



# Environmental report 2020

 AVINOR OSLO AIRPORT

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# ENVIRONMENTAL STATUS

Oslo Airport is Norway's largest and most important traffic hub, as well as one of the country's largest workplaces. Avinor's environmental policy, strategy and goals form the framework for our environmental work. As the largest airport, measures here at Oslo Airport are absolutely crucial for Avinor's environmental goals to be achieved. To succeed, environmental considerations must be integrated both in day-to-day operations, in the procurement of products and services, and in the planning and implementation of construction projects here at Oslo Airport.

We are certified according to the EN-NS ISO14001 environmental standard, which ensures good environmental management in our everyday lives. While we conduct innovative work and are pioneers in many fields, all the work that is done every day through good routines and solid experience is crucial to being able to operate the airport with the least possible environmental impact.

In 2020, however, Oslo Airport was strongly affected by the Covid19-pandemic and it has been a demanding year for both our own employees and all our partners and passengers. It has been a different year and we have had to adapt to a new everyday life.

It is terribly wrong to say that the C pandemic has been positive for the environment, but the fact is that both the consumption and the emissions have been reduced. Closed shops and restaurants resulted in less waste, closing large parts of the terminal reduced energy consumption, reduced air traffic and single runway operations resulted in fewer noise complaints, and the low activity has of course also reduced the greenhouse gas emissions.

Oslo Airport is accredited in the scheme Airport Carbon Accreditation (ACA). They early declared 2020 a "non-year". This means that emission figures for this year will not be reported, nor will they be included in future calculations of greenhouse gas emission reduction targets.

An important part of the environmental work is related to our discharge permits, framework conditions, certifications and ongoing projects that require continuous management, monitoring, follow-up and reporting both internally, externally and to the authorities regardless of the pandemic.

We have also managed to implement the planned measures with phasing in of biofuels, put in place new electric buses, planned for charging infrastructure aircraft side, as well as activities within energy management and the project GV2030 and even more. Unfortunately, the economy has tightened, and we have, among other things, had to postpone the removal of PFAS-contaminated soil.

For Oslo Airport, it has also been important in 2020 to be able to look ahead and spend time and resources on planning for and preparing for the day we are up to more normal activity level.

We must continue to find smarter and more efficient ways to operate the airport with reduced environmental impact. We also face new demands and expectations in the future from Avinor in the coming strategy period 2021-25, but also through the EU's Green Deal, taxonomy, sustainability and circular economy to name a few.

It will be exciting, and we are looking forward to a time without the pandemic and again gain focus on our important environmental work at the airport.

Oslo Airport's environmental report for 2020 shows the status of the focus areas climate, aircraft noise, water and soil, as well as the other environmental aspects at the airport.

Gardermoen, April 2021

Stine Ramstad Westby  
Managing Director



# ENVIRONMENTAL MANAGEMENT

Oslo Airport must maintain ISO14001 certification and ACA level 3+ accreditation

## Environmental policy

To create a clear common direction in Avinor's environmental work, Avinor has adopted a group-wide environmental and corporate social responsibility policy.

### *Environmental and corporate social responsibility –policy*

This policy describes the general principles for environmental and social responsibility in Avinor. The purpose is to improve Avinor's own environmental performance, be a driving force in the environmental work in the aviation industry and be a leader in the work on corporate social responsibility in Norwegian aviation.

#### **Principles environment:**

- Avinor works to constantly improve its environmental performance and will work actively to reduce the impact of the enterprise on the environment
- Avinor must comply with regulatory requirements and its own requirements, and its environmental management must be in accordance with ISO14001, ensuring a systematic approach to coordination and follow-up of environmental work
- Avinor must ensure there is a high level of environmental awareness and expertise throughout the entire group. Employees and partners at the airport must be aware of the group's significant environmental aspects
- Avinor must emphasise and integrate environmental considerations early in the planning and implementation of projects and when purchasing products and materials. There must be strong emphasis on the environment in expansion projects
- Avinor wishes to maintain open, constructive and proactive communication with partners, local communities, authorities, aviation organisations and other stakeholders to reduce environmental impact
- Avinor seeks solutions to environmental challenges through cooperation with research and development communities, authorities and other organisations both nationally and internationally

## Management of environmental work

Environmental management is an integral part of Avinor's management system. Oslo Airport was certified in March 2014 according to EN-NS ISO14001: 2004 and is now a part of a common Avinor certificate according to ISO 14001:2015.



Oslo Airport uses environmental management methodically to get an overall grip of environmental work both internally within the company and among other stakeholders at the airport. To manage environmental work, it is necessary to maintain a constant overview of the company's environmental impact and regulatory environmental requirements. The requirements relating to the proportion of public transport, the discharge permit for water and soil from the Norwegian Environment Agency, and the Norwegian Civil Aviation Authority's noise prevention regulation are particularly important framework conditions for the airport operations.

Risk assessment is an important tool in environmental management and is used to prevent or mitigate potential adverse events. Through operational risk management, we have a well-updated survey and assessment of environmental risks at the airport, which forms the basis for implementing risk-reducing measures. Focus has been on environmental risk associated with tank storage of chemicals and other infrastructure related to potential discharges

Oslo Airport has mapped the airport's environmental impact, and this is being addressed by means of Avinor's identified significant environmental aspects: Consumption of chemicals, transport and climate, noise from aircraft and helicopters, energy, purchasing, building and construction projects and the natural environment. Oslo Airport is also focusing on the environmental aspects of waste and emissions to air.

For Oslo Airport, it is both about improving performance, as well as understanding the mechanisms that influence our environmental reputation. Through changes in infrastructure and processes, we will reduce our environmental impact through continuous improvement, innovative solutions and focusing on the most effective measures. Through open and active communication, we will strengthen our environmental reputation.

An Environment and Noise Committee has been established, involving the mayors of the Øvre Romerike municipalities and a representative from Oslo Airport. The purpose of this committee is to discuss challenges linked with noise and other environmental effects when expanding and running Oslo Airport. The committee also facilitates communication with the airport's neighbours by meetings with a forum of neighbours and other surrounding municipalities.



Quiet in air traffic at Oslo Airport 2020.

# TRANSPORT AND CLIMATE

*By 2020, Avinor must reduce its own total controllable greenhouse gas emissions by 50 percent, compared with 2012, and help to reduce greenhouse gas emissions from surface access and air traffic. Furthermore, Avinor has a goal that its own activities (airport operations) will be fossil-free by 2030.*

*Oslo Airport's proportion of public transport should be 70 percent by 2020 and 75 percent by 2030.*

## Greenhouse gas emissions in brief

Oslo Airport has mapped its climate impact annually in accordance with the Greenhouse Gas Protocol and the ISO14064 series and prepared a greenhouse gas inventory verified by a third party (except for 2020). The greenhouse gas inventory includes emissions linked with all the company's own activities categorised as direct or indirect emissions, along with a selection of indirect emissions from other sources.

The major sources of emissions at Oslo Airport are the LTO cycle (i.e. emissions from aircraft below 3 000 feet; approach, landing, taxiing, take-off and climb out) and surface access (passengers' emissions on their way to the airport). The remaining emissions (less than 5 per cent) are related to the operation of the airport such as ground handler operations, own vehicles, de-icing, employee travel to and from work, APU, electricity, business travel, thermal energy, waste, winter maintenance and bus services airside.

Remote heating from Statkraft Varme AS is not included in the greenhouse gas inventory, neither is recovered heat from Oslo Airport's groundwater wells and heat recovery units. Nevertheless, these forms of energy help limiting the need for procured electricity. The use of runway de-icing chemicals is included because the chemicals are made from fossil carbon sources and therefore greenhouse gas emissions are calculated based on their degradation. In line with the usual calculation method in Norway, Avinor assumes that greenhouse gas emissions from advanced biodiesel / biofuel oil are zero.

Several records in the greenhouse gas inventory are unpredictable and greatly dependent on winter conditions. This is primarily applicable to the areas of Oslo Airport-owned vehicles, thermal energy and de-icing.

Oslo Airport has held accreditation to the Airport Carbon Accreditation scheme (ACA) at the level "Neutrality" since 2009. This requires Oslo Airport reducing its own emissions from year to year (in relation to the number of passengers), taking the initiative to involve other parties at the airport in a joint effort to reduce the airport's total greenhouse gas emissions, and investing in climate quotas to compensate for remaining emissions. 333

airports are now certified in the ACA, of which 62 are on "Neutrality" level (January 2021).



*Profiling of the ACA certification on the electric buses*

In the ACA context, 2020 is considered an exceptional year and will not be included in reporting, nor will accreditation be applied for this year. Our certificate has therefore been valid until May 2022.



To compensate for the remaining greenhouse gas emissions under Oslo Airport's control, annual investment is made in emissions allowances through the UN's CDM, Clean Development Mechanism. Avinor cancel allowances for the emission year 2020 too.



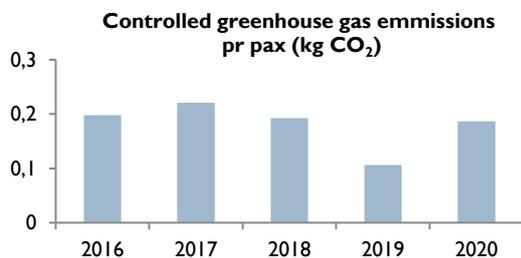
*For 2020, investments were made in the project "Solar Power Project by Fortum Finn Surya Energy Pvt Ltd" in Karnataka, India. (Project: CDM 10404).*

## Status, climate 2020

Due to the pandemic situation, the figures are both partly missing and not representative, so for 2020 we do not have a complete, verified greenhouse gas inventory. The items marked with \* in the table below are not included in the emission figures for 2020.

<b>Control</b> <i>Directly controlled by the airport operator</i>	<b>Guide/manage</b> <i>Carried out by a third party, but central to the operation of the airport</i>	<b>Influence</b> <i>Independently carried out by a third party</i>
Own vehicles (including airside bussing) Thermal energy Runway de-icing Fire drills Purchased electricity Business travel	Aircraft operation: taxiing* Ground operations Aircraft de-icing Waste: transport from airport to processing plant* APU*	Aircraft operation: movement in the air up to approx. 1000 m above airport level* Surface access* Employee commuting*  Not mapped: Business operations for tenants and lessees Transport of goods and services
<b>1 687 tonnes</b>	<b>3 163 tonnes</b>	<b>0 tonnes</b>

In 2020, Oslo Airport's own, controllable greenhouse gas emissions from airport operations were 1 687 tons of CO<sub>2</sub>, which means that there has been a reduction in emissions of more than 44 per cent compared with 2019. The decrease is strongly connected to the reduced operations / activity due to the pandemic situation. However, emissions per pax have increased.



### Vehicles

An important measure for reducing greenhouse gas emissions from own operations is the introduction of advanced biodiesel, as a large proportion of Oslo Airport's greenhouse gas emissions came from the vehicles. Through a framework agreement, advanced biodiesel is purchased that meets the EU's sustainability criteria and is also guaranteed without palm oil or palm oil products. Advanced biodiesel is used in vehicles that cannot be easily electrified, such as snow blowers and sweepers. In 2020, 528 441 liters of biodiesel were fueled on our own vehicles, which means that the consumption of biodiesel accounted for more than 93 per cent of the total consumption.

When procuring vehicles, an assessment must always be made as to whether fossil vehicles can be replaced by electric vehicles or other technology with renewable energy sources. Providers are invited, regardless of the

vehicle group to be purchased, to come up with solutions to reduce greenhouse gas emissions.

At the end of 2020, the vehicle fleet of administrative vehicles at Oslo Airport consisted of 23 zero-emission vehicles and the electric car park went a total of 53 638 km. Together with refueling biodiesel, this combined resulted in a reduction in greenhouse gas emissions of 1 439 tons of CO<sub>2</sub>.

In August 2020, eight electric 18-meter buses were delivered to Oslo Airport as a replacement for eight fossil buses. The electric buses were intended to carry passengers between the terminal and remotely parked aircraft. However, the pandemic and the large decline in air traffic led to a reduced need for busing and some buses were therefore planned to be transferred to other Avinor airports.



Oslo Airport's new electric buses on the airside.

The electric buses were supplied with associated infrastructure with depot charging for the buses at night and fast charging with a pantograph. The project was partly funded by Enova.



Both depot and pantograf charging.

Work is also in progress to plan for the development of infrastructure for charging vehicles on the airside to cover a need on the basis that commercial vehicles and equipment are increasingly being electrified.



*Great need for charging options at apron.*

### Surface access

By surface access is meant how our passengers get to and from the airport. In order to strengthen the offer to travelers, reduce greenhouse gas emissions and improve local air quality, Oslo Airport wants to be a driving force and facilitator so that as much of the transport to and from the airports as possible can take place by public transport. Most instruments for increasing the public transport share are outside the airport's area of responsibility and require cooperation between a number of actors. The airport's most important contribution is to facilitate the infrastructure at the airport and provide good information about the services to travelers.

The public transport share at Oslo Airport has been up to 72 percent, which is among the highest in the world. Due to the pandemic and the authorities' recommendation to avoid public transport, it is not relevant to compare 2020 with previous years. Also, the Airport Bus has had to cancel its routes at the airport.



*The airport train (Flytoget) contributes to a high public transport share.*

Not everyone can travel by public transport to the airport. It has therefore been important to facilitate the charging of electric vehicles in the parking areas so that those who have to drive can do so with the lowest possible greenhouse gas emissions. Oslo Airport has more than

eight hundred charging options for electric cars in the parking garages.



*Charging an electric car in a parking garage at the airport.*

### Air traffic

Electrification of aviation can help to reduce the total greenhouse gas emissions from Norwegian aviation in the coming decades, and Avinor is still an important driving force in this work.

From 2020, a requirement of 0,5 percent biofuel was introduced as a share of all aviation fuel sold in Norway. Norway is the first country in the world with such a requirement. The biofuel must be advanced; that is, fuel that is made from waste and residues.

In 2020, Avinor, together with Norwegian, SAS, Widerøe, LO and NHO Luftfart, presented the report «Sustainable and socially beneficial aviation» and for the first time, Norwegian aviation has launched a joint roadmap with goals for fossil-free aviation in 2050. This means that on scheduled flights in and from Norway in 2050 fossil fuels will not be used. The roadmap takes the initiative to prepare a program for the production and increasing phasing in of sustainable fuels.



*Phasing in biofuels to aircraft is an important measure.*

Improved navigation technology allows for more accurate and flexible arrival and departure procedures. Through curved approaches, the aircraft can fly shorter distance and reduce fuel consumption and greenhouse gas emissions. There was a total of 15 percent curved approach to Oslo Airport in 2020. Expanding the number of curved approach routes are in progress.

# CONSUMPTION OF CHEMICALS AND EMISSIONS TO WATER AND SOIL

Activities at Avinor airports must not cause new ground contamination or reduce the environmental status of the water environment.

## Water and soil in brief

Oslo Airport is located on parts of the Romerike aquifer. About half of the east runway to the north is in contact with that part of the groundwater reservoirs that has the potential to become a future source of drinking water. The airport borders three protected landscape areas. The area south-west of the airport is a characteristic ravine landscape. In this landscape the rivers Sogna and Vikka are located.

In general, surface water is handled locally at the airport. In the case of major run-offs, particularly during snowmelt, there will be some influx of unprocessed surface water from the west runway to the river Sogna. The first melt-water contains a quantity of de-icing agent, and this is collected and treated. The natural groundwater level has been lowered along the western runway and the railway route to safeguard the infrastructure. Groundwater pumped out is released into the Sogna or re-infiltrated into the groundwater reservoir

Much of the glycol used will be collected at a de-icing platform. The proportion with the highest concentration is delivered to a local recycling plant, where it is concentrated before transported to a facility and reused as industrial glycol. Wastewater and some of the collected de-icing chemicals (glycol and formate) are treated at the Gardermoen treatment plant.

Climatic conditions vary considerably between the individual seasons: snow volume, days involving frost on aircraft, temperatures, wind, etc. This manifests in differences in the consumption of de-icing chemicals – in terms of quantity, mixing ratio and the use of different liquid types – and how this drip off the aircraft or remains on the aircraft and is collected or spread with the wind. All these conditions result in yearly variation in collection levels. Chemical residues from de-icing degrades locally in the ground and soil along the runway systems.

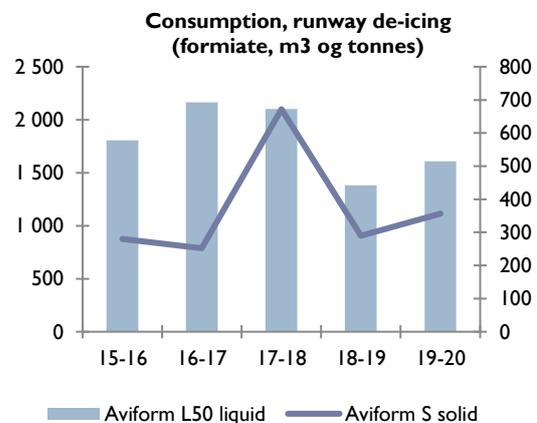
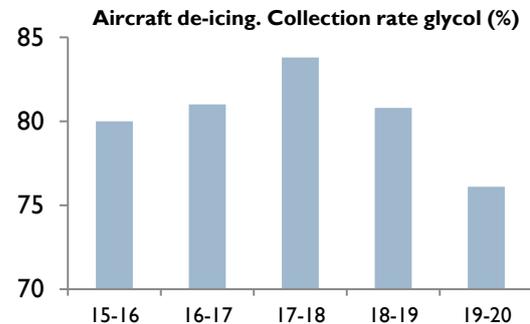
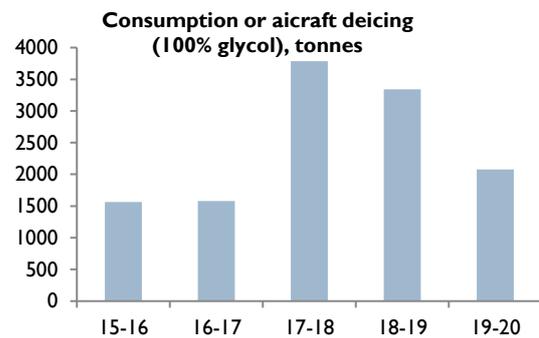
The biggest challenges in water and soil are linked with increased traffic volumes in combination with a wilder, humid winter climate. This increases the consumption of de-icing chemicals, which in turn means that larger volumes of de-icing chemicals must be degraded in the soil above the groundwater. Contaminated soil from

Contaminated soil from activities prior to the opening of the airport also presents challenges in local areas.

## Status, water and soil (2019/2020 season)

### De-icing

Total consumption of aircraft de-icing chemicals during the 2019/2020 season was somewhat lower than last season, much due to a very mild winter after the New Year. The collection rate for aircraft de-icing fluid was 76,1 percent in the 2019/2020 season. For runway de-icing chemicals, consumption was somewhat higher than last season.



Violations of the groundwater discharge permit were identified in three groundwater wells during 2020 (formate and glycol). Two of the wells are located at the Alfa de-icing platform south of the western runway, while the last is at the Bravo de-icing platform north of the eastern runway. No higher values were detected in the wells over a long period of time. Sampling was performed in all wells with fractures until de-icing chemicals were no longer detected in the samples. Oil was also detected in a well above the acceptance limit in the discharge permit. This is a known site from the time before the airport was opened and is regularly monitored in the airport's monitoring program.

In Sogna, one violation of the discharge permit was detected during the winter season 2019/20 (o20xygen). This was due to relatively high temperatures in the transition between winter and the summer season, which affected measured oxygen content.

Oslo Airport has discharge agreements for wastewater with the municipalities of Nannestad and Ullensaker. The wastewater from the airport that goes to Nannestad municipality's pipeline network is delivered to the pipeline network to Ullensaker municipality and then to Gardermoen treatment plant for treatment. According to the discharge agreements, no more than 20 mg / l oil per day shall be discharged from the airport's fire training field, which is an annual average. The annual average for 2020 was lower than this limit and it is therefore not a violation of the discharge agreements.



*Management of air injection.*

A limiting factor for degradation in the most critical areas is access to oxygen. In 2011, a pilot project began, with the aim of looking at the effect of injecting air to soil and groundwater. The pilot project showed good results and demonstrated that in the long run it will help re-establish natural conditions in the ground if enough oxygen-rich air is added to the ground. The project was expanded to a total of 65 air wells and started in spring 2016. Air is now injected in the most stressed areas along the western runway.

During the de-icing season, other measures are also considered and implemented. One of these is the fertilization of the relevant areas with sodium nitrate. This will give the bacteria enough nutrients to break down the de-icing chemicals. Another measure is to remove chemical-contaminated snow from some highly loaded areas along the runway, which is to reduce the burden to the ground.



*Degradation of de-icing chemicals on the side areas.*

In 2019, Oslo Airport started a new project "Groundwater 2030" with the aim of improving the understanding of the long-term effects of the de-icing chemicals on ground and groundwater, and the processes behind it. The project also aims to assess and optimize existing measures, and to explore opportunities for developing new measures. In 2020, assessments of historical data for groundwater chemistry were carried out, and a monitoring program was established in accordance with the requirements of the water regulations, which will help to set correct environmental targets for the groundwater reservoir beneath the airport.

## Contaminated soil

There is ongoing follow-up of sites with contaminated ground due to activities from before the establishment of the main airport, as well as of contaminated soil and groundwater encountered in recent times. There have not been any acute incidents with contamination of soil in 2020.

PFOS (perfluorooctyl sulphonate) was previously a legal additive in fire foam. Today, PFOS is classified as an environmental toxin that is not degraded in nature, is accumulated in food chains and has harmful effects even at low concentrations. Oslo Airport has areas that are contaminated with PFOS due to historical use of PFOS-containing fire-fighting foam. The highest concentrations have been measured in ground and groundwater in the fire drill fields. There is also a PFOS contaminated area from an accidental discharge at a hangar back in 2010.

On the fire drill field at Oslo Airport, the spread of PFOS to surrounding areas is halted by the establishment of plants that purifies PFOS from groundwater and stormwater with good results. In 2019, the Norwegian Environment Agency has granted permission for excavation of parts of the area that are heavily PFOS contaminated (areas with an average concentration above 1000 µg/kg). This work was planned to be completed in 2020 but was postponed due to the Covid-19 pandemic. The measure has been followed up with regular sampling to monitor any spread from the area to groundwater and recipients downstream.

# AIRCRAFT NOISE

*Avinor must work actively to limit noise levels (from aircraft and helicopter traffic) for residents in areas close to the airports at 10 of Avinor's most noisy airports by 2020 (including Oslo Airport).*

## Aircraft noise in brief

Aircraft noise affects the local areas around the airport. Oslo Airport is working actively to ensure that aircraft noise is predictable for its neighbours. Therefore, the monthly reports on traffic development and noise levels sent to the authorities are also made available to neighbours on our website. The Noise and Track Monitoring System (NTMS) records aircraft movements and carries out continuous noise measurement near the airport. This data is assessed for compliance with the regulations for arrivals and departures to highlight any deviations from the regulations.



*Oslo Airport's NTMS records the aircraft noise level continuously at 11 sites around the airport.*

Oslo Airport's website for neighbours is designed to help the airport's neighbours find information on the regulations on traffic management and the airport's aircraft noise zone map and contact Oslo Airport about aircraft noise. Oslo Airport also has a separate phone number for enquiries relating to aircraft noise. A summary of the enquiries and how traffic management affects the noise situation at the airport are reported to the Norwegian Civil Aviation Authority in the monthly report from the NTMS.

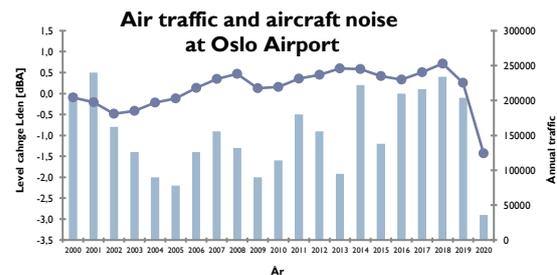
In 26 May 2016, a revised noise regulation issued by the Civil Aviation Authority took effect for Oslo Airport. The purpose of these regulations is to avoid unnecessary noise levels in the areas around the airport, while also meeting requirements in terms of safety, operational conditions, capacity and other environmental conditions. The regulations allow for permanent use of curved approaches,

where the routes are directed outside densely populated areas. Furthermore, the regulations indicate an adjusted departure corridor from the airport's north-eastern corner. Compliance with the new departure corridors exceeds 95 percent. This adjustment will make it possible to maintain the departure capacity at the airport, whilst preventing aircraft from flying over the most densely populated areas

## Status, aircraft noise 2020

The figure shows the development of aircraft noise and air traffic volumes at Oslo Airport between 2000 and 2020. Total noise emissions ( $L_{den}$ ) from all registered traffic are calculated for each year. According to this, there are changes in level calculated for every year from 2000, and these are plotted together with total traffic development. This provides a view of noise development independently of the geographical areas affected.

The combined aircraft noise impact around Oslo Airport was reduced by 2,8 dB from 2019 to 2020, while the number of aircraft movements was reduced by 45 percent. The level change is due to this marked decline in the number of aircraft movements in 2020.



The noise level for 2020 was 2,9 dB below the 2000 level, based on calculations for all registered traffic. The traffic increase from 2000 to 2020 on 80 152 aircraft movements corresponds to a level increase of 2,16 dB over 2000 traffic. This means that new modern aircraft types have more than compensated for the increase in traffic

In 2020, 9 088 curved approaches were completed, i.e. 15,7 percent of all. Despite a large decline in air traffic, the number of curved approaches has tripled. The total number of curved approaches since 2012 is 41 924.

Oslo Airport had aircraft noise complaints from 72 people in 2020. This is less than a half of the number of complaints compared with 2019. The reduction is probably due to the introduction of single-runway operations during the pandemic period. The traffic therefore went mainly on the western runway, so that the areas Mogreina, Sand and Jessheim had far fewer overflights.

On behalf of the Ministry of Transport and Communications, Avinor has updated the knowledge base for assessing the future location of a possible third runway at Oslo Airport. The two alternatives, the eastern and the western, have been reconsidered, and Avinor maintains the recommendation for the eastern alternative as a location for a possible third runway.

# ENERGY

*Avinor will reduce purchased energy by 25 percent by 2020 compared with energy consumption in buildings and constructions in 2012.*

## Energy in brief

Oslo Airport has a high share of renewable energy. A separate district heating and district cooling system ensures that the buildings at Oslo Airport maintain the correct temperature throughout the year. The heat and cooling are mainly produced by heat pumps, which draw energy from several different sources:

- The return heat in your own energy circuit.
- The groundwater system which consists of nine hot and nine cold groundwater wells, where surplus energy can be stored and recovered.
- Recovered energy from the wastewater to Ullensaker municipality's treatment plant.
- Clean snow is collected in the winter in a large snow storage which is insulated with wood chips. The melt water is used to cool the terminal on days in the summer with extra cooling is needed.

In addition, district heating with chip heating from Statkraft Varme AS is used.

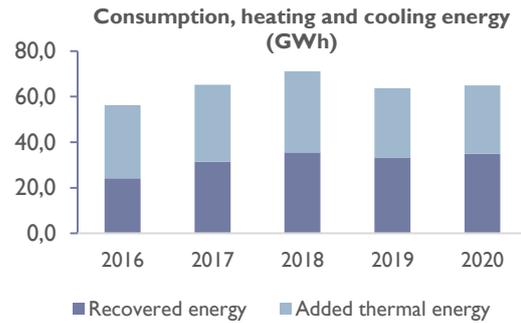
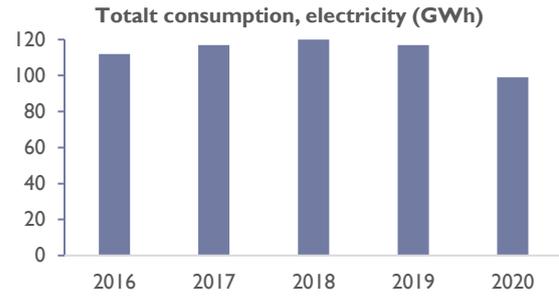
Electrode boilers and oil boilers have a low priority and are only used during periods when Statkraft Varme cannot supply sufficient energy. All fossil fuel oil for heating buildings are phased out and replaced with biodiesel, and only the reserve power units still use plant diesel.

## Status, energy 2020

Oslo Airport has reduced specific energy consumption by 38 per cent from 2012 to 2020. This means that the target of a 25 per cent reduction in specific energy was achieved. The goal has been achieved through several years of active energy management and profitable energy measures. Purchased energy was reduced by 19 percent in 2020, compared with 2019.

The year 2020 has, however, meant that Oslo Airport has had to adapt to a new everyday life, also when it comes to energy. Due to low traffic, the focus has been on adapting energy consumption to the new level of activity. Large parts of the airport were also eventually physically closed off and a lot of time was spent on steering, turning off where possible and making sure that only strictly needed energy is used.

A number of control measures have been detected and carried out via the energy management working group, such as extinguishing pulses in the T2 rig, optimization of ventilation in Pir Syd and Flyporten, as well as temperature reduction in the engine room. Several measures were detected via night inspection. Furthermore, the energy monitoring system (Optima) has been optimized by constantly introducing more and new energy meters.



An important energy economic project has been the replacement of a heat exchanger between the energy plant and the transport circuit, which collects energy from Ullensaker municipality's treatment plant. With it, energy savings corresponding to annual electricity consumption for approximately 150 houses each year. In addition, the power consumption for operation of the plant will also decrease.



*Heat exchange to wastewater in DA8.*

There are also ongoing work on replacing floodlights around the terminal with new LED lighting.



*Big savings when switching to LED.*

# WASTE

## Waste in brief

Airport operations generate waste from public areas with security control, serving, shops and waiting areas, but also from aircraft cleaning, from operating companies, airlines, catering, cargo, workshop, garages, office space and not least from construction projects.

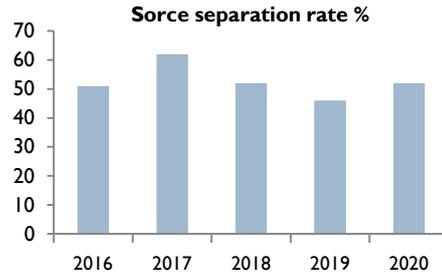
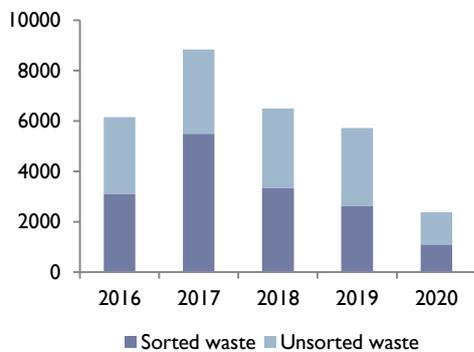
All companies at the airport participate in a joint waste management scheme whereby all waste is handled by the same waste handling company. The waste management scheme is flexible, and waste fractions, container sizes and collection rates are adapted according to set requirements. Waste is separated at source and dropped off at waste collection points. The waste handling company deals with the waste and delivers it to approved final disposal and recycling plants. The waste handling company reports monthly the source separation rates and tonnages for all collection points.

Oslo Airport is responsible for organising the waste management scheme at the airport and acts as a driving force, ensuring that the airport achieves good results in terms of waste. Waste from the building and construction project activities is reported separately.

## Status, waste 2020

The total amount of waste for the entire airport in 2020 was 4 815 tonnes. The amount of waste invoiced via Oslo Airport was 2 370 tonnes. Sorted waste amounted to 1 090 tonnes and unsorted waste 1 280 tonnes, which gave a sorting rate of 52 percent. The large reduction in waste volume is mainly due to less activity, fewer passengers and many closed shops and restaurants due to the pandemic. 32 per cent were recycled, 5,3 percent biologically treated, 56 per cent energy recovered and 6,4 percent sent to landfill.

Waste volume, tonnes



The collection of recyclable beverage containers made of aluminum and PET (plastic) from the aircraft continued in 2020. SAS and Sodexo are taking part in this scheme. A total of 3,8 tonnes of recyclable material was received from this initiative. The airlines donate surplus revenues from deposits and aluminium returns to charity. Oslo Airport also works together with the Norwegian Red Cross in Ullensaker to handle beverage containers collected from public areas in the terminal building. The Red Cross is responsible for receiving, sorting and returning bottles efficiently and can spend the profit from deposits as it pleases. The handling is done with volunteer work from sports teams, school classes and so on.

Avinor introduced payment for plastic carrier bags at all airports in April 2019. Part of the profit goes to the Trade's environmental fund and the rest of the profit goes to Avinor's environmental fund to support measures with the ambition of reducing climate and environmental footprints in connection with commercial activity on the airport. In 2020, however, no funds were allocated from the fund as our partners have had limited capacity and resources to work with this type of measure during the pandemic period. The initiative will be continued, and it is planned for allocation in 2021. New shopping bags with less plastic per bag and a share of recycled plastic have also been designed. This bag was to be phased in by 2020, but due to little activity during the pandemic period, there is still use of residual stock of the old bags.

To minimize food waste from restaurants and kiosks at airports, the app "Too Good To Go" has been tested, where food, which would otherwise have been thrown away, is sold at a greatly reduced price. However, this was put on hold due to the closure of a number of restaurants related to the pandemic.



Too Good To Go minimise food waste.

# PURCHASING, BUILDING AND CONSTRUCTION PROJECTS

## Consumption of products and materials in brief

Oslo Airport, through Avinor's centralized purchasing function, undertakes procurement for services, products and materials by means of purchases linked with regular operation or via construction projects for significant sums. The processes ensure that all purchases are made in accordance with public procurement regulations.

Environmental requirements in procurement processes are an important element in the environmental policy and help to reduce Oslo Airport's environmental footprint. They also provide financial benefits beyond safeguarding and preserving the environment. Through the acquisitions we can influence suppliers in several sectors in a more environmentally friendly direction.

Oslo Airport has ambitions and sets requirements in areas such as reducing greenhouse gas emissions, waste management and minimisation, the use of environmentally friendly products and chemicals, noise, and the conservation of the natural environment.

Environmental certification requirements or equivalent qualifications are required where applicable, quality requirements are set as well as award criteria where suppliers compete to deliver the most environmentally friendly solutions, products, materials and services.

Environmental requirements are set in all contracts with actors operating at the airport and in all our construction projects, and continuous efforts are being made to further develop the environmental requirements in line with the industry's development.

Oslo Airport focuses on the environment throughout the life cycle of the projects, including early identification of environmental challenges and possible environmental ambitions for the project. Environment is part of the project management system as a separate process. For major building and construction projects, environmental follow-up plans are prepared that consider the external environment at all stages and ensure environmental considerations in the choice of materials and solutions.

For products and services that have significant environmental impact, environmental documentation is required. Systematic work is done on substitution and reduction of the number of chemical products. All products used must meet environmental requirements from local and central authorities.

## Status, consumption of products and materials 2020

In 2020, specific environmental requirements have been set for the procurement of a service for winter maintenance, a new agreement for fuel and lubricants, a shuttle bus service for parking and for the conclusion of new contracts for Taxfree and travel value shops in the terminal.



*Winter maintenance*



*Taxfree*

The luggage handling system in the old part of the terminal is to be replaced. Prior to disconnection, dismantling and demolition of the facility, demands were made that as much as possible must be reused. An extensive mapping resulted in many elements being reused at Oslo Airport or at other of Avinor's airports, some spare parts were returned to the supplier, and several schools were allowed to take over various electronics, engines and other things for teaching purposes.



*Planned demolition of the luggage handling system BHS 1*

# NATURAL ENVIRONMENT

## Biodiversity in brief

Oslo Airport has mapped and charted the important areas for biodiversity, with descriptions of flora, vegetation and bird life within the airport area, on Oslo Airport properties, leased area and influenced areas. The results of the surveys are publicly available, including in Naturbase. Management advice has also been prepared, which is being followed up.

The areas between the runways and the side areas within the airport site mainly have trivial grassland that is cut and fertilised regularly. Just outside, however, there are greater natural assets such as ravine forests, meadows and calcareous lakes with several rare and endangered species that we wish to preserve. Unfortunately, black-listed species are also registered at the airport. These are unwanted as they suppress the natural Norwegian flora. Oslo Airport maintains an overview of the scope and potential for the spread of blacklisted species on and around the airport site. A maintenance plan for combating the four plant species Lupine, Giant hogweed, Canadian goldenrod and Japanese knotweed has been compiled based on an assessment of consequences and prioritisation of species and localities.

## Status, biodiversity 2020

Major efforts to combat these plants began back in the summer of 2014, mainly involving several rounds of root cutting, weeding and cutting down before the plants seeded, as well as a certain amount of spraying with pesticides. Combating measures have continued since, with a focus on avoiding dispersal into valuable natural areas.



Removal of Lupines

Both inside and outside the airport fence there are large areas with flowers suitable for a large selection of insects, -especially plants in the pea flower family that are important for long-tongued, red-listed bumblebees, such as the critically endangered Clover Bumblebee that lives at the airport. Oslo Airport has dedicated four areas of a total of about 140 000 m<sup>2</sup> which are good habitats for pollinating insects. These have been followed up with special measures in 2019 and 2020, including adjusted frequency for mowing, avoidance of pesticides, as well as cutting using grass trimmers of each individual blacklisted species. The work is supported by the County Governor



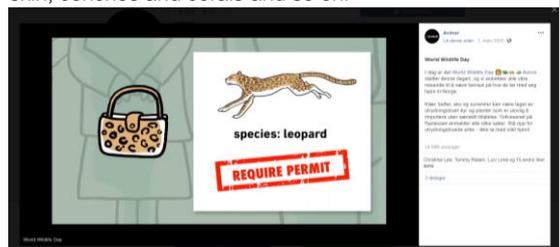
Large areas that are good habitats for pollinators.



Bustling insect life also in the park where pollinator-friendly flowers are seeded

## CITES

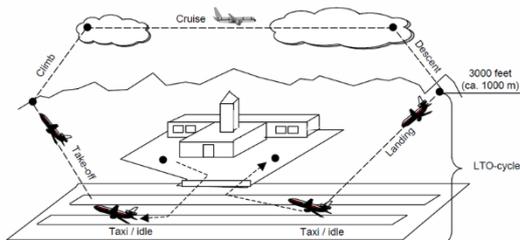
The purchase and introduction of endangered species or endangered species products is illegal and regulated by CITES (Convention on International Trade of Endangered Species). For several years, Oslo Airport has provided guidelines to passengers during the holiday season, via various social media, preventing them to buy "endangered holiday souvenirs", which include objects made from ivory, turtle shells, hippo teeth, shark teeth, leopardskin, snake-skin, conches and corals and so on.



Information for travelers on Avinor's facebook page

# LOCAL AIR QUALITY

Air quality in and around the airport area is affected by local and regional emissions, as well as by weather conditions and the local terrain. Emissions from airport operations have the greatest impact on ambient air quality locally at the airport, with aircraft and vehicles being the largest contributors. Off the airport site, road traffic is the most important source of emissions. Industrial emissions, emissions from heating and long-range contamination are other factors that affect air quality.



*Sources of emission.*

The municipalities bear primary responsibility for assessment of air quality, but if there are reasons to suspect that limits have been exceeded, then owners of facilities that make significant contributions to these levels will be responsible for assisting to map the levels and assessing measures. Oslo Airport has operated a facility for monitoring air quality since the early 2000s. This was originally related to measurement of air quality close to the fire drill area. The historical data for previous years shows that concentrations of particulate matter and nitrogen dioxide at the selected measuring point were within both regulatory requirements and national targets, with few instances where the recommended air quality criteria were exceeded.

In 2001, NILU, the Norwegian Institute for Air Research, carried out a major survey of local air quality on behalf of Oslo Airport. Calculations were performed, and measurements were taken at various locations around the airport. This report was updated in 2016. NILU's report concluded that air quality at and around the airport was much better than in urban areas.

NILU has further concluded that the smell of aviation fuel that may occasionally occur in the airport area is present in such low concentrations that there is no reason to believe that it could cause health problems. Furthermore, there is no indication that the blackening of residential buildings around Oslo Airport is due to soot drop from airplanes but is mainly due to black moulds growth.

Oslo Airport has participated in the project entitled "Assessment of exposure to diesel exhaust particles in the Norwegian labour market, using elementary carbon (EC) as a marker". The National Institute of Occupational Health (STAMI) concludes in its report that "Operators at the airport who are exposed to diesel exhaust fumes and

exhaust fumes from stationary, parked aircraft are exposed to air concentrations (= 2.7  $\mu\text{g}/\text{m}^3$ ) that occur in central urban areas".

## Status, emissions to air 2020

In 2020, Oslo Airport did not carry out measurements of air quality. Previous years' measurements show values well below regulatory requirements and national targets.



*Aircrafts and vehicles are the most important sources of emissions locally at the airport.*

# KEY FIGURES

		2016	2017	2018	2019	2020
<b>Air traffic</b>						
Passengers	number in thousands	25 766	27 458	28 510	28 572	9 022
Aircraft movements	number in thousands	238	243	249	244	117
Passengers per aircraft movement	number	108	113	114	117	77
<b>Public transport share</b>						
Public transport share for surface access	%	70	70	71	72	
<b>Noise</b>						
Change in total noise impact relative to reference year 2007	dBA	0	0,1	0,4	-0,1	-2,9
Inquiries, aircraft noise (persons)	number	285	245	150	183	72
<b>Energy</b>						
Total consumption of electricity	GWh	112	117	120	117	99
Electricity for electricity-specific installations	GWh	105	111	112	113	96
Purchased heating and cooling energy	GWh	32	34	36	31	30
Electricity for electrode boiler	GWh	7	6	8	4	3
Electricity for compressors, pumps, etc.	GWh	9	9	11	11	10
Statkraft Varne AS	GWh	15	16	15	17	16
Heating oil (Energy central)	GWh	1	4	2	1	1
Recovered energy	GWh	24	31	36	33	35
Consumed heating and cooling energy	GWh	56	65	71	64	65
<b>Non-renewable resources / biofuel</b>						
Jet fuel	m <sup>3</sup>	618 192	672 000	700 000	693 600	288 000
Heating oil/diesel	m <sup>3</sup>	182	465	220	104	26
Bio heating oil	m <sup>3</sup>	21	60	64	63	80
Fuel for Oslo Airport vehicles*	m <sup>3</sup>	911	783	1 011	254	53
Biofuel for Oslo Airport vehicles*	m <sup>3</sup>	83	178	250	1 009	528
Fuel for fire drills (paraffin/Jet A1)	m <sup>3</sup>	18	17	13	0	0
Fuel for fire drills (propane)	tonnes	0,3	0,3	0,9	0,0	0
<b>Waste</b>						
Sorted waste	tonnes	3 111	5 498	3 323	2 620	1 091
Residual waste	tonnes	3 044	3 342	3 175	3 096	1 280
Total amount of waste	tonnes	6 155	8 840	6 498	5 716	2 370
Source separation rate	%	51	62	51	46	52
Hazardous waste	tonnes	62	178	111	151	274
<b>Greenhouse gas emissions</b>						
Control - Oslo Airport emissions	tonnes CO <sub>2</sub>	5 093	6 055	5 491	3 036	1 687
Control - Oslo Airport emissions , kg per passenger	kg CO <sub>2</sub> /passenger	0,198	0,221	0,193	0,106	0,187
Guide- third party emissions	tonnes CO <sub>2</sub>	96 570	82 803	88 806	79 286	3163**
Impact - third party emissions	tonnes CO <sub>2</sub>	188 939	198 538	203 278	200 484	0**
<b>Water supply and sewage</b>						
Water consumption	m <sup>3</sup>	221 000	277 000	271 000	246 000	131 700
Wastewater volume	m <sup>3</sup>	297 000	337 000	341 000	336 000	159 000
Drainage water volumes	m <sup>3</sup>	1 870 000	1 444 000	1 411 000	1 660 000	2 185 650
<b>De-icing chemicals (per season)</b>						
		2015/16	2016/17	2017/18	2018/19	2019/2020
<b>Aircraft de-icing</b>						
Total consumption, glycol	tonnes	1 565	1 579	3 785	3 340	2 080
Specific consumption, glycol	kg/aircraft	139	147	210	211	186
Collection rate for glycol	%	80	81	84	81	76
<b>Runway de-icing</b>						
Aviform L50	m <sup>3</sup>	1806	2164	2102	1383	1609
Aviform S	tonnes	281	252	672	290	356
* The figure includes airside bus services and winter maintenance						
** Emission figures are not complete						