<table>
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<tr>
<th>Highlights</th>
<th>-33.5 kT/y CO₂</th>
<th>-2.1 kT/y CO₂</th>
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<td>Extended arrival management</td>
<td></td>
<td>Optimised arrivals</td>
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<td>Improvement of vertical flight profiles</td>
<td>-3.2 kT/y CO₂</td>
<td>-54.5 kT/y CO₂</td>
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<td>Continuous Descent Operations</td>
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<td>Energy efficiency since 2006</td>
<td>+30%</td>
<td>-200 MWh/y</td>
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<td>Renewal of radio system</td>
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<td>Power consumption of tower simulators</td>
<td>-12 MWh/y</td>
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<td>La Dôle heating, ventilation and air-conditioning system</td>
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Skyguide has embarked on a strong and determined environmental policy in three main action areas: its operations, its infrastructure and the involvement of its employees.

We have fully embraced European strategies which strive for environmental efficiency in air traffic activities. Furthermore, skyguide is involved in the Swiss Confederation’s “Exemplary in Energy” programme. Environmentally friendly practices have become part of our business strategy.

Thanks to our multi-layered efforts in Air Traffic Management and in other areas like buildings and renewable energies as well as mobility and green IT, we have already achieved several of our long-term targets.

Alex Bristol
CEO skyguide Ltd
Skyguide is contributing to national and international initiatives intended to improve the ecological credentials of air traffic and to reduce its own ecological footprint with activities centred around three axes: operations, infrastructure and mobility.

On the operational side, flight efficiency is the key factor. The European Commission’s plan for a Single European Sky (SES) contains environmental targets. In that regard, skyguide is also collaborating closely with the SES Research and Development programme (SESAR) and is furthermore participating in the International Civil Aviation Organisation’s Committee on Aviation Environmental Protection.

Concerning buildings and renewable energies, green IT and mobility, the Swiss Confederation’s “Exemplary in Energy” initiative is actively supported by skyguide which has developed its own environmental management system and sets itself concrete goals. To achieve maximum impact, the Green Team, made up of employees from various departments, is upholding the principles of environmentally friendly behaviour, launching the necessary activities and spreading the message.
Efficient flight handling

Skyguide is taking steps to reduce the environmental impact of air traffic by implementing better procedures such as iStream, XMAN, improved vertical flight profiles, direct routes and continuous descent operations.

iStream at Zurich Airport, for instance, aims at assigning a precise slot to each aircraft to avoid queuing at the arrival route entries just before the end of the night flying restrictions, thus reducing noise, fuel consumption and CO2 emissions.

Environmental benefits of drones

Instrument landing systems (ILS) have to be calibrated regularly, by means of an aircraft with specialised equipment. It will be gradually replaced by drones, thus reducing the number of such flights by 50 per cent from 2020 and by 70 per cent from 2023. As a result, CO2 emissions will be cut by 142 tons and energy consumption by 541 MWh per year from 2020. From 2023, these reductions will amount to 199 tons of CO2 and 757 MWh per year.
In the same vein, XMAN (extended arrival management) is optimising the arrival flow and cutting the aircraft’s holding time at airports by adapting their cruising speed while still in the airspace of adjacent control centres. By 2023, a reduction in CO2 emissions of 33.5 kT per year is projected.

But the energy efficiency of an aircraft depends also on its cruising altitude. By improving vertical flight profiles, it is possible to optimise its energy efficiency. Thus, an additional 7.8 GWh per year could be saved through an adaptation of procedures.

Flying more directly also enables fuel savings and, in turn, reduces CO2 emissions and airspace users’ costs. In 2017, 63 direct routes were implemented in the airspace controlled by skyguide.

Finally, continuous descent operations allow aircraft to almost “glide” down to the runway. Traditionally, flights descended from cruising altitude to landing in several steps when approaching the airport. Continuous descent into Zurich and Geneva will result in energy savings of 133 GWh per year.
63 direct routes were implemented in 2017

* Savings for the route segment between the areas around Pontarlier (Jura Mountains) and Chambéry (Savoie) through the Geneva region.

** XMAN Project **

kerosene consumption

CO2 emissions

* Current situation

XMAN Project

--- Arrival management / Speed reduction

11 kT/year

33.5 kT/year

kerosene consumption

CO2 emissions
In its efforts to protect the environment, skyguide goes far beyond activities directly related to ATM. The company is reducing its environmental footprint by participating in the action plan of the Swiss Confederation, which focuses on buildings and renewable energy, mobility, data centres and green IT. The objective is to reduce energy consumption by 25 per cent by 2020 compared to 2006. Skyguide has already improved its energy efficiency by over 30 per cent, and has implemented about two-thirds of the planned measures.

Here are some of skyguide’s contributions: in 2012, the company inaugurated a third 3D control tower simulator (TOSIM) in Dübendorf, called TOSIM Green. Its projection system is now equipped with LED technology, a measure that has saved 4.8 MWh per year by reducing energy consumption from 11.9 to 7.1 MWh. Together with the savings achieved by replacing the projection systems of the other two tower simulators in Dübendorf, the total energy saving amounts to 12 MWh per year.

A project called “Smart Radio” aims at renewing the entire radio system of 600 radio communication devices and 34 transmitting and receiving stations. The new equipment consumes up to 30 per cent less energy.
A major goal was achieved in skyguide’s radio and radar station at La Dôle in the Vaud Jura mountains. Its heating, ventilation and air conditioning facilities were renovated in 2016, resulting in energy savings of about 35 MWh per year.

**Promotion of wind energy**

Wind farms have a positive impact on the environment but can present a physical obstacle and interfere with air traffic control systems. To overcome these contradictions, skyguide has created a communication platform to foster dialogue with key stakeholders such as Suisse Eole, with the aim of enabling the safe coexistence of aviation and wind turbines. Skyguide is also investing in radars better equipped to handle interference arising from wind farms.
Ongoing commitment and daily efforts

As a company with a strong emphasis on safety and reliability, skyguide relies on the commitment of its employees. As an incentive, they are offered flexible ways of working, such as home office to avoid unnecessary travel. Within its “Dynamic Working Environment”, skyguide is offering more mobile working arrangements including creating open office areas in Geneva and Dübendorf for better communication and installing modern videoconference systems.

Skyguide maintains its “FlexWorks” programme, which allows more flexible working from home or elsewhere. Since both programmes reduce the volume of office space required on its premises, they also enhance skyguide’s ecological credentials.

We take a number of other measures to reduce our energy consumption. For example, we have gained better control of paper consumption by centralizing our printer facilities and standardising their settings. The company is working to further reduce its paper use, with a target of 5 kilos per employee and per year maximum.

However, the implementation of such ambitious programmes would not be possible without the commitment and
daily efforts of skyguide’s staff. The company has created a working group called “Green Team” made up of employees from various departments who are striving to raise awareness among all levels of the organisation and launch environmental activities.

**Public instead of private transport**

Business travel and commutes to work consume a great deal of energy. Skyguide encourages its staff to use public transport by issuing half-fare rail cards or subsidising local and regional season tickets. Travelling between Geneva and Dübendorf has also been reduced by developing videoconferencing facilities.
More complete information can be found in the Environmental report 2017

www.skyguide.ch/annual-report