ZÜRICH AIRPORT

Environmental Achievements at Pier E

Contents

General information

The construction of pier E was part of the fifth expansion of Zurich Airport. From the beginning, the building was optimised for energy efficiency and conservation of natural resources. Today's pier E includes several features which benefit from the particular conditions and contribute essentially to the fact that Zurich Airport could stabilise its total energy consumption despite the expansion. Already during the construction phase from 2000 to 2002, measures were taken to minimize adverse environmental effects. That means for example that construction companies were bound to employ vehicles with particle filters and that concrete was manufactured on site.

The new pier is located in between the runways which results in shorter taxiways for aircraft. Therefore the time during which engines are running is reduced which saves fuel and reduces emissions. Additionally, because of the central location of the pier, aircraft have to cross other runways less frequently, resulting in more efficient ground traffic with less waiting time and overall safer operations.

Today, with its 27 gates including passenger loading bridges, pier E represents the core of intercontinental air traffic at Zurich Airport. One aircraft stand was designed and has later been equipped with a third passenger loading bridge to accommodate new large aircraft like the Airbus A380.

Pier E in short
Beginning of Operation: 2003
Length: 485 Meter
Width: 35 Meter
Gates: 27 with passenger loading bridges

Pier E is linked to the terminals by the Skymetro for passengers and by a road tunnel for handling vehicles. The Skymetro is a cableway, hovering on a 0.6 mm air cushion. 2009, 30% of the passenger volume was handled at pier E.

Flughafen Zürich AG has reduced its own CO_2 emissions from scopes 1 and 2 (emission sources owned and operated by Flughafen Zürich AG and external electricity purchased) by more than 15,000 tonnes (minus 31 percent) since 1991, despite a 40 percent increase in infrastructure and a 65 percent increase in traffic units. The total energy consumption has been stabilised at the level of the year 1994. This has only been possible through consequent efforts in terms of energy efficiency and conservation of natural resources when renovating infrastructure and realising new buildings like pier E.

Fixed ground power for aircraft

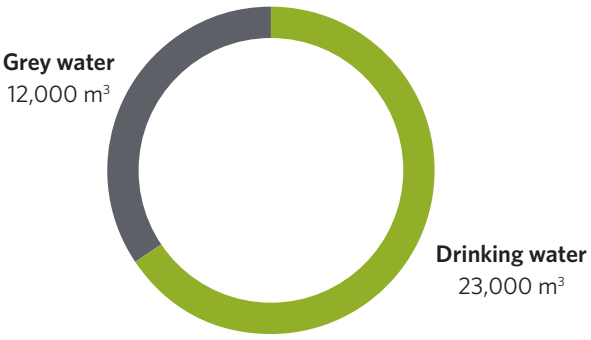
All aircraft stands are equipped with fixed ground systems for supplying aircraft with electricity (400 Hz) and pre-conditioned air (PCA). Electricity is provided directly to the plane by cable, the conditioned air through a flexible hose. In return, the fuel-consuming auxiliary power units (APU) of the aircraft can remain switched off. The use of the stationary systems, which are located inside and underneath the buildings, is mandatory. This measure contributes substantially to reduce fuel consumption and to improve air quality at the apron and in the surrounding of the airport.

Fixed ground power
15 gates are cat. C, D and E (up to 180 KVA)
11 gates are cat. C (90 KVA)
1 gate is cat. C, D, E (up to 360 KVA)

Total capacity is 5.05 MVA

Rainwater collection

On the roof of pier E, rainwater is collected and afterwards stored in two tanks in the underground. Through a separated distribution network, this water is piped to the 160 toilets and 70 urinals in the building. This saves about 12,000 m^3 of drinking water per year, which equates to one third of total water consumption of pier E or 2% of consumption of the airport in total. Another advantage of the rainwater collection is the retention of the precipitation water. This helps at least periodically not to exceed the limit of rainwater allowed to run off.



Average water consumption at pier E per annum.

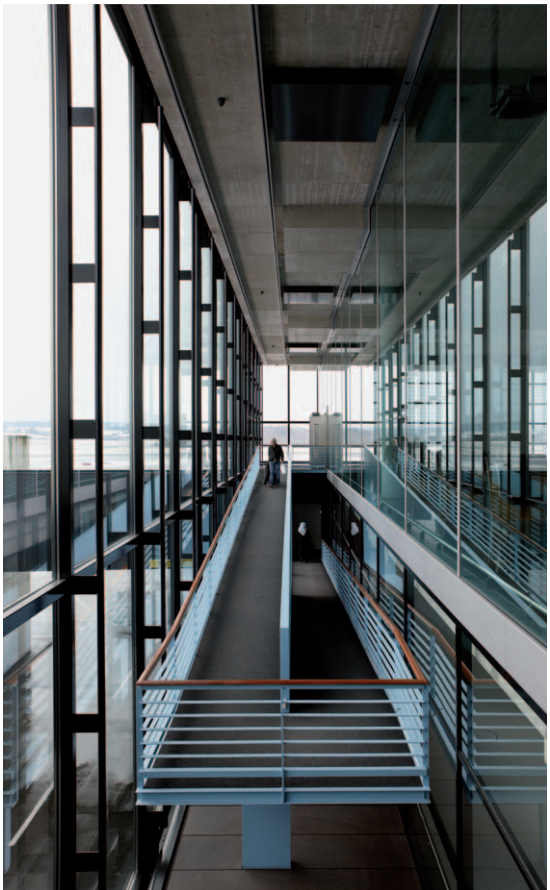
Photovoltaic plant

The roof of Pier E as the "fifth façade" has a triple function: the roof as a solar power plant, the shading of the façade and a design function. Approximately 5,000 solar modules cover an area of 5,800 m^2. The solar plant is designed as part of the electricity network. The mean power production of 290,000 kWh per annum contributes to the electricity supply of Pier E. The additional costs for the plant were approximately 3 million Swiss Francs. In 2002, the airport received the Swiss solar prize award for its solar initiatives.

Glass façade as climate buffer

The double glass façades have a substantial share in the energy efficiency by functioning as climate buffers. The air inside the 3 meter wide space between the two glass walls is hardly mixed with the inner air of the building and therefore is effectively insulating the inside from extreme temperatures. The heated air during summer and the cooled air during winter inside the buffer is led away by natural ventilation directly over the roof. Thanks to this excellent isolation and the use of the excess heat of technical equipment and people, the overall energy used for heating can be reduced.

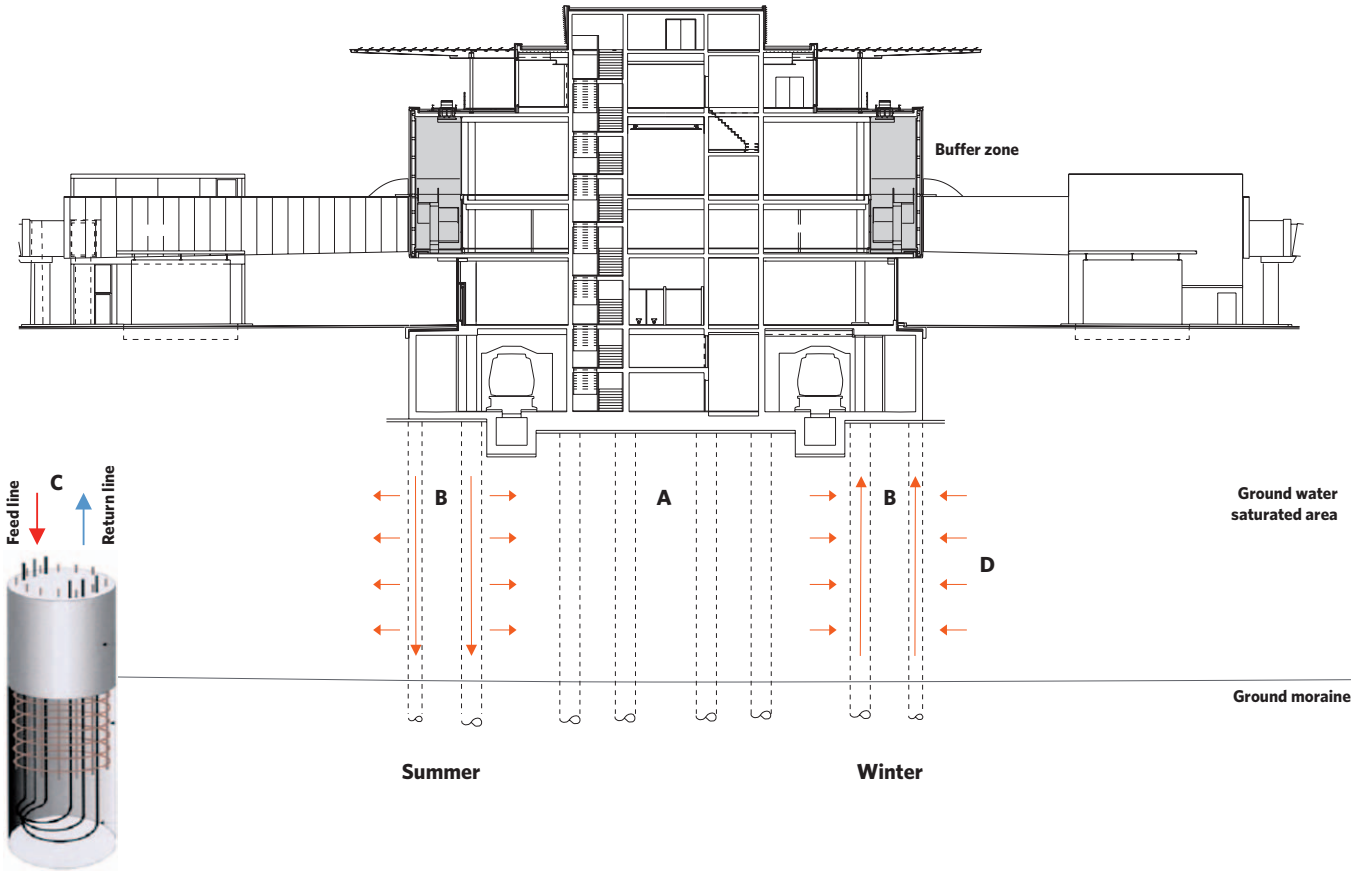
Furthermore, the use of glass for most parts of the façade allows utilising daylight to a great extent, which lowers the power consumption for lighting significantly.



Energy piles

Due to the instable soil, the pier was constructed on 441 piles (A). Of these piles, approximately 310 were equipped as energy piles, reaching 30 m down to the ground moraine (B). A water-glycol-mixture is pumped through tubes integrated into the concrete piles (C) in order to exchange heat with the surrounding soil. This heat-exchanger is being used in conjunction with the ground water saturated soil (D) as a seasonal storage. During the summer, internal excess heat is collected through a heat exchange and ventilation system and is stored in the soil via the energy piles. The necessary cooling that is required for the heat exchange can be provided almost entirely by the energy piles. In winter, the heating can be covered by internal excess heat and heat from the soil storage. A heat pump is used as part of this process. In total, about two thirds of the cooling and heating demand can be covered by this system. It was granted the Swiss Geothermal Award 2010 by the Swiss Geothermal Society.

Cross section of pier E



Waste management

There are decentralised waste bins for paper, plastic bottles and residual waste installed inside the building. Outside on the apron, a central waste disposal facility allows separating paper and cardboard from mixed waste. Additional waste fractions are collected separately in several service areas.

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