company with an important socio-economic function. The airports in our Group create value for society and for the economy. Our 'Why' is Connecting your world. In carrying out our role, we contribute to prosperity and wellbeing in the Netherlands and beyond. We also facilitate outstanding multimodal connectivity for the benefit of national and regional development, trade and wellbeing. Our ambition to create the world's most sustainable and high-quality airports is underpinned by our Vision 2050.

Vision 2050

The need for strong air travel connectivity has been brought into sharp focus by the COVID-19 pandemic, which has led to a decline in our direct destinations as well as reduced flight frequencies on many routes. Royal Schiphol Group supports the social and economic recovery from the crisis by restoring essential connections between the Netherlands and the wider world. However, to remain sustainable as an organisation, we ensure our 'Why' balances the need for connectivity with the need to secure quality of life for local communities and the environment.

Schiphol Group has developed its Vision 2050, which defines our aspirational goals in light of our current environment, the fast-changing world around us, and potential long-term developments and scenarios. With demand for connectivity continuing to grow, we want to ensure air travel is managed responsibly – balancing the needs of passengers with those of the planet and society at large.

Vision 2050 is structured around three pillars: Quality of Life, Quality of Network and Quality of Service. It is built on the belief that – today and in the future – maximising the societal value of aviation requires Schiphol Group to carefully balance Quality of Life (environment) and Quality of Network (connectivity) while maintaining Quality of Service and ensuring a robust organisation and safe operations at all times.

Sustainability and safety are fundamental principles governing the actions and activities of all aviation and non-aviation activities across our Group. They are also key indicators against which we judge our success and measure our performance.

'Sustaining your world' explains our Quality of Life pillar in more detail, and it outlines our ambitious and comprehensive strategy. Schiphol Group aims to lead by example, focusing our efforts on four themes: Energy positive; Circular economy; Sustainable aviation and Communities. The topics are interlinked: Energy positive and Circular economy can contribute to the solutions for Communities and Sustainable aviation. We believe we have to 'walk the walk' on Energy positive and Circular economy to be a credible partner in the dialogues on Sustainable Aviation and Communities.

In 2018, Schiphol Group published our comprehensive vision and strategy 'Sustaining Your World', which explains the Quality of Life element of our Vision 2050 in more detail, and outlines the steps we are taking to drive sustainability and achieve our ambition across four themes: Energy positive; Sustainable aviation, Circular economy; and Communities.

The themes Energy positive and Circular economy are within our direct sphere of control, as they are largely bound to our airport operations and own real estate activities at our airport sites. These themes – and the resulting targets – relate to our Scope 1 and 2 CO_2 emissions, as well as a portion of our Scope 3 emissions. We are already making significant progress across both of these themes and driving positive change for our stakeholders.

The themes Sustainable aviation and Communities are outside our direct control and relate solely to our Scope 3 CO_2 emissions, which account for more than 90% of CO_2 emissions in scope of Schiphol Group. Our direct influence on these emissions is limited since they are emitted by others. Subject to applicable regulatory frameworks, Schiphol Group is committed to further shape a sustainable aviation sector in the Netherlands, Europe and beyond.

The topics are interlinked: Energy positive and Circular economy can contribute to the solutions for Sustainable aviation and Communities. We believe we have to 'walk the talk' by setting ambitious goals in Energy positive and Circular economy to be a credible partner in the activities for Sustainable aviation and Communities. The starting point for developing our sustainability vision and strategy – then and now – are the United Nations (UN) Sustainable Development Goals (SDGs) and the 2015 Paris Agreement. We have also considered the latest science-based evidence regarding climate change and its impacts, particularly in relation to the impact and role of the global aviation sector. We also take our sector-specific regulatory context into account. These insights have helped to shape our ambitions and goals.

Key topic	Sustainable Development Goal
Energy positive	
Sustainable aviation	
Circular economy	
Communities	

Figure 3
Sustainable Development Goals that Schiphol Group can contribute to

UN Sustainable Development Goals
Introduced in 2015, the Sustainable Development Goals relate to the 17 most important opportunities and challenges facing the world in the years to 2030. The 2030 agenda is adopted by all United Nations Member States in 2015. In developing our sustainability vision and strategy, Schiphol Group analysed the SDGs, including the underlying indicators, and identified the goals that are particularly relevant to our activities. There are also indicators that are relevant for our role in the value chain: SDG 8 and 12 both address sustainable tourism. We will actively support and contribute to these goals over the coming years in line with our 2030 targets.

Planetary boundaries
The UN forecasts a global population of 9.7 billion people by 2050, up from 7.9 billion today, increasing society's need for basic facilities such as water, food, housing, energy, clothes, work and transport. The rapid depletion of the earth's resources severely jeopardises our ability to meet these needs. Meanwhile, climate change is already adversely affecting living conditions for communities everywhere, with air pollution and other forms of contamination a growing global issue. The only solution is to respect planetary boundaries by acting conscientiously and responsibly.

Embedding sustainability across our four themes

As well as incorporating new external developments in the field of sustainability, our updated strategy is informed by the extensive research and development that we are undertaking in the field of sustainable aviation, together with our partners throughout the value chain. The resulting innovations and insights are shaping the development of our four sustainability themes. However, to realise our sustainability ambitions and meet our 2030 and 2050 targets, it is crucial that we fully embed our actions in our internal procedures and decision-making. Measuring and reporting of performance data, portfolio management, training and awareness, procurement, communication and alignment with regional airports are all essential steps to drive progress in executing our Quality of Life strategy.

Governance and reporting

The CEO of Schiphol Group has a leading role in ensuring sustainability. The Management Board defines the sustainability vision and policy and has been assisted by the Supervisory Board's Safety, Sustainability & Stakeholders Committee in this task since 2010. The sustainability programme manager is part of Schiphol Group's Strategy and Airport Planning department, which reports directly to the CEO to enable sustainability to be effectively integrated throughout the Group and to ensure it plays a key role in shaping our strategy. All relevant business units have one or more sustainability

Understanding the regulatory context

The Dutch state owns a majority of the shares in Schiphol Group, while our airports are subject to an extensive range of (inter)national legislation, regulations and policies. The Dutch Aviation Act is the main legal basis regulating the activities and capacity of Dutch airports, including through airport zoning decrees, traffic decrees and operational decrees. The Dutch Aviation Act includes a legal obligation for Schiphol Airport to operate the airport and to maintain the availability of the prescribed runway system for air traffic.

Following the EU Slot Regulation and the Slot Allocation Decree, coordinated airports are legally obliged to set their capacity declaration in line with the available capacity as determined by the government. Airport slots, required for airline operations, are then allocated by an independent (governmental) slot coordinator. Furthermore, the Airlines Operation Regulation and the EU Slot Regulation require our airports to make available the maximum amount of capacity, expressed in slots. Under the current regulations, our airports cannot unilaterally limit the available capacity; for example, for reasons of environmental impact resulting from the use of the airport infrastructure. Furthermore, the EU internal market rules hold as a principle the freedom of airlines to determine the destinations of their air traffic services.

The Aviation Act allows airports to differentiate their cost-based airport charges to a certain extent, bound by specific reasons of public interest. Our airports constantly seek to maximise incentives for airlines to invest in best-in-class aircraft from a sustainability perspective by amending the charges structure. For example, the noisiest (and usually least fuel-efficient) aircraft pay landing charges that are five times higher compared to those paid by the latest generation of aircraft at Schiphol Airport.

Within our regulatory context, we maximise our efforts to further reduce the environmental impact of our own activities, aviation and all other activities related to our operations. Our ‘Sustainable aviation’ theme outlines our efforts at Schiphol Group to stimulate and to push the international aviation value chain to reduce emissions.

leads, ensuring that all Schiphol Group colleagues can play their part in achieving our sustainability goals.

Progress towards Schiphol Group's Quality of Life strategy is monitored through our Most Sustainable Airports roadmap. Our regional airports have also translated the Group's roadmap into local roadmaps, which are executed independently and include the same 2030 targets and 2050 goals. Ongoing dialogue between the regional airports in the group, as well as Schiphol Airport, is maintained regarding the actions and progress we make as well as the lessons learned. Meanwhile, our regional airports often function as pilot locations for innovation and new initiatives.

Sustainability is an important topic at all our international airports in which Schiphol Group holds an equity participation. Through our knowledge network, representatives of all the airports in our Group participate and share knowledge and best practices on sustainability, which then feed into the action plans of the respective airports.

Schiphol Group was the first airport company in the world to successfully issue green bonds. Our first green bond was issued in 2018, followed by two others totalling approximately €2 billion.
Schiphol Group adheres to OECD guidelines for responsible business conduct for multinational organisations where applicable. Schiphol also expects its international suppliers to comply with the OECD guidelines for multinational organisations in force and its national suppliers to comply with the OECD guidelines where relevant. These stipulations are part of our supplier code.

We endeavour to go the extra mile in our commitment to supply chain responsibility. We see a shift in our role: rather than simply facilitating others, we actively engage with our suppliers and business partners, often to the point of guiding their activities. To this end, Schiphol Group collaborates closely with airports across Europe and beyond, and we actively share our progress and sustainable innovations to enable others to accelerate their ambitions, too. A key example is our contribution to the development of the **ACI Airport Carbon Accreditation benchmark**.

Progress towards our goals is also reported externally in our integrated annual report, as well as through other channels. Given the central role of our airports in society, sustainability and other disclosures are not new to Schiphol: we published our first environmental report in 1992, and we began merging our financial and sustainability disclosures in 2009. Our integrated annual report has won several prizes for its distinctive and transparent reporting, including the Henri Sijthoff Prize in 2012, 2015 and 2018, and the 2018 'Crystal Prize' for the most transparent report.

In our integrated annual report, we report on the achieved results on the material topics for Schiphol Group. These are the most relevant topics for our stakeholders and where our organisation can have the most impact. We report in line with relevant mandatory and self-imposed reporting standards, such as the

TULIPS
Schiphol Group is the lighthouse airport of the **TULIPS consortium**, a collaboration between airports, airlines, knowledge institutes and industrial partners supported by €25 million EU funding for 2022-2025 as part of the European Green Deal. The consortium aims to accelerate the deployment of sustainable aviation technologies that will contribute towards the zero-emissions and zero-waste airports targets set for 2030 and for realising net-zero-carbon aviation by 2050. Solutions such as ultrafine particle measurement and mitigation, as well as multi-modal journey optimisation, will enable the transition to low-carbon mobility and strengthen current airport sustainability actions. Innovations developed by the TULIPS consortium will be demonstrated at Schiphol Airport, with our partner airports Oslo, Turin and Larnaca implement a selection of these innovations.

Non-Financial Reporting Directive, the EU Taxonomy, GRI standards, the UN SDGs and elements of the IIRC framework. Furthermore, our integrated annual report provides further details regarding (sustainability) governance, board responsibilities, target setting, risk management and remuneration.


Energy
positive

Energy positive

Royal Schiphol Group is climate-neutral in its activities by offsetting its carbon emissions and is transitioning towards becoming a zero carbon emissions organisation. Ultimately, we will go beyond zero by realising energy-positive airports by 2050. Our surplus renewable energy can also provide solutions for our other key topics, namely Communities and Sustainable aviation, for example by supporting the production of sustainable aviation fuel (SAF).

One of Schiphol Group's goals is to reach zero carbon emissions by 2030, meaning no natural gas or other fossil fuels will be used for our own operations (Scope 1) as well as ground operations at airside (Scope 3).
This is a key milestone towards becoming energy positive by 2050. Our ambition in this theme is 20 years ahead of the Dutch Climate Act and IPCC recommendations.
We also set this goal to be a credible partner in the discussions with our partners, who are responsible for our Scope 3 emissions. Our analysis proves that zero-CO_2 is achievable, given the fact that approximately 90% of necessary emission reductions is already possible through current technology in an economically sensible way. Eliminating the remaining 10% will be more difficult and requires technological innovation such as hydrogen, whereas Hydrotreated Vegetable Oil (HVO100) and green gas present potential transitional solutions.

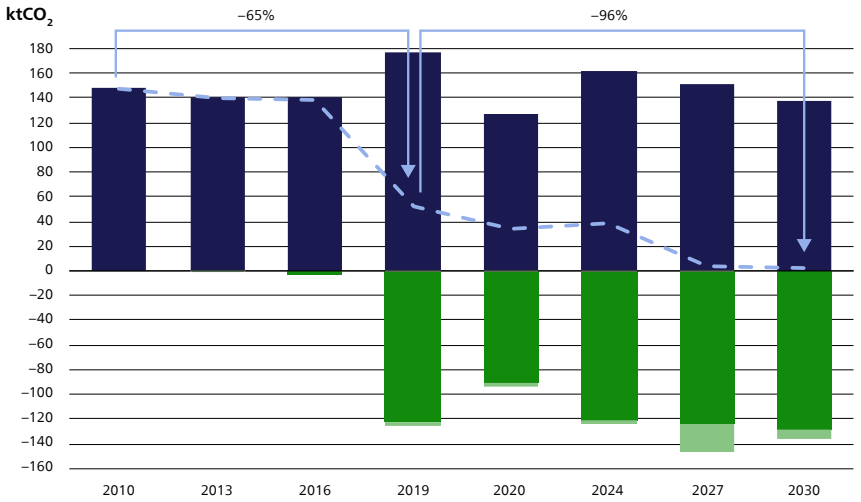


Figure 4
Schiphol Group CO_2 emissions 2010-2030 within 'zero emissions airports 2030'
Figures for 2021 onwards include projections.

- Schiphol Group location-based emissions of Scope 1, Scope 2 and part of Scope 3
- Renewable electricity (purchased Dutch wind power and own solar power generation)
- Green gas and HVO100 biofuel
- Market-based emissions (excluding offsets)

Our goals

- Our own operations and ground support operations achieve zero-carbon emissions by 2030
- Our Dutch airports are energy positive by 2050

Carbon management
Our way of working is based on the Trias Energetica approach:

1. Reduce the use of energy and fossil fuels
2. Use energy as efficiently as possible
3. Produce and use renewable energy to replace fossil energy

We began this process in 2009 when we initiated carbon emissions mapping and monitoring. Building upon these insights, we have categorised our reduction measures in terms of buildings, mobility and renewable energy.
Many airport activities, such as ground handling, are operated by third parties. This situation complicates carbon management, since many of the emission sources are outside the direct control of the airport operator.
As such, other airport users, including airlines, concessionaires and ground handlers, play an important role in reducing overall emissions at airside and landside.
Schiphol Group employs an energy management system that is ISO 50001-certified for our four Dutch airports and closely monitored as part of our sustainability governance.

In 2009, Airports Council International (ACI) introduced a CO_2 benchmark for airports, which Schiphol Group helped to develop. The benchmark ranks the Schiphol Group airports among the airports most actively pursuing emission reduction. Rotterdam The Hague Airport entered the benchmark in 2021 at the newest Level 4+, Transition. Schiphol Airport and Eindhoven Airport have reached the Level 4+ in 2022, after retaining the Level 3+ status since 2012. The own activities of Schiphol Airport and Eindhoven Airport have been climate-neutral since 2012; own activities of Rotterdam The Hague Airport and Lelystad Airport since 2018.

The Airport Carbon Accreditation guidelines are based on the GHG Protocol, with some minor adjustments reflecting the nature of airport operations in relation to carbon accounting. The full methodology and the offsetting guidelines are available on the **website** of the benchmark. More in-depth information is included in the appendix.

In 2019, following the lead of Schiphol Group and several other airports, ACI Europe set a long-term goal for its member airports to reach net-zero carbon emissions by 2050, with more than 200 European airports joining in this commitment. ACI World followed the initiative, resulting in a similar long-term commitment being made by airports worldwide. In the meantime, many European airports have accelerated their efforts and pledged to achieve the goal before 2050.

Our actions and results

Our pathway towards our energy-positive goals includes:

- Energy-positive own buildings: phasing out natural gas and improving energy efficiency
- Zero-emissions mobility: phasing out fossil fuels for ground-service equipment and our own vehicle fleet
- Renewable energy: solar power generation at our own airport locations

The 'Energy positive' theme includes all our Scope 1 and 2 emissions plus a subset of our Scope 3 emissions.

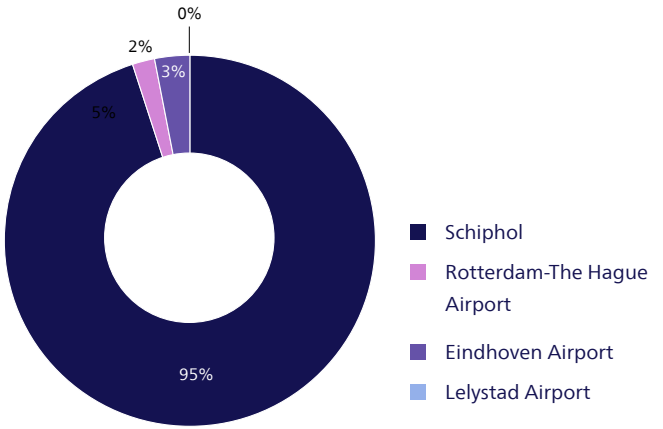


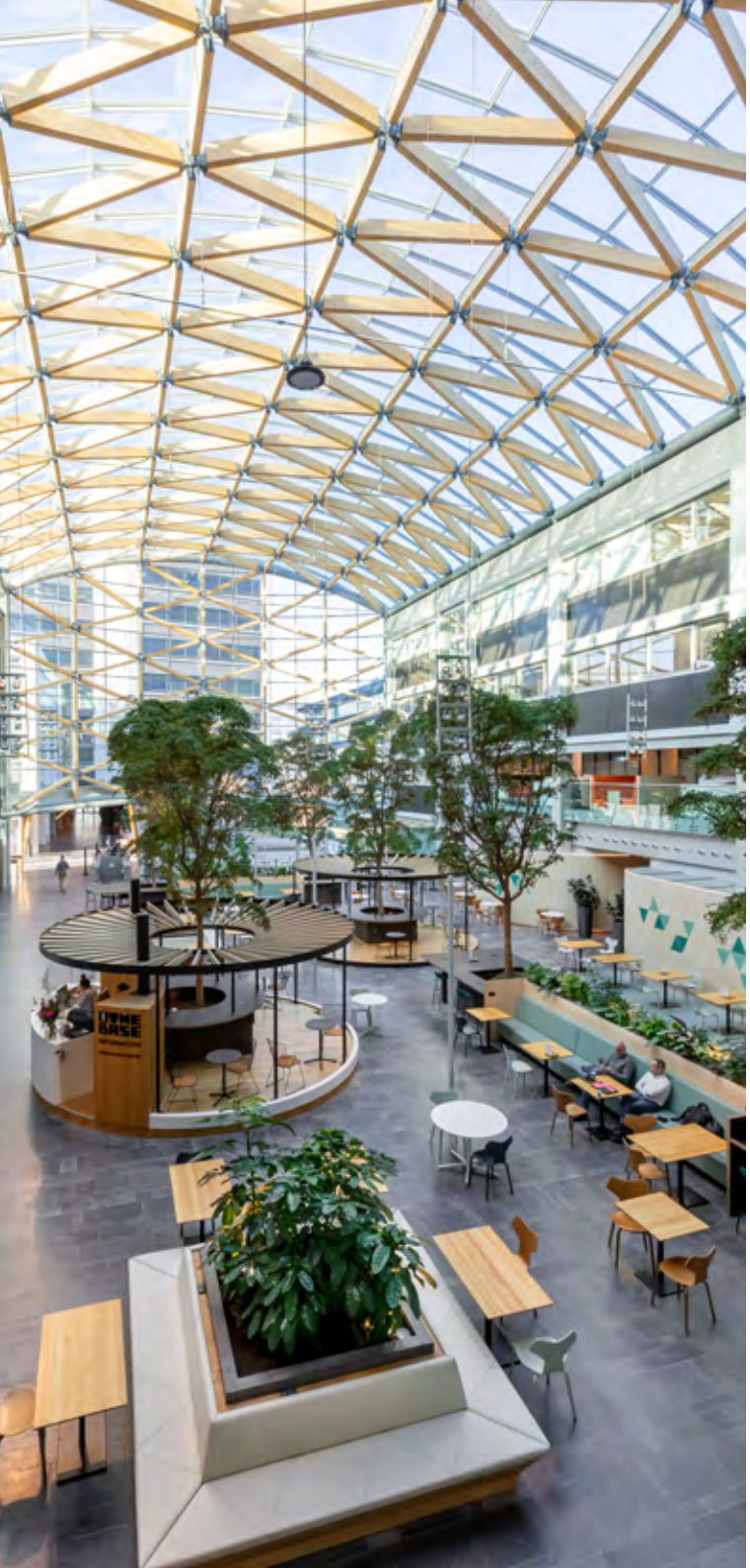
Figure 5
2019 location-based CO_2-emissions within Energy positive theme by airport

1. Energy-positive own buildings

As buildings and assets fall within our direct sphere of influence (Scopes 1 and 2), we place strong emphasis on improving their energy performance. We have an energy-efficiency programme in place for existing buildings and assets, with a year-on-year energy reduction target of at least 4% at our airports. The target for Schiphol Airport is currently 7%.

We expect to achieve a 90% reduction in our natural gas consumption, which is mainly for heating and cooling our buildings, by 2030 compared with 2019. On a few cold days each year, peak heating with green gas may still be required by 2030. As far as we are not entirely independent from natural gas by then, any consumption will be in the form of green gas. As a transitional solution, we intend to purchase all our natural gas as green gas by 2030 at the latest. Since 2019, we purchase 100% green gas for Eindhoven Airport and 15% green gas for the other Dutch airports. Biogas is generated from renewable sources and subsequently upgraded to the quality level of natural gas. Vertogas green gas certificates are awarded to Schiphol Group on a yearly basis, and the contract with our supplier runs until 2024. Schiphol Group buildings fall under two main categories: new buildings and renovations.

airport carbon accredited TRANSITION



New buildings
From 2025 onwards, all newly completed own buildings at Schiphol Airport, Rotterdam The Hague Airport and Lelystad Airport will be energy positive, with energy-efficient designs, aquifer renewable thermal energy storage (ATES) and solar power integrated as standard elements. International sustainable building certificates are used as a benchmark and framework during the design and construction of new buildings. We apply LEED certification (gold/platinum) for new terminal buildings and BREEAM certification (excellent/outstanding) for new commercial properties.

Renovations
Existing own buildings will be upgraded to at least energy-neutral at natural renovation moments in their lifecycle. Phasing out gas during renovations is more challenging than developing new buildings without natural gas, since our airports are always in operation.

Further difficulties are presented by maintenance planning and deprecation, and the early devaluation of assets. Some older buildings are less suitable for heating without natural gas, which occasionally makes it difficult to implement the newest energy conservation measures. Installing ATES is the preferred solution to reduce gas usage with similar electricity needs, being the main reason for the 40% reduction in natural gas emissions from our buildings since 2010. A key current project involves installing ATES in terminals 1 and 2, reducing our gas consumption by 35% compared with 2019. All required renovations of our remaining buildings to phase out natural gas are scheduled for the upcoming years to achieve our 2030 target.

A visual overview of 2010-2030 scope 1 emissions by airport is included in the appendix

2. Zero-emission mobility

Schiphol Group owns and leases a mixed fleet consisting of light and heavy vehicles (Scope 1), with all light vehicles set to be replaced by electric vehicles over the coming years. We are monitoring developments in the powertrain and clean fuels for heavy vehicles. For each potential replacement case, we balance the need for operational performance with environmental and safety concerns.

We take steps to stimulate clean commuting for Schiphol Group employees (Scope 3). For example, all new lease cars offered to staff are electric and we also provide financial incentives to encourage people to commute by bike. Meanwhile, the COVID-19 pandemic has increased the number of digital meetings, reducing commuter traffic and business trips. Air travel by Schiphol Group for work is partly undertaken using sustainable aviation fuels; offsetting is used to compensate for the remaining emissions, in addition to offsetting emissions from commuter traffic (Scope 3).

Zero-emission airside

Schiphol Group is undertaking an ambitious programme to reduce airside emissions to zero by 2030 (Scopes 1 and 3). We aim for a reduction in fuel consumption of at least 90% by 2030, compared with 2019. This ambition relates to our own equipment, the required (energy) infrastructure and third-party equipment, among other elements. Some of our operational vehicles will be electric in the near future; where there is not a viable zero-emission alternative, we use 'transitional' clean fuels such as HVO100. Currently, gas-to-liquid (GTL) is the standard fuel used at Schiphol airside. GTL is better than diesel for local air quality and has been the default fuel at airside since mid-2019.

As well as reducing CO_2 emissions, we prioritise airside projects that will reduce local air quality emissions such as nitrogen oxides (NOx). We also aim to improve local air quality by reducing concentrations of fine particles and ultrafine particles (UFPs) and substances of very high concern (SVHC).

Equipment

We do not expect to replace our existing snow fleet equipment and fire brigade equipment with zero-emission vehicles by 2030. Instead, these engines will be powered by HVO100. We are still considering zero-emission alternatives for propane, a gas used in firefighting simulations and training practices. Meanwhile, we continue to monitor the development of zero-emission firefighting equipment that adheres to the highest operational and safety standards. When such solutions become available, Schiphol Group will transition our remaining fleet at a natural moment in its lifecycle.

Collaborating with many stakeholders, Schiphol Group aims to be a catalyst for change in our industry as we strive to reach our wider sustainability and carbon-emission objectives (Scope 3). The installation of electric charging facilities at airside will be key in speeding up the transition to clean mobility at our airports, as will the support we offer our partners to transition from fossil fuels to renewable energy sources (Scope 3). Stationary aircraft normally use their own kerosene-driven auxiliary motors (APU) or a separate diesel-powered generator (GPU) to supply electricity and air conditioning. To reduce this form of fossil fuel use (Scope 3), we have equipped the majority of aircraft stands with installations for fixed electrical ground power (FPU) and pre-conditioned air units (PCAs). The availability of FPUs will be expanded to all connected aircraft stands at Schiphol Airport during the coming years.

Handlers own the ground-support equipment used at our airports, and replacing zero-emission equipment depends on their specific replacement calendars. Together with a supplier, we have co-developed an electric ground power unit (e-GPU) that supplies zero-emission power to aircraft docking at remote aircraft stands as an alternative to traditional diesel GPUs. With handlers and airlines, we are working on the implementation of the e-GPUs in the procedures. At Rotterdam The Hague Airport, all GPUs will be zero-emission by 2026, and all ground-support equipment will be zero-emission by 2027. Airport regulations to enforce this are currently being drafted. At Eindhoven Airport, over 65% of GSE is already zero-emission.

3. Renewable energy

Since 2018, all Schiphol Group airports in the Netherlands have been powered by **newly built Dutch wind farms** located both onshore and offshore. We have a long-term purchasing contract (2018-2032) in place with our electricity supplier, **Eneco**. This PPA-contract includes Guarantees of Origin (GoO) certificates for all electricity used by our own operations, as well as all ground operations at airside and all buildings leased by Schiphol Group to third parties.

Our next step will be to generate more renewable energy on site at our airports. Given the difficulty of generating geothermal energy or locating wind farms near runways, we consider solar energy to be the most practical and clean energy option for an airport. Schiphol Airport and Eindhoven Airport are developing plans for on-site solar farms. At Rotterdam The Hague Airport, 100% of available roofs are already covered with solar panels and the airport opened a 14 MWp solar park in spring 2022. This key installation generates approximately three times the annual electricity consumption of the airport, which means surplus electricity is supplied to the local grid. Several of our solar power installations will be replaced with the latest-generation technology in the near future.

The recently opened solar park at Rotterdam The Hague airport is a major step towards our goal of generating 21 MWp locally at our four Dutch airport locations by 2030 and to generate all energy needed on our airport premises by 2050.

We expect increased demand for electricity at our airports over the coming decade, driven by the shift from fossil fuels. Schiphol airport owns and operates its own energy grids, and these must be strengthened to provide sufficient capacity for this energy transition. The grid at Eindhoven Airport faces a similar challenge as well.

Third party buildings

Several third parties, including KLM and LVNL, own buildings on the airport sites and arrange their own energy contracts (Scope 3). For these locations, our targets are aligned with the Dutch Climate agreement. We aim for net-zero-carbon-emissions from built environment at our airport locations by 2050. The Dutch Climate Act provides guidance on the required reductions towards 2050. We consult with the owners of these buildings to learn more about their plans to decarbonise including their plans to install solar panels. Such changes influence electricity demand and supply, which must be factored into grid development. During the coming years, we will discuss opportunities for acceleration and mutually beneficial solutions; for example, aligning investment in new ATES. Buildings owned by third parties fall outside the scope of our 2030 zero-emissions target.

We are monitoring technological developments in terms of grid balancing as well as smart-energy storage facilities such as batteries. Eindhoven Airport is an active participant in the development of a **local energy trading platform**. Companies at the airport and nearby business parks can trade the energy they generate themselves among themselves without involving energy suppliers. Among its many benefits, this project is an important first step towards **preventing grid overload**.

A visual overview of 2010-2030 scope 2 emissions by airport is included in the appendix

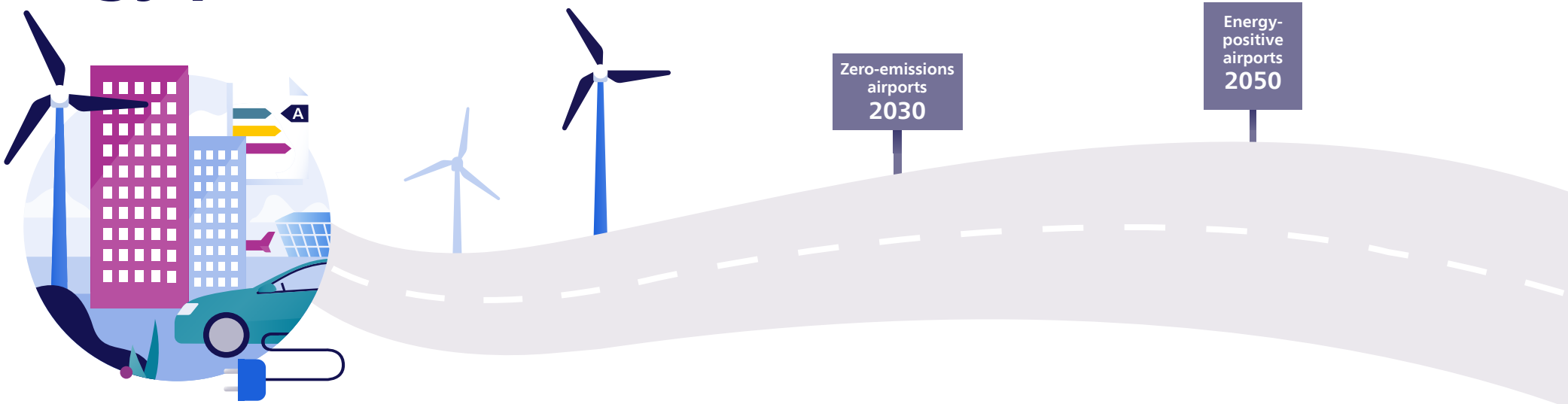
Offsets

Since 2012, Schiphol Airport and Eindhoven Airport have offset any residual emissions resulting from the use of natural gas or other fossil fuels through Gold Standard and VCS carbon offsetting projects, with Rotterdam The Hague Airport and Lelystad Airport following since 2018. The appendix provides an overview of purchased credits.

All Dutch airports acquire certified offset credits with a high likeliness of additionality. Most credits originate from solar power projects in other parts of the world, whereas Eindhoven Airport supports a local carbon offsetting project. As our own emissions decrease towards 2030, our use of offsets will also decrease.

We regard offsets as an interim solution until viable zero-emission alternatives become available.
Our zero-emission 2030 goal does not include any offsets – our goal is zero emissions.

Energy positive



Energy-positive own buildings

- Design energy-positive own buildings
- Phase-out natural gas
- Continue energy efficiency improvements

Zero-emissions mobility

- Facilitate zero-emission airside
- Shift to zero-emissions fleet
- Stimulate clean commuting

Renewable energy

- Increase solar power on -site
- Strengthen energy grid and ensure it remains future-proof
- Develop sustainable lease concepts and consult on-site partners on site regarding energy transition

Sustainable aviation

Foto: Mark Wagtendonk

Sustainable aviation

Our airports are transport nodes: passengers and cargo switch from ground-based transport to aircraft, and vice versa. Our hub operation at Schiphol Airport also facilitates transfers, namely passengers and cargo transferring from one aircraft to another. The airport is also a multimodal hub, hosting one of the busiest railway and bus stations in the Netherlands. Over 90% of the emissions in our scope are the result of the kerosene fuelled by aircraft.

Although our influence over emissions of the aviation sector (Scope 3 emissions) is limited by the regulatory constraints within which Schiphol Group operates, we encourage our airlines, suppliers, main contractors and other business partners as much as possible to take steps to improve their impact on the environment. Key elements include reducing our Scope 3 CO_2 emissions and other pollutants, fostering positive working conditions, combating illegal trade of protected flora and fauna species, and improving safety and security in their various forms.

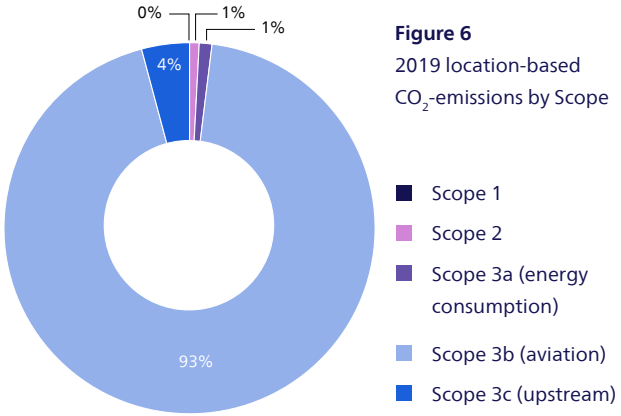


Figure 6
2019 location-based CO_2-emissions by Scope

Our goals

Sustainable aviation

- Reducing in-sector carbon emissions of international aviation to 2005 levels, or lower, by 2030 in the Netherlands
- Net-zero-carbon aviation emissions by 2050

Surface access

- 15% reduction in surface access emissions by 2030 compared with 1990 according the Dutch Climate Act
- Net-zero-carbon-emissions from surface access by 2050

Reducing carbon emissions to limit global warming to 1.5ºC above pre-industrial levels, despite growing global demand for aviation, presents a key challenge. The aviation sector is responsible for 2%-3% of CO_2 emissions generated worldwide and 7% of CO_2 emissions in the Netherlands, and this share will increase if the sector stands still as other sectors reduce their CO_2 output. While efforts have been made to make aircraft more energy efficient during recent decades, demand for aviation has outpaced the sector's efficiency drive. The hard-to-abate nature of aviation results in a different reduction pathway to eventually reach the same 2050 goal as all other sectors. Schiphol Group takes an active role in our value chain to achieve ambitious global sustainability objectives.

Our actions and results

The pathway towards our sustainable aviation goals include three key action areas:

Net-zero-carbon-emissions aviation:

- stimulating fleet renewal to reduce emissions through more efficient aircraft;
- introducing sustainable aviation fuels (SAF) at scale at our airports as soon as possible, reaching 14% SAF or more by 2030;
- Stimulating innovation to introduce zero-emission aircraft (battery electric, hydrogen);
- Optimising airside procedures

Smart and clean mobility:

- Stimulating and incentivising clean, efficient transport modes for passengers and commuters

Sustainable passenger journey:

- Informing passengers about sustainability and offering sustainable options during their airport visit

1. Net-zero carbon aviation

The Mission Possible report of the Energy Transition Committee convinced us in 2018 that the aviation sector can transition to being a net-zero sector by 2050, and we have since pushed other stakeholders in the aviation industry to adopt this ambition consistently.
Net-zero-carbon means that sector-based emissions should be reduced as much as possible. Kerosene emissions are by far the largest contributor to aviation emissions and consequently to Schiphol Group's Scope 3 emissions. The most important measures to reduce kerosene consumption include fleet renewal, airspace improvements and use of SAF. Although emissions related to these activities are not under our direct control, and airport operators traditionally have a limited role in these fields, Schiphol Group is nevertheless stepping up to this challenge as part of our commitment to help reduce international aviation emissions. Advocacy on (inter)national policy is the cornerstone of our efforts to stimulate emissions reduction across our wider value chain.

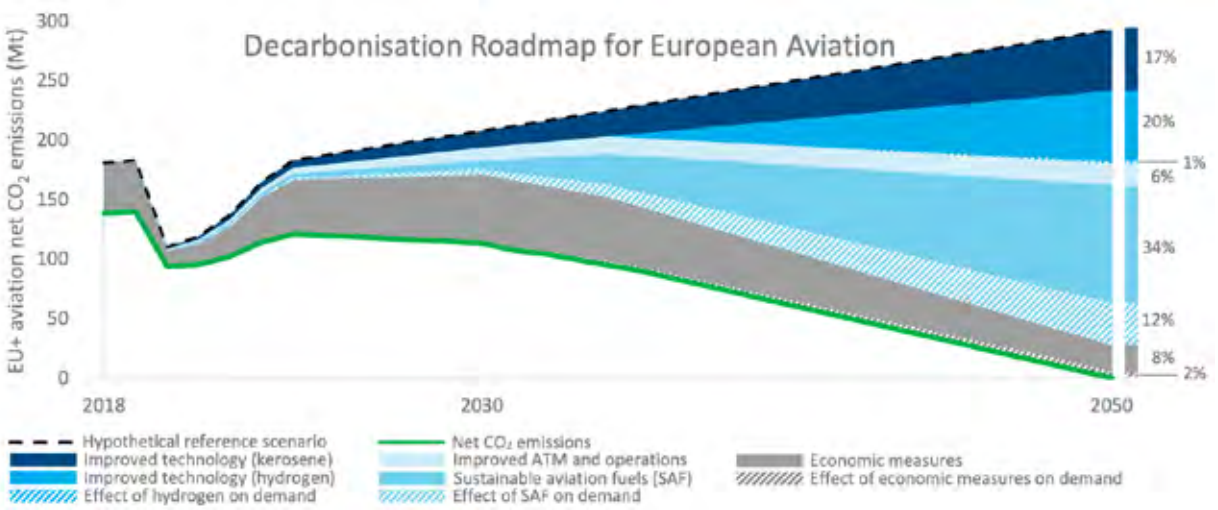


Figure 7
Destination 2050 decarbonisation roadmap for European aviation

Aviation emissions pathways

Schiphol Group's commitment to net-zero-carbon aviation emissions was set in 2018. There is no silver bullet, and a basket of measures will be needed to achieve this ambition. Important building blocks are SAF, fleet renewal and improvement of airspace. For the European aviation sector, the emissions reduction pathway is outlined in **Destination 2050**. Based on current projections, the aviation industry in Europe will be left with 8% of its most hard-to-abate emissions in 2050 and will need to invest in high-quality carbon removal technologies. The Destination 2050 study sets out how to achieve this ambition, having been commissioned by the representatives of European airports, airlines, aerospace manufacturers and air navigation service providers, and conducted by the Royal Netherlands Aerospace Centre and SEO Amsterdam Economics.

We have identified three emission scenarios regarding the short-term horizon until 2030. The divergent pathways acknowledge potential uncertainties in this domain, such as regulatory developments, the availability and pricing of SAF, and the industry's recovery from the COVID-19 pandemic.

We expect an initial increase in emissions during the first few years of the pathway, as the recovery in demand for air travel following the COVID-19 crisis likely exceeds the availability of SAF. From 2023 onwards, emissions developments primarily depend on the blending levels of SAF.

The three scenarios present the ReFuelEU blending mandate (2% in 2025, 5% in 2030 and 20% in 2035) as the upper bound, the Dutch Agreement on Sustainable Aviation blending mandate (14% in 2030) and an aspirational scenario, which aims to realise 30% SAF by 2030. Whether this scenario is within reach depends on various elements, including financial and policy support from governments, investments to expand production capacity, and research and development.

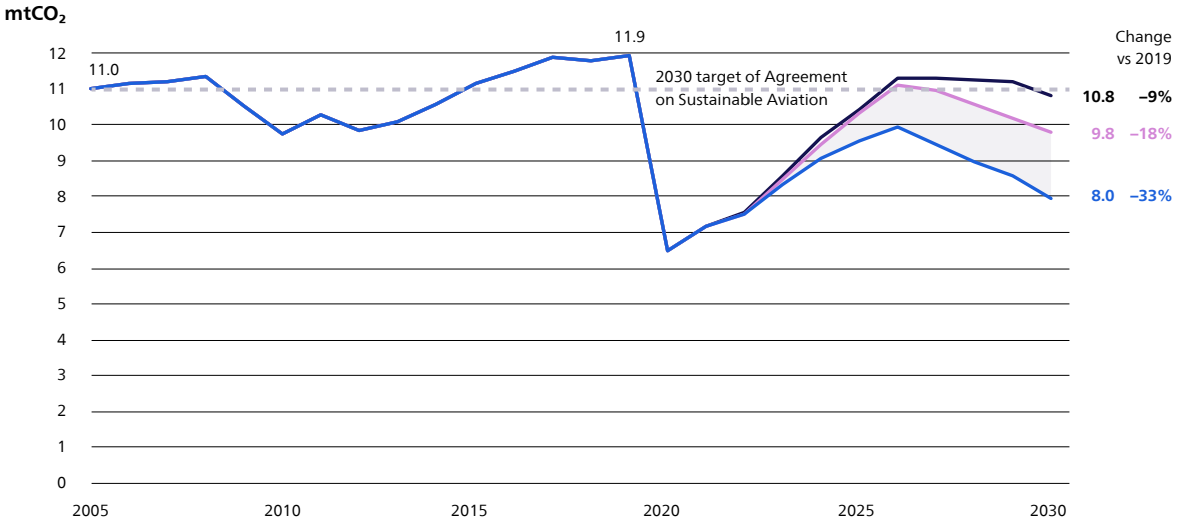


Figure 8
Schiphol Group CO_2 emissions scenarios in megatons from aviation in the Netherlands (Scope 3b), location-based. The positive impact of airspace optimisation has yet to be incorporated in each scenario, since it has yet to be seen whether European governments will agree on this before 2030. In our trajectory, we have taken flight movements published in the Civil Aviation Policy Memorandum 2020-2050 as our baseline. The basis for the calculations is 500,000 flight movements at Schiphol, 10,000 at Lelystad Airport, 41,500 at Eindhoven Airport and 19,000 at Rotterdam The Hague Airport. These technical calculations do not necessarily reflect policy assumptions. The non-CO_2 emissions are not included in this graph. Please refer to page 35 for more information.

Mission possible

Given that aviation will continue to grow globally, we work on scalable decarbonisation solutions. With an increasing supply of SAF and upcoming propulsion innovations, decarbonisation is expected to accelerate from 2030 onwards. Ultimately, aviation will achieve the same net-zero goal by 2050 as applicable to all industries. Through the combined efforts of the aviation sector, governments and other stakeholders, we can reach these goals.

Schiphol Group is an international frontrunner in pushing the envelope for sustainable aviation. We contribute to international advocacy focused on policy shaping and standard setting, as well as on research and development in the field of SAF and hydrogen, and other measures required for decarbonising aviation. We accelerate our efforts where possible within the (inter) national ecosystem consisting of multiple parties like governments, investors, fuel suppliers, OEMs, knowledge institutes and airlines.

The Dutch aviation sector is committed to reducing in-sector carbon emissions to 2005 levels, or lower, by 2030. The 2030 goal is an important step towards realising net-zero-carbon emissions by 2050. The most important measures to reach this goal include 14% SAF, fleet renewal and the optimisation of airspace. Furthermore, as part of the 'Fit for 55' proposals, the European Commission has introduced a series of measures that include the strengthening of the EU ETS (and phasing out of free credits), a progressive SAF blending mandate and a tax on kerosene.

EU ETS was applied to approximately 60% of flights facilitated by Schiphol Group's Dutch airports in 2019. Acting as a cap-and-trade system, the EU ETS limits the number of emission allowances issued, and thereby constrains the total amount of emissions of the sectors covered by the system. In effect, ETS allowances put a price on carbon emissions. Because free ETS allowances will be phased out, the emission reductions in the aviation sector will follow a more steep CO_2 reduction curve in line with the Fit for 55 goals.

Pathway

Our pathway towards net-zero aviation carbon emissions by 2050 involves:

a) Advocacy to accelerate the decarbonisation of the aviation sector

b) Promoting SAF as the best available short-term solution to reduce carbon emissions from aviation

c) Supporting improvements in technology to increase aircraft efficiency; for example, through differentiated airport charges as an incentive for fleet renewal and sustainable taxiing pilots

a) Advocacy

There is no time to waste in mitigating climate change, which is why we continuously seek to accelerate our sustainability efforts. This is a central theme in our advocacy as well: we need to speed up the decarbonisation of the entire aviation industry to achieve our net-zero-carbon goal by 2050 in line with the IPCC recommendations.

Our advocacy efforts focus on the 'Sustainable aviation' theme as a key enabler in reducing our Scope 3 emissions. We engage with ACI and International Civil Aviation Organization (ICAO), as well as with international airports, airlines, air traffic control and aircraft manufacturers, on worldwide solutions to make airports and the wider aviation sector more sustainable. The 2018 'Smart and Sustainable' action plan, jointly developed by Schiphol and the Dutch aviation sector, marked an important turning point. Through the action plan, the Dutch aviation industry commits to reducing in-sector carbon emissions to 2005 levels by 2030, or lower, which is approximately 10% below 2019 levels. A cornerstone of this goal is a 14% blend-in level for SAF for all fuels used at our Dutch airports by 2030.

Eindhoven Airport has formulated an aspirational goal, together with regional stakeholders, trying to achieve a 45% overall reduction in emissions by 2030. The key element and necessary condition in this ambition is the allocation of proceedings generated by passengers at Eindhoven Airport from an announced passenger aviation tax to supply additional SAF above and beyond the government mandate.
Compared with Schiphol Airport as an intercontinental hub airport, the route network of Eindhoven Airport is focused primarily on intra-European short-haul flights. This network is well-positioned as a showcase for accelerated SAF usage, as both the number of flights and the average fuel consumption per flight are lower, while EU ETS and other Fit-For-55 measures apply to most flights as well. If the government contributes to this aspirational goal, Eindhoven Airport could be a test location within Royal Schiphol Group.

This project has helped to drive advocacy for sustainable aviation around the world. In the Netherlands, the Ministry of Infrastructure and Water management led the process to develop the 2019 **Agreement on Sustainable Aviation**.

The combined efforts of Schiphol Group, KLM and various other aviation stakeholders led to the joint development of a European version of 'Smart and Sustainable' together with aviation trade organisations, known as 'Destination 2050' (published in 2021). This roadmap outlines how to achieve net-zero-carbon European aviation by 2050.

All relevant stakeholders (OEMs, fuel suppliers, airlines, airports) are partners in the World Economic Forum Clean Skies for Tomorrow (WEF CST) coalition, co-founded by Schiphol Group. The WEF CST focuses on all aspects of SAF, acknowledging that there is no silver bullet. The coalition has published several research reports, including on SAF feedstocks, the scalability of production capacity for sustainable aviation fuels and the potential price impact of scaling up the use of SAF.

Insights from 'Destination 2050' and the WEF CST coalition provided input for the recently announced Fit-for-55 legislative proposal by the European Commission. This package outlines the climate actions included in the European Green Deal, which aims to reduce EU emissions by at least 55% by 2030 compared

with 1990. Three proposed regulations have a direct impact on aviation:

1. a revision of the EU Greenhouse Gas Emissions Trading System (EU ETS)
2. a mandate to accelerate the use of sustainable fuels for intra and extra European flights (ReFuelEU), which Schiphol Group called for
3. a revision of the Energy Taxation Directive by introducing a tax on aviation fuel for business and leisure travel.

Internalisation of external costs is a crucial element in all credible decarbonisation pathways, meaning that the actual environmental impact of flights should be reflected in the price of plane tickets. Schiphol Group promotes schemes such as the European Union Emissions Trading System (EU ETS) and the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) that contribute to this goal. Both schemes require strengthening to credibly pursue a pathway to keep global warming below 1.5°C.

b) Promoting the use of sustainable aviation fuels

Given that SAF is one of few available short-term measures to reduce international aviation emissions, Schiphol Group has been an active advocate for rapid and responsible upscaling of SAF to replace fossil kerosene. Sustainable aviation fuels have multiple positive effects since their use leads to lower emissions of CO_2, soot and UFPs, which is better for the climate at a global level and air quality at a local level. SAF can also contribute to reduced contrail forming during aircraft flights.
As an airport operator, we focus on funding SAF-related R&D and expanding production capacity, as well as contributing to responsible sourcing policies and stimulating SAF demand within the industry.

R&D and production

Schiphol Group contributes expertise and funding to the research and development of SAF, including feedstock and scale-up opportunities.

In an effort to boost SAF production, we are an early-stage co-investor in a **SAF refinery** being developed by SkyNRG in Delfzijl, the Netherlands with a projected annual production capacity of 100,000 tonnes.

KLM launched its Corporate SAF Programme in 2011 to develop the SAF market, the proceeds from which will be used to bridge the price gap between SAF and fossil kerosene. Schiphol Group has been a partner in this programme since 2013, with a fixed annual contribution. In 2019, 48% of the fuel consumption for business trips of our own employees via KLM flights was SAF, and since 2021 we have purchased the amount of SAF required to cover 100% of our corporate emissions on KLM flights.

Responsible sourcing

There are currently insufficient feedstocks to produce the SAF needed replace all fossil kerosene in the global aviation industry, according to the Mission Possible report and other sources. What is more, SAF brings the additional risks of biodiversity loss, land use change and competition with food crops. We therefore support the European RED II guidelines for the current generation of SAF.

Schiphol Group also contributed to the first statement of the **Fuelling Flight Project**, an initiative led by the European Climate Foundation and ClimateWorks Foundation to address key principles in guiding real and durable reduction of environmental impact by aviation when growing the production and use of SAF.

We are also actively involved in the development of synthetic kerosene as a long-term alternative to kerosene from fossil origin. Synthetic kerosene is made from CO_2 captured from air, water and green electricity. To become truly sustainable, synthetic kerosene production requires further innovation to reduce the need for renewable energy. To this end, Schiphol Group contributes financially to two Dutch start-ups, **Zenid** and **Synkero**, which are working to advance the research and development of synthetic kerosene through direct air capture (DAC). Our participation includes a substantial research grant for developing a pilot factory at Rotterdam The Hague Airport.

Stimulating SAF demand

The hydrant system infrastructure for refuelling aircraft at Schiphol Airport is ready for SAF, and the first batches of European SAF have already been used to fuel aircraft. Several production facilities will come online during the next few years to supply a steady flow of SAF, though prices are still substantially higher than fossil kerosene.

To bridge this gap, Schiphol provides a temporary incentive of €500 per tonne to airlines using SAF at Schiphol, with a budget of €15 million allocated for the 2022-2024 period. Only SAF produced in Europe and using European feedstock in compliance with RED II requirements is eligible for the incentive. Several airlines are already working on reducing their emissions. KLM, for example, uses 0.5% SAF on flights departing from Amsterdam.

Many corporations and individual travellers are willing to reduce their emissions by flying on SAF during their journey. The booking flow for a plane ticket seems the best moment to offer voluntary SAF purchases to passengers. To increase awareness and offer the opportunity of purchasing SAF to passengers that have not received such an offer in their booking process, Schiphol Airport is developing a SAF experience centre.

Schiphol Group is exploring other ways to facilitate this trend as well, together with our partners. Rotterdam The Hague Airport launched a **consumer proposition** in 2021, whereby passengers can buy SAF for any flight via a book-and-claim system on the airport's website. KLM offers its customers the option of purchasing an extra quantity of sustainable fuel. We intend to significantly expand our efforts in this domain and we are investigating potential options with partners.

c) Supporting improvements in technology

As is common practice in the energy transition, the Trias Energetica is also a guideline for the aviation sector. There are several initiatives to lower the energy needed by optimising procedures, the use of new technologies and substitutions.

Incremental and radical fleet renewal

As an airport operator, we reward airlines operating the cleanest and quietest aircraft on the market by embedding a strong sustainability element in our differentiated airport charges. At Schiphol Airport, the noisiest (and usually least fuel-efficient) aircraft pay landing charges that are five times higher compared to those paid by the latest generation of aircraft. In addition, since April 2022, the airport charges at Schiphol Airport include a charge for NOx emissions in the landing and take-off (LTO) phase. The sustainability element in the charges will be further strengthened as part of future revisions of our airport charges.

Technological innovation, and the investment needed to support this, is a key driver of a sustainable aviation future. Working closely with manufacturers, airlines and other mobility partners, we support the research and development of sustainable aviation technologies by promoting the trialling, and eventual use, of new innovations at our airports.

Alternative propulsion

Hydrogen (H_2) is a potential alternative to fossil fuel as a power source for aircraft propulsion systems in the form of a 'non-drop-in fuel', though realising hydrogen-based aviation will require new aircraft designs, new power trains, new airport infrastructure and new energy infrastructure. Schiphol Group follows developments in this area closely. We are in contact with stakeholders such as Airbus, as well as new entrants such as Zero-avia, a start-up with which we are working to schedule the first commercial flights between Rotterdam The Hague Airport and London in 2024 using a 19-seater aircraft. Hydrogen is also a potential energy source to produce synthetic kerosene. Schiphol Group is part of a consortium based in the Noordzeekanaalgebied (NZKG) cluster near Amsterdam that is exploring opportunities of a regional hydrogen value chain. The aim is to produce and use hydrogen on a wider scale.

Whereas hydrogen as aviation fuel must overcome challenges in terms of production capacity and energy infrastructure, battery-electric flying faces challenges related to energy density. Power Up is a collaboration between Eindhoven Airport, Rotterdam The Hague Airport, Groningen Airport Eelde and Maastricht Aachen Airport that aims to learn more about the possibilities of electric aviation. The four airports are supported by Schiphol Group and the Netherlands Aerospace Centre (NLR). In 2021, all Schiphol Group airports welcomed a flight by a Pipistrel, the first fully electric two-seater

aircraft. The Pipistrel is based at Rotterdam The Hague Airport. We closely monitor developments in this segment, especially at our regional airports, and have already begun investing in recharging facilities for electric aircraft.

As most required technologies have not yet reached the maturity needed to support commercial aviation, general aviation (which includes private aircraft and other non-military and non-commercial flights) offers an important stepping-stone for innovations that can support zero-carbon emission aviation. We aim to use our learnings from general aviation to scale up solutions for larger commercial aircraft. CO_2 emissions from domestic general aviation account for less than 0.2% of total Dutch aviation emissions.

Airspace improvements

Greater efficiency in airspace demarcations and management could yield significant emissions reductions, as aircraft routes require less diversions. Schiphol Group closely monitors national and European developments and participates in international projects such as the Single European Sky (SES) initiative, which advocates a single, unified European airspace free from national borders, to support the region's long-term aviation capacity needs. Together with our European partners, we actively promote the accelerated introduction of SES, given its potential to modernise Europe's air traffic control system and drive efficiency across ground processes, aircraft handling and airport use. The European Governments are in the lead, together with the Eurocontrol and the national Air Traffic Controls.

Sustainable procedures at airside

Aircraft emissions during the taxi, landing and take-off (LTO) phases amount to approximately 5% of total aviation emissions at our airports. As an airport operator, we actively pursue solutions that can contribute to a decrease in kerosene consumption and therefore reduce aircraft emissions of CO_2 and other pollutants, such as NOx and UFP. These include operational measures such as single-engine taxiing, reduced APU usage and towing. Once pushback at Schiphol Airport is completed, the departing aircraft taxis out on its main engines from the gate towards a runway (or vice-versa for arriving aircraft). Usually, aircraft travel at close to their maximum weight. The average taxi time at Schiphol Airport is 14 minutes out and 9 minutes in. This is longer than is required for the warm-up (5 minutes) or cooling down (3 minutes) of aircraft engines.
We are exploring the use of 'sustainable taxiing', an umbrella term for solutions that involve aircraft taxiing while their engines are shut down. While it is marketed as 'electric', current solutions still use fossil fuels for propulsion. Even on fossil fuels, however, taxiing powered by GTL is far more efficient than on aircraft engines. Sustainable taxiing therefore has the potential to significantly reduce LTO-related emissions.

Building on the first successful pilot taking place in 2020, in 2022 Schiphol Airport ordered two special towing trucks known as TaxiBots, which are expected to enable a total saving of between 50% and 85% in fuel consumption while taxiing. We aim to get more insights into the operational impact of the towing trucks at Schiphol Airport during the coming years.

Air-rail substitution

The further development of landside transport systems such as high-speed trains, autonomous road transport and Hyperloop will increasingly provide an alternative to short-distance journeys. In Europe, in particular, train travel offers a potential alternative to flying over shorter distances. Air-rail substitution offers several advantages: it avoids aviation-related emissions and fossil fuel consumption (in the Netherlands, trains run on 100% wind energy, for example) and helps to balance scarce airport capacity.

Schiphol Airport is involved in a project with the government, KLM, NS and ProRail (the Dutch train and railway operators) to advance international train travel. To this end, Schiphol Group is working to improve check-in procedures for train passengers to and from our airports, and we participate in partnerships **focused on progressing air/rail substitution** as well as Hyperloop technology.
Furthermore, we advocate for an extension of the North/South metro line from Amsterdam to Schiphol

Airport and beyond to Hoofddorp. A separate metro line will increase rail capacity for international trains when fewer local trains visit our railway station and travellers, while commuters will also have the choice of travelling to and from work by metro.

Offsetting by third parties

Many airlines, corporates and passengers offset their emissions: easyJet, Delta and others offset emissions from every flight, while KLM offers offsetting to passengers via its CO_2Zero programme. Furthermore, some tour operators offset emissions for the entire package holiday and several large corporations offset some of their business travel emissions. Passengers also have the option to offset themselves via dedicated websites. We have no insight in the overall share or quality of such offsets and therefore exclude these efforts from our emissions overview. The estimated range of emission offsets for flights to and from Dutch airports is approximately 3-6%. Offsets by third parties are not reflected in Scope 3b emissions or any other emissions overview in this document.

While we do see a minor role for carbon removals (approximately 8%, according to Destination 2050) in achieving net-zero-carbon aviation by 2050, we view SAF and investments in cleaner technologies as the best use of funds to rapidly decrease the sector's emissions in the near future.

Non-CO_2 aviation emissions

Other aircraft emissions, besides CO_2, also contribute to global warming. The non-CO_2 impacts arise from aircraft emissions at high altitudes of nitrogen oxides (NOx), soot, oxidised sulphur, and water vapour. These respective emissions and induced contrails can have both warming and cooling effects on the climate, although the net impact results in positive (warming) radiative forcing.

In 2020, researchers at **Manchester Metropolitan University** found that two-thirds of the climate impact of aviation is potentially caused by non-CO_2 emissions, and the remainder by CO_2 emissions. The European Union Aviation Safety Agency (EASA) included these findings in an **updated analysis** on the impact of non-CO_2 aviation emissions in 2020.

The extent to which these substances influence the atmosphere depends on weather conditions and flight altitudes. Formulating aviation emissions equivalencies for short-lived climate forcers, such as non-CO_2 impacts, with long-lived greenhouse gases, such as CO_2, presents scientific and policy challenges, especially when trade-offs between emissions with different time horizons are involved. Additional research on the climate impact and effective mitigation measures is required.

CO_2 reduction policies are also expected to deliver an important contribution to non-CO_2 impacts.

Besides CO_2 reduction, Schiphol Group's efforts to mitigate the impact of non-CO_2 emissions resulting from aviation activities at our airports include the introduction of an NOx charge, the promotion of SAF and participation in research projects.

Effective 1 April 2022, a specific NOx charge is included in the airport charges structure at Schiphol Airport, while Eindhoven Airport and Rotterdam The Hague Airport are considering introducing a similar element in their charges structure. This financial incentive seeks to stimulate the use of aircraft engines that emit less nitrogen.

Our efforts to stimulate accelerated SAF use also has a positive knock-on effect on non-CO_2, since **SAF can contribute to less aircraft contrails** compared with fossil kerosene. Schiphol Group participates in the advisory board of the European project **ClimOp** (EU Horizon 2020; Climate assessment of Innovative Mitigation strategies towards OPerational improvements in aviation), which aims to map reduction measures for both CO_2 and non-CO_2 aviation emissions.

2. Smart and clean mobility

Part of our 'Sustainable aviation' segment, this theme focuses on reducing the negative effects of road traffic at our airports, and on journeys to and from these locations. This includes movements to and from the airport by passengers, third-party commuters, suppliers and contractors. The emissions share of surface access are the second-largest category included in our Scope 3 emissions. While CO_2 emissions resulting from these activities are not under the direct control of Schiphol Group, we aim to **further stimulate clean mobility and reduce emissions**. We have aligned our target with the Dutch climate agreement.

Our overall principle is that we prefer collective and clean transport over individual transport based on fossil fuels. At Schiphol Airport, approximately 48% of passengers arrived by public transport in 2019.
Schiphol Group invests in clean transport solutions to achieve further emission reductions. Zero-emission mobility has the additional benefit of reducing air pollution in the communities around the airport. We also provide or support infrastructure and charging facilities for all types of vehicles, **including bikes** and scooters.
A zero-emission fleet, as well as conditions promoting the use of public transport for commuters, are increasingly included in contracts with our suppliers and contractors.

Clean mobility

Schiphol Group was a frontrunner in requesting electric vehicles in the tender procedure for taxis at Schiphol Airport in 2014, resulting in the airport having the largest Tesla taxi fleet of any airport in the world. Furthermore, electric public transport buses have been running to and from Schiphol Airport since 2018, with over 95% of the fleet fully electric as of 2021. Most public transport buses to and from Eindhoven Airport, Rotterdam The Hague Airport and Lelystad Airport are electric as well.

Railway access

Schiphol Airport has excellent connections to the Dutch railway system, as the train station is located directly below our terminal. It is the sixth-busiest railway station in the Netherlands. In 2019, the rail tracks and platforms have reached their maximum capacity during peak hours.
Schiphol Airport is working with partners including the Dutch government, several municipalities, ProRail and NS (the railway manager and railway operator) to upgrade the train station and expand capacity. The planned extension of Amsterdam's North-South Metro line is another key element to further develop Schiphol as a multimodal hub. Adding metro access to the airport would alleviate congestion on the rail tracks, creating more capacity for international trains.

Road access

At Schiphol, we are planning smart infrastructure improvements to improve both accessibility and sustainability. We also discourage people from picking up and dropping off passengers by car, to eliminate unnecessary traffic movements. We stopped the promotion to drink coffee while picking up and dropping off family and friends at the airport already in 2011.

Shared cars and self-driving cars will have an impact on people's behaviour and choice of transport, as well as on certain occupational groups, such as taxi drivers, and on the use of the road network and the need for parking facilities. How large this impact will be and how quickly the mobility sector will change, is hard to predict. We offer a car-sharing service for passengers and employees at Schiphol Airport. Meanwhile, we continue to closely monitor new developments in mobility.

Many employees at our airport locations work in shifts. We investigated whether it was possible to change the timetables of public transport running to and from the airport. For several reasons, we concluded that this would not be feasible: in the very early morning, afternoon and late evening, there are no traffic jams and employees can drive quickly to the airport. Furthermore, there are not enough people commuting to make it cost-effective to offer a higher frequency of public transport.

Logistics and cargo

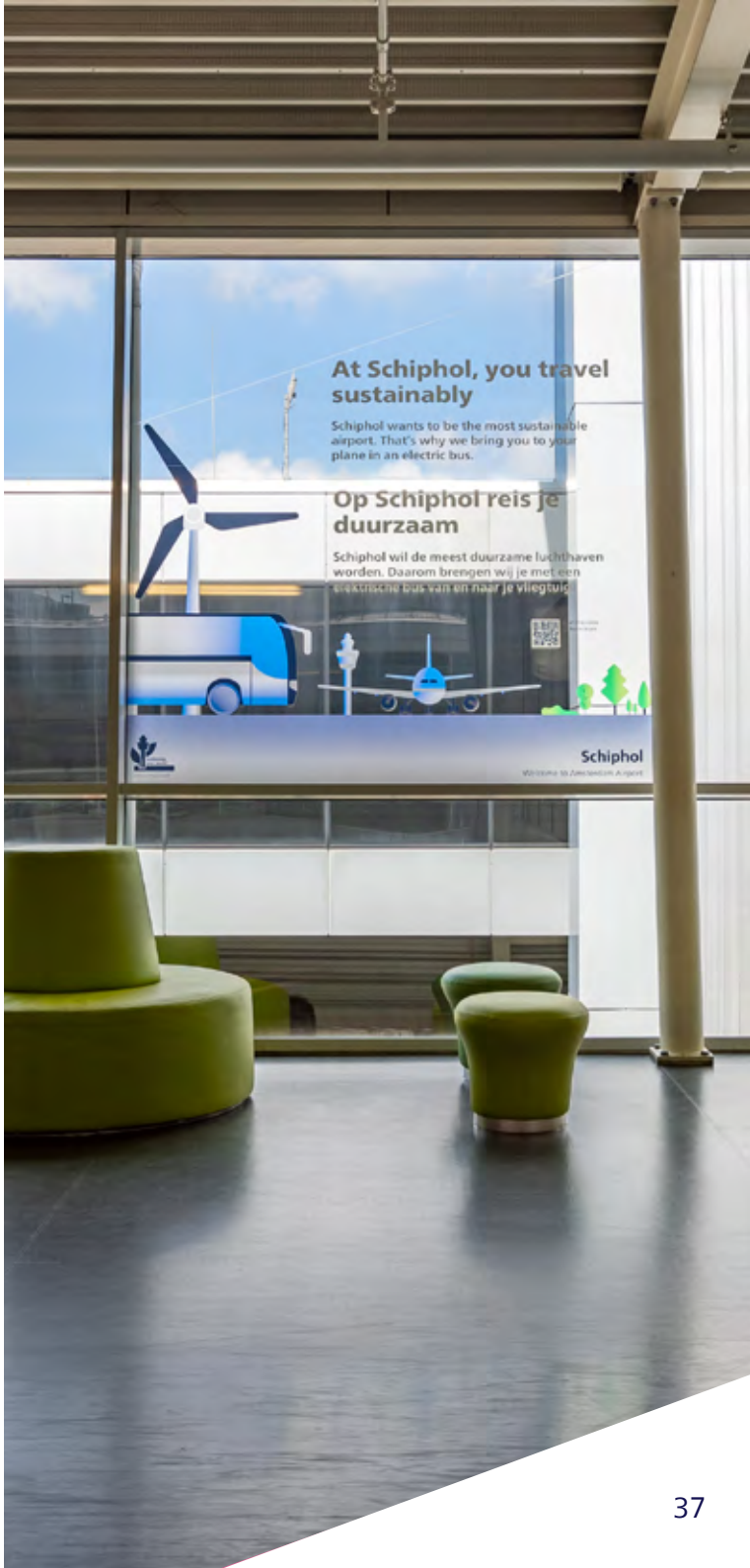
There are several transport streams to and from Schiphol Airport, including transport to supply the shops and restaurants in the terminal, as well as traffic related to construction and picking up and delivering cargo. Schiphol Group facilitates and integrates zero-emission mobility in contracts and partnerships and operational processes and in logistic providers and cargo providers. Our partners are also committed to reduce their emissions. Their Scope 1 emissions are often our Scope 3 emissions, this makes facilitation of smart and clean mobility a win-win situation.

The municipality of Haarlemmermeer and Schiphol plan to make Schiphol Centre a zero-emission zone for delivery vans and supplier lorries, with only electric or hydrogen-powered company vehicles set to be allowed from 2026. Cargo vehicles are excluded from these requirements, though we will continue to encourage low-emission cargo processes at landside. The usage of low- and zero-emission vehicles is a standard process requirement in construction projects.

3. Sustainable passenger journey

Schiphol Group wants to create a sustainable passenger journey, inspired by the need to think and take action together. As part of this approach, we aim to create a sense of place at our airports, so our customers feel welcome and inspired. We inform passengers about sustainability, including our ambitions and actions and support them in making sustainable choices. Together with our concessionaires, we provide local, organic food, and all coffee served in the terminal buildings is fair trade. Relaxing and de-stressing facilities and activities are a cornerstone of the passenger experience at our airports, resulting in natural daylight and extensive green spaces in the terminal buildings. At Schiphol Airport, the interiors of some piers have been upgraded with smart lighting and cooling, reused walls and chairs, and green walls, and sustainability was at the heart of M-corridor renovation. The Privium Airside Lounge has many sustainable features, including a table made from reused plastics and healthy as well as freshly prepared organic food and beverages.

As part of our approach, we actively communicate our sustainability ambitions with passengers to help them learn more about the topic. We also provide tips and services for passengers to reduce the negative impact of their journey, educate people on how to safeguard nature at their destination, explain how local organisations can benefit economically from passenger visits and offer interactive ways to increase awareness



around sustainability; for example, through digital tools such as apps. While net-zero-carbon aviation will become a reality, this does not mean the aviation sector can be allowed to grow without limits. Customers also share a responsibility to decide whether taking a flight is strictly necessary; travelling can be avoided with digital solutions such as videoconferencing, for example, while alternative transport modes are often available on certain routes.

We also support customers with special needs during their time at the airport, including people with reduced mobility or those such as families with young children who may require other forms of support. Passenger assistants are available to accompany people. Meanwhile, passengers can use their own wheelchairs up to the entrance of the aircraft, with wheelchairs also available upon arrival. The Airport Chaplaincy has been present at Schiphol Airport since 1975 to contribute to the emotional and spiritual care of all airport visitors, including employees. We also recognise the impact of hidden disabilities, which can include mental health, speech, visual or hearing impairments, and diseases such as asthma, COPD and diabetes. Our airports participate in the Hidden Disabilities Sunflower scheme, through which affected people are given more time and space to go through security and passport control comfortably.

Preventing human and wildlife trafficking

Schiphol Group is committed to fighting human and wildlife trafficking and smuggling by collaborating with sector partners and ACI, and by setting up supply chain management to combat illegal trade. With aircraft frequently used as a method of transport by traffickers, airlines and airports are ideally positioned to help combat human and wildlife trafficking and smuggling.

Human trafficking is the transportation and coercion of people into prostitution, crime and domestic servitude or forced labour, usually following recruitment with false promises of paid work. Trafficking people is a form of modern slavery. At Dutch airports, most victims of human trafficking are not aware that they have been trafficked. While this makes it difficult to recognise trafficking straight away, airport employees can be trained to notice the signs and to report suspicious behaviour. For example, travellers waiting in transit lounges for a long time, lost travel documents, or people who do not appear to know who they are travelling with or who have organised their trip themselves are all possible indicators of trafficking or smuggling. These reports from employees form part of the evidence needed to solve cases. Schiphol Group takes steps to educate our employees, improve awareness and undertake scrupulous monitoring and reporting of incidents. We also collaborate with partners across the aviation value chain to help them better recognise signals by providing information directly to the public to facilitate the fight against trafficking.

Wildlife trafficking is the illegal trade in protected wild animal and plant species, either threatened with extinction or not threatened, but managed to avoid utilisation incompatible with their survival. International airports are often used as transit points for trafficked wildlife and wildlife products moving between source and demand regions in the Americas, Africa and Asia. The Netherlands – and Schiphol Airport in particular – acts as a key connecting hub for these regions, with Dutch airports regularly encountering trafficked mammals and illegal animal products.

We follow a zero-tolerance approach to illegal trade in wildlife and take firm measures to prevent this activity. Schiphol Group is a signatory of the **Buckingham Palace Declaration**, a landmark agreement committed to shutting down the routes exploited by traffickers involved in the illegal wildlife trade. We also chair the ACI World Wildlife Trafficking Task Force, through which we collaborate with our partners and industry organisations such as IATA and the USAID Reducing Opportunities for Unlawful Transport of Endangered Species (ROUTES) Partnership to combat this trade. Customs shares data with ROUTES on a yearly basis, and Schiphol Group is working as an intermediary, translating information provided by ROUTES into our business, network, roles and responsibilities.

Sustainable aviation

Reduction of CO_2 emissions to 2005 levels
2030

Net-zero-carbon aviation sector
2050

Net-zero-carbon aviation sector

- Make Sustainable Aviation Fuels mainstream
- Reduce emissions via operational excellence of ground procedures and air space management
- Investigate and test non-drop-in fuels

Smart and clean mobility

- Improve railway station infrastructure and extend North/South metro line
- Stimulate use of zero-emission transport modes for passengers and commuters
- Offer charging facilities for cargo, construction and logistic providers and implement low-emission zones for logistic providers

Sustainable passenger journey

- Offer customers sustainable choices
- Create awareness and actively communicate on sustainability
- Strengthen network to combat human and wildlife trafficking

Circular economy

Circular economy

Our current world is based on the linear economy. Natural resources are mined to produce goods, which are then transported, used and finally thrown away, with valuable materials lost along the way. At the same time, a growing global population and rising prosperity levels are driving higher demand for the earth's natural resources, which are in increasingly limited supply. For the benefit of future generations, we need to shift from a linear to a circular economy to preserve our natural resources and derivative materials, and to increase their value. Circularity and reducing CO_2 emissions strengthen each other. A non-linear economy, in which resources remain valuable and in use for longer, significantly reduces the need for virgin natural resources and fossil fuels, and the resulting emissions.

Our goals

a) Zero-waste airports by 2030
b) Circular airports by 2050

Schiphol Group aims to operate fully circular airports by 2050. An important milestone in this ambition is to operate zero-waste airports by 2030, meaning all raw materials, components and products will be reused or recycled to the maximum extent possible according to the waste hierarchy. This will be achieved at our own locations or as close to our airports as possible.

Following this vision, used materials will be regarded as the resources of tomorrow, rather than simply useless waste. Each new project brings circular economy principles into practice, providing essential insights that help to bring us closer to our goals.

Schiphol Group fully embraces circularity, which we believe offers many wider advantages beyond its clear environmental benefits. As detailed in the following paragraph, the application of our zero-waste guiding principles enables increased speed and flexibility of assets during the construction phase, as well as improved cost control during the project lifecycle and improved indoor air quality.

Our actions and results

Our pathway towards our Circular economy goals includes

- Circular design principles: designing to enable reuse of materials and reduce materials needed
- Reuse and upcycle: minimising, separating and upcycling waste streams
- Closed loops: reusing materials in high-value, next-life applications

1. Circular design principles

Schiphol Group has developed zero-waste principles, and we are gaining experience in applying them during the design and construction of new buildings and the renovation of existing assets. By applying principles such as extending the lifetime of an asset, we can reduce the amount of maintenance and renovation needed, and we aim to achieve the maximum output from resources. Embodied carbon, that is the carbon footprint of a material, is also an important aspect, by considering GHG emissions throughout the supply chain (mine – produce – transport – use – residuals). The design, construction and the materials are key elements in achieving our zero-waste goal.

Schiphol Group uses material passports to provide overviews of all materials used in building construction, to enable high-value reuse and recycling at the end-of-life stage. The main focus is on how to collect data in a structural manner and how to keep the material passports accurate. We apply the Building Circularity Index (BCI) defined in the BCI building tool to determine the circularity potential of new and existing buildings. From experience, we have learned the importance of applying circular economy principles during the design phase, considering the estimated lifespan of the asset, whether it can be disassembled after use and the potential new purpose of the materials. This last reflection on future usage stimulates the designer to use standard sizes and to rethink the way components are

assembled; for instance, by using screws instead of glue, increasing the reuse potential of components and ensuring fewer materials are lost after the use phase.

It is also important to focus on the origins of materials and their specifications; for example, bio-based materials are made from renewable resources. Schiphol Group is therefore a signatory of the covenant to stimulate use of bio-based materials in construction. The parking P1 extension and morgue at Schiphol Airport, as well as the main gate at Eindhoven Airport, are designed for disassembly, and the design must also consider processes and procedures such as future maintenance impacts. The terminal at Lelystad Airport has been designed as a sustainable airport and has been awarded 'Gold' category LEED certification. Sustainable construction methods were used to build the new terminal.

Since the principles of circular design are new, it is important that we continue to develop the circular design knowledge and skills of our staff by creating a broad curriculum of circular economy trainings.

2. Reuse and upcycle

Schiphol Group uses the '**Lansink's ladder**' waste hierarchy and the '9 Rs' guidelines to determine the optimal use of residuals. The waste hierarchy helps in visualising the best future application of a material to reduce its environmental impact and ultimately create value, helping us to minimise, separate and upcycle everyday waste from food and beverage, office and aircraft residuals. Approximately 90% of our infrastructural streams are reused or recycled, preferably at our airport sites or at least as close by as possible.

Working with our suppliers, we aim to reduce the environmental impact of materials, starting with high-impact items such as asphalt and concrete, which represent the majority of our residual streams in terms of weight and embodied impact. Accordingly, 60% of the original asphalt on the Polderbaan runway, Parking area P3 (both at Schiphol) and Taxiway at Rotterdam The Hague Airport was reused during maintenance. We focus on achieving higher separation rates through better registration, technology and the 'polluter pays' principle. These allow higher-value next-life applications. We also stimulate the market to reduce (harmful) residuals and rethink our current linear processes.

One of the current focus areas of our circular economy theme is the phase-out of selected single-use products. Working with our suppliers, we aim to reduce the environmental impact of materials, starting with

high-impact items such as asphalt and concrete, which represent the majority of our residual streams, in terms of weight and embodied impact. The first sensor-based water bottle refill locations have been installed in the terminal at Schiphol Airport. Donation bins are also in place to collect PET bottles with deposits donated to charities.
A big residual stream is glycol, an oil product used for aircraft de-icing that generates substantial CO_2 emissions during its production. Recycling of the glycol used in the de-icing process has the potential to significantly reduce upstream emissions. Besides operational and infrastructure-related residuals, we also focus on preventing food waste, minimising unnecessarily waste of drinking water, exploring recycling opportunities for wastewater and encouraging the responsible use of electronics' residual flows.

3. Closed loops

In addition to the construction and renovation buildings and other fixed assets, we are working to better understand incoming and outgoing residual flows to help close material loops and reuse and recycle residuals to the fullest extent possible. To 'reuse' means the component will be used again without changing its basic specifications and the component will keep its value. To 'recycle' means materials are broken down and blended so that they subsequently decrease in value. For example, a platform made of concrete can be recycled as foundation materials for a new road.

The circular economy creates many opportunities for regional and national stakeholders, and various regional partners are involved in ensuring materials are reused locally around our airport sites, especially when the value of a residual material, such as concrete, is too low to warrant its transport over long distances. Here, the best option is to recycle locally via a materials hub. Insights into resource characteristics help with the exchange of materials with the communities around Schiphol Group's airports as well as with third parties. Material passports capture information on which materials are used in buildings, including the method of construction used. Thanks to insights in supply and demand of materials, sound-absorbing panels from the temporary bus gates at Schiphol Airport are being used in the reclaim hall at Eindhoven Airport. Suppliers and contractors can contribute by using hubs for prefabrication and recycling residuals. The ultimate ambition is to close the loop so that products stay in use longer and receive a better next-life application during its next cycle.
Creating a marketplace for use by Schiphol Group and our stakeholders helps in realising this ambition.

Circular economy

Circular design principles

- Embed circular design for new buildings
- Issue materials passports for new buildings and assets
- Apply bio-based, reused and recycled materials

Reuse and upcycle

- Phase out single-use products
- Improve separation, recycling and upcycling
- Shift to recycled asphalt and concrete

Closed loops

- Introduce a data-driven approach to material flows
- Implement a materials hub
- Source locally and procure sustainably

Communities

Communities

We realise that the success of our 'Why', Connecting your world, will increasingly depend on the well-being of the world around us. We pay close attention to the needs of local communities around our airports, as well as our other stakeholders, while striving to maintain a strong local and national support base for our activities. Airports are an important driver of employment, boosting regional development and economic growth. Our mid-term goal is to improve the balance between the positive and negative effects of aviation for the communities around our airports. Looking to the longer term, we maintain a good environment around our airports in which people can live and work.

Our goals

a) Improved balance between communities and airports by 2030
b) Maintain a good living and working environment around airports by 2050

Our actions and results

Our pathway towards our Communities goals includes:

- Air quality and noise reduction: improving living areas by lowering environmental impact and maintaining constructive dialogue to ensure the well-being and support of our neighbours
- Healthy and inclusive workplaces: empowering our strongest asset – our inclusive, diverse and motivated workforce
- Climate adaptation and biodiversity: creating resilient airports and improving biodiversity

1. Air quality and noise reduction

Local air quality

Schiphol Group commits to improving air quality at and around our airports by reducing nitrogen oxides (NOx), ultra-fine particles (UFPs) and substances of very high concern (SVHCs) emitted by our own activities and those of third parties. We have published specific action plans to reduce concentrations of NOx and UFPs. We also take proactive measures to eliminate the emission of SVHCs as part of our effort to reduce the consumption of fossil fuels. Through the electrification of buses, taxis and the wider vehicle fleet, we have already taken important steps towards reducing these emissions. At Schiphol Airport, the switch from diesel to gas-to-liquid (GTL) at airside has improved local air quality and the working environment. The aviation sector, the Federation of Dutch Trade Unions (FNV), the Dutch government and research institutes are working together to conduct research and implement solutions to reduce UFP concentrations and improve local air quality at Schiphol Airport. Measuring, reducing and capturing local air quality emissions is a key focal point of this collaboration. For example, Schiphol Group and TNO have been collaborating with Corendon and KLM to test the **use of mist** to reduce the amount of UFPs in the air at the airport and in the surrounding area.

Noise disturbance and direct community engagement

We recognise the wider impact of aviation on neighbouring communities and the environment. In particular, we note growing calls from governments, local communities and the wider public to reduce emissions and noise pollution, and to mitigate climate change.

We have developed a noise-reduction programme for Schiphol Airport, '**minder hinder**', to reduce noise disturbance by further optimising noise preferential runway usage and routes and incentivising the use of quiet and clean aircraft, both during the day and at night. Through the Schiphol Group Quality of Life Foundation, we focus on area-specific projects in the immediate environs of our airports and on mitigation in cases of noise-related disturbance.

Eindhoven Airport's stakeholders collaborate through the Airport Eindhoven Consultation Body (LEO) to reduce (noise) emissions from civil aviation. Balancing the benefits and costs of our activities will therefore be crucial to ensure the well-being and support of our neighbours and stakeholders in future years. We maintain a constructive dialogue with the surrounding communities, on issues such as the impact of flight paths and runway maintenance projects on the living environment. Meanwhile, daily information on local air traffic, runway use and general aspects of living near Schiphol is provided through the **Local Community Contact Centre Schiphol (BAS)** and our Notifly app. BAS registers complaints about noise or any other concern our neighbours may have. Eindhoven Airport undertakes similar initiatives via the BurenApp and **samenopdehoogte.nl**. Our airports also engage directly with our neighbours through regular discussions, events and other initiatives. The Schiphol and Eindhoven Airport Community Funds stimulate innovative projects to improve the environment and local living and environment, as well as sport and exercise activities by donating to non-profit public benefit organisations. As a future-looking organisation, we make a special effort to engage with children, students and other young people, with a particular focus on issues such as safety, sustainability and other key aviation topics.

2. Healthy and inclusive workplaces

Schiphol Group supports a wide range of careers, from various transport and retail positions to roles at our head office and with companies located near our airports, employing individuals of all ages and levels of experience. Through close collaboration with Aviation Community Schiphol (**Luchtvaart Community Schiphol**; LCS), we contribute to education and a stable labour market that stimulates regional employment, and we support individuals with difficulties accessing employment. 250 people with a distance to the labour market found a job via LCS since the start of the programme in 2020. At the same time, Schiphol Group prioritises the personal development of each employee, ensuring their preparation for the future labour market in the best way possible. Promoting sustainable local employment is one of Lelystad Airport's core values, and the airport aims to hire at least 30% of its workforce from within a 30-kilometre radius. An additional 163 local jobs are created during the construction phase of the airport and when it opens to commercial air traffic.

We operate in an environment that is constantly changing, and we need to be agile and respond quickly to trends and developments when needed. Maintaining a diverse workforce that includes different perspectives is key to this need, and we work hard to promote an inclusive environment for all employees regardless of their cultural or work background, gender, sexual orientation or physical disability. Since 2021,

Schiphol Group has a Diversity & Inclusion Board and a clear plan of approach for the bi-cultural and youth dimensions. Our aim is for our employees to be a reflection of society. Because we value people for who they are and their qualities and talents, we work hard to promote an inclusive environment for all employees regardless of their cultural or work background, gender, sexual orientation or physical disability.

Our commitment to our employees extends to ensuring safe and healthy work environment, and we work closely with our sector partners to improve conditions for those working in physically demanding roles at our airports such as security and baggage-handling, among others. This approach has included introducing lifting aids to reduce physical strain on employees, as well as standing supports to provide relief to workers operating security lanes. We are also introducing robotic process automation into our daily work process. Covering repetitive tasks through automation enables them to be carried out 24/7, removes the potential for human error and allows employees more time for higher-level tasks such as quality control. Regarding Schiphol Group's commercial real estate portfolio, we are conscious of the potential impact of new office developments on the environment, as well as our responsibility to ensure the health and well-being of the people working in these spaces. To address this, we are developing healthy offices, monitoring air quality in offices, improving public transport and bicycle infrastructure, and paying close attention to external standards such as BREEAM and LEED certification. We also recognise that organisations based at Schiphol Airport are all part of a community; through the **Spot community** initiative, we promote employee events and knowledge-sharing platforms that support networking, collaboration and innovation.

3. Climate adaptation and biodiversity

In addition to decarbonising our activities, we must also create resilient, future-proof airports. Climate adaptation is key to continue providing vital infrastructure when it is needed the most. Increasing frequency of extreme weather events requires additional efforts to remain prepared to facilitate emergency services, humanitarian aid transport and overall connectivity.

Changing climate influences aviation

Despite our efforts to limit global warming, there is scientific consensus that the climate is changing and will continue to change. More extreme weather and climate-related events are expected. Chronic risks such as shifts in climate patterns resulting in changing wind directions, rising groundwater and, in the long term, sea levels, and acute physical risks – extreme weather events such as heatwaves and storm water flooding – all impact business continuity.

Climate change can negatively influence aviation operations in many ways. The frequency, intensity, spatial extent, duration and timing of these events are expected to increase, making flight disruptions and cancellations more common. Winter-sport destinations can become too warm and sunny destinations too hot. Meanwhile, thunderstorms and severe weather events lead to increases in operational delays; the aviation network is affected as flights are re-routed around hurricanes and severe turbulence during flights lead to a higher risk of more severe injuries for passengers.

Adapting to climate change

Employees, flora and fauna are exposed to a changing climate. Schiphol Group is taking proactive steps to adapt our infrastructure and operations to ensure our airports remain pleasant locations and continue providing our essential social and economic services in the long term. We believe investing in climate resilience upfront is financially more attractive than investing when there is actual damage.

Key threats to our airports include increased frequency in extreme rainfall events as well as extreme heat days. During the longer term, rising groundwater levels and changes in the prevailing wind direction will become more urgent issues. Situated in a complex urban area and more than four metres below sea level, Schiphol Airport is especially vulnerable to the impact of climate change, and structural measures are essential to prevent potential short- and long-term issues. We give particular consideration to spatial design elements, such as a flood-resilient airport water-management system and

heat-stress mitigation measures such as green roofs that can also store rainwater. The Uniform platform has a smart water buffer and drainage system for excess rainwater, where the rainwater can collect temporarily (when there is heavy rainfall, for instance).

Biodiversity

Schiphol Group stimulates biodiversity at our airport locations and supports the restoration of natural areas outside of our airports. Climate change is also the biggest threat for biodiversity, which is also important in preventing climate change. Nitrogen emissions also affect ecosystems. Our Most Sustainable Airports roadmap contains actions to mitigate emissions and to stimulate biodiversity. As our airports are linked with other areas with high biodiversity value, our actions are focused on supporting the wider ecosystem; for example, by reducing light pollution.

Stimulating biodiversity around our airports is bound by certain flight safety constraints, given that the presence of hazardous birds at airports must be limited. The runways at Schiphol Airport are surrounded by approximately 1,000 hectares of grassland. To lower the risk of bird strikes, we regularly cut the grass to make it unattractive to hazardous birds while making sure to safeguard diversity in flora. The airport is also close to several farms; through initiatives such as the 'gras voor graan' programme, we aim to encourage farmers to grow crops that are less attractive to birds such as grass, flax and miscanthus (elephant grass). These crops can also be used to produce bio-based materials such as panels, concrete and composites. Eindhoven Airport together with Flight Forum, Air Base Eindhoven, municipality of Eindhoven and province Noord-Brabant are the initiators of the **Eindhoven Airport District Vision**. In this vision the future vision for the Eindhoven Airport area in 2040 is described, which has 12 ambitions covering a range of topics that include climate adaptation, biodiversity, sustainable mobility and ensuring a pleasant living and working environment around the airport.

Communities

Air quality and noise reduction

- Implement noise reduction plan to mitigate negative impact on neighbouring communities with renewed Schiphol Quality of Life foundation
- Execute Ultra Fine Particle and Nitrogen action Action Plans, including measurements
- Continue dialogue with local communities and engage with young people

Healthy and inclusive workplaces

- Offer sustainable, smart and healthy operational and commercial real estate
- Contribute to education and support people with difficulty accessing employment, through the Luchtvaart Community Schiphol (LCS)
- Develop plans to increase inclusion and diversity within the organisation

Climate adaptation and biodiversity

- Develop climate adaptation and biodiversity action plans
- Adapting climate impact by protecting against waterlogging, drought, heat, and flooding
- Preserve and, where possible, improve native flora and fauna and habitat management on-site

Appendix

- Schiphol Group sustainability themes in relation to Scope 1, 2 and 3 emissions
- Schiphol Group sustainability themes in relation to objectives
- Schiphol Group full value chain emissions
- High level financial overview
- (Inter)national regulations and policies
- Carbon accounting
- Offsets
- Schiphol Group Scope 1 emissions 2010-2030, by airport
- Schiphol Group Scope 2 emissions 2010-2030, by airport
- Schiphol Group emissions per passenger 2010-2021
- Definitions and abbreviations

Schiphol Group sustainability themes in relation to Scope 1, 2 and 3 emissions

Table 2

	Scope 1	Scope 2	Scope 3		
	Natural gas and fuel consumption own activities	**Electricity consumption**	**Energy consumption**	**Aviation**	**Upstream**
Scope	1	2	3a	3b	3c
Energy positive	■ Own buildings including consumption by tenants ■ Owned and leased vehicles ■ Emergency power supply	■ Own buildings and grounds including consumption by tenants	■ Ground support equipment		■ Employee business travel ■ Employee commuting (excl. lease)
Sustainable aviation				■ Aircraft emissions (including full flight)	
Circular economy					■ Waste and waste transport ■ De-icing fluids
Align with external targets			■ Third party buildings on our grounds		■ Passenger surface access ■ Public transport buses ■ Third-party employee commuting ■ Cargo traffic ■ Construction activities and materials ■ Waste water ■ Scope 1 and 2 WTT emissions from electricity, natural gas, fuels, refrigerants, snow- and ice clearance ■ International participations

Schiphol Group sustainability themes in relation to objectives

Table 3

CO_2 emissions are likely to reflect 1/3 of the climate impact of aviation. The non-CO_2 emissions are not quantified yet, because further reflection on how to best address non-CO_2 climate impacts is required. Absent a baseline, we have not explicitly included non-CO_2 emissions in our target. However, our net-zero-carbon target by 2050 – which is in line with the 1.5°C pathways – will also lead to a reduction in non-CO_2-emissions. Please refer to page 35 for more information.

	2050 objective	2030 goal	Interim targets
Energy Positive	**Energy positive airports** ■ Explanation: 100% of electricity need is generated at our own airport locations 100% reduction of fossil fuels and energy, including transitional energy carriers such as green gas and HVO100	**Zero Emission airports** ■ Explanation: no fossil fuels or natural gas ■ 90% of natural gas in our own buildings has been phased out compared with 2019 ■ Remaining 10% of natural gas in own buildings has been replaced by green gas ■ 85% of fossil fuels in ground handling and own vehicle fleet has been phased out compared with 2019 ■ Remaining 15% of fossil fuels in ground handling and own vehicle fleet has been replaced by HVO100 ■ 10% of electricity need is generated at own airport locations (21MWp) ■ Commuter traffic of own employees is emission-free ■ Refrigerant losses, runway de-icing fluids and propane used for firefighting are not included. ■ Buildings owned by third parties fall outside the scope of our 2030 zero-emissions target. The Dutch climate act provides guidance on the required reductions towards 2030 and 2050	■ In 2027, 40% of natural gas in our own buildings at Schiphol has been phased out compared with 2019. ■ At 100% of connected gates at Schiphol are FPUs installed ■ In 2030, 100% of business trips by air is on SAF
Sustainable aviation	**Net-zero-carbon aviation sector** ■ Explanation: maximum feasible reductions of carbon emissions in-sector; carbon removals for hard-to-abate emissions (<10%)	■ Reducing in-sector carbon emissions of international aviation to 2005 levels, or lower, by 2030 in the Netherlands ■ Explanation: key elements include fleet renewal, SAF and airspace improvements ■ Goal fully aligned with Dutch government (Civil Aviation Policy Memorandum 2020-2050 and Agreement on Sustainable Aviation) ■ Compared with 2019, this target results in ~10% reduction in 2030	■ 2% carbon reduction because of 2% SAF uptake at Schiphol Group airports in 2025 in line with ReFuel EU ■ Eindhoven Airport aims for -45% aviation emissions by 2030 by proposing to gradually redirect the aviation tax revenues paid by Eindhoven Airport's passengers towards the purchase of SAF, with a 50% SAF share in 2030
	No carbon emissions from surface access ■ Explanation: clean and smart mobility for passengers travelling to/from the airports, logistics and cargo movements, commuter traffic of third parties	**15% reduction of carbon emissions in line with Dutch climate agreement** ■ Explanation: Dutch mobility sector has carbon reduction goals. For many organisations fuel is Scope 1 emissions, motivated to reduce those emissions	■ 2026: 2,000 tonne emissions reduction as a result of the zero-emissions zone for terminal logistics at Schiphol ■ 2027: 50% of OD passengers use public transport or car sharing to travel to and from Schiphol
Circular economy	**Circular airports**	**Zero-waste airports**	■ 2023: Introduce a data-driven approach to material flows
Communities	**Maintain a good living and working environment around airports**	**Improved balance between communities and airports**	■ 2023: Set up measurement of nitrogen and UFP and diversity and inclusion

Schiphol Group full value chain emissions (1/2)

Table 4

The table provides an overview of all CO_2-emissions related to the operations of Schiphol Group. This overview will be updated annually. Figures for 2021 and 2030 include projections. Non-CO_2 emissions are not included this footprint. Please refer to page 35 for more information.

Emission source	tCO_2	Scope	Theme	2010	2013	2016	2019	2020	2021	2030	2030 status
Gas consumption	Location-based	1	Energy positive	27,817	18,430	16,895	19,957	14,310	17,847	2,105	Target
Fuel consumption by owned and leased vehicles	Location-based	1	Energy positive	2,177	2,659	1,516	2,144	1,409	1,477	720	Target
Potassium formate (runway de-icing fluid)	Location-based	1	Energy positive	665	587	229	335	78	356	356	No viable alternative identified
Firefighting training propane	Location-based	1	Energy positive	10	327	319	304	198	198	339	No viable alternative identified
Refrigerants (R410A)	Location-based	1	Energy positive	-	-	-	-	13	13	13	Further insights required
Total scope 1	Location-based	1	Energy positive	30,669	22,003	18,959	22,741	16,007	19,890	3,533	
Purchased green gas		1	Energy positive	-	-	-	3,167-	3,084-	3,115-	2,105-	Residual target
Purchased HVO100 for owned and leased vehicles		1	Energy positive	-	-	-	-	-	-	720-	Residual target
Total Scope 1 (market-based excluding offsets)	Market-based	1	Energy positive	30,669	22,003	18,959	19,574	12,923	16,776	708	
Electricity consumption	Location-based	2	Energy positive	83,942	85,818	87,111	116,421	86,014	104,225	118,661	Target
Purchased Dutch wind power		2	Energy positive	-	441-	3,295-	115,203-	82,224-	99,427-	113,863-	Contract
Own solar panels		2	Energy positive	-	-	1,249-	1,218-	3,790-	4,798-	12,000-	Target
Total Scope 2 (market-based excluding offsets)	Market-based	2	Energy positive	83,942	85,377	82,567	0-	0	-	-	
Ground support equipment (GSE)	Location-based	3a	Energy positive	33,196	32,262	34,735	37,414	25,245	25,184	16,021	Target
Gas consumption in third party buildings on our grounds	Location-based	3a	Align with external targets	37,564	35,092	31,186	23,092	19,045	23,246	23,246	Minimum ambition
Electricity consumption in third party buildings on our grounds	Location-based	3a	Align with external targets	64,119	68,572	70,930	77,354	58,469	58,469	77,766	Minimum ambition
Total Scope 3a	Location-based	3a		134,879	135,926	136,852	137,860	102,759	106,898	117,032	
Purchased HVO100 for fuel-powered GSE		3a	Energy positive	-	-	-	-	-	-	5,106-	Residual target
Purchased Dutch wind power for electric GSE		3a	Energy positive	-	-	-	4,186-	3,530-	3,530-	10,893-	Contract
Total Scope 3a (market-based excluding offsets)	Market-based	3a		134,879	135,926	136,852	133,674	99,229	103,368	101,033	

Schiphol Group full value chain emissions (2/2)

Non-CO_2 emissions are not included this footprint. Please refer to page 35 for more information.

Emission source	tCO_2	Scope	Theme	2010	2013	2016	2019	2020	2021	2030	2030 status
Scenario EU Fit for 55 (5% SAF)	Location-based	3b	Sustainable aviation	9,767,346	10,074,584	11,476,671	11,938,635	6,473,191	7,161,146	10,811,267	Target
Scenario Agreement Sustainable Aviation (14% SAF)	Location-based	3b	Sustainable aviation	9,767,346	10,074,584	11,476,671	11,938,635	6,473,191	7,146,823	9,787,041	Target
Aspirational scenario (30% SAF)	Location-based	3b	Sustainable aviation	9,767,346	10,074,584	11,476,671	11,938,635	6,473,191	7,146,823	7,966,196	Scenario
Employee business travel	Location-based	3c	Energy positive	746	625	764	1,172	201	205	782	Target
Employee commuting	Location-based	3c	Energy positive	2,590	2,411	2,701	3,124	2,552	2,522	2,077	Target
Passenger surface access	Location-based	3c	Align with external targets	176,067	239,175	297,333	275,272	80,209	91,576	255,096	Minimum ambition
Public transport buses	Location-based	3c	Align with external targets	5,500	9,591	15,525	-	-	-	-	Realised
Third party employee commuting	Location-based	3c	Align with external targets	66,988	67,361	103,838	79,719	63,565	63,496	68,529	Minimum ambition
Cargo traffic	Location-based	3c	Align with external targets	74,322	67,997	63,728	49,914	49,832	49,832	49,914	Minimum ambition
Construction activities and -traffic	Location-based	3c	Align with external targets	484	484	484	498	627	558	88	Further insights required
Waste transport	Location-based	3c	Circular economy	115	469	895	2,672	1,044	1,025	1,652	Further insights required
De-icing (glycol)	Location-based	3c	Circular economy	1,795	1,586	424	741	455	707	730	Further insights required
Waste water	Location-based	3c	Align with external targets	-	-	911	992	497	497	992	Minimum ambition
WTT-emissions Scope 1 and 2	Location-based	3c	No target	17,661	16,481	15,965	20,568	15,062	18,289	17,342	Minimum ambition
Construction materials	Location-based	3c	No target	-	-	-	-	-	-	-	Further insights required
International participations	Location-based	3c	No target	-	130,151	121,600	127,832	130,377	118,448	118,448	Minimum ambition
Total Scope 3c	Location-based	3c		346,268	536,330	624,167	562,504	344,421	347,156	515,651	
Air travel SAF purchase		3c	Energy positive	-	16-	134-	102-	53-	92-	357-	Residual target
Total Scope 3c (market-based excluding offsets)	Market-based	3c		346,268	536,315	624,033	562,402	344,368	347,064	515,294	
Emission offsets				2,596-	29,124-	27,420-	24,333-	19,205-	44,561-	3,930-	Residual target

High level financial overview

Schiphol Group forecasts its investments 10 years ahead. This means that our sustainability targets for 2030 are included in the planning horizon. In our latest investment plan, we expect to invest €6 to € 7 billion over the 2022-2029 period. The planned investments at Schiphol Airport were agreed in 2021 in consultation with the airlines, as part of our airport charges consultation. Consequently, Schiphol Airport is committed to these planned investments, and the majority of airlines also support them. The financial planning cycles and visibility of forecasted investments differs between our regional airports, but the commitment to achieving our 2030 targets remains unchanged.

These investments partly relate to projects that directly contribute towards achieving our sustainability goals. Schiphol Group has allocated a dedicated capital expenditure budget to cover various sustainability improvements until 2030. As sustainability is an integral part of our projects and procedures, most projects have no dedicated sustainability budgets, and, furthermore, most projects are subject to public procurement tenders. Consequently, we cannot publish financial details at a project level. At Schiphol Group level, approximately 50% of all planned investments contain elements contributing to reducing our Scope 1, 2 and 3 emissions during the current decade.

Key projects that reduce emissions at our airports:

Scope 1 and 2

- Phasing out natural gas: multiple projects have been initiated to phase out natural gas. Project Heating and Cooling Terminal 1 and 2 is the most complex project, with a long lead time. ATES systems are installed to provide heat and cold to offices buildings;
- C-Pier renovation: C-Pier is the oldest pier at Schiphol and requires renovation to improve the passenger experience, enlarge capacity and improve energy efficiency (including phasing out natural gas);
- Terminal maintenance programme and renovation of fire stations: the annual maintenance budget for the Schiphol Airport terminals for the next few years is equal to 300% of the realised annual maintenance expenditures over 2017-2019 (pre-COVID). This step-up supports our drive for emissions reduction through accelerated energy efficiency, and phasing out natural gas;
- Airfield maintenance programme: replacement of halogen airfield ground lights with energy-efficient LED lights;
- Vehicle replacement programme: shifting to zero-emission mobility across our own vehicle fleet;
- Reduce emissions at Rotterdam The Hague Airport, in addition to regular replacement investments;
- Schiphol Airport and Eindhoven Airport plan to significantly expand PV capacity for solar power generation, subject to the outcome of feasibility studies. The required investments (and carbon-reduction potential) have not yet been quantified. Both the costs and the CO_2 reduction are excluded from any overview in this document. Additional investments in PV capacity are not required to achieve our zero-emissions target for 2030, but will help us to outperform our energy-positive interim target on the path to 2050;
- Schiphol Group is the lighthouse airport of the TULIPS consortium, a collaboration between airports, airlines, knowledge institutes and industrial partners supported by €25 million EU funding for 2022-2025 as part of the European Green Deal. The consortium aims to accelerate the deployment of technologies that will contribute to achieving the zero-carbon-emissions and zero-waste airports targets set for 2030 and to realising net-zero-carbon aviation by 2050.

Scope 3: Investments to reduce emissions of third parties, active at our airport locations

- Enable zero-emission airside operations for Schiphol Airport and third parties, including electric ground-support equipment and fixed power units for aircraft;
- Purchase of two special aircraft towing vehicles to reduce aircraft taxiing emissions;

- Schiphol Group has committed €15 million to stimulate SAF uptake at Schiphol Airport over the 2022-2024 period, in anticipation of an EU blending mandate by 2025. We are considering committing an additional €15 million in 2023/2024 if the initial phase of this SAF incentive programme is successful;
- Schiphol Group is providing subsidies and loans exceeding €5 million to support the production of SAF in the Netherlands, including funds for the Zenid e-fuels pilot factory at Rotterdam The Hague Airport, a SkyNRG SAF plant and the Synkero consortium;
- Dual taxiway system: facilitates a more efficient ground operation;
- The application for the National Growth Fund aims to accelerate research and development to reach net-zero-carbon aviation. An element that is awarded, is the accelaration of R&D for hydrogen propulsion in aircraft;
- Decarbonise surface access: facilitating charging facilities for electric vehicles and introducing a zero emissions zone by 2026;
- Schiphol Multimodal Hub: redevelopment of the train station, bus platforms and Plaza to increase capacity for public transport. This will enable a decrease in surface access emissions;
- Rail-Air connection to Schiphol Airport baggage-handling system, with the aim of creating a competitive baggage journey by train.

A prerequisite for all activities at Schiphol is the execution of the Power Grid Masterplan. This will improve and increase the capacity of the electrical grid to enable the energy transition for third parties and for our own activities.

Finally, sustainability is a core element in the requirements of Pier A-Pier and Terminal the South Terminal. Pier A-Pier has a climate façade, PV solar panels, ATES heating and cooling, FPUs and PCAs on the passenger boarding bridges and, grey water circuits for the bathrooms, and uses recycled and recyclable materials. The pier will obtain LEED gold certification. Terminal The South Terminal is in the design phase. It will receive a LEED platinum certification and will be an energy- positive building.

(Inter)national regulations and policies

The policies Royal Schiphol Group develops have to be seen in the context of the developing (inter)national regulations and policies, which give guidance to our activities. Although Schiphol Group aims to perform a leading role in our value chain and will do everything reasonably possible to reach the net-zero-carbon goal in 2050, it is important to emphasize that the influence of Schiphol Group on the emissions of the aviation sector (Scope 3 emissions) is relatively limited, both from a technological perspective and because Schiphol Group is bound by the existing regulatory framework. For example, Schiphol Group is obliged on the basis of the EU Slot Regulation and the Slot Allocation Decree to make available the maximum amount of capacity, expressed in slots, and the EU internal market rules hold as a principle the freedom of airlines to determine the destinations of their air traffic services. Under the current regulations, Schiphol Group cannot unilaterally limit the available capacity, e.g. for reasons of environmental impact resulting from the use of the airport infrastructure. Schiphol Group advocates for amendments to existing regulations to create more possibilities to incentivize sustainable aviation.

Key regulations and policies that influence the policies of Schiphol GroupI include the following:

- **The Paris Agreement:** During the 21st Conference of the Parties in 2015, almost all countries agreed to limit global warming to well below 2°C, and preferably to 1.5°C, compared with pre-industrial levels to avoid the worst impact of climate change. This requires deep cuts in carbon emissions, in every country and every industry
- **Intergovernmental Panel on Climate Change (IPCC) reports:** The IPCC assesses science related to changes in the climate and publishes reports about the state of scientific, technical and socio-economic understanding of climate change and its impact. In 2018, the IPCC recommended that each sector should reach net-zero-carbon by 2050. The most recent publications, in 2021 and 2022, further emphasised strong evidence of humanity's responsibility for environmental and climate breakdown. Humans are also the ones with the ability to stop climate change and work simultaneously on climate adaptation.
- **International Civil Aviation Organization (ICAO):** Emissions from international aviation are covered by the UN International Civil Aviation Organisation (ICAO). In 2010, member states agreed on two goals: 2% annual fuel-efficiency improvement through 2050 and carbon-neutral growth from 2020 onwards. ICAO is pursuing a basket of measures that include aircraft technology improvements, operational improvements, sustainable aviation fuels and market-based measures (CORSIA). A key effort being led by ICAO is the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA). Approved by governments in 2016, and adopted by the ICAO General Assembly in 2018, the scheme mandates offsetting from 2021 onwards for all emissions above the 2019 level. Any growth in global aviation should become 'carbon-neutral' through CORSIA. ICAO is also exploring the feasibility of a long-term global aspirational goal for international aviation. ICAO member states convene later in 2022 to discuss a more ambitious goal. The Dutch government furthermore aims to introduce more progressive reduction targets at ICAO and will adjust the Dutch reduction targets accordingly.
- **European regulation:** the European Commission aims for a climate-neutral Europe by 2050. In 2020, this target was enshrined in the European Climate Act. In 2021, the European Commission presented Fit-for-55, a set of legislative proposals to reduce 55% of the carbon emissions by 2030 compared with 1990 combined with initiatives in many other industries. Three elements stand out for aviation, increasing costs for airlines to emit CO_2:
  1. EU ETS: Free ETS allowances will decrease over time
  2. Energy directive The exemption of kerosene from the Energy Tax Directive will end
  3. ReFuelEU initiative stipulates blending mandates for sustainable aviation fuels

While some elements of the Fit-for-55 proposals also apply to our own activities, the impact is relatively limited as Schiphol Group is currently well ahead of the reduction targets and on track to realise zero emissions by 2030 (regarding Scope 1 and 2 plus some elements of Scope 3). Additionally, the Commission announced the restart of work towards Single European Sky (SES), helping to achieve aviation emissions reduction through more efficient routing. Intra-European flights have been included in the EU ETS since 2012. Acting as a cap-and-trade system, the EU ETS limits the number of emissions allowances issued, and thereby constrains the total amount of emissions of the sectors covered by the system. In effect, ETS allowances put a price on carbon emissions. The total quantity of allowances decreases over time, which leads to an increase in the price of emissions over time. As airlines will incur higher costs, ETS is by design an incentive to reduce in-sector emissions. The actual reduction follows the abatement curve, as emitting companies are allowed to trade the remaining allowances. In 2019, EU ETS applied to approximately 60% of flights from our Dutch airports.

- **Sector initiatives:** There are several initiatives in the sector. Led by Airports Council International, **European airports** committed to net-zero-carbon by 2050, at a **global level** the long term aspirational goal for airports was set in 2021. **Destination 2050** study sets out how to achieve a net-zero-carbon aviation sector in Europe. The study has been commissioned by the representatives of European airports, airlines, aerospace manufacturers and air navigation service providers, and conducted by the Royal Netherlands Aerospace Centre and SEO Amsterdam Economics. In 2021, IATA and **airlines** aligned at a global net-zero-carbon-emissions target by 2050.
- **Dutch regulation:** The Dutch Government introduced the Climate Act with reduction targets for 2030 and 2050 to act in line with the Paris Agreement. **The Dutch Climate Agreement** outlines how to reach these goals for the largest sectors in the Netherlands. The Dutch government has introduced a Climate Act including the following goals to act in line with the Paris Agreement: a 55% reduction in CO_2 emissions by 2030 compared with 1990 levels, and a 95% CO_2 reduction by 2050. Airport carbon emissions are covered by the 2015 Paris Agreement, with emissions from domestic flights, part of national emissions, also included.
- **Agreement on Sustainable Aviation:** Although international aviation emissions are not part of the nationally determined contributions (NDCs, a central element in the Paris Agreement), the Dutch Government led a multi-stakeholder dialogue that resulted in the Agreement on Sustainable Aviation. The aim is to reduce in-sector carbon emissions to 2005 levels, or lower, by 2030 in the Netherlands. The most important measures to reach this goal are 14% sustainable aviation fuels (SAF), fleet renewal and optimisation of airspace. The next step in this agreement is the ambition to achieve a reduction of 50% compared with 2005 levels by 2050 – in line with the ICAO goal – and zero emissions by 2070.
- **Civil Aviation Policy Memorandum 2020-2050** In November 2020, the Dutch Ministry of Infrastructure and Water Management approved the Civil Aviation Policy Memorandum 2020-2050, 'Responsible aviation towards 2050', which sets out the Ministry's vision for the development of Dutch aviation sector over the coming decades. The memorandum centres on four areas of public interest in relation to airport capacity: 1) safety, 2) connectivity, 3) living environment and 4) sustainability. Specific attention is given to the number of commercial flights the Netherlands will be able to accommodate going forward in light of climate change. In its analysis, the Ministry considers, and approves, the steps proposed by the 2019 Dutch Climate Agreement, emphasising the need for innovation and international collaboration to realise the agreement's objectives. The memorandum also considers the impact of the COVID-19 pandemic on air travel. In particular, it highlights uncertainties around how commercial air travel will recover from the crisis, given its potential long-term effect on passengers' propensity to travel as well as the economy, and the resulting structural changes that may occur.

- **Government coalition**: In December 2021, **the Dutch government coalition agreement was presented**. The agreement outlines the new government's objectives for the 2021-2025 period. The Dutch Cabinet reaffirmed the Civil Aviation Policy Memorandum 2020-2050. The coalition underlines the need for the aviation industry to invest in SAF to accelerate the decarbonisation of air travel in the Netherlands. The coalition parties stated the need to ensure a level playing field when implementing new (European) measures. However, they also agreed to raise the expected revenues from the so-called 'ticket tax' by 400 million euros, which will be partly re-invested in supporting sustainable aviation and safeguarding the environment around airports.
- **Nature permits:** In November 2020, applications were submitted for nature conservation permits *(natuurvergunning)* under the Nature Conservation Act *(Wet natuurbescherming)* for both Amsterdam Airport Schiphol and Lelystad Airport. When granted, the permits will confirm the maximum amount of nitrogen emissions and their resulting deposits.

Carbon accounting

The GHG Protocol Corporate Standard categorises emissions as Scope 1, Scope 2 or Scope 3. Scope 1 emissions result from owned or controlled sources, such as the heating of our buildings. Scope 2 emissions result from electricity purchased for our operations. Scope 3 emissions are all indirect emissions occurring in our value chain, including aircraft emissions and surface access emissions.

As multimodal transport hubs, airports have a unique emissions profile. ACI Europe, together with airports including Schiphol Group, developed the Airport Carbon Accreditation (ACA) in 2009. This carbon management certification programme provides a common framework to monitor and reduce CO_2-emissions for airports. ACA has been developed in line with the GHG Protocol (2004, including amendments) and ISO 14064 principles. All emissions provided in this document are in line with ACA level 4+ reporting requirements. The **full methodology** is available at the **ACA website**.

Organisational boundaries

The organisational boundaries for Scope 1, Scope 2 and Scope 3 are set in line with the ACA methodology. All CO_2-emissions are reported on a tank-to-wheel location-based basis, unless otherwise noted. The corresponding well-to-tank emissions from our emissions in Scope 1 and 2 are included in our Scope 3 emissions overview.

Other greenhouse gas emissions in our own operations are limited to refrigerant losses. While reporting on CO_2-equivalents would be technically correct, for simplicity reasons we have converted and included these losses as CO_2-emissions in our reporting.

A key element in defining the organisational boundaries concerns avoiding the double-counting of aircraft emissions. In line with ACA methodology, emissions from a return flight are effectively split between the two airports: each airport includes all emissions from their respective departing flights.

Our emissions in Scope 1 include tank-to-wheel emissions. The corresponding well-to-tank emissions are included in our Scope 3. Aviation emissions, in our Scope 3, are also based on tank-to-wheel emissions. Following the ACA methodology, based on the GHG Protocol, blending in SAF results in a 100% reduction in our Scope 3 emissions, compared with fossil kerosene. Well-to-wheel SAF-emissions depend on various factors, and the reduction resulting from currently available SAF is often around 80%.

Eindhoven Airport shares facilities with a military airfield. The organisational boundaries for the CO_2-emissions of Eindhoven Airport are defined in line with the environmental permit. Eindhoven Airport has no insights in the emissions related to the military airfield. Specifically, this means that runway lighting and maintenance, for instance, the air traffic control building and firefighting are excluded from the airport's emissions. The overall share of these emissions within the organisational boundaries of Eindhoven Airport is estimated to be quite limited.

Emission factors

All emission factors are in line with the database **www.co2emissiefactoren.nl**. Forward-looking emission projections are based on the latest emission factors as per 1 April, 2022.

Aviation non-CO_2 emissions (Scope 3) are not included in our emissions overview. Formulating aviation emissions equivalencies for short-lived climate forcers, such as non-CO_2 impacts, with long-lived greenhouse gases, such as CO_2, presents scientific and policy challenges, especially when trade-offs between emissions with different time horizons are involved. Additional research on the climate impact and effective mitigation measures is required.

Opportunities for improvement
Schiphol Group initiated comprehensive carbon accounting practices in 2009, in line with the updated ACA methodology (level 4+ Transformation). Over the years, several categories have been refined. We are currently improving our reporting on a few emission sources that require further analysis and understanding. This includes refrigerant losses (tracking initiated in 2020), construction materials (tracking to be initiated), construction traffic (tracking incomplete) and waste disposal and treatment (tracking incomplete).

Integrated annual report
Our annual report is drawn up with due regard for the most relevant international reporting guidelines and best practices regarding non-financial information. We elaborate on the elements of the EU directive regarding non-financial information and we report in accordance with the Global Reporting Initiative (GRI) Standards (core option) of the Global Reporting Initiative. The GRI sector supplement for airports has also been applied. Furthermore, our annual reporting is inspired by the International Integrated Reporting Council framework as can be seen in our Value creation model as well as other elements of our reporting. The texts and financial statements are submitted for approval to the Management Board and the Supervisory Board. Lastly, Schiphol Group's independent external accountant signs the auditors report. The auditor provides limited assurance on selected socio-economic information and the allocation of the proceeds of our green bonds as presented in this report.

Materiality analysis and stakeholders
In our annual report, we report on the material aspects that relate to Schiphol Group. We apply the GRI-guidelines, which indicate that an aspect is considered material when it influences the decision-making of our stakeholders or reflects a significant economic, social or environmental impact of our organisation. We maintain a regular dialogue with our stakeholders to understand their needs and interests. The nature and frequency of these communications are diverse, as are the material aspects covered in our discussions. In our annual report, the materiality analysis and a list of non-exhaustive contact moments for consultations with our stakeholders are included.

Offsets

Table 5

Schiphol Group purchases offsets for all emissions in Scope 1 and 2, plus business trips and employee commuting. Schiphol Airport and Eindhoven Airport have purchased credits since 2012, with Rotterdam The Hague Airport and Lelystad Airport following since 2018. Schiphol Group policy is to purchase sufficient credits to offset or slightly exceed the expected emissions in the current year. Major surpluses are subtracted from the required amount for the following year. We have not yet experienced a shortfall in purchased credits.

All purchased credits are Gold Standard or VCS verified and must have a high likeliness of additionality. Our offsetting policy is in line with the ACA offsetting guidelines. All offsets are also verified by WSP as part of our ACA accreditation. The table provides further details on the offsets purchased by Schiphol Group in recent years.

Schiphol Airport, Rotterdam The Hague Airport, Lelystad Airport	Quantity (tCO_2)	Issuer	Project	Location	Description
2018	30,000	Kinect Energy (Gold standard)	Solar thermal power plant	Jaisalmer district, Rajasthan, India	The project introduces state-of-the-art and sustainable solar thermal power generation using parabolic trough technology in rural India. It is expected to supply 119 GWh of clean electricity to the local grid annually resulting in abatement of 1,131,600 tCO2e during the crediting period.
2019	24,000	Kinect Energy (Gold standard)	Solar power project	Ujjain, Madhya Pradesh, India	The project is a greenfield solar plant that supplies clean, sustainable electricity to the local grid in rural India. With an installation capacity of 12 MWp, the project activity will result in abatement of 19 374 tCO2e every year.
2020	19,000	World Kinect (Gold standard)	Solar power project	Orange Charanka, Gujarat, India	

Eindhoven Airport	Quantity (tCO_2)	Issuer	Project	Location	Description
2018	610	Climate Neutral Group (Gold Standard)	Biogas	Tanzania	This project makes biogas installations accessible for families in remote areas. On a piece of land, a biogas installation is installed by local construction companies. The manure from their own livestock is collected in the installation. Fermentation of the manure takes place and biogas is created. This gas is led to the house next door, where it is used for cooking and lighting.
2019	333	Climate Neutral Group (Gold Standard)	Biogas	Uganda	These offset projects provide access to biogas installations in rural areas in Uganda. They are installed on recipients' land by local construction companies. Even if a family owns just two cows, these digesters can generate enough gas for cooking and lighting.
2020	205				
2021	200	Climate Neutral Group (VCS)	Biogas	Princepeel (NL)	The biogas project involves several dairy farms and agro pig farms, which, by installing biogas installations, no longer have to dispose of all their manure on local fields. The fermentation of manure and other residual flows produces electricity that is fed into the national power network.

2010-2030 Scope 1 emissions Schiphol Group

Figure 9
Schiphol Airport

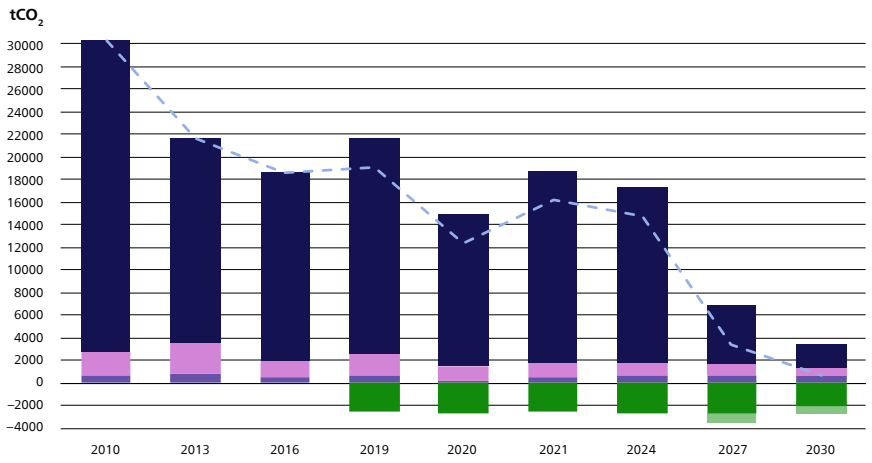


Figure 10
Rotterdam
The Hague Airport

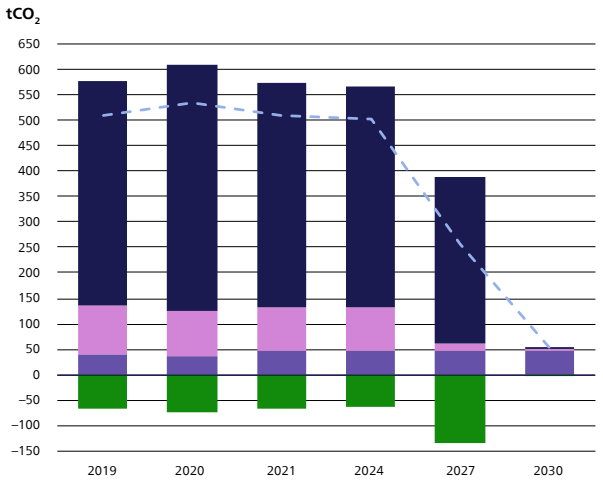
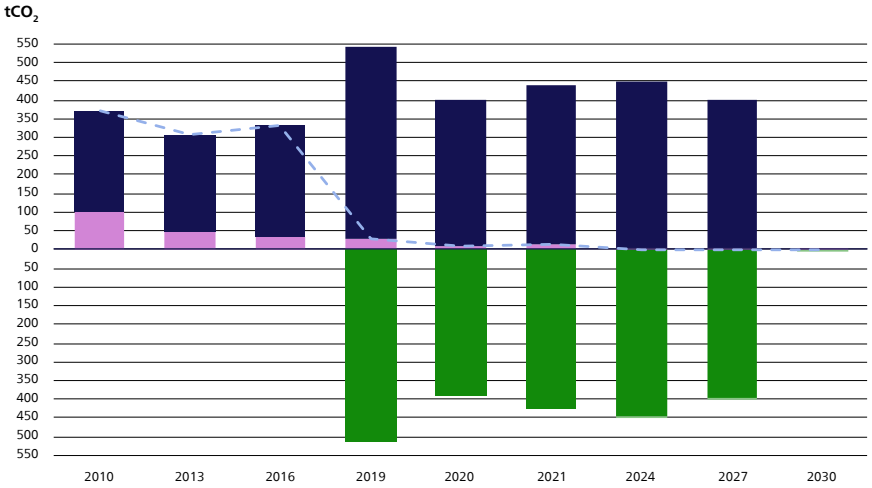


Figure 11
Eindhoven Airport



- Gas consumption
- Green gas
- Owned and leased vehicles
- HVO100 for owned and leased vehicles
- Firefighting training propane, refrigerants and runway de-icing fluids
- Market-based emissions (excluding offsets)

Our ongoing construction activities to install ATES in terminal 1 and 2 at Schiphol Airport will be finished around 2026, resulting in a major reduction in gas consumption from 2027 onwards. All other buildings at our airports are scheduled to phase out gas from 2025 onwards.
Note: annual fluctuations in gas emissions are primarily caused by different weather conditions. This graph excludes 'degree day corrections' as included in our ACI ACA administration.
Figures for 2021 and later are projections.

Schiphol Group Scope 2 emissions 2010-2030, by airport

Figure 12
Schiphol Airport

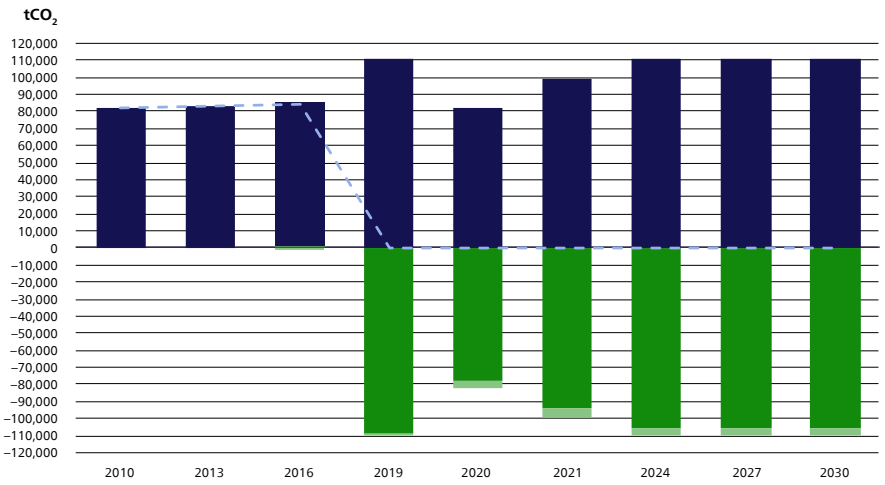


Figure 13
Rotterdam
The Hague Airport

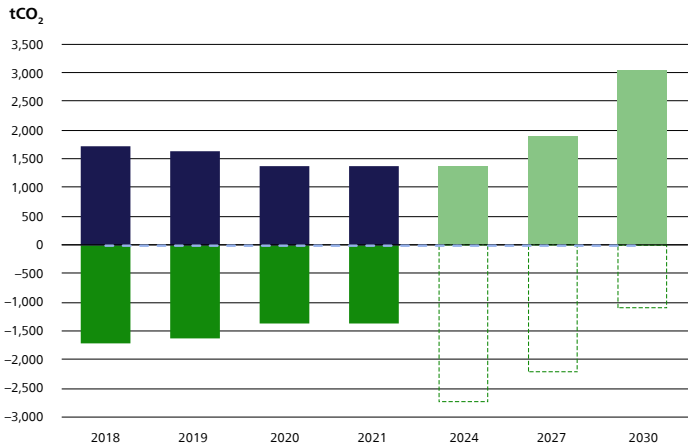
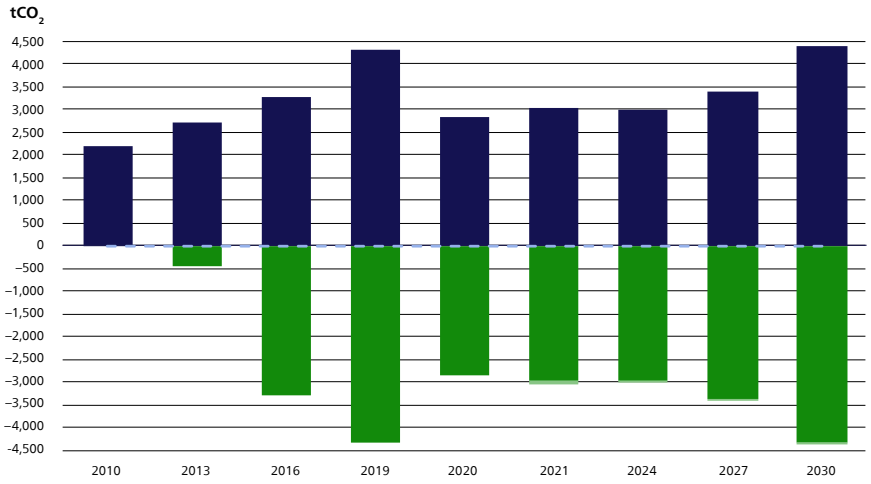


Figure 14
Eindhoven Airport



- Electricity consumption
- Renewable electricity (purchased Dutch wind power)
- Own solar power generation
- Market-based emissions (excluding offsets)
- Residual solar power supplied to the grid (excluded from RTM footprint)

The blue bars represent our location-based electricity consumption, assuming the average Dutch emission factor for grey electricity. Since 2018, we purchase Dutch wind power, which effectively has zero emissions. The overview also includes electricity production from our own solar panels. This results in market-based emissions of approximately zero from 2018 onwards. Although we have an ambitious energy-efficiency target, the expected electricity consumption at our airports remains stable or increases until 2030. This is primarily driven by an expected increase in electricity demand to replace fossil fuels and natural gas as a power source. Figures for 2021 and later are projections.

Schiphol Group emissions per passenger 2010-2021

Passenger growth exceeded emissions development over 2010-2019.
Figures in 2020 en 2021 reflect a downturn in aviation due to the COVID-pandemic.

Figure 15
Schiphol Group location-based CO_2-emissions (left axis) and passenger development (right axis)

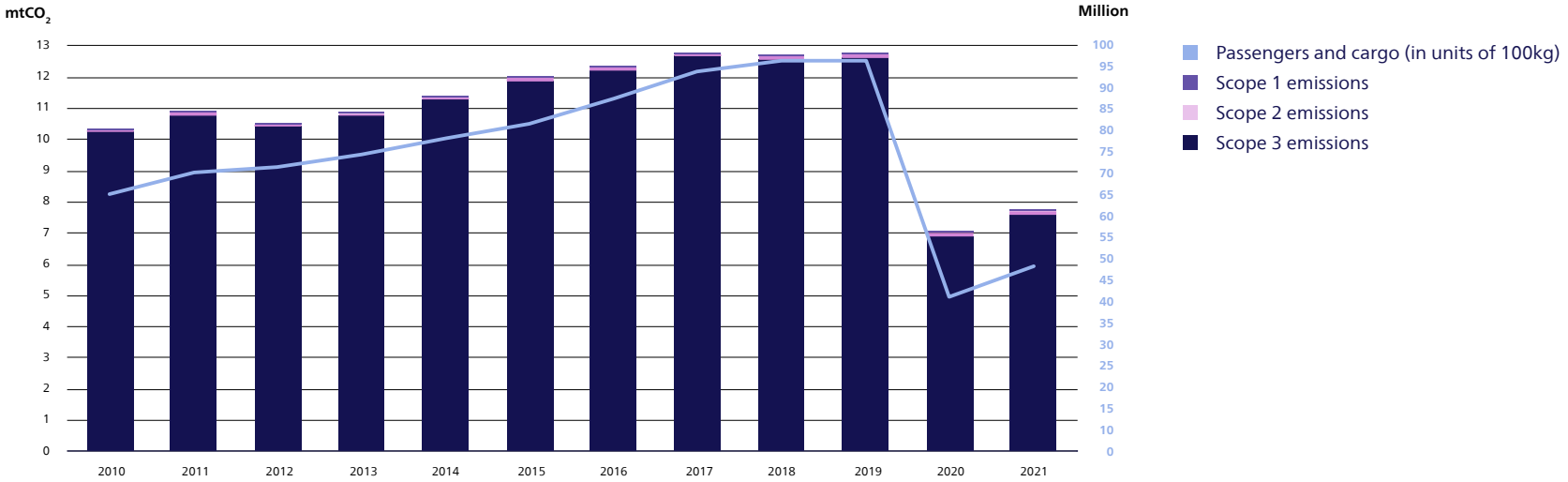
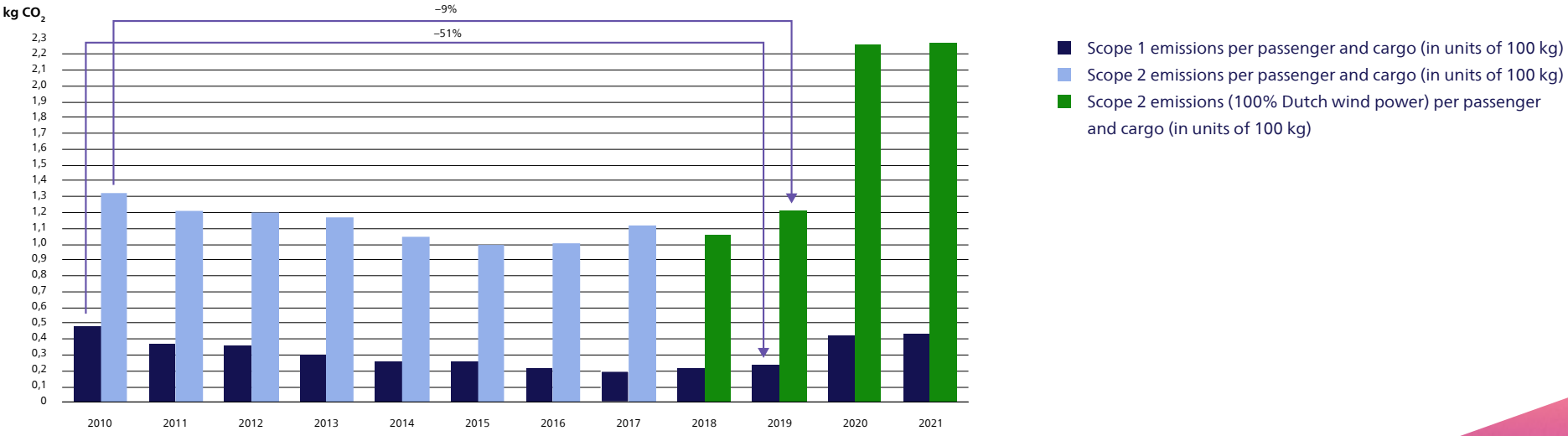


Figure 16
Schiphol Group location-based CO_2-emissions per passenger



Definitions and abbreviations

ACA	Airport Carbon Accreditation, a global carbon management accreditation programme for airports, developed by Airports Council International (website: **Airport Carbon Accreditation - Home**)
ACI	Airports Council International, the industry organisation for airports
ATES	Aquifer Thermal Energy Storage – an open-loop geothermal technology for seasonal storage of cold and/or warm groundwater in an aquifer. Used to replace gas-powered heating in winter and reduce electricity needs for cooling in summer
Carbon-neutral	Reducing carbon emissions and compensating for the remaining carbon emissions through the purchase of carbon offset credits. These credits are the result of decarbonisation in other sectors.
Energy-neutral building	The building-related energy load (like heating and cooling and lighting) is generated by the building. Usually includes ATES and solar panels. Energy-neutrality is a design principle for new buildings.
In-sector (sector-based) reduction	Emissions reduction within the (aviation) value chain, not including allowances or emission trading schemes
Location-based emissions	A location-based method reflects the average emissions intensity of grids on which energy consumption occurs, using mostly grid-average emission factor data (ghgprotocol.org) Scope 1: Energy consumption multiplied by the emission intensities of the respective fossil fuels and natural gas Scope 2: Energy consumption multiplied by the average emission intensity of the Dutch electricity grid
LTO	Landing and take-off phase of a flight, including taxiing
Market-based emissions	A market-based method reflects emissions from electricity that companies have purposefully chosen (or their lack of choice) (ghgprotocol.org) Scope 1: Energy consumption multiplied by the emission intensities of the actually purchased fuels, including green gas and HVO100. Our market-based emissions never include offsets. Scope 2: Energy consumption multiplied by the emission intensity of the energy purchased through our 15-year power purchase agreement (PPA) for Dutch wind power. Market-based Scope 2 emissions for Dutch Schiphol Group airports are zero.
Net-zero	Net-zero carbon requires that the maximum feasible reductions of CO_2 emissions are first made and that any residual emissions are removed by an equal volume of carbon removals.
SAF	Sustainable aviation fuels, either biobased or synthetic, with zero TTW-emissions. WTW-emissions should be reduced by at least 80% compared with fossil kerosene.
Schiphol Group	Royal Schiphol Group (RSG), the Dutch airport operating company. Emissions from our four Dutch majority-owned airports are fully included in our Scope 1, 2 and 3 overview. Scope 1 and 2 emissions resulting from our minority-owned international participations and management contracts are included in our Scope 3.
Well-to-tank (WTT)	Emissions from the production phase, for example the extraction, refining and transport of fuels
Tank-to-wheel (TTW)	Emissions from the use phase of the product; for example, burning the fuel in a combustion engine
Well-to-wheel (WTW)	Total emissions from the production and use phase

1 Economic measures' refer to offsetting and emission trading schemes today. By 2050, economic measures will exist exclusively of carbon removal

2 Schiphol Group offsets our own emissions in Scope 1 and part of Scope 3. We do not offset aviation emissions, other than those related to our own business travels – in addition to the SAF procured

For further details, please visit the following websites:

- **Schiphol Group website**
- **Schiphol Group sustainability website**
- **Annual Report Schiphol Group**
- **Rotterdam The Hague Airport sustainability website**
- **Eindhoven Airport sustainability website**
- **Lelystad Airport sustainability website**
- **Local Community Contact Centre Schiphol (BAS)**
- **NOMOS**
- **Schiphol Community Council**
- **Luchtvaart Community Schiphol (LCS)**
- **Air quality**
- **Safety in Dutch aviation sector**
- **ACI Airport Carbon Accreditation**
- **ACI wildlife trafficking**
- **ICAO human trafficking**

If you have questions or feedback, please visit
schiphol.nl/nl/contact-schiphol

Royal Schiphol Group, April 2022