lux airport

ROADMAP TO

NET ZERO 2030

NET ZERO

NET ZERO STRATEGY

NET ZERO BY	ENERGY CONSUMPTION REDUCTION
2030	**-50% BY 2027**

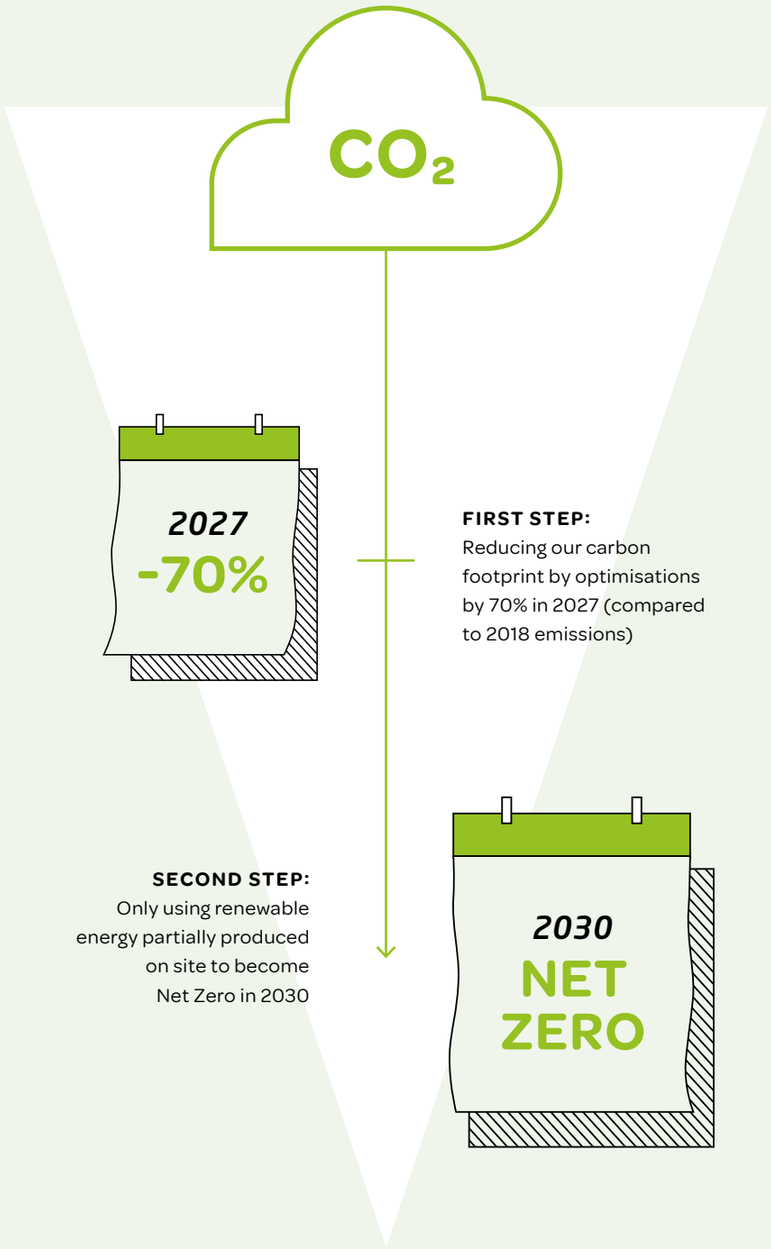
COMMITTING TO NET ZERO BY 2030

LUX-AIRPORT IS ONE OF AIRPORTS COMMITTED TO ACHIEVING NET ZERO, ABSOLUTE CARBON NEUTRALITY, BY 2030.

Net Zero in the definition proposed by the International Panel on Climate Change (IPCC) is that state "when anthropogenic CO_2 emissions are balanced globally by anthropogenic CO_2 removals over a specified period." In other words, to achieve this we either need to stop producing new CO_2 or compensate for any emissions by removing existing emissions from the Earth's atmosphere.

As the IPCC report underlines: "urgent and drastic action to limit Global warming in line with the Paris Agreement" is needed. This means that Global emissions should decline by 45% by 2030 and reach Net Zero by 2050.

OUR GOALS:



LUX-AIRPORT

NET ZERO 2030

European countries where one or more airports are commited to Net Zero by 2030.

IN GOOD COMPANY: EUROPEAN AIRPORTS ARE PULLING TOGETHER

Airports have bold ambitions on their path to carbon neutrality, with experience in carbon management dating back over a decade. In their landmark Resolution adopted in June 2019, they committed to Net Zero carbon emissions from operations fully within their own control by 2050 at the latest. **lux-Airport is one of the ambitious airports committed to achieving earlier Net Zero, absolute carbon neutrality, by 2030.**

EMISSION INVENTORY AND DEFINING TARGETS

CARBON FOOTPRINT BASELINE ASSESSMENT

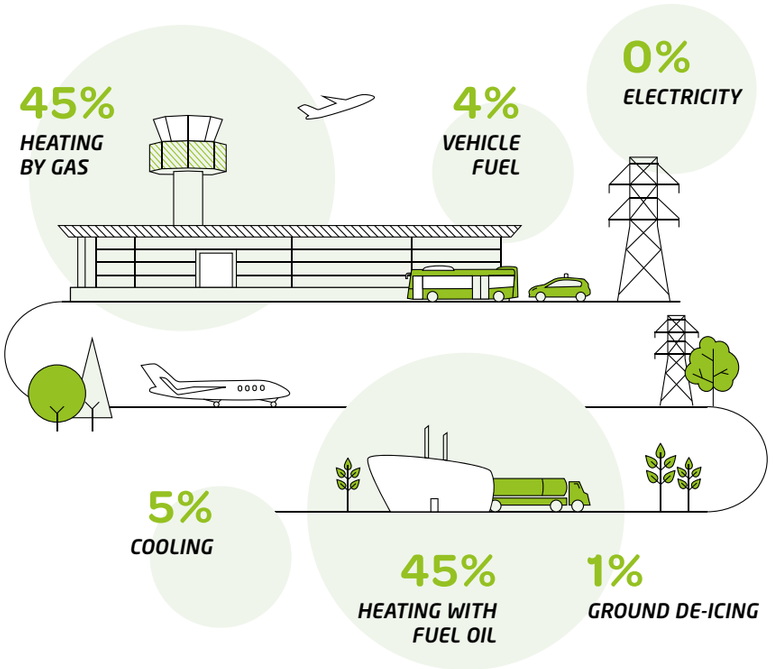
In line with the IPCC report (2023), it is recommended to use 2010 as a baseline. In case of lack of high-quality emissions data or full operating later, airports can choose another reference year. In lux-Airport, the data are available since 2014 but the reference year chosen is 2018 as it is the first complete year integrated the terminal B after refurbishment in the operational perimeter.

Once the baseline had been decided, a detailed analysis of emission sources was prepared to understand where the major opportunities for improvement at the airports are.

An extensive list of solutions used at other airports and in other industries has been studied and the potential of their application to lux-Airport has been analyzed in detail. With this approach, the different opportunities available to reach Net Zero Carbon, their potential impact and the challenges involved have been analyzed. From this, the list of possible solutions applicable to lux-Airport has been extended.

OUR CARBON EMISSIONS SOURCES

(reference year 2018)



LUX-AIRPORT

NET ZERO 2030

NET ZERO

ACTIONS TO REDUCE CO_2 EMISSIONS

ENERGY CONSUMPTION BY 2027	RENEWABLE ELECTRICITY PRODUCTION BY 2030	PV PLANNED BY 2030
-50%	**20%**	**2 MWp**

ENERGY OPTIMISATION

Since July 2014, lux-Airport has only been supplied with green electricity, via Enovos. The renewable energy certificates are issued by the Institut Luxembourgeois de Régulation (ILR) and also validated by the European Energy Certification System (EECS). Our electricity mainly comes from hydraulic energy. Since 2020, the gas used to heat the terminals has also been climate-neutral.

Nevertheless, energy is too precious to be wasted, even if it comes from renewable sources.

lux-Airport's journey towards optimisation started by taking inventory of the airport's energy consumption and overall energy management. After an analyze of the existing situation, a statutory energy audit of the buildings on the airport grounds was completed to get an overview of their energy consumption and management.

After 10 years of energy management at Terminal A, with an initial design already thought to be energy efficient, it is now time to review all aspects of energy management at the terminal. The airport's efforts to optimise Terminal A involve the revision of energy metering through the analysis of existing meters, their operation, their suitability, and their replacement according to specific needs, as well as their integration into the GTC control system. After creating a work group dedicated to energy management, existing set values have been controlled and adapted to optimise the different installations in terms of efficiency and energy saving potential.

Several project were already carried out in 2021, such as replacing of the energy meters (hot / cold), revising the set points, and the replacing part of the lighting with LED.

In 2022, optimizations and adjustments continued with new parameters implemented for public and office areas, which allows some temperature variations, but significantly reduces overall energy consumption. For instance, in the offices, the air conditioning start cooling only when the temperature reaches 24°C and not below anymore, according to the thermostat setting. **We already reach 50 % reduction in heating consumption and 40% for cooling between 2022 and 2023.**

Most of the carbon footprint is concentrated in the heating by fuel oil of older buildings. lux-Airport analyzed heating processes and management systems of these buildings to identify areas of consumption reduction potential. In 2023, we changed the heating-cooling installation for GAT-SH by efficient heat pump. The change of other old heating installation are planned in the coming year according the roadmap to reach Net Zero by 2030.

lux-Airport also carry out a study of new concepts such as a progressive replacement of energy-intensive light sources with LED lighting. **The replacement of LED** is now achieved for every parkings and apron and continues by taking place progressively in the terminals.

Moreover, since 2024, we are ISO 50001 certified, with a compliant Energy Management System, able to proof the efficiency of our measures for energy savings

SCENARIO: 6 PILLARS

We created an emission inventory (reference year: 2018) and established a baseline emission forecast until 2030.

We have 6 different sources of emissions: vehicle fuel, heating, cooling, electricity, de-icing products and losses of refrigerant. For each of these main pillars, we developed and assess possible measures, including a technical feasibility check, an assessment of possible CO_2 reductions, as well as a timeline and cost estimation (CAPEX / OPEX). The resulting feasibility scenario matrix determine our actions.

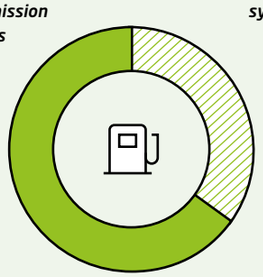
This roadmap is not an end in itself but is continuously adapted according to technological innovations and further feasibility studies.

MAIN PILLARS SCENARIO

VEHICLE FUEL

65% *Low emission vehicles*

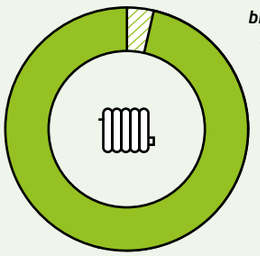
35% *synthetic fuel*



HEATING

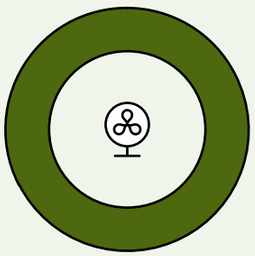
Terminal *electric*

Other buildings *biomass, electric*



COOLING

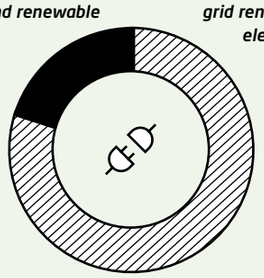
100% *electric*



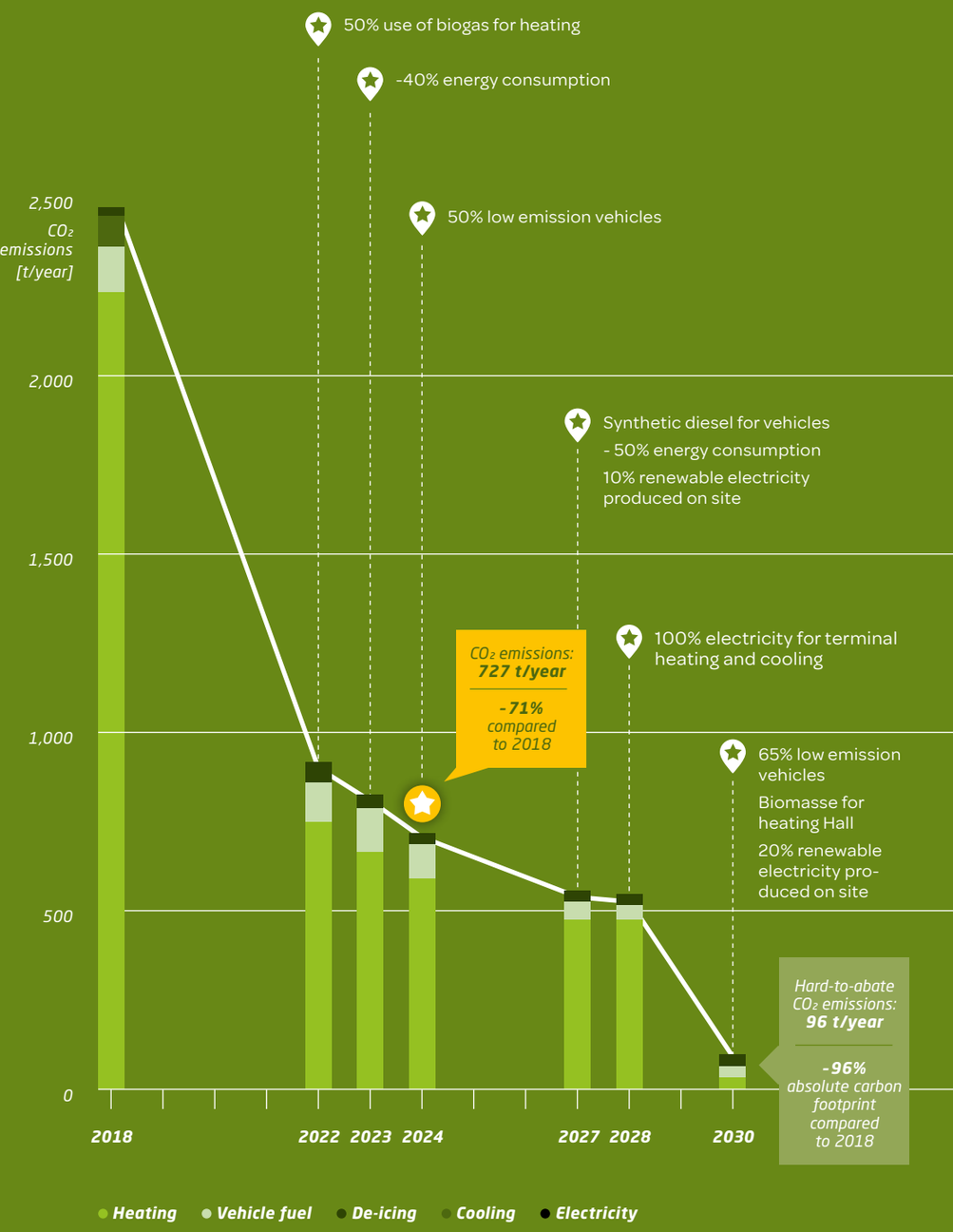
ELECTRICITY

20% *local and renewable energy*

80% *grid renewable electricity*



OUR PATHWAY



VEHICLE FUEL

In 2024, 54% of our vehicle fleet are low emission vehicles, 29% fully electric. Our new vehicle policy excludes buying any new fully thermal vehicles if there is no operationnal reasons. Some heavy vehicles, like sweepers, tractor or other can not be changed by electrical one. In 2030, due to this constrains, the low emissions vehicle will represent 65% of our fleet.

HEATING

The heating consumption and consequently the solutions are different building per building.

For the main terminals, the heating production comes from a cogeneration plant using climate neutral gas. In 2028, this system will be change by another production based on several electrical heat pump combined with compressors.

The other buildings are using fuel oil for heating. We planned to change progressively there different heating installation by either an heat pump or biomass, depending on the feasibility of each case. The transformation has already start in 2024 by the heating installation for GAT wit heat pump.

COOLING

Except some autonomous cold production units, the main consumption is for the terminals. Currently, the production is combined with the heating production with cogeneration plant. In 2028, this production will be provided only by electrical compression installation.

ELECRICITY

As we are using 100% renewable electricity, the idea for this pillar is to produce this renewable energy production on site as much as possible.

lux-Airport is conducting a study of photovoltaic potential in the airport, considered the safety constraints, such as OLS restrictions, ILS or glint and glare possible impacts.

The first project is now authorized and will be achieved in 2025 with an expected production around 150 000 kWh. After a testing phase for this first photovoltaic project in the airport fence, year by year at least five other projects are planned. We expect a installed power around 2,000 kWp, with a production estimated around 2,000 MWh/year.

Despite the strong presence of wind, wind power is not an easy choice for an airport. Too many safety constraints make the installation of large horizontal wind turbines impossible. However, innovative solutions exist, and one of them will be installed on the roof of our new timber-framed building: the Skypark Business Center. Combining three vertical wind turbines to concentrate gusty winds onto the central turbine, the chosen solution is highly relevant for this roof exposed to prevailing winds.

Since the wind turbines must be equipped with a front deflector to concentrate the winds and covered with photovoltaic panels for year-round linear production, they fit perfectly into the initially planned photovoltaic panel project.

To meet our sustainability requirements, the photovoltaic panels will be produced in Luxembourg and the wind turbines will be made of 100% bio-sourced polymer, composed of sea silk and talc.

DE-ICING PRODUCTS AND REFRIGERANT LOSSES

The two other pillars, according ACA scope 1 emissions definitions are refrigerant losses from air-conditioning units and fugitive emissions from de-icing chemicals.

The consumption of de-icing products is strongly dependent on weather conditions. The products currently used (format and propylene glycol) are those with the lowest emission factor currently on the market.

The refrigerant losses are kept in lower level with good preventive maintenance.

HARD-TO-ABATE EMISSIONS

Although the developed scenarios describe pathways that aim to ensure lux-Airport becomes a Net Zero Carbon airport, a few hard-to-abate emission sources are expected to remain.

These emissions are largely due to the consumption of products to ensure the de-icing of aircraft, which is necessary for their safety and depends on weather conditions.

lux-Airport will choose a solution called "CO2finBéton" which consist of carbon sequestration in recycled concrete in Luxembourg.

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DESIGN & IMPLEMENTATION

LEKKERWERKEN GMBH

NET ZERO 2030