Green Airports
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Airport Council International EUROPE

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Warsaw – 19 March 2015
What is a green airport?
The environmental impacts of airport operations

The sources:
- Aircraft engines
- Ground-handling equipment (tugs, APU, fuel trucks, pax vehicles)
- Airport own vehicles
- Buildings
- Power plants
- Waste management
- Water management plants
- Surface access

The impacts:
- Carbon emissions
- Air pollutants
- Noise
- Water
- Waste
- Soil
- Fauna and Flora
A complex framework (I)

- Mandatory
- Voluntary agreements
- Economic instruments
- Aviation and environment
- Non-aviation and environment
- Aviation and non-environment
A complex framework (II)

Intergovernmental bodies

Regulators

Airport operators

NGOs/Public

Industry bodies
Moving from regulatory compliance to environmental leadership

**CONTROL:**
Activities airports are directly responsible for → take measures themselves

**GUIDE:**
Activities which airports do not directly manage → steer partners towards joint measures

**INFLUENCE:**
Activities which airports do not directly manage → only an influencing role
Greenhouse Gas Emissions

- Greenhouse Gas Protocol by the WBCSD and the WRI

<table>
<thead>
<tr>
<th>Scope 1 (direct control)</th>
<th>Scope 2 (indirect control)</th>
<th>Scope 3 (guide and influence)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Heating and cooling in airport’s building</td>
<td>• Electricity purchased by the airport</td>
<td>• Aircraft engine (LTO)</td>
</tr>
<tr>
<td>• Airport’s own fleet</td>
<td></td>
<td>• APU</td>
</tr>
<tr>
<td>• Fire fighting training</td>
<td></td>
<td>• Surface Access</td>
</tr>
<tr>
<td>• Emergency generators</td>
<td></td>
<td>• GSE</td>
</tr>
<tr>
<td>• Maintainance</td>
<td></td>
<td>• Airside vehicles</td>
</tr>
</tbody>
</table>
Airport Carbon Accreditation, airports’ response to climate change
Voluntary programme for active carbon management with measurable goals and reporting.

Specifically designed for the airport business – site specific but universal to all airports.

Covers on-site airport operational activities that contribute the most to carbon emissions.

Enables airports to implement best practice carbon management processes and gain public recognition of their achievements.

4 ascending levels of performance.
Governance

- **Independent expert Advisory Board**
  - Policy direction, approval and advice
  - Overall administrative oversight (Administrator, Technical Task Force)
  - Monitors and strengthens progress of programme
  - Encourages external recognition and endorsement

- **Task Force**
  - Technical task force of airport environmental managers
  - Continuing relevance of technical standards

- **Programme Owner**

- **Advisory Board**

- **Administrator**

- **Owned by ACI EUROPE**
  - Public positioning and marketing of programme
  - Engages Administrator
  - Optimises Institutional approval
  - Sets programme fees

- **Independent Administrator – WSP Environmental**
  - Applicant registration and processing (entry, renewal and upgrades)
  - Formal accreditation approval
  - Annual and interim reporting and accounting
  - Day to day secretariat and administration
  - Programme Help Desk
  - Verifier oversight and training
External Recognition

Airport Carbon Accreditation is formally supported or endorsed by:

International Civil Aviation Organization

United Nations Environment Programme

European Commission DG MOVE, DG CLIMA

Eurocontrol

European Civil Aviation Conference
## Participation to date

<table>
<thead>
<tr>
<th>World Region</th>
<th>No airports</th>
</tr>
</thead>
<tbody>
<tr>
<td>Europe</td>
<td>90</td>
</tr>
<tr>
<td>Asia Pacific</td>
<td>24</td>
</tr>
<tr>
<td>North America</td>
<td>6</td>
</tr>
<tr>
<td>Africa</td>
<td>1</td>
</tr>
<tr>
<td>Latin America</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>122</strong></td>
</tr>
</tbody>
</table>
ACERT

- Carbon footprint calculator
- Developed by ACI World and Transport Canada
- Available free of charge
- Operational inputs (fuel used, electricity purchased, aircraft activity, estimates of ground transport)
- Primarily aimed at airports with limited resources
- Compatible with the footprinting requirements of Airport Carbon Accreditation
## Airport Carbon and Emissions Reporting Tool

**ACERT v1.0 (2012)**

### Airport: Seattle-Tacoma International Airport
- **Country:** United States
- **Aircraft mvmts:** 314,947
- **Passengers:** 32,819,796
- **Traffic units:** 35,142,986

### Greenhouse Gases (t)

<table>
<thead>
<tr>
<th>Entity</th>
<th>Source</th>
<th>Scope</th>
<th>CO2 (t)</th>
<th>CH4 (t)</th>
<th>N2O (t)</th>
<th>CO2e (t)</th>
<th>CO2e %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airport Airside Vehicles</td>
<td>1</td>
<td>1,212</td>
<td>0.2468</td>
<td>0.1011</td>
<td>1.249</td>
<td>0.21%</td>
<td></td>
</tr>
<tr>
<td>Airport Buildings (gas/oil/coal)</td>
<td>1</td>
<td>14,421</td>
<td>0.2571</td>
<td>0.0257</td>
<td>14.355</td>
<td>2.45%</td>
<td></td>
</tr>
<tr>
<td>Airport Fire Training</td>
<td>1</td>
<td>0</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.00%</td>
<td></td>
</tr>
<tr>
<td>Airport Emergency Generator</td>
<td>1</td>
<td>16</td>
<td>0.0008</td>
<td>0.0025</td>
<td>17</td>
<td>0.00%</td>
<td></td>
</tr>
<tr>
<td>Airport Glycol</td>
<td>1</td>
<td>0</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.00%</td>
<td></td>
</tr>
<tr>
<td>Airport Electricity Purchase</td>
<td>2</td>
<td>4,537</td>
<td>-</td>
<td>-</td>
<td>4,537</td>
<td>0.77%</td>
<td></td>
</tr>
<tr>
<td>Airport Heat Purchase</td>
<td>2</td>
<td>0</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.00%</td>
<td></td>
</tr>
</tbody>
</table>

**Airport Operator Sub-total:** 20,238 t (3.4%)

### Tenants (including airlines, government, shops etc.) and Employees

| Tenant Aircraft (LTO & taxi) | 3 | 307,489 | 9.6639 | 27.8204 | 316,316 | 63.69% |
| Tenant Aircraft APU | 3 | 42,149 | 1.3247 | 3.8135 | 43,359 | 7.36% |
| Tenant Aircraft Engine Run-ups | 3 | 456 | 0.0144 | 0.0414 | 469 | 0.08% |
| Tenant Aircraft De-icing | 3 | 0 | - | - | - | 0.00% |
| Tenant Airside Vehicles | 3 | 8,947 | 1.7332 | 0.7355 | 9,211 | 1.56% |
| Tenant Buildings (gas/oil/coal) | 3 | 2,827 | 0.0276 | 0.0314 | 2,837 | 0.48% |
| Tenant Electricity Purchase | 3 | 0 | - | - | - | 0.00% |
| Tenant Heat Purchase | 3 | 48 | 0.0758 | 0.3884 | 170 | 0.03% |
| Tenant Fire Training | 3 | 0 | - | - | - | 0.00% |
| Tenant Emergency Generator | 3 | 0 | - | - | - | 0.00% |
| Tenant Landside Vehicles | 3 | 48,411 | 17.2212 | 4.0374 | 50,024 | 8.49% |
| Airport Employee Vehicles | 3 | 3,142 | 1.1442 | 0.2600 | 3,246 | 0.55% |

**Tenant Sub-total:** 425,634 t (72.2%)

### Public (including Passengers)

| Public Access | Ground Cars, taxi | 3 | 126,643 | 40.71 | 10.57 | 130,776 | 22.20% |
| Public Access | Bus. shuttles | 3 | 12,181 | 1.05 | 0.99 | 12,510 | 2.12% |
| Public Access | Rail | 3 | 22 | - | - | 22 | 0.00% |

**Public Sub-total:** 143,308 t (24.3%)

### TOTAL

**Total emissions (tonne):** 572,502 t (73.47%) 48.82% 589,180 t (100%)

### Summary

<table>
<thead>
<tr>
<th>Scope</th>
<th>t CO2e</th>
<th>CO2e %</th>
</tr>
</thead>
<tbody>
<tr>
<td>AirPort Scope 1</td>
<td>15,701</td>
<td>2.66%</td>
</tr>
<tr>
<td>AirPort Scope 2</td>
<td>4,537</td>
<td>0.77%</td>
</tr>
<tr>
<td>AirPort Scope 3</td>
<td>568,942</td>
<td>96.57%</td>
</tr>
</tbody>
</table>

- The aircraft emissions calculations were based on detailed aircraft data.
- The landside traffic calculations were based on estimated traffic data.
- A more detailed separate GHG inventory is also available for Year: 2011.
Benefits of Participation

A. Raised sustainability profile & external credibility

-353,842 tCO2 in Year 5 in Europe

A. Reduction in exposure to climate change regulatory risks

B. Efficiency improvements

C. Knowledge transfer
Concrete measure: aircraft emissions

- An essential enabler: Airport-Collaborative Decision Making
  > Principle: Enhance the communications flow between the airport, the airlines, the GSE providers and ATC to improve taxiing
  > Goals:
    - Reduce taxiing time and related fuel consumption
    - Improve the use of airport capacity
    - Eliminate bottlenecks on the ground
Concrete measures: aircraft emissions

- Alternative taxiing systems:
  - Not all engine taxiing
  - Taxibot
  - EGTS
  - Wheeltug

- Restrictions on Auxiliary Power Unit usage:
  - Cooperation with GSE providers and airlines is paramount

- Switch from APU to Fixed Electric Ground Power Units (FEGPU) and Pre-Conditioned Air (PCA):
  - Requires airport investments, reflected in the airport charges

- Biofuels for aviation
Concrete measures: airports’ own emissions

- **Buildings**
  - Reduction of energy consumption
    - Retrofitting of LED technology
    - Retrofitting of airport buildings (roof, air-conditioning…)
  - Use of renewable sources of energy
    - Purchase of green electricity
    - Production of energy from renewable sources (solar, Co-generation, aquifer, biomass…)

- **Airports’ ground vehicles**
  - Fleet replacement programmes
  - Challenges:
    - Economies of scale
    - Reliability under all climatic conditions
Concrete measures: 3rd party emissions

- **Surface access (up to 45% of emissions within the LTO cycle)**
  - Asset: airports are intermodal nodes by nature
  - Cooperation with local/national authorities to develop more environmental-friendly access to the airport
  - Incentive schemes
  - Adapting schedule of the public transport services

- **Tenants**
  - Information campaigns
  - The Carbon Challenge
    - Since 2010 at Manchester Airport
    - Identify the top energy-consumers at the airport and exchange best practices on carbon management
Noise management
# Noise Management: ICAO Balanced Approach

## Reduction of noise at source
- Aircraft entering today’s fleet are 20 dB than 40 years ago. This represents a subjective noise reduction of 75%.
- Adoption of a new ICAO noise standard in 2013: Chapter 14

## Land-use planning
- ICAO Resolution 35-5 “Not compromised by inappropriate land-use or encroachment”
- Local authorities are responsible for delivering building permits.

## Operating restrictions
- Decision made by national (CAAs) or local authorities
- Cost Benefit analysis should take into account economic impacts on airlines and on the region.

## Noise abatement procedure
- Curved approaches CDO/CCO
- Impact assessment on noise and fuel.

**Cost Benefit analysis should take into account economic impacts on airlines and on the region.**
Engagement

- Why is it needed?
  - Regulatory drivers
  - Role of aviation in society
  - Demand is growing, so are the benefits and the economic and social impacts
  - Community tolerance is decreasing
  - Threat of public and political opposition
  - Multiple stakeholders: no decision can be made in isolation
  - Risks of not engaging
Engagement

- Who are your stakeholders?

**Regulators**
- Gvts
- Planning bodies
- CAAs

**Internal SKH**
- ANSPs
- Airports
- Airlines
- Service partners
- Other

**External SKH**
- Local communities
- Statutory bodies
- Environment groups
- Interested parties
- Air transport users
Engagement

- **Benefits of engagement:**
  - Control the process
  - Save time and costs
  - Minimise conflicts
  - CSR
  - Mandate to grow

- **Benefits of community engagement:**
  - Identify the nature and extent of disturbance
  - Enable tolerance through:
    - Acknowledging there is a problem
    - Engaging communities in finding a solution
    - Constructive problem-solving
    - Collaborative decision-making process
Engagement: the DialogForum in Vienna

- **Context:**
  > Traditional consultation procedures at Vienna airport with the creation of neighbour councils in 1989.

- **Mediation process: 2000-2005**
  > 50 parties involved
  > 2 main issues:
    - Current measures
    - Expansion plans
  > In 2005 **Mediation contract**
    - Sets up the **DIALOGFORUM**: Lasting communication structure that deals with potential conflicts inherent to the system

- **Results:**
  > Strong involvement of all in a resource-intensive process (e.g. definition of new procedures, new SID, test flights with different turning points, curved approaches)
  > Decrease in noise complaints (20,000 in 2004 – 6,129 in 2013)
  > Publication of environmental data and flight track system
  > Looks into future operations
Engagement: Collaborative Environmental Management (CEM)

- A protocol aimed at supporting cooperation between operational stakeholders at airports.
  > Local approach
  > Flexible
  > Builds on existing arrangements
  > Launched in November 2014

- Content:
  > Working arrangement between interested parties
  > An environmental vision for the airport
  > An action plan to translate the environmental vision into a concrete measures
  > A forum of operational stakeholders to present their issues

- Support documents:
  > CEM specifications
  > Check-list of 31 questions
Local Air Quality

- Concentration limit values:
  - Not airport-specific
  - Airports requested to take measures when threshold is exceeded in the region, not necessarily on the airport site

Gothenburg Protocol (transboundary pollution – in 2001 and reviewed in 2012)

<table>
<thead>
<tr>
<th>NEC Directive</th>
<th>Dir on Ambient Air quality and Clean Air for Europe</th>
<th>Directive 2004/107/EC</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Limits in 2010 for SO2, NO2, volatile organic compound and NH3</td>
<td>- pm 2.5: limit value, exposure concentration and exposure reduction target</td>
<td>- Target values for arsenic, nickel and PAHs</td>
</tr>
<tr>
<td></td>
<td>- pm 10: monitoring</td>
<td>- Monitoring for mercury</td>
</tr>
<tr>
<td></td>
<td>- SO2, NO2, NOx, benzene, CO, pm and lead: limit values in ambient air</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- ozone: target value, long-term obj for the concentration</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Volatile organic compound and Nox: monitoring requirements</td>
<td></td>
</tr>
</tbody>
</table>
Local Air quality

- **Methodology:**
  > Air quality is monitored and results are compared with limit values.
  > A detailed inventory and dispersion calculation is conducted to determine the source causing exceedance.

- **Mitigation measures:**
  > Modulation of landing charges
  > Rules on the vehicles allowed on the apron
  > Industry initiatives ("Switch-off your engine")
  > Rules on APU usage
  > Surface access
  > Any measure related to the reduction of emissions from combustion engines
Water Management

- Stormwater management
Water Management

- Waste water management

Sanitary waste water from buildings

Sanitary waste water from aircraft

Waste water from aircraft de-icing
Water Management

- Waste Water Treatment Plant
  > Comparable with the waste water of a community of 8,000 inhabitants (excl. de-icing water)
  > Investment costs
  > Maintenance costs
Water Management

- **Reduction of water consumption**
  - Installation of waterless urinals
  - Use of storm water for cooling towers
  - Use of storm water for sanitary purposes
  - Use of storm water for fire fighting exercises

- **Measures to improve water quality**
  - Waste water treatment plants
  - Emergency measures in case of oil spill
  - De-icing stands
Waste Management

Most Preferable

AVOID
REDUCE
REUSE
RECYCLE
RECOVER
TREAT
DISPOSE

Least Preferable
Other impacts

- Fauna and Flora
  - Wildlife and Habitat
  - Natura 2000 Directive
  - Habitat Directive

- Soil
THANK YOU

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www.aci-europe.org

www.airportcarbonaccreditation.org