Zurich Airport

Global Trade: Greener Airports?

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Outline

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2. Airport Cities
3. Environmental Challenges
4. Mitigation Planning and Solutions
5. Sustainable Achievements?
6. Conclusions

Airports' Role in The Global Trade

People
+ Services

Goods
(Export/Import)

Airports:
Interface Air-to-Ground and Ground-to Air ?

for requirement "fast" or conditions "perisheable", "valuable"

Transfer

Origin/
Destination

Zurich Airport 2007

- 268,500 Movements
- 20.7 Million Passengers
- 399,600 t Cargo
- 24,000 Employees
- ca. 8 km^2 Area

Economic Relevance of Zurich Airport

Switzerland: 7.5 mio residents
Zurich Airport: 20.7 mio. passengers (2007)

Zurich Airport:

- 13 billion CHF generated value* (2004)
- 97,000 generated jobs*
- approx. 1-2% of Swiss GDP
- 8.8% of total Swiss export value (only 2.7% by weight; 2007)

* direct, indirect, induced, catalytic

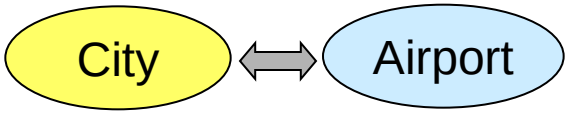
Airport Trend: Airport Cities

The past:
Cities have their airport as means of a transportation gateway, providing flight operations.

The present/future:
Airports delevop themselves to airport cities ("Aerotropolis"), providing all services of a city; flight operations are just a part of it.
⇨ Not only interface air/ground or air/air, but also ground/ground, including cargo (FTZ).

Typical examples:
Amsterdam, Dubai, Frankfurt, Zurich

Past



Present/Future: "Aerotropolis"

Zurich Airport City

Zurich Airport is the 3rd largest Shopping Mall (incl. services) in Switzerland (by revenues):

- 60 Shops Landside (daily, 6am-10pm)
- 50 Shops Airside (daily, 6/8am – 9pm)
- 7,300 public parking spaces (+6,300 staff/ others)

Zurich Airport is an intermodal traffic hub, serving not only passengers, but many local or regional residents:

- 350 daily train departures (11 mio. users) (regional and inter-/national connections)
- 610 daily local bus departures

Environmental Challenges of Airports

Main Local Aspects:

- Noise: public nuisance
- Local air quality: pollution concentration (non-attainment areas)
- Energy: Use of fossile energy
- Water: use and purifying
- Impact on land use and ecosystem
- Use of resources, production of waste
- Traffic: congestion, leading to impacts

Global Aspects:

- Climate Change (CO_2): contribution

Zurich Airport - Constraints

- Emission cap of 2,400t/a NOx from aircraft, handling, infrastructure
- Stabilizsation of energy consumption for the infrastructure at the 1994 level until 2005
- Modal split of 42% (share of public transportation on total traffic)
- And many more (night curfew, storm water management, de-icing, …)

Mitigation Planning Approach

Effective mitigation planning is the art, to
"develop a solution to an existing problem and not to find a problem to an existing solution".

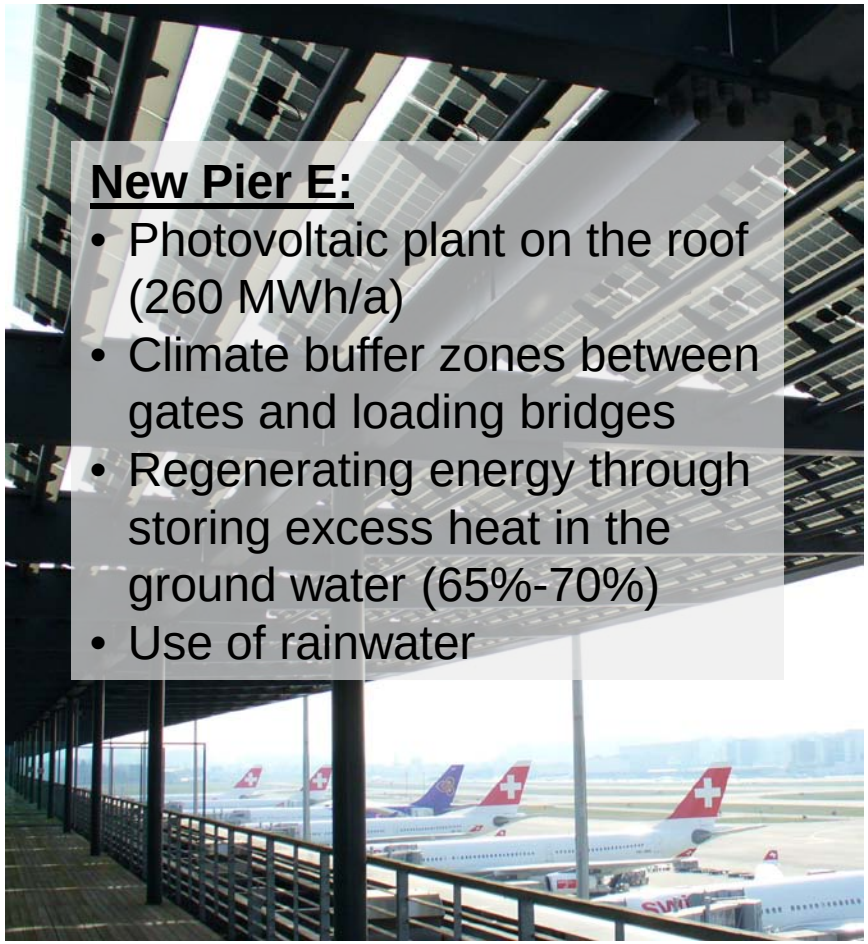
Mitigation planning should be a:

- combined approach: looking systematic and at a broad range of options
- joint approach: cooperating with partners and tenants at the airport

in order to achieve cost-efficient and effective energy and/or emission reduction results.

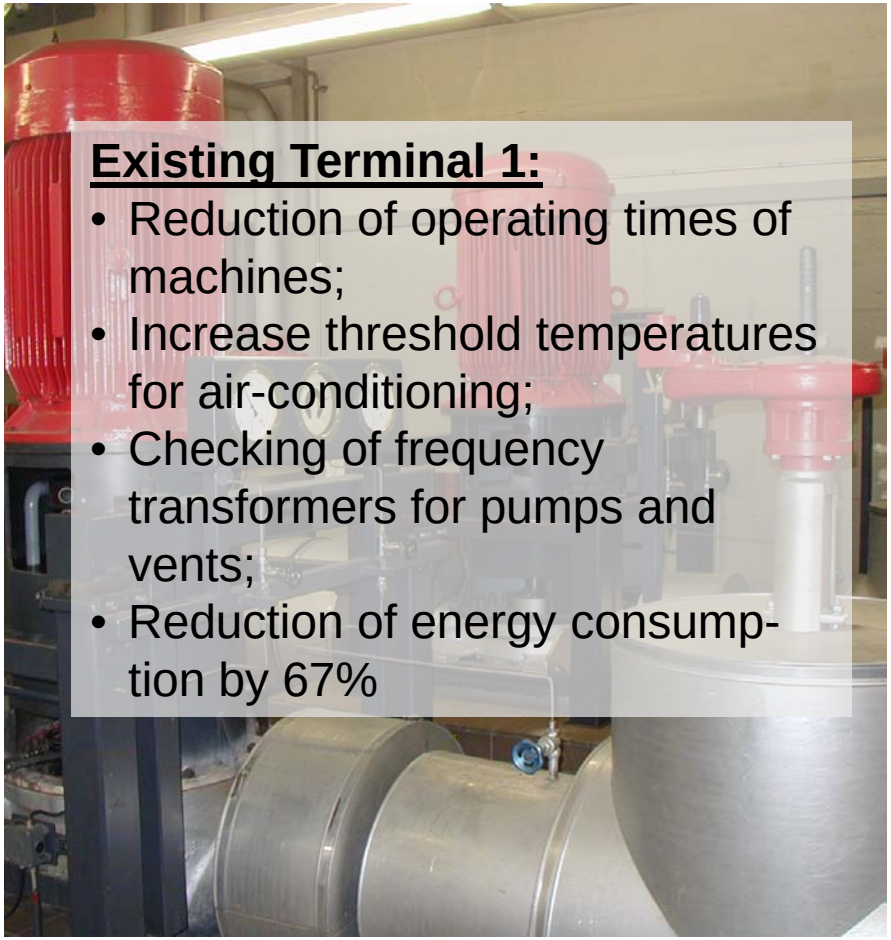
Elements of potential measures to individually be discussed are:
Legal basis, responsibilities, partners, costs, benefits, time, interdepencies, implementation procedures, political & technical feasibility.

Zurich Airport – Solutions (1)



New Pier E:

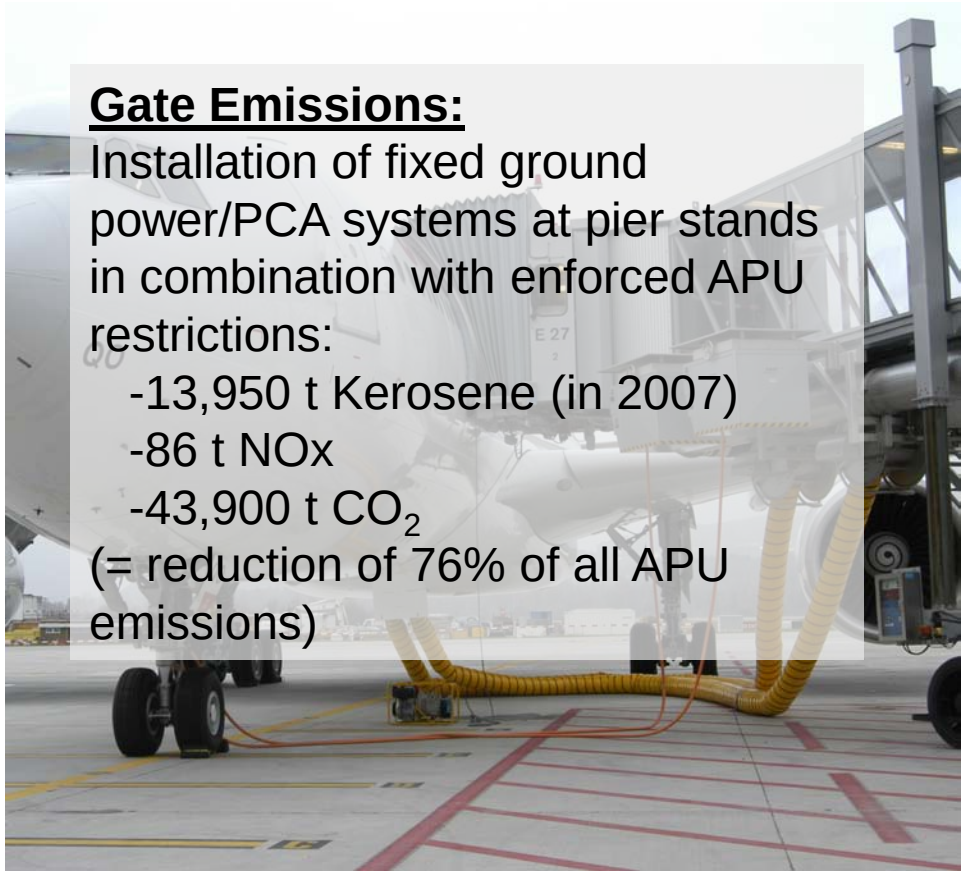
- Photovoltaic plant on the roof (260 MWh/a)
- Climate buffer zones between gates and loading bridges
- Regenerating energy through storing excess heat in the ground water (65%-70%)
- Use of rainwater



Existing Terminal 1:

- Reduction of operating times of machines;
- Increase threshold temperatures for air-conditioning;
- Checking of frequency transformers for pumps and vents;
- Reduction of energy consumption by 67%

Zurich Airport – Solutions (2)



Gate Emissions:

Installation of fixed ground power/PCA systems at pier stands in combination with enforced APU restrictions:

-13,950 t Kerosene (in 2007)

-86 t NOx

-43,900 t CO_2

(= reduction of 76% of all APU emissions)

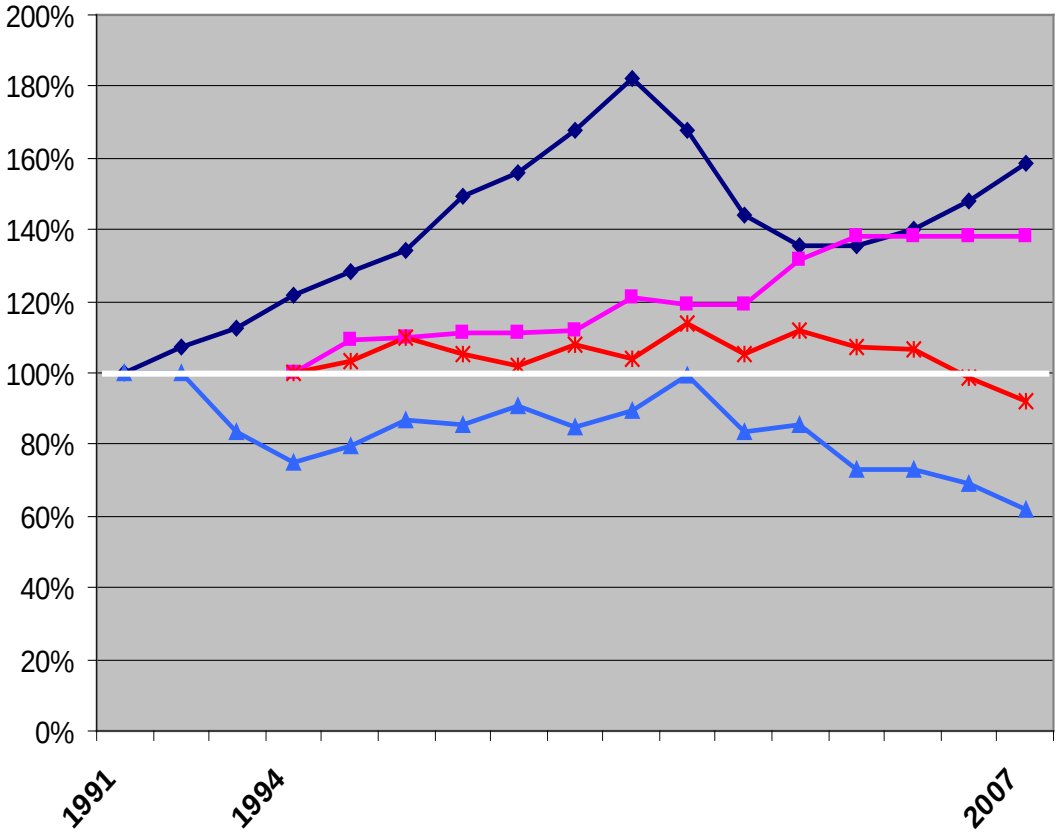
Aircraft Taxi Emissions:

- Airport Layout with new Pier E:
  - 11,500 t CO_2
  - 15 t NOx
- Departure Planning Tool (darts) to avoid queuing:
  - 3,600 t CO_2

(for 2004: 266,000 movements)

The Results

Handling, infrastructure, landside traffic



Traffic Units: +59%

Buildings (m^2): +38%

Energy: - 8%
(specific: -33%)
CO_2: -38%
(specific: -61%)

Specific Energy: kWh/m^2
Specific CO_2: g/TU

Sustainable Achievements?

- Airports strive to reduce their specific environmental footprint; specific, because the increase in traffic (or the demand of society for air travel or shipping) often outgrows the achieved benefits.
- Wherever airports develop, trade, industry and residents move in closer, thus combining impacts from airport and non-airport activities (encroachement).
- Evolutionary development and improvements might not be enough, revolutionary steps will be needed; but: do we have those solutions available in time?

Conclusions

- Airports tend to fulfil multiple roles in today's global trade and societal requirements.
- This increases the complexity for sustainable development.
- It is possible to detach energy demand and CO_2-emissions from traffic growth.
- A dedicated effort is needed: systematic, combined and joint.
- Studies, inventories, analysis, models, … don't reduce emissions.
- How long such a development can be pursued is unknown.

Thank you!

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