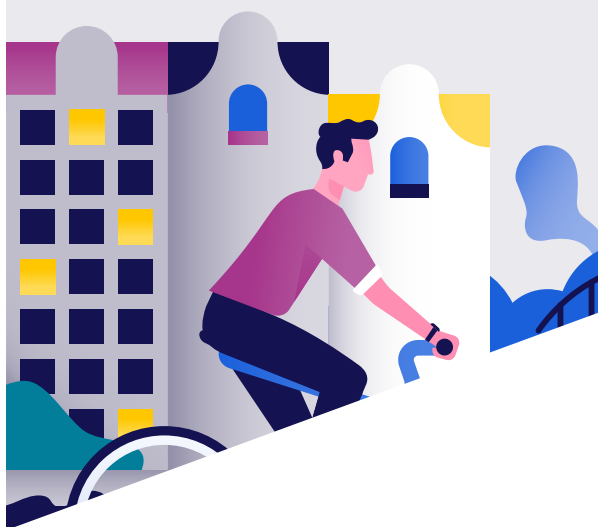


# Quality of Life

Schiphol Group's focus on Quality of Life acknowledges our responsibility to help ensure a sustainable future for aviation. As an airport operator and a central player in the aviation chain in the Netherlands, we aim to promote safe and responsible air travel and to safeguard the long-term wellbeing of people and the environment.



Schiphol Group aims to operate the world's most sustainable airports. Building on our current sustainability performance, we have created the Most Sustainable Airports roadmap, which sets out the actions required to achieve our 2030 objectives as a next step towards realising Vision 2050. Despite the impact of the COVID-19 pandemic, in 2021 we continued to implement the actions outlined in the roadmap. Once again, we recognise that many of our perceived sustainability achievements during the year, including the recent reductions in Schiphol's greenhouse gas emissions and local noise-disturbance levels, were due to the current downturn in air traffic.

As we recover from the crisis, we have an opportunity to achieve a better balance between the needs of our customers and other stakeholders. These include our local communities, but also society at large. Sustainability is a priority during the recovery period. We aim to operate our Group airports in a safe and responsible manner and embrace innovation that has the potential to support environmentally friendly operations. We must also continue to work with governments, regulators and other leading airports (including those in our Group) to advance the sustainable aviation agenda at a regional and international level.

## Top performance indicators Quality of Life



## Accelerating sustainable aviation

Building on our current sustainability performance, in 2021 we took steps to accelerate the process of making aviation more sustainable with the support of the TULIPS and Bright Sky funds.

## Sustainable Development Goals

Introduced in 2015 by the United Nations, the UN Sustainable Development Goals (SDGs) relate to the 17 most important challenges facing the world towards 2030. Of the 17 SDGs, 6 are highly relevant to our activities and our role in the value chain. We are working to increase our positive impact and reduce our negative impact with regard to each of these 6 SDGs as part of our ongoing contribution to a future-proof aviation industry. For the underlying SDG KPIs and our activities supporting these goals, please refer to [Reporting guidelines](#) in Socio-economic Accountability.

	SDG 8	Decent work and economic growth
	SDG 9	Industry innovation and infrastructure
	SDG 11	Sustainable cities and communities
	SDG 12	Responsible consumption and production
	SDG 13	Climate action
	SDG 17	Partnerships for the goals

## 'Most sustainable airports' roadmap

### Zero-waste airports 2030 towards circular in 2050

- For infrastructure, we focus on circular design and the reuse of materials. Training of staff, materials hubs and material passports are key enablers.
- For operational processes, we minimise, separate and upcycle everyday catering, office and aircraft residuals. We focus on better separation, while phasing out selected single-use products.

### Zero-emissions airports 2030 towards energy-positive in 2050

- All new vehicles are zero emissions, including ground support equipment on airside.
- 'Older' buildings will be renovated and new buildings are at least energy-neutral.
- For energy use, we increase efficiency, produce more solar power and strengthen our grid.

### Facilitate the sustainable passenger journey towards net-zero carbon aviation in 2050

- Contribute to 14% sustainable aviation fuel in 2030 and optimise airside procedures.
- Increase smart and clean mobility to and from the airport by investing in public transport, bike infrastructure and electric car sharing.
- Actively inform passengers about sustainability and offer sustainable travel options and combat human and wildlife trafficking.

### Improved balance between communities and airport in 2030

- Improve balance between communities and airports.
- Improve local air quality and biodiversity.
- Empower our strongest asset – our inclusive, diverse and motivated workforce – and offer sustainable workspaces.

We also made enquiries about a potential contribution from the National Growth Fund.

Led by Royal Schiphol Group, TULIPS is a consortium that forms part of the European Green Deal and involves a 25 million euro subsidy from the European Commission. TULIPS aims to speed up the roll-out of sustainable airport and aviation technologies. Amsterdam Airport Schiphol will be the proving ground for 17 demonstrator projects that result from this partnership. The TULIPS project kicked off in January 2022 and will run until December 2025. The collaboration between airports, airlines, knowledge institutes and industrial partners in this unique European consortium will give sustainable aviation a significant boost.

Located at Schiphol East, Bright Sky is a place where professionals and students from the aviation industry and beyond can work together to achieve a shared mission: making aviation cleaner and more sustainable. Partners include Schiphol Group, Luchtvaart Community Schiphol ('Schiphol Aviation Community'; LCS), Air Traffic Control the Netherlands (LVNL), JetSupport, Regional Training Centres (ROCs) of Amsterdam and Flevoland, and the Delft University of Technology. In 2021, the Bright Sky partners successfully applied for a public grant (R&D mobility fund) consisting of work packages related to maintenance repair and overhaul, airport security, ground-handling and airport systems. Schiphol will serve as a testing ground for two of these work packages: 1) autonomous airport, which involves digitising and making processes such as baggage handling more sustainable, and 2) smart access, which aims to digitise the security process at airports using digital sensors and artificial intelligence.

Schiphol Group is also part of a consortium consisting of LRN, SkyNRG, Royal Netherlands Aerospace Centre, Delft University of Technology and other partners. The valorisation of promising research and innovations is accelerated when bottlenecks are resolved and new innovation infrastructure is created. The consortium has asked for a contribution from Nationaal Groeifonds ('National Growth Fund'), which is expected to be

earned back fourfold. The leading consortium, the Ministry of Infrastructure and Water Management (I&W), has submitted the application, supported by the Ministry of Economic Affairs and Climate. The outcome of the application is expected to be received in the second quarter of 2022.

At the start of 2022, Schiphol received a letter from Dutch environmental organisation Milieudefensie, which included a request to present a CO<sub>2</sub> reduction plan towards 2030. We have welcomed this request as an opportunity to review our sustainability efforts, including the Most Sustainable Airports roadmap, and to implement improvements where needed.

Read more about the steps we are taking to ensure sustainability and our achievements here [www.schiphol.nl/en/schiphol-group/page/a-sustainable-future/](https://www.schiphol.nl/en/schiphol-group/page/a-sustainable-future/).



## Zero-emission airports

Schiphol Group's four Dutch Airports are on track to become zero-emission airports by 2030, while our long-term goal is to become an energy-positive organisation by 2050. We are sticking to these targets despite the COVID-19 pandemic. We continue to focus on becoming a more energy-efficient organisation by transitioning from fossil fuels to renewable energy sources.

Schiphol Group endorses the national, European and international aviation climate agreements. We are committed to reaching the targets set out in the Paris climate agreement, which are translated into the 2019 Klimaatakkoord ('Dutch Climate Agreement'). We do this by strictly adhering to the 'Smart and Sustainable' action plan, developed by Schiphol together with the Dutch aviation sector.

Recognising that our impact is greatest on our airports, we have set out concrete measures at our airports, such as the electrification of Schiphol's vehicle fleet and switching to sustainable taxiing by 2030. However, Schiphol Group also plays an influential role in the wider aviation sector, and we encourage measures such as the use of synthetic or bio-kerosene, the transition to electric flight and the substitution of air travel for train travel for shorter distances. Furthermore, in 2021 the decision was made to make the logistics roads around the Schiphol terminal zero-emission zones by 2026, as part of our action plan to become a zero-emission airport by 2030.

In October, the ISO 50001 certification for all four of our Dutch airports was reviewed and renewed following positive feedback from the auditor, especially regarding the progress made by the Schiphol Group airports on energy management through collaboration. Schiphol's overall energy usage rose from 1598 TJ in 2020 to 1609 TJ in 2021. The increase was due to increased natural gas usage as 2021 was colder than 2020, though Schiphol's electricity usage fell once again due to a number of energy saving activities. In 2019, Schiphol Group introduced Top Performance Indicators (TPIs), including a sustainability TPI with

the aim of monitoring our progress towards our 2030 zero-emission goal. While the sustainability TPI target was not met in 2021, our zero-emission goal for 2030 remains unaltered as it still deemed feasible. To achieve this ambition, emissions in the category gas and airside fuels, in particular, will need to decrease for Schiphol Airport. Projects to realise the phasing out of gas and airside fuels are planned after 2022.

## Renewable energy

Renewable energy supports our carbon-reduction programmes. All electricity purchased by Schiphol Group comes from wind farms in the Netherlands, while green gas accounts for 17% of total Group gas purchases and 100% of the gas used by Eindhoven Airport. We aim to eliminate our use of natural gas by 2030. In 2021, solar panels at Schiphol Airport produced a total of 2.3 million kWh, with the panels on the roof of the new P3 car park fully operational throughout the full year for the first time. We also began installing solar panels on the roof of the new A-Pier, as well as in a field next to the runway at Rotterdam The Hague Airport.

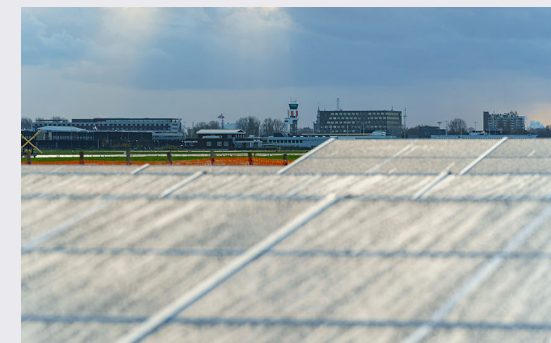
## CO<sub>2</sub> management

In 2009, Airports Council International (ACI) introduced a CO<sub>2</sub> benchmark for airports, which Schiphol helped to develop. In February 2021, Schiphol's application for the renewal of its carbon-neutral certification (level 3+) within the Airport Carbon Accreditation (ACA) programme was approved for the eighth consecutive year.

The accreditation requires the airport's own activities to be CO<sub>2</sub>-neutral. This certification has been prolonged by a year, as the ACA programme decided to discount 2020 due to COVID-19.

Schiphol Airport aims to reach the new level 4+ (transition) introduced in late 2020 in the short term, joining RTHA.

Specially selected solar energy projects in India and the Philippines help offset our remaining carbon emissions (from natural gas and other fuels), as a result of which Schiphol Group has been carbon-neutral since 2012.



## Rotterdam The Hague Airport turns energy-positive

In 2021, work began on a new solar park at Rotterdam The Hague Airport (RTHA), which will be built alongside the airport runway. With more than 37,000 solar panels, the park will generate 14 GWh of green energy each year, meeting the annual energy needs of RTHA three times over. Excess energy will be distributed to local homes and businesses.

The solar park is a key reason RTHA has been awarded the highest level (Level 4+) of the Airport Carbon Accreditation (ACA), becoming the fifth airport in the world to reach this level and the second in Europe. The solar park is expected to be completed in 2022.



## CO<sub>2</sub> emissions at Amsterdam Airport Schiphol

(in tonnes)

in tonnes	2021		2020	
	Location-based	Market-based	Location-based	Market-based
Scope 1 <sup>1</sup>	14,720 <sup>2</sup>	12,181 <sup>3</sup>	12,162 <sup>2</sup>	9,662 <sup>3</sup>
Scope 2 <sup>4</sup>	73,930 <sup>5</sup>	0	74,768 <sup>5</sup>	0
<b>Total Scope 1 and 2 CO<sub>2</sub> emissions</b>	<b>88,650</b>	<b>12,181</b>	<b>86,930</b>	<b>9,662</b>
Scope 3 - Gas and electricity used by third parties in Schiphol commercial buildings, airside fuel used by third parties, own staff commuter traffic & business trips by air / own car <sup>6</sup>	36,987	36,987	35,091	35,091
<b>Total CO<sub>2</sub> included in Sustainability TPI for Amsterdam Airport Schiphol<sup>7</sup></b>	<b>125,637</b>	<b>N/A</b>	<b>122,021</b>	<b>N/A</b>
Scope 3 - other items <sup>8</sup>	-	-	651,676	651,676
<b>Total Scope 3<sup>9</sup></b>	<b>-</b>	<b>-</b>	<b>686,767</b>	<b>686,767</b>
CO <sub>2</sub> emissions from total kerosene tanked in the Netherlands <sup>10</sup>	-	-	6,709,500	6,709,500

1 Consists of the categories: gas under the Schiphol Nederland BV licence, fuels used by own vehicle fleet, fire brigade, emergency power and own staff business trips by lease cars. CO<sub>2</sub> emissions from gas includes a correction for standard weather conditions ('graaddagencorrectie'). Please note that TTV emission factors apply for airside fuels (where previously WTW emission factors were applied), the 2020 figures have been updated accordingly.

2 Grey gas emission factors have been applied for location based purposes.

3 Since 2019, Amsterdam Airport Schiphol has been purchasing green gas for part of its consumption.

4 Consists of electricity consumption by Amsterdam Airport Schiphol.

5 Grey electricity factors have been applied for location based purposes.

6 Please note that TTV emission factors apply for airside fuels (where previously WTW emission factors were applied), the 2020 figures have been updated accordingly.

7 Consists of Scope 1, Scope 2 and selected items from Scope 3 (Gas and electricity used by third parties in Schiphol Commercial buildings, airside fuel used by third parties, own staff commuter traffic and business trips by air/own car). The Top Performance Indicator is calculated on basis of the location based approach. The Group CO<sub>2</sub> emissions included in the Sustainability TPI is 133,5kt, including Amsterdam Airport Schiphol, Rotterdam The Hague Airport, Eindhoven Airport and Lelystad Airport.

8 Other Scope 3 items are not part of the Sustainability TPI definition and include, among others: electricity and gas consumption by third parties, all road traffic to and from the airport and fuels related to aircraft handling and landing and take-off cycle. 2021 data will be reported with a one year delay.

9 2021 total scope 3 data is reported with a one year delay.

10 Source: CBS. 2021 data will be reported with one year delay.

## Energy efficiency

In 2021, Schiphol Airport's energy-efficiency rating rose to 7.8% based on our projected energy usage for the year, exceeding our 7% target. This improvement is a result of more than 100 individual adjustments to the airport environment, including extending our use of LED lighting, replacing old telecom and IT equipment and upgrading our climate-control and heating, ventilation and air conditioning (HVAC) systems. In 2021, Schiphol Group's ISO 50001 certification was renewed following the expiration of the Meerjarensafspraken (Multi-year agreement;

MJA) agreement between Schiphol and the Ministry of Economic Affairs and Climate Policy. In 2021, it became known that Schiphol had achieved an energy-efficiency rating of over 28% for the 2017-2020 MJA agreement, thereby exceeding the initial target of 12%.

## Phasing out natural gas

The heat and cold storage systems installed in Terminal 3 and The Base now function even more effectively than in 2020, though it takes about three years for the systems to reach their optimal

efficiency level. Due to this process, less energy was needed for the heat pumps, which has further optimised the heat and thermal energy storage system at D-Pier. In 2021, we also installed a new thermal-energy storage system for the WTC Schiphol Airport 1 multi-tenant building, though the resulting energy savings will only start to be seen during 2022-2024.

## Emissions in our value chain

The majority of CO<sub>2</sub> emissions at Schiphol are caused by third-party (Scope 3) activities, including aircraft landings and take-offs as well as aircraft-handling operations and road traffic around the airport site. CO<sub>2</sub> emissions resulting from kerosene used by aircraft landing at or taking off from Schiphol are included within the Scope 3 emissions figures in the CO<sub>2</sub> table on this page.

## Air quality

Schiphol Group commits to reducing levels of potentially harmful emissions at and around our airports and to improving air quality at our airport sites and in neighbouring communities. Air quality at Schiphol is continuously monitored by the government; the province of North Holland has three air quality meters in the vicinity of the airport and publishes its measurements online. For the 2021 operating year, Schiphol met all government air quality requirements (based on EU directive 2008/50/EG) for this category.

We use performance indicators to help maintain a high level of air quality based on input measurements. These include the installation of fixed power units (FPU) at aircraft stands and the electrification of Schiphol's vehicle fleet. Performance indicators on output are not currently measured, as it is difficult to define clear causal links between third-party emissions – i.e. resulting from motorways or industrial activities, or (urban) background concentrations – and those created by our own activities.

## Clean mobility

Schiphol supports the use of clean mobility solutions, whether through our own vehicle fleet or those of companies operating on site. We have two objectives: 1) replacing fossil-fuel-powered

vehicles with zero-emission alternatives, 2) and reducing overall fuel consumption.

### Buses

In 2015, electric buses began operating on Schiphol's aprons. An additional 16 were introduced in early 2020, which means all 53 buses on airside are now electric. On landside, all 206 public transport buses in the Connexxion Amstelland Meerlanden concession (including Schiphol Airport) are zero-emission buses. This makes this public transport concession the largest emission-free fleet in the Randstad region. Our next step will be to electrify the bus fleet serving Schiphol's P3 remote parking facility.

### Taxis

Schiphol's official taxi concession holders, Bios Group (ZCN), Schiphol Taxi (BBF) and Schiphol Service (Willemsen de Koning), have been using sustainable vehicles since 2014. Together, they operate a fleet of 145 electric taxi cabs (mostly Tesla) and 40 biogas-powered taxi vans from the official taxi stand. Independent taxi operators are required to register with the taxi control foundation (STC) and have to meet specific sustainability requirements. This additional taxi fleet includes a further 397 zero-emissions vehicles, amongst which 28 zero-emission vans. In total, 514 electric taxis are currently operating from the official taxi stand. This number has declined by more than 200 since 2019, reflecting reduced demand due to the COVID-19 pandemic.

### Ground support equipment

Special vehicles, known as ground support equipment (GSE), operate on and around the airport aprons to handle aircraft. Schiphol encourages users to replace traditional GSE (which use fossil fuels) with electrically powered equipment. To support this ambition, we are investing in additional charging facilities, in addition to the 750 currently available on airside, to reach the 2030 target of zero-emission ground operations.

To expand the use of electric GSE, Schiphol has introduced an operational pilot with mobile electric ground power units (E-GPU). These E-GPUs are being tested as a replacement for traditional diesel gas-to-liquid (GTL)-powered GPUs. The current

GPU pool is responsible for almost half of the total GTL used in ground services processes. The pilot is being carried out in cooperation with all six handlers at Schiphol as well as the owner and maintainer of the current diesel GPU pool, KLM Equipment Services (KES). In recent years, Schiphol has successfully tested several operational-handling models on narrow-body aircraft, and in late 2021 we also began testing them on wide-body aircraft. The pilot will continue until mid-2022; if the E-GPUs are determined to be technically and operationally suitable as a replacement for traditional GPUs, it will have a major impact in terms of improving air quality and reducing noise and CO<sub>2</sub> emissions.

Airlines operating at Schiphol must comply with various requirements related to air quality. For example, pilots are asked to use only one engine as they taxi to the gate and use fixed power units when available. Schiphol has 243 aircraft stands for passenger aircraft, cargo aircraft and buffer positions. These include 128 aircraft stands with a direct connection to the terminal and 115 stands without a direct connection. So far, 72 aircraft stands have been equipped with fixed power units and are operationally available.

### Cleaner fuels

In June 2019, KLM Equipment Services switched from GTL fuel to improve air quality on airside. All airside equipment now runs on this synthetic fuel made from natural gas, which emits hardly any sulphur oxides and significantly reduces ultra-fine particles (UFPs) as well as nitrogen emissions.

### Supporting electric vehicles

To facilitate emission-free mobility in publicly accessible areas, Schiphol equips an average of 10% of its parking spaces (an increase of 35%) with charging points for tenants and visitors. The implementation of the E-GPUs and the required charging points is taken into account in the 'Electrification of Airside' strategic plan. Implementation, of course, depends on the final outcome of the current E-GPU pilot.

### Ultra-fine particles

Relatively little is known about the concentrations and possible health impacts of UFPs. Therefore, the Dutch National Institute for Public Health and the Environment (RIVM) is currently investigating the possible health risks of aviation-related UFPs to local residents, though an earlier RIVM study did not indicate that mortality rates in local communities differ from socio-economically comparable regions in the Netherlands. The forthcoming RIVM study, which will be published in 2022, will identify the UFP exposure of local inhabitants and any associated long-term health risks. More information is available on the [RIVM website](#).

In a recent Integrated Science Assessments (ISA) published in September 2021, the Health Council of the Netherlands concluded that there are indications that long-term exposure to UFPs increases the risk of cardiovascular disease. There are also indications of an increased risk of developing respiratory diseases and of a negative influence on foetal growth. In addition, the committee advises the limiting of UFP emissions and, where possible, increasing the distance between exposed individuals and the source of the emissions. In addition, the Council advises mapping exposure to UFPs by structurally measuring UFPs in the National Air Quality Monitoring Network.

As a first step, in October 2021 Schiphol published its own report based on measurements undertaken in partnership with TNO into UFP concentrations at the airport site. The results of the study are reason to set up a task force together with sector parties to conduct an exposure study among platform workers and investigate short-term measures to limit employees' exposure to UFPs. Schiphol will also conduct research on protecting people from the potential health effects of UFPs and the possibility of accelerating the Most Sustainable Airports roadmap, including by intensifying the electrification of airside equipment. We also plan to optimise operational processes (for example, with the 'taxibot', which limits the use of the APU) and continue our focus on sustainable aircraft fuels (SAF).



### UFP Action Plan

In anticipation of the RIVM's research results, Schiphol launched the UFP Action Plan in 2019 to learn more about UFPs and take measures to reduce emissions at and around the airport. These measures will also help reduce CO<sub>2</sub> and nitrogen oxides (NOx) and will, therefore, contribute to our broader sustainability targets. UFP concentration measurements taken in the summer of 2021 show that the number of UFPs averages between 100,000 to 120,000 per cubic centimetre around terminals and piers. Given that the health impact of these figures is not yet known, Schiphol will continue to monitor employee health and explore ways of reducing their exposure to UFPs. For example, we are looking to develop technology that uses mist to capture UFPs.

### Nitrogen emissions (NOx)

Schiphol commits to reducing our nitrogen emissions, an ambition supported by the Actieprogramma stikstof ('Nitrogen action plan') launched in early 2020. In addition to NOx, the plan will have a mitigating effect on CO<sub>2</sub> and UFPs. In February 2021, the Ministry of Agriculture, Nature and Food Quality published a draft natuurvergunning ('nature conservation permit') under the Wet Natuurbescherming ('Nature conservation act'). Based on the draft nature conservation permit, Schiphol's NOx emissions, and their resulting deposits, are within the legal limits. We are expecting a decision on the draft permit in early 2022.

## Sustainable aviation

Sustainability is central to aviation sector discussions on how to move forward after the COVID-19 pandemic. Positive steps are already being taken: governments have included clear environmental and sustainability elements in many of the financial support packages awarded to airlines affected by the pandemic. Carriers are also retiring older aircraft sooner than expected. These new developments support the long-term course set out by Royal Schiphol Group, together with the wider aviation sector in the Netherlands. Our shared ambition is to reduce carbon emissions generated by the Dutch aviation

industry to 2005 levels by 2030. We are committed to reaching the targets of the Paris and Dutch climate agreements, and to stimulating measures such as the use of synthetic or bio-kerosene, introducing electric flights and encouraging train travel for shorter distances.

The airport charges for the 2022-2024 period introduced for Amsterdam Schiphol directly support our ambitions, by incentivising airlines to use cleaner, quieter aircraft. The new charges also include a nitrogen oxides (NOx) element, to support the reduction of aviation-related nitrogen emissions.

### Supporting Single European Sky

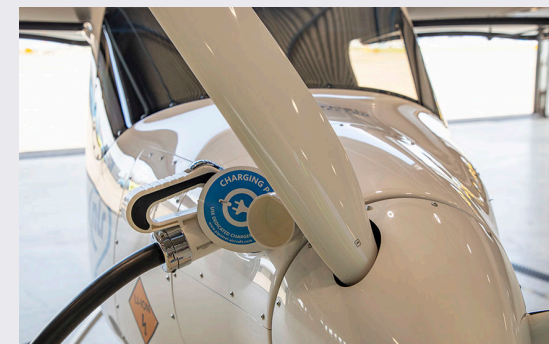
Schiphol Group supports the Single European Sky (SES) objective to shorten flight paths and optimise flight capacity through the creation of a single, borderless European airspace. Meanwhile, the associated Single European Sky ATM Research (SESAR) programme aims to modernise Europe's air traffic management system and drive efficiency across ground processes, aircraft-handling and airport use.

### Total Airport Management

Designed by the SESAR programme, the Total Airport Management concept aims to provide smart solutions for future aviation challenges, starting by strengthening cooperation between industry stakeholders. After implementing Airport Collaborative Decision Making (A-CDM) at Schiphol Airport, the next step in developing Total Airport Management will be the introduction of the Airport Operations Plan (AOP), a real-time airport planning system to provide operational managers at Schiphol with up-to-the-minute information to plan and manage operations. In 2021, the first step has been taken with the introduction of an initial AOP, which will be extended in the coming years. Managed by Schiphol's new Airport Operations Centre (APOC), the AOP will help airport staff, air traffic control, airlines and ground-handling teams to work more closely within a common operational picture.

### Sustainable aviation fuel

Flying with sustainable aviation fuel (SAF) is the most effective way to decarbonise air travel. It also helps to improve air quality around our airports. In addition to supporting the Fit for 55 package, Schiphol Group supports the 14% SAF industry-wide



### Power Up

How feasible is electric flight? What do airports need to facilitate it? And is an electric-only network connecting European regions possible? To answer these questions, Eindhoven Airport, Rotterdam The Hague Airport (RTHA), Groningen Airport Eelde and Maastricht Aachen Airport launched Power Up, the living lab for electric flight.

Power Up is supported by Schiphol Group and the Koninklijk Nederlands Lucht- en Ruimtevaartcentrum (Royal Netherlands Aerospace Centre; NLR). The first electric passenger flights between airports in the Netherlands are expected to become feasible within the next five years. Power Up wants to put this process in motion by testing four- to nine-seater planes in the Netherlands, with a view to flying with larger aircraft in years to come and creating a European network of electric-only flight routes.

target that has been set for Dutch aviation by 2030, and we are involved in several projects aimed at accelerating uptake among carriers.

### Promoting production capacity and the use of SAF

In 2021, Schiphol Group continued to support the development of a new bio-kerosene plant in the province of Groningen by SkyNRG. Schiphol Group will also encourage Neste, Shell and Argent Energy in their plans to invest in new production capacity for SAF based on hydrotreated vegetable oils if sustainable and scalable feedstocks are used. Over the coming years, Schiphol plans to invest 15 million euros to subsidise the use of SAF by airlines operating at Amsterdam Airport Schiphol.

In 2020 and 2021, all work trips taken by Schiphol Group employees via KLM flights were CO<sub>2</sub>-neutral, thanks to our contributions to KLM's SAF programme. The amount of SAF purchased by Schiphol via the programme was sufficient to fully mitigate all CO<sub>2</sub> emissions resulting from these trips.

Rotterdam The Hague Airport (RTHA) also supported the development of SAF markets in 2021 by joining the Fly on SAF programme initiated by SkyNRG and CHOOOSE. This tool enables travellers to fly more sustainably by replacing fossil fuels with SAF via the 'book and claim' principle, and will be launched in early 2022.

Schiphol Group plans to further encourage the use of SAF for passenger flights. In 2022, we will set up an experience centre at Schiphol to showcase the initiatives we are undertaking in this space, together with airlines and the aviation fuel industry. Passengers visiting the centre will be able to learn about sustainable aviation and sustainable fuel, and purchase SAF for their trip.

### Supporting long-term solutions for sustainable aviation

We recognise the need to support other sources of sustainable energy in addition to SAF. In February 2021, the Ministry of Infrastructure and Water Management hosted a high-level conference on synthetic SAF. Following the conference, a

## Sustainable aviation policy and partnerships

At Schiphol Group, we see a supportive policy landscape as the cornerstone of a sustainable aviation industry. We actively support a wide range of industry initiatives and partnerships aimed at advancing sustainability, including those presented below.

### Destination 2050

Schiphol Group was involved in the creation of the European Roadmap Destination 2050, together with other European aviation sector organisations such as ACI Europe, A4E and ASD. The plan paves the way towards a net-zero European aviation sector by renewing fleets, using sustainable aviation fuels and increasing airspace efficiency. This European agreement dovetails with Schiphol Group's Most Sustainable Airports roadmap, through which we aim to achieve net-zero carbon emissions by 2050.

### World Economic Forum (WEF) and COP26

At the COP26 Summit in Glasgow in November 2021, Schiphol Group called for the acceleration of sustainable aviation. Schiphol Group's CEO, Mr Dick Benschop, participated in the Sustainable Aviation Fuel Ambassadors event organised by the World Economic Forum and the UK government. He also joined WEF Mission Possible Partnership's newly-established board. The partnership aims to transform some of the world's most carbon-intensive sectors. Schiphol Group is one of the leaders of the WEF Clean Skies for Tomorrow coalition, which aims to ensure sustainable aviation fuel (SAF) comprises at least 10% of the total aviation fuel mix by 2030.

### Fit for 55

The EU Fit for 55 package unveiled by the European Commission in July 2021 is a comprehensive set of interconnected proposals to achieve the EU Green Deal goal of reducing EU-wide CO<sub>2</sub> emissions by 55% by 2030. The package contains measures that will support Europe's climate policy framework and put the EU on track for a 55% reduction in carbon emissions by 2030. Overall, Schiphol is positive about the proposals, in particular about the proposed blending obligation for sustainable aviation fuels and strengthening of the European Union Emissions Trading System (EU ETS).

### The Fuelling Flight Initiative

Schiphol Group is part of a group of major European aviation companies – including KLM, easyJet, Air France and International Airlines Group – as well as research organisations and environmental groups, calling for a more stringent policy approach to sustainability and the sector's climate impact. The Fuelling Flight Initiative has issued a statement with recommendations on sustainability for the EU's policy design to support the use of SAF.

consortium consisting of RTHA, Rotterdam The Hague Innovation Airport (RHIA), SkyNRG and Climeworks launched Zenid, a demonstration plant producing fully circular SAF with 100% CO<sub>2</sub>

captured from the air. The estimated daily production capacity will be about 1,000 litres of fuel.

Together with the Port of Amsterdam, SkyNRG and KLM, Schiphol Group has also helped to set up Synkero B.V, a start-up focused on developing a commercial facility for synthetic kerosene in Amsterdam. Production is scheduled to begin in 2027, after which the aim is to produce 50,000 tonnes of synthetic kerosene a year. These initiatives require considerable amounts of renewable energy and new supply chains. Schiphol Group is working with various supply chain partners to scale up regional availability of green hydrogen in the coming decade.

### Use of sustainable aviation fuel at Schiphol

In 2021, almost 10,000 tonnes of SAF were delivered to Amsterdam Airport Schiphol. The fuel was used on a number of flights, including the first cargo flight operated by Malaysia Airlines from Schiphol, as well as by KLM's SAF programme.

### Sustainable taxiing roadmap

Schiphol is exploring options for sustainable taxiing, a process where aircraft taxi without the use of their own engines. The reduced runtime of aircraft engines can drastically lower fuel consumption, greenhouse gas emissions and noise disturbance. This method is already being used on empty aircraft, but Schiphol is collaborating with sector partners to also sustainably taxi aircraft with passengers, fuel and cargo on board. The results of a feasibility report published by Schiphol suggest that sustainable taxiing would require changes to the equipment, airside infrastructure and operational processes. In 2021, Schiphol, Corendon, Transavia, KLM, LVNL and dnata jointly published a roadmap for the gradual roll-out of sustainable taxiing between now and 2030.

### Policy on human and wildlife trafficking and smuggling

Schiphol Group works with various sector partners and Airports Council International (ACI) to fight human and wildlife trafficking and smuggling. As traffickers often use aircraft to smuggle their goods, airlines and airports are ideally positioned to help combat trafficking and smuggling by training staff to recognise and deal with trafficking situations, raising awareness by providing information to the public and through partnerships in the supply

chain. In 2021, we published our first zero-tolerance policy against human and wildlife trafficking and continued to chair the Wildlife Trafficking Prevention Taskforce of ACI. We also participated in the 'Partner Spotlight' video series created by WWF and ROUTES; a unique opportunity to speak directly about our efforts to combat wildlife trafficking.



## Circular economy

Schiphol Group strongly believes in the circular economy principles of consuming fewer natural resources, using environmentally friendly materials, and making resources last longer by giving them a new lease of life. These are the principles driving our goal to operate a zero-waste airport by 2030. While the impact of the COVID-19 pandemic on the aviation industry has slowed certain activities, we have used this time to create baselines that will help us measure our circular targets and define actions to lead us closer to our goals. We are also taking concrete steps to implement those circular solutions that are already feasible.

### Circular innovation at Schiphol

#### Implementing the Building Circularity Index

Schiphol has used the Building Circularity Index (BCI) to measure circularity in the different design stages of 13 building projects in our terminal building, resulting in an average score of 57%. The BCI helps us determine the environmental impact of the materials by examining their origin and potential next-life use to improve future designs. Schiphol has generated a materials passport for one project (Privium ClubLounge West) using the BCI input as a pilot for the near future.

#### Circular furniture on M Corridor

The M Corridor, connecting Lounge 4 with M-Pier, was given a sustainable upgrade in 2021. All of the seats used in the corridor have been previously used at Schiphol and reupholstered using discarded leather. In addition, former Schiphol information desks



## From grass to construction materials

The runways at Schiphol are surrounded by about 1,000 hectares of grassy fields – almost 2,000 football pitches. The mowing of these fields produces thousands of tonnes of grass cuttings. As part of our ambition to be a zero-waste airport by 2030 and become fully circular by 2050, Schiphol has teamed up with ECOR, a company that presses panels from materials, including grass clippings, to find a sustainable use for these cuttings.

The first batch of grass was planted in spring 2021 and, after a thorough clean, the remaining grass fibres were turned into panels. The first panels were pressed during a test run in October, with production set to be scaled up during 2022. The panels are used to make a range of new products. They include construction materials such as ceiling tiles and partition walls that will be used for different construction projects around the Schiphol site.

and a KLM Boeing 747 were used to make planters and two windmill-shaped battery charging facilities.



### Eliminating plastic bottles

To reduce the number of plastic bottles, new sensor-based water taps are being installed around Schiphol for reusable water bottles. We have also placed 70 'donation bins' throughout the terminal, where passengers can deposit used PET bottles for recycling and donate to support a drinking water project in Africa (Amref & Made Blue Foundation).

### Embedding circularity in our partnerships

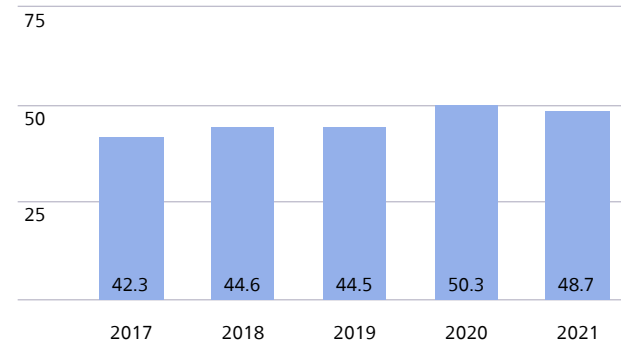
In 2021, together with several of our main contractors, we explored the possibility of using resources from the different parcels for future strategic planning. We organised communities of practice with Schiphol's three main infrastructure partners to increase the recycling of asphalt and concrete by challenging Schiphol's specific system requirements. As a result, we were able to reuse 60% of the original asphalt from the Polderbaan runway renovation during maintenance. At D12, we used a top layer consisting of 30% recycled asphalt, and at Sloteweg we reused as much as 70% of the asphalt. At the P3 car park, we reduced the environmental impact by 60%, in part by using 50% recycled asphalt and hydrotreated vegetable oil as fuel for our equipment. At underpass E2, we worked with an innovative light-reflecting asphalt mixture to reduce the number of public lighting fixtures.

In 2020, circular design principles were applied during the design of security checkpoint 90. Though the project was put on hold in 2021 due to COVID-19, the 'urban-mined' parts were stored for re-use during the construction phase. In 2022, the design will be further developed, and in 2023 construction of the project will take place using the salvaged parts.

BAM, one of Schiphol's main contractors, organised a sustainability day with its supply chain partners and Schiphol in C-Bèta at Schiphol Trade Park. The aim was to encourage our supply chain to commit to the zero-waste and circular goals outlined in Schiphol Group's Vision 2050. The primary focus was on zero-waste logistics, the registration of surplus materials for reuse and the refurbishment of components. The sustainability days produced a tangible result: a jointly developed trolley for the zero-waste exchange of air filters.

### Percentage of separated operational residual flows<sup>1</sup>

(per year at Amsterdam Airport Schiphol)



<sup>1</sup> Excluding CAT1 aircraft waste.

In 2021, BAM Bouw Schiphol also developed an app to register surplus materials stored in several technical areas to be used for future construction work in the terminal. Better separation of construction waste and collaboration between the different parcels and their value chain partners has reduced the amount of waste in the terminal overall.



60% of the original asphalt from the Polderbaan Runway was reused as it underwent maintenance.



## Community and Noise

2021 was a period of gradual recovery for the wider Schiphol community, and our focus remained on being a good neighbour to people living near the airport as well as our passengers and all those who work at the Schiphol site. It was also the year when we began to 'build back better' by strengthening our focus on sustainability and taking steps to reduce noise and other emissions. Together with our regional partners, we are exploring initiatives that will benefit the entire community. These include advancing the development of noise-cancelling technology and the extension of the North-South metro line from Amsterdam to Hoofddorp via Schiphol.

### Engaging with our neighbours

We believe direct contact with our stakeholders is the most effective way to discuss important topics. However, the COVID-19 pandemic and subsequent restrictions meant that working visits to Schiphol were again reduced to a minimum in 2021, while our traditional 'Neighbours' days' were also postponed. Because of this, we focussed on other ways for our neighbours to connect with Schiphol online, including our website for local residents, 'Schiphol als buur', as well as a monthly newsletter and the weekly Schiphol air traffic outlook, which provides projections for air traffic movements and runway use.

2021 saw the launch of Notify, a smartphone app providing local residents with location-based air traffic predictions. The Notify app uses a special forecast model to make the predictions as accurate as possible. This model processes a wide range of information, such as radar data and information about the wind and weather conditions (KNMI). So far, the app has been downloaded by around 18,000 people and has more than 3,000 monthly users. In 2022, we plan to further develop the app's functionality and enlarge the coverage area.

### Monitoring Schiphol's reputation

Research agency, Motivaction, provides regular insights into how Schiphol is perceived by local residents as well as the general public on issues such as communication, products, innovation, management and corporate social responsibility (CSR). In 2021, our reputation score among local residents was 7.5. The research also shows that local residents view Schiphol in much the same way as the general public, but that our efforts to improve management visibility, CSR and relationship building are increasingly appreciated by local residents.

Together with tracking the number of people who file reports with Bewoners Aanspreekpunt Schiphol ('Local Community Contact Centre Schiphol'; BAS) each month, our reputation score among local residents is a key driver of our 'Local Residents' Top Performance Indicator (TPI). In 2021, we also commissioned research to better understand the communication needs of different resident groups. These insights will help shape our communications activities in 2022.

### Reducing noise disturbance

Schiphol and Air Traffic Control the Netherlands (LVNL) have launched a noise-disturbance reduction programme, [minderhinderschiphol.nl](https://minderhinderschiphol.nl). The programme consists of 44 measures to reduce noise disturbance in the region surrounding the airport. The measures have been put together in consultation with local authorities, local residents and other stakeholder groups.

In March 2021, Schiphol presented the programme to the Ministry of Infrastructure and Water Management (I&W), which also commissioned an additional review of the programme. This review will be completed in early 2022. We will keep our community informed and actively involved in the development of the programme as we continue to research, implement and introduce new measures over the coming years. In 2021, eight measures were entirely or partially implemented. One of the measures is the proposed introduction of the new airport charges which provide a real incentive for more silent aircraft types.

In 2021, LVNL indicated to the Minister that the COVID-19 crisis could have an impact on their project portfolio, due to travel restrictions and quarantine measures for international suppliers, as well as reduced availability of air traffic controllers for development, test and training activities. In 2022, LVNL will provide detailed information to the minister about the impact of COVID-19 on the project portfolio, and consequently on the [minderhinder.nl](https://minderhinder.nl) programme.

### Engaging with young people

We see the next generation as future users – or potential employees – of our airports, and they also offer inspiration and fresh perspectives on topics such as innovation and sustainability. Each year, Schiphol receives hundreds of information requests from young people. We have increased our efforts to respond to the many questions we receive, as well as requests for interviews, materials and information. Meanwhile, Schiphol has begun working on research and development projects in partnership with local secondary schools. Together, we have explored topics ranging from flow-balancing to reducing emissions. Students have also challenged Schiphol on its design choices and made suggestions to improve the passenger experience in the terminal.

### Collaboration and dialogue with the value chain

Schiphol participates in various collaborations aimed at making the airport industry more sustainable and advancing multimodality at Amsterdam Airport Schiphol. In 2021, we continued working with our partners to strengthen international rail connectivity and to make rail a more attractive alternative to short-haul flights.

Schiphol is also a member of the Logistics Alliance, and in May 2021 we became the newest member of the Mobility Alliance that aims to sustain and improve mobility and infrastructure in the Netherlands. Furthermore, we are part of the Mobiliteitssysteem Amsterdam Schiphol Hoofddorp ('Mobility System Amsterdam Schiphol Hoofddorp'; MASH) coalition, established to identify and promote solutions for current bottlenecks in the public transport network, with a focus on the Amsterdam Metropolitan Area (MRA). MASH agrees on the need to extend the North/South



### Kids reporters go in search of answers

2021 brought an exciting new feature to Schiphol's YouTube channel. 'Kids reporter' invites children to visit the airport site and to go and find the answers to their questions about our airport and aviation in general.

metro line to Schiphol and Hoofddorp. In April 2021, the Nationaal Groeifonds ('National Growth Fund') announced setting aside funding of up to 1.5 billion euros, or 50% of the estimated costs for the extension. This adds to the 1.025 billion euros pledged by Schiphol Group, regional governments and national companies to contribute to the extension of the Amsterdam Metropolitan Area's metro network, including the extension of the North/South metro line. Before the contribution of the National Growth Fund is available, the MASH coalition must provide additional substantiation of the project and find the remaining funds.

### Schiphol Quality of Life Foundation

The Stichting Leefomgeving Schiphol ('Schiphol Quality of Life Foundation') oversees two initiatives: 1) an improvement programme focused on area-specific projects, and 2) a programme focused on individual measures, including those aimed at reducing noise-related disturbance. Schiphol has made 20 million euros available to the foundation, with funding also



## Schiphol Fund

The Schiphol Fund encourages sports activities. A few times per year, it hands out donations to public, non-profit sports associations in the area surrounding Schiphol to help pay for facilities and equipment. In 2021, the regular budget of the Schiphol Fund was reduced by 25% to 375,000 euros, of which 278,276 euros was donated to 57 initiatives during this year. The Schiphol Fund will have 375,000 euros at its disposal in 2022.

If you would like to know more about the Schiphol Fund, visit [our website](#).

provided by the province of North Holland and the Ministry of I&W. Applications for funds for the individual measures programme will continue to be accepted from 2021 onwards, though the foundation will no longer accept applications for area-specific initiatives. In 2022, the foundation will launch a new funding programme focused on techniques and innovations aimed at improving quality of life. Further details can be found at [stichtingleefomgeving.nl](#).

## Schiphol Local Community Council

2021 was a transitional year for the Omgevingsraad Schiphol ('Schiphol Local Community Council'; ORS) as we awaited a final

decision on a future model. In December 2020, a future governance model for the ORS was presented by the chairman, Mr Pieter van Geel, on which the new Dutch government coalition is expected to rule in due course. In the meantime, practical arrangements have already been implemented to ensure the dialogue continues in a constructive manner. Schiphol remains committed to maintaining an open dialogue with all local and regional stakeholders and will continue its active involvement in the ORS during this interim period.

## Supporting local employment

Schiphol stimulates regional employment through initiatives such as the Luchtvaart Community Schiphol ('Aviation Community Schiphol'; LCS) partnership. The Community brings together companies as well as educational and government organisations to strengthen the labour market at Schiphol. Schiphol's participation in LCS supports our ambition to be an attractive regional employer as part of an open and collaborative community. The community also plays a coordinating role in the Luchtvaart Inclusief ('Aviation Inclusive') programme, which supports individuals who are having difficulty finding employment.

In January 2020, Schiphol began working with the municipality of Amsterdam and other partners to help individuals experiencing difficulty accessing employment to find work at the airport, with nearly 250 placements secured to date. Since the COVID-19 outbreak, the focus of the partnership has evolved towards helping current airport employees find roles in other sectors, and an office of the Regionaal Werkcentrum Groot-Amsterdam ('Regional Work Centre Greater Amsterdam') has been set up at Schiphol.

## Political advocacy and stakeholder engagement

Schiphol Group engages with political stakeholders on a local, national and international level regarding a wide range of topics. Over the last year aviation as well as Schiphol and Lelystad Airport have featured in many public debates, both in politics and the media, with every aspect of the debate covered. While we recognise that not all stakeholders have the same views regarding

aviation and its future, we strongly believe that an open dialogue is the way forward. In 2021, Schiphol, together with leading aviation value chain partners, presented political parties and government officials two position papers outlining how the industry is taking clear steps towards a sustainable future. Both papers call for government policy, innovation and investment to be more closely aligned, including through the establishment of a sustainable innovation fund and a community fund. Schiphol and its partners are also seeking the ratification of the Luchthavenverkeersbesluit ('Airport Decree'; LVB) and the opening of Lelystad Airport, among other developments.

## Noise

Noise disturbance due to air traffic remained a central topic in our discussions with the local community in 2021. Schiphol adheres to the agreements in place to minimise the impact of our activities on local residents, such as keeping the number of annual air transport movements (ATMs) below 500,000 (of which 32,000 may take place between 23.00 and 07.00). Due to COVID-19, only 238,758 ATMs were recorded during the 2021 operational year (versus 497,303 in the most recent pre-COVID year, 2019), of which 16,450 were at night. Schiphol is monitoring developments around the pandemic and its impact on air travel. Based on our most recent recovery scenarios, we do not expect the current 500,000 ATM ceiling to be reached before the mid-2020s.

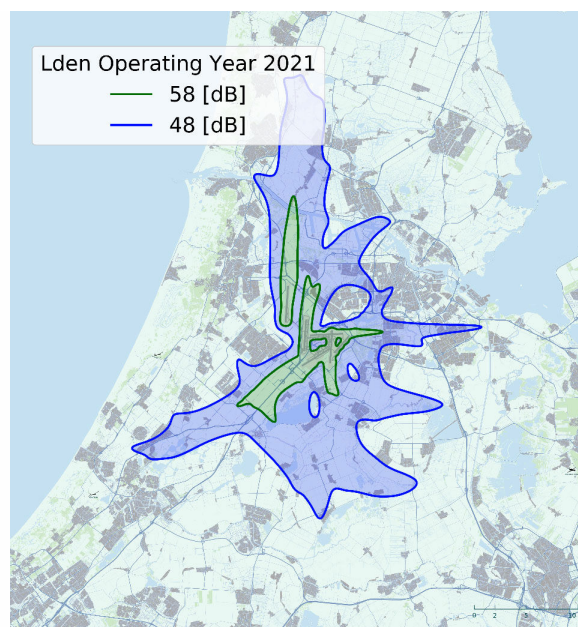
## Noise disturbance

The Dutch Ministry of Infrastructure and Water Management (I&W) is working to introduce the New Environmental Standards and Enforcement System (NNHS). The NNHS includes rules regarding the use of preferred runways at Schiphol. It also limits the number of people who may be exposed to severe noise disturbance in communities surrounding the airport, and aims to contain the affected residents within specific noise contours. The NNHS prescribes the 48 dB(A) and 58 dB(A) Lden noise contours using the ECAC Doc.29 noise calculation method. However, the current regulations still prescribe the older NRM method, for which the results are shown below.



Figure 1 (Lden noise contours) depicts the contours for 2021 (between 1 November 2020 and 31 October 2021) as blue and green lines. The contours highlight the areas where the average sound exposure due to aircraft is higher than 48 and 58 dB(a), respectively.

### Lden noise contours



The limit for the number of severely affected people living within the 48 dB(a) contour is set at 180,000. In 2021, significantly fewer people (59,600) within the contour were considered to have experienced severe noise disturbance compared with the most recent pre-COVID year, 2019 (142,000), which was due to the reduced number of ATMs. Given the reduced air traffic in 2021, the noise contours in the figure shrunk considerably, while the total number of severely affected people also decreased significantly compared to the pre-COVID situation.

Two factors typically influence severe noise disturbance figures at Schiphol: 1) changes in runway use as a result of weather conditions and 2) runway maintenance. These factors require the

### Number and nature of reports to BAS

	Focus group <sup>1</sup>		Habitual complainants	
	2021	2020 <sup>2</sup>	2021	2020 <sup>2</sup>
<b>Number of complainants</b>	<b>7,645</b>	<b>7,314</b>	<b>61</b>	<b>36</b>
<b>Number of complaints</b>				
Specific reports <sup>3</sup>	60,618	32,564	105,402	62,986
Period reports <sup>3</sup>	50,084	27,096	8,645	4,569
General reports <sup>3</sup>	4,833	1,350	230	200
<b>Total number of reports</b>	<b>115,535</b>	<b>61,010</b>	<b>114,277</b>	<b>67,755</b>

- <sup>1</sup> The focus of BAS reports is on the focus group: complainants who submit a complaint between 1 and 500 times per year. Individuals who submit more than 500 complaints per year are referred to as habitual complainants. They are mentioned in overviews but omitted from analyses in order to avoid a distorted picture.
- <sup>2</sup> A correction was made in February 2022 in an addendum to the BAS Annual Report 2020 after research showed that approximately 2% of the total number of complaints and 0.6% of the number of complainants had not been properly registered. For more information, see Rapportages 2020 - BAS ([bezoekbas.nl](https://bezoekbas.nl))
- <sup>3</sup> Specific complaints are complaints about noise nuisance at a specific time, period complaints are complaints of noise nuisance during a specific period and general complaints are all the complaints not directly related to noise nuisance from air traffic, such as environmental policy.

use of less preferential runways that increase the disturbance to local residents. As a result of low air traffic numbers, several maintenance and construction works could be efficiently (re-)planned and executed to reduce the impact on local residents.

### Local Community Contact Centre: reports by local residents

BAS provides local residents with information on various topics regarding the daily operation of Schiphol. The contact centre also registers noise disturbance reports and complaints by local residents. The insights from the BAS reports support our ongoing efforts to reduce noise disturbance and improve the living environment around the airport. The website for Schiphol's noise-reduction programme, [minderhinderschiphol.nl](https://minderhinderschiphol.nl), explains how BAS data is being used to develop and evaluate noise-reduction measures.

### Impact of registration system flaw

Between November 2019 and April 2020, BAS's registration system went offline as a result of a reported potential security flaw in the system (responsible disclosure). During this time, BAS was only able to process complaints via telephone, email and a

temporary online form. In 2021, it emerged that a small number of complaints had not been properly processed during this period and, as such, not included in the annual report. Further investigation showed that this involved approximately 2% of the total number of complaints and 0.6% of the number of complainants. Based on this information, a correction was made in February 2022 in an addendum to the BAS Annual Report 2020. The discrepancy of around 2% has not resulted in changes to the annual report's general conclusions and recommendations.

### Rise in number of complaints

In 2021, the number of complaints increased by almost 80% compared to 2020, while the number of complainants increased by less than 5%. The number of flight movements hardly increased in 2021 compared to the previous year. The proportion of complaints relative to the total number of flight movements therefore increased. An explanation for this may be that the decrease in air traffic since the start of the COVID-19 pandemic has made local residents more aware of noise nuisance caused by aircraft. For more information and an analysis of the figures, visit [bezoekbas.nl](https://bezoekbas.nl).