

LTOU NET ZERO STRATEGY 2023–2050

LIETUVOS ORG UOSTAI
VNO KUN PLQ



2023 – 2050

LTOU NET ZERO STRATEGY

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01

INTRODUCTION

Air transport is responsible for 2% of global CO₂ emissions, of which only 5% is attributed to airports, i.e., 0.1% of global CO₂ emissions. In Lithuania, air transport emissions account for only 0.03% of transport emissions, and just 0.01% of total greenhouse gas emissions.

As part of the 2015 Paris Agreement, Lithuania has committed to becoming climate-neutral by 2050. In the meantime, the International Air Transport Association (IATA), which brings together airlines, airports, air navigation service providers, and manufacturers, has set a target of halving aviation CO₂ emissions by 2050 compared to 2005.

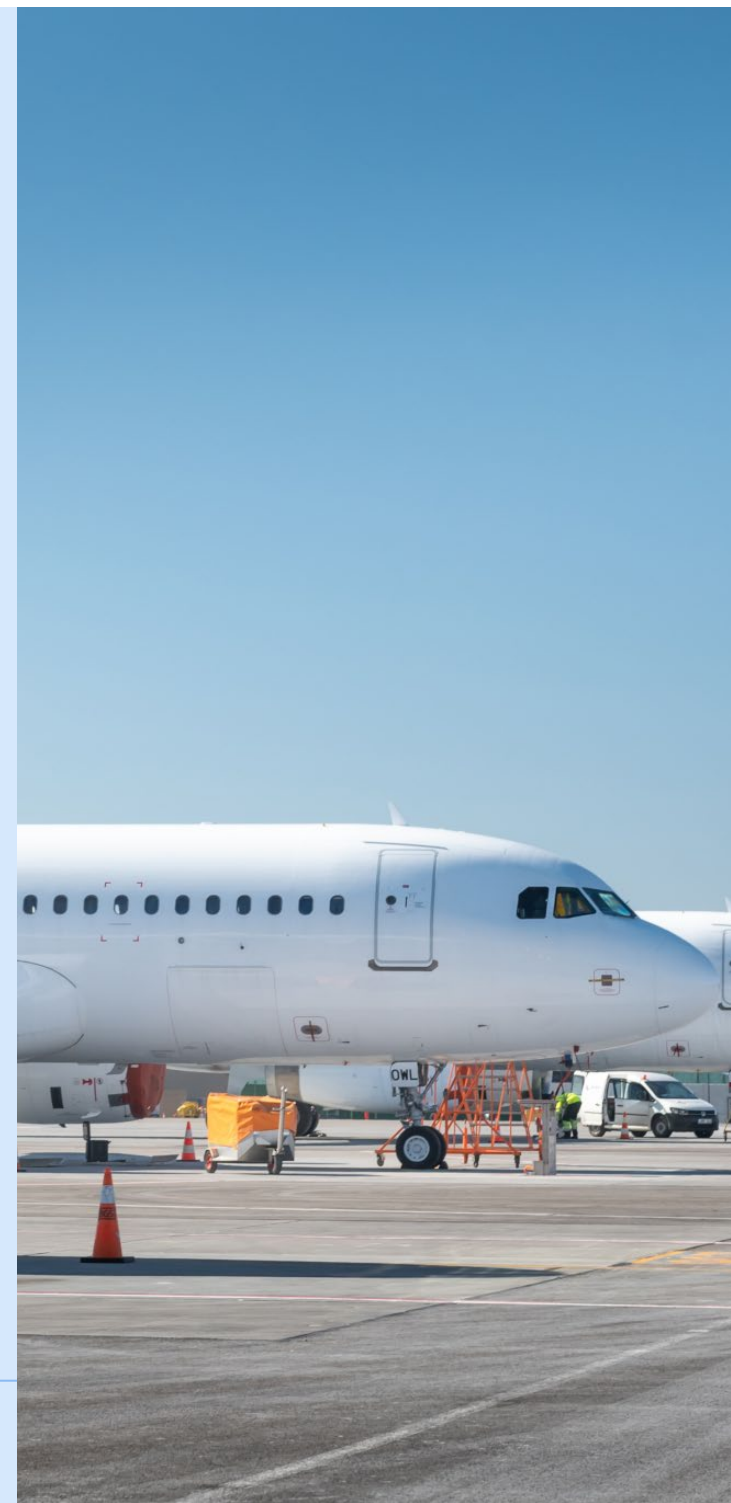
In accordance with the Paris Agreement and special commitments to the aviation sector, Lithuanian Airports (Vilnius, Kaunas, and Palanga), together with 235 other European airports, has voluntarily committed to becoming climate-neutral by 2030, assessing emissions into the environment from operations that can be controlled (Scope 1 and Scope 2).

One of the strategic directions of Lithuanian Airports (LTOU) is “increased public support for airport development as a cornerstone of the economy,” which is increasingly based not only on the availability and economic benefits of services, but also on the image being created. The aim of LTOU to expand its activities by creating more value for passengers and providing higher quality services, increasing operational efficiency, and ensuring stable growth and financial sustainability is impossible without commitments to reduce the impact on the environment.

To ensure the 1.5 °C scenario identified in the Paris Agreement, LTOU (Vilnius, Kaunas, and Palanga) commits to achieve zero carbon dioxide (CO₂) emissions (without compensating) by 2050 at the latest from operations that can be controlled (Scope 1 and Scope 2). Most of these emissions are transport, electricity, and thermal energy emissions.

Lithuanian Airports undertakes to limit the impact of the airport on climate change, surrounding communities, and the environment and increase the accessibility of air travel.

This document provides the Lithuanian Airports' guidelines on how they will aim to achieve climate neutrality by 2030 and zero CO₂ emissions from airport-controlled operations by 2050.



¹ <https://am.lrv.lt/lt/veiklos-sritys-1/klimato-kaita/sesd-apskaitos-ir-prognoziu-ataskaitos-nacionaliniai-pranesimai>

02

THE BASIS OF THE LTOU NET ZERO STRATEGY



01

Eco-friendly transport park

Electric mobility and/or
alternative fuels



02

Energy efficiency

Monitoring, controlling, and
reducing energy consumption
by investing in energy-efficient
solutions



03

Renewable energy

Transforming fossil-based
energy into renewable energy
systems



04

Elimination of residual emissions

By 2030 – compensation by
investing in certified projects;
implementation of carbon
sequestration projects by 2050

03

THE CURRENT SITUATION: ACHIEVEMENTS IN REDUCING CO₂ EMISSIONS

3.1 Vilnius airport

VNO carbon footprint

The absolute Scope 1 and Scope 2 emissions in 2019 (the year of normal activity before the COVID-19 pandemic) were 20% lower and in 2021 – 30% lower than in 2017 (reference year).

Fig. 1. VNO Scope 1 and Scope 2 emissions, 2021

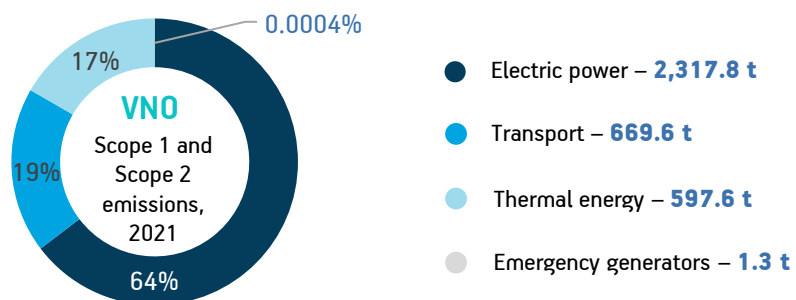


Table 1 VNO Scope 3 emissions 2021

Source	CO _{2e}	% of total emissions
Take-off/landing cycle (LTO)	17,308.9	51.71%
Aircraft Auxiliary Power Units (APUs)	2,940.4	8.78%
Aircraft engine start-up	39.6	0.12%
Transport (including aerodrome transport, equipment, ground handling equipment)	666.2	1.99%
Electricity	2,335.6	6.98%
Thermal energy	231.2	0.69%
Third-party waste treatment	757.1	2.26%
Transport of lessees and their visitors	1,272.4	3.80%
Journeys to and from work by the airport operator staff	306.9	0.92%
Cars, taxi	1,987.6	5.94%
Buses, minibuses	1,902.8	5.68%
Trains	120.9	0.36%
Secondment of staff of the airport operator	17.1	0.05%
Scope 3 – TOTAL	29,887	89.29%



Initiatives to reduce CO₂ that have been implemented:

Scope 1:

- **Transport park:** M1, M2, and N1 category vehicles are leased for a period of three years. Between 2020 and 2023, 18 new, efficient, Euro-6-compliant vehicles were leased, of which there were four hybrid vehicles and one electric vehicle. Between 2019 and 2021, VNO replaced two new airfield sweepers, one tractor, three fire engines, and one fire service headquarters car. CO₂ emissions decreased by 12.5 t.
- **Fire drills:** For a long time, a mixture of kerosene and water was used during fire drills. About 400 l of kerosene was consumed per year. Since 2021, smoke cartridges or smoke generators have been used during fire exercises and CO₂ emissions have been reduced by 6 t/year.
- **The lighting systems efficiency programme,** was launched in 2017 when LED lamps were introduced to illuminate parts of the VNO platform and stationary areas. In 2020–2021, all lamps were converted to LEDs. New LED signal lights were installed during the reconstruction of the runway in 2017, saving about 92 MWh of electricity per year, corresponding to 35 t CO₂/year.
- A 25 kW **solar power plant** on the roof of the VIP terminal provides about 14% of the VIP terminal's energy demand, saving 0.6 t of CO₂ in 2021.
- Regular **energy audits** of buildings and installations are carried out every four years.

- **The building management system,** which contributes to the efficient management of energy use, started in 2020 and is constantly being updated and improved by gradually connecting the VNO terminal premises. It is planned to complete the installation together with the construction of the T4 terminal.
- **Energy efficiency:** 392 MWh of thermal electrical energy was saved between 2018 and 2019 and 2,414 MWh in 2021 – a reduction of 1,222 tonnes of CO₂ emissions.

Scope 3:

- Between 2021 and 2022, **nine new underground gas processing units (GPUs)** were installed to replace diesel, thus reducing emissions (CO₂ and non-CO₂) due to stationary electricity supply to aircraft. 33 parking areas in total have a power supply at VNO.
- **New and reconstructed runways:** runway Alpha was dismantled, Bravo – was reconstructed, Foxtrot was extended, connecting both ends of the runway, and a new Zulu runway was built. All this allowed to shorten each runway operation by two minutes.
- **A collection system for wastewater** contaminated with de-icing agents **and four dedicated aircraft de-icing sites** were installed between 2021 and 2022.

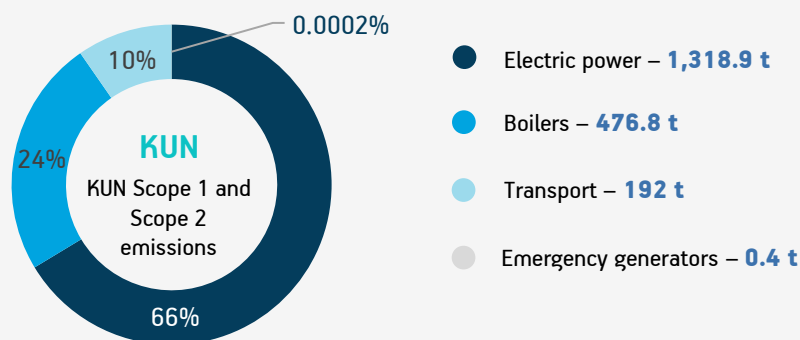


3.2. KAUNAS AND PALANGA AIRPORTS

KUN carbon footprint

The absolute Scope 1 and Scope 2 emissions in 2019 (the year of normal activity before the COVID-19 pandemic) were 40% lower and in 2021 – 36% lower than in 2018 (reference year).

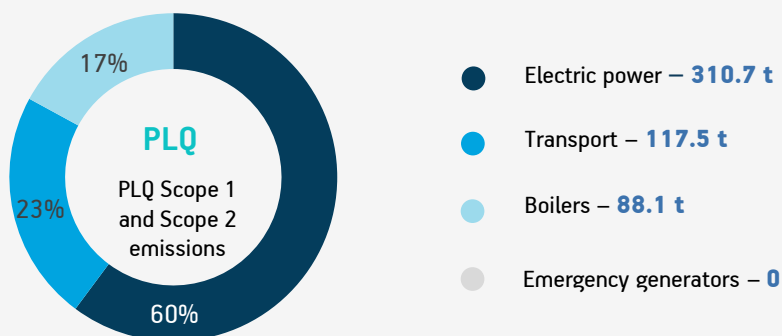
Fig. 2. KUN Scope 1 and Scope 2 emissions



PLQ carbon footprint

The absolute Scope 1 and Scope 2 emissions in 2019 (the year of normal activity before the COVID-19 pandemic) were 45% and in 2021 – 44% lower than in 2018 (reference year).

Fig. 3. PLQ Scope 1 and Scope 2 emissions



Initiatives to reduce CO₂ that have been implemented:

Scope 1:

- Transport park:** every three years a new lease agreement for fuel efficient and hybrid vehicles is concluded and special-purpose equipment and vehicles used at the aerodrome are gradually replaced. Between 2018 and 2021, KUN replaced two airfield sweepers, two tractors, two fire engines and one fire service headquarters car, one lawnmower, while PLQ – one chemical reagent dispenser, one fire engine and one fire service headquarters car, and one loader.

Scope 2:

- Lighting system efficiency programme:**
 - 96–98% of all premises administered by KUN and PLQ airports use LED lighting.
 - PLQ was equipped with new LED signal lights during the reconstruction of the runway in 2021, which saves about 2.9 MWh of electricity per month – 1.1 t CO₂/month.
- Regular **energy audits** of KUN and PLQ buildings and installations are carried out every four years.
- A **building management system** at KUN passenger terminal, which helps to efficiently manage energy use.

Scope 3:

- Auxiliary gas processing units (GPUs)** that allow the elimination of diesel GPUs and the avoidance of CO₂ and other air pollutants:
 - At KUN, nine out of 24 aircraft parks are electric.
 - During the reconstruction of the platform in 2021, seven underground GPU power plants were installed in PLQ.
- In 2021, the **PLQ runway was reconstructed** and the platform coating was completely changed. The refurbished coatings provide better surface grip and smoother rolling, reducing fuel consumption and emissions by aircraft.

04

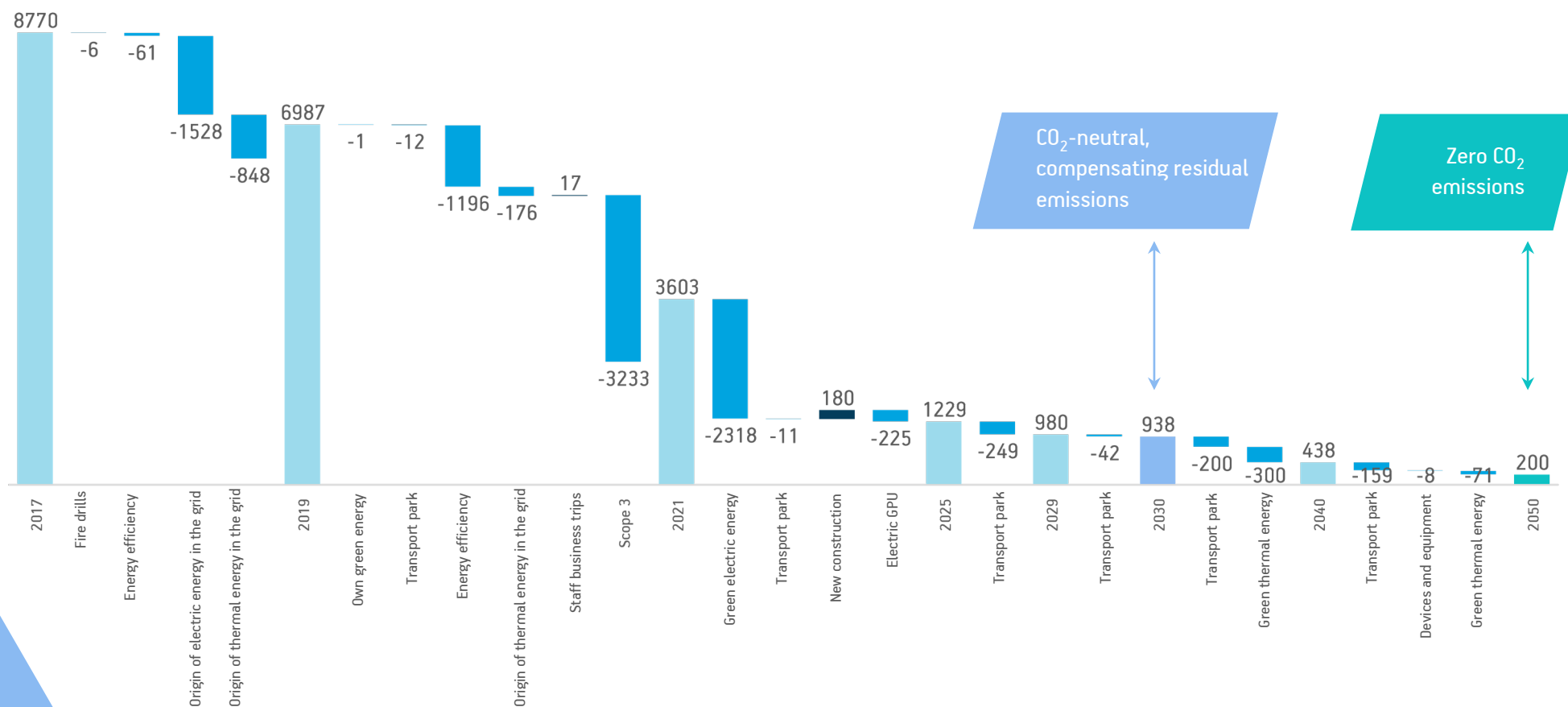
ACTION PLAN ON CO₂ REDUCTION: NEUTRALITY AND ZERO EMISSIONS

4.1 VILNIUS AIRPORT



Vilnius Airport CO₂ neutral and zero emission plan

To reach zero emissions after 2030, less than 1,000 t of CO₂ will need to be decarbonised



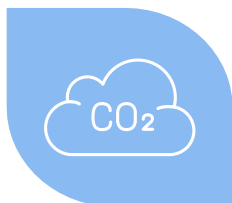
CO₂ NEUTRALITY BY 2030

Scope 1:

- **The transport park.** M1, M2 and N1 automobiles are rented for three years, increasing each time the number of hybrids and electric cars, until all these categories are electric by 2030. VNO special vehicles and equipment (fire engines, tractors, snow ploughs, lawnmowers, etc.) are gradually being upgraded, choosing the most sustainable alternative available on the market.
- **GPU.** By 2025, eight mobile diesel GPUs will be replaced by electric ones.
- **Development of an electric vehicle charging network.** By 2025, a charging station with a total capacity of 1.08 MW for the charging of passenger electric buses will be installed in the aerodrome area; five dual charging points and five three-phase power outlets with a total capacity of 0.36 MW for the charging of special aerodrome vehicles, equipment and mobile GPUs; four dual 0.24 MW total power charging points for transport by ground handling companies and other partners.

Scope 2:

- **Green electricity.** As long as green energy generation capacity to cover VNO demand is not guaranteed, electricity from the grid will be purchased with certified guarantees of origin.
- **Own production of green energy.** The aim is that 80–90% of the total electricity demand of VNO is covered by own renewable energy. The vision is to use the unbuilt area of the VNO plot and the roof of the new T4 terminal for the construction of photovoltaic cells. As an alternative, the construction, rent, etc. of remote power plants are also considered.
- **Energy efficiency.** In order to reduce the consumption of electricity and thermal energy, various savings measures are in place: only LED lighting is used; motion sensors are installed in less-used areas; mounted temperature sensors for optimal temperature tracking.
- **Standards for sustainable buildings.** New buildings are designed to meet the requirements of international building certification standards (BREEAM, LEED, etc.).
- **ISO 50001:2011 Energy Management.** implementation. This standard would help reduce energy costs in the company by setting up an energy management system. The successful implementation of the energy management system allows for a reduction in energy consumption from 15% to 30% after the first year.



RESIDUAL CO₂ EMISSIONS — ABOUT 938 T

COMPENSATED WHEN INVESTING IN CERTIFIED PROJECTS

ZERO CO₂ EMISSIONS BY 2050

Exploring options for zero emissions by 2050:

- **Vehicles and equipment,** powered by non-fossil fuels, hydrogenated vegetable oil, renewable electricity, hydrogen.
- **Green thermal energy.** Buildings heated using renewable energy sources — green gas, green electricity, biofuels. A fundamentally redesigned VNO heating system, securing its own renewable heat sources, or heat sources with guarantees of origin. One of the possible solutions is its own renewable fuel-fired cogeneration plant that provides VNO's electricity, heating, and cooling needs.
- **In diesel generators,** diesel is replaced by non-fossil fuel, e.g., hydrogenated vegetable oil.
- **100% own production of green electricity.**



RESIDUAL CO₂ EMISSIONS –AROUND 200 T

CARBON SEQUESTRATION PROJECTS ARE ONGOING to absorb CO₂ in the atmosphere (green roofs, greenery, trees, hedges, etc.). To absorb 200 t/year of CO₂, approximately 10 ha of forest should be planted or 111,000 m² of green roofs should be installed.

04

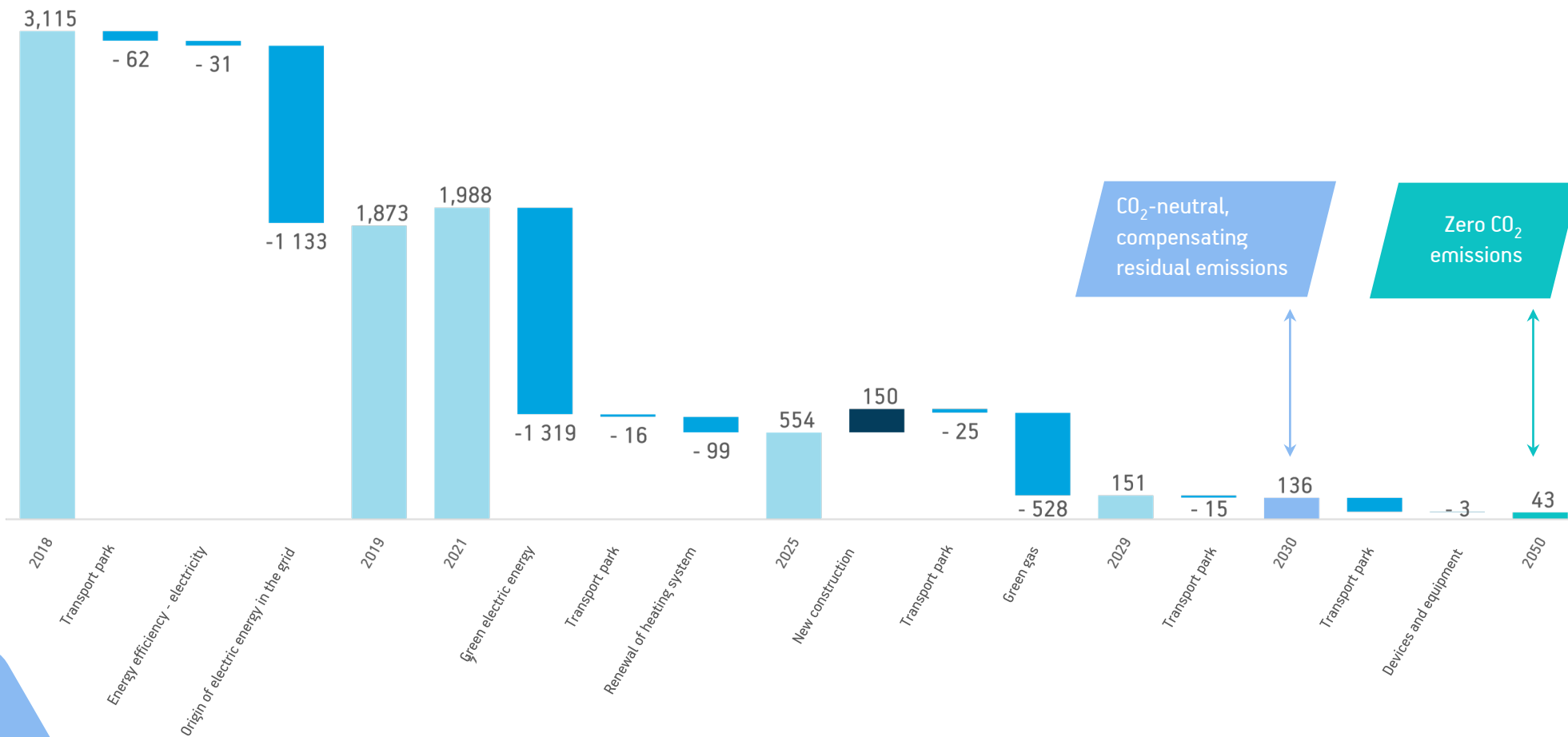
ACTION PLAN ON CO₂ REDUCTION: NEUTRALITY AND ZERO EMISSIONS

4.2 KAUNAS AIRPORT



Kaunas Airport CO₂ neutral and zero emission plan

To reach zero emissions after 2030, around 130 t of CO₂ will need to be decarbonised



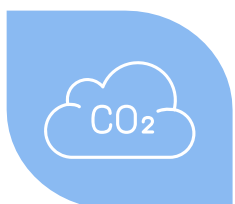
CO₂ NEUTRALITY BY 2030

Scope 1:

- **The transport park.** M1, M2 and N1 automobiles are rented for three years, increasing each time the number of hybrids and electric cars, until all these categories are electric by 2030. KUN special vehicles and equipment (fire engines, tractors, snow ploughs, lawnmowers, etc.) are gradually being upgraded, choosing the most sustainable alternative available on the market.
- **Thermal energy.** In 2022, the use of one of the powerful but inefficient KUN boiler rooms was halted, minimising heating in low-use KUN buildings (garages, storage rooms) and installing air-to-air heat pumps in other buildings. This is also the case in the fire-rescue council's building. In 2023, the gas boilers of the administrative and old terminals are expected to be replaced by new, efficient ones, saving at least 5% of gas.
- **Green gas.** The envisaged use of gas from renewable energy sources with a certified guarantee of origin.
- **Development of electric vehicle charging network:** By 2025, a charging station for electric buses, special aerodrome vehicles and equipment, and partner cars with a total capacity of 1.32 MW will be installed at 14 charging points.

Scope 2:

- **Green electricity.** Until green electricity generation capacity is available to cover all of KUN's needs, electricity from the grid will be purchased with certified guarantees of origin.
- **Production of green electricity.** In 2023, two solar power plants, 10 kW and 30 kW, will be installed. The next phase will be the construction of a solar power plant of around 1,000 kW, using the roofs of buildings and the unbuilt area of the KUN plot. The objective will be to gradually cover 80–90% of the total electricity demand of the KUN by its own renewable energy.
- **Energy efficiency.** In order to reduce electricity consumption, savings measures such as LED lamps, motion sensors, etc. are used for lighting.



RESIDUAL CO₂ EMISSIONS — ABOUT 136 T

COMPENSATED BY INVESTMENTS IN CERTIFIED
PROJECTS (OFF-SETTING)

ZERO CO₂ EMISSIONS BY 2050

Exploring options for zero emissions by 2050:

- **Vehicles and equipment,** powered by non-fossil fuels, hydrogenated vegetable oil, renewable electricity, hydrogen.
- **Green thermal energy** – Buildings heated using renewable energy sources — green gas, green electricity, biofuels.
- **Gas from renewable energy sources,** the origin of which is certified as guaranteed.
- **In diesel generators** dyzelinas pakeičiamas neiškastiniu kuru.
- **100% own production of green electricity.**



CARBON SEQUESTRATION PROJECTS ARE ONGOING

to absorb CO₂ in the atmosphere (green roofs, greenery, trees, hedges, etc.). To absorb 43 t/year of CO₂, approximately 2 ha of forest should be planted or 24,000 m² of green roofs should be installed.

04

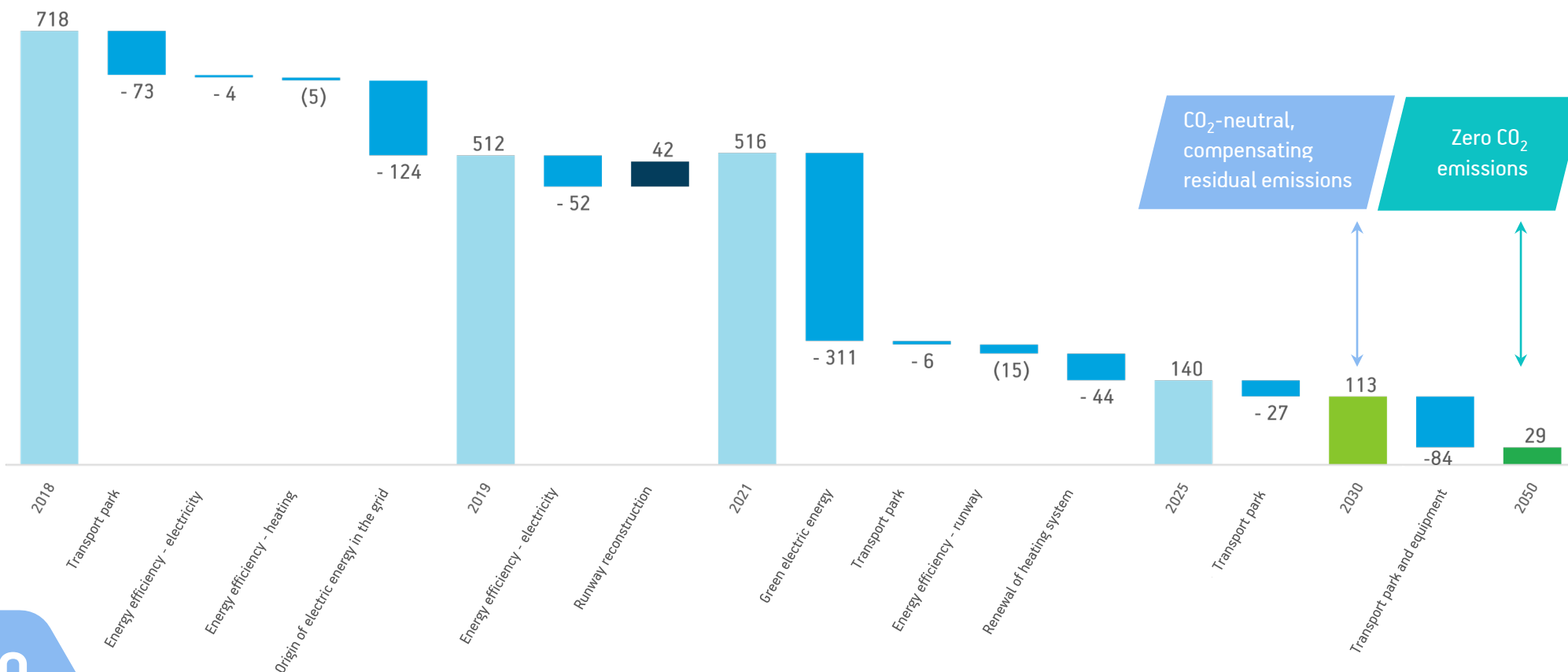
ACTION PLAN ON CO₂ REDUCTION: NEUTRALITY AND ZERO EMISSIONS

4.3 PALANGA AIRPORT



Palanga Airport CO₂ neutral and zero emission plan

To reach zero emissions after 2030, around 110 t of CO₂ will need to be decarbonised



CO₂ NEUTRALITY BY 2030

Scope 1:

- **The transport park.** M1, M2 and N1 automobiles are rented for three years, increasing each time the number of hybrids and electric cars, until all these categories are electric by 2030. PLQ special vehicles and equipment (fire engines, tractors, snow ploughs, lawnmowers, etc.) are gradually being upgraded, choosing the most sustainable alternative available on the market.
- **Thermal energy.** Renovation of the heating system is planned, installing air-to-air heat pumps in some of the premises.
- **Green gas.** The vision is to use gas from renewable energy sources with a certified guarantee of origin.
- **Development of an electric vehicle charging network:** By 2025, it is planned to install three charging stations (two charging points with a capacity of 44 kW each) for charging electric buses, special aerodrome vehicles and equipment, and partner cars.

Scope 2:

- **Green electricity.** As long as green electricity generation capacity is not guaranteed to cover all PLQ needs, electricity from the grid will be purchased with certified guarantees of origin.
- **Production of green electricity.** In the initial phase, it is planned to install 400.18 kW solar power plants using the roofs of buildings and the unbuilt area of PLQ. Gradually, 80–90% of PLQ's total electricity demand will be covered by own renewable energy.
- **Energy efficiency.** In order to reduce electricity consumption, savings measures such as LED lamps for lighting, motion sensors, heat reduction in low-use areas, etc. are applied.



RESIDUAL CO₂ EMISSIONS — ABOUT 113 T

COMPENSATED BY INVESTMENTS IN CERTIFIED
PROJECTS (OFF-SETTING)

ZERO CO₂ EMISSIONS BY 2050

Exploring options for zero emissions by 2050:

- **Vehicles and equipment,** powered by non-fossil fuels, hydrogenated vegetable oil, renewable electricity, and hydrogen.
- **Buildings heated** using renewable energy sources – green gas, green electricity, and biofuels.
- **Gas from renewable energy sources,** the origin of which is certified as guaranteed.
- **Diesel generators** replacing diesel with non-fossil fuel.
- **100% own production of green electricity.**



RESIDUAL CO₂ EMISSIONS — ABOUT 29 T

CARBON SEQUESTRATION PROJECTS ARE ONGOING
the atmosphere (green roofs, greenery, trees,
hedges, etc.). To absorb 29 t/year of CO₂,
approximately 1.5 ha of forest should be planted
or 16,000 m² of green roofs should be installed.

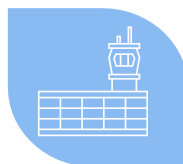
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**ANALYSIS OF SCOPE 3
INITIATIVES**

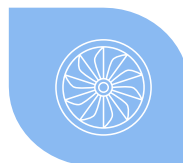
AIRCRAFT OPERATIONS

The largest source of CO₂ at airports is aircraft emissions from the take-off cycle (up to 3,000 ft altitude), taxiing, aircraft auxiliary power units (APUs), and engine start-ups (approximately 60% of the airport's CO₂ emissions).

Airports have no direct impact on aircraft operations, but as infrastructure managers can contribute to CO₂ reduction initiatives:

**Take-off, landing, and taxiing**

LTOU together with *Oro navigacija* will continuously assess the possibilities of optimising the approach trajectories of aircraft and reducing their taxiing time on the ground by implementing in a coordinated manner the technological, procedural, and infrastructure improvement projects for this purpose.

**Single engine taxiing**

can reduce CO₂ emissions by 20–40%. This technique is used by many airlines, including Finnair, Ryanair, Scandinavian Airlines, etc. In cooperation with the airlines, the use of only one engine during taxiing operations will be encouraged.

**GPU**

By 2030, all aircraft parking spaces will be provided with electricity from renewable sources.

**Safe aviation fuels (SAF)**

LTOU will seek to implement the European Commission's initiative to increase the share of safe aviation fuels at airports by increasing the supply of SAF and synthetic fuels from 3% SAF to 66% SAF, of which at least 28% will be synthetic aviation fuels, every five years from 2025 onwards. Provisions on the adaptation of infrastructure for the blending (if necessary) and supply of sustainable aviation fuels are already included in the lease agreements for the VNO and PLQ fuel bases.

**Electric and hydrogen-powered aircraft**

LTOU commits to align its infrastructure projects with these emerging technologies to ensure the design of the respective parking areas, hydrogen fuel storage and supply infrastructure, and sufficient and affordable power supply once such aircraft are put into service.



Ground transportation

Passenger transport to and from the airport accounts for about 12% of the airport's CO₂ emissions (VNO). LTOU accepts the responsibility to take decisions that motivate travellers to choose sustainable ways to reach the country's airports (public transport, railways, hybrid cars, electric cars, etc.) and to cooperate with municipalities in improving the ground transport infrastructure, creating conditions for walking, cycling, scooters, etc.



Ground handling transport and equipment

LTOU ground handling operations — fuelling, de-icing, loading/unloading luggage and cargo — are carried out by independent companies. Most of them have their own sustainability goals, so LTOU commits to cooperating and promoting their implementation. The main source of ground handling CO₂ is transport and equipment (fuel refuelling and de-icing cars, tractors, buses, loaders, etc.). While some specific ground handling facilities do not yet have clean and fuel-efficient alternatives available on the market, the gradual electrification of ground handling equipment is foreseen in the future, and the use (e.g., for heavy duty transport and buses) of alternative renewable fuels such as biodiesel, renewable gas, or hydrogen is also being explored.

Airports will cooperate with and promote the ambitions of ground handling companies to use CO₂-neutral vehicles and equipment, ensuring a sufficient number of electric charging points. By 2025, a charging station with a total capacity of 1.08 MW for the charging of passenger electric buses will be installed in the aerodrome area; five dual charging points and five three-phase power outlets with a total capacity of 0.36 MW for the charging of aerodrome specialty vehicles, equipment, and mobile GPUs; four dual 0.24 MW total power charging points for transport by ground handling companies and other partners. In addition, LTOU participates in projects analysing the use of hydrogen fuel in aerodrome and aircraft handling vehicles and commits to adapting its infrastructure accordingly.



Energy consumed by lessees

About half of the airports' electricity and about a third of the thermal energy is attributed to lessee consumption. Airports undertake to ensure that lessees are supplied with green electricity as soon as the airports have secured their generation capacity. Otherwise, the lessees will be supplied with electricity, the production of which from renewable sources will be confirmed by guarantees of origin. Changes in the transformation of the heating system into renewable energy systems at VNO, KUN, and PLQ airports will ensure that airport lessees are also supplied with green thermal energy. In addition, airports plan to expand engagement and information campaigns to involve as many partners as possible in decarbonisation activities.



Waste

The airports will seek to achieve the most efficient sorting and recycling of waste and to minimise the amount of waste entering landfills. To this end, an airport waste management strategy will be developed. In the future, alternatives to energy recovery from waste, such as biogas reactors where the generated gas would be used for heat production, will also be considered.



Staff travel

In 2021, travel by VNO and LTOU staff contributed to 17 t of CO₂ emissions and accounted for about 0.5% of Scope 1 and Scope 2 emissions. The travel contribution of KUN and PLQ staff will be estimated in 2023, but the percentage is likely to be similar. LTOU commits to reducing CO₂ emissions related to staff business trips in Lithuania and abroad by encouraging employees to choose sustainable travel solutions — not travel when meetings can be done remotely, coordinate travel times and routes in Lithuania in order to travel with a full crew, to travel abroad on buses or trains, and for further journeys — to choose direct flights, and to contribute to airlines' CO₂ reduction initiatives.

06

IMPLEMENTATION – ACA PROGRAMME

This strategy is based on the Airport Council International (ACI) programme's Airport Carbon Accreditation (ACA) requirements for calculating, assessing, and reducing emissions. The LTOU will strive for neutrality in accordance with the principles of the ACA programme made up of six levels.

In 2022, VNO reached Level 3 and KUN and PLQ reached Level 2. All the airports will become climate neutral in 2030 and reach ACA Level 3+ Neutrality and 4+ Transition in 2050.



Airport Carbon Accreditation Levels

