Renewable Energy Deployment and other GHG-mitigation for Airports in Africa

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ACI World Environment Standing Committee
Agenda

- Greenhouse Gas Emissions at the Airport
- Renewable Energy at Airports in Africa
- AGES-Simulation
- Airport Carbon Accreditation in Africa
Greenhouse Gas Emissions at the Airport
Greenhouse Gas Emissions at the Airport

- A majority of the GHG at the airport is not in control of the airport

*Example of Munich Airport*
Greenhouse Gas Emissions at the Airport

- ACI’s manual on GHG management provides guidance for airports to appropriately measure their emissions

**Scope 1**

Emissions from airport controlled sources

- 01 Vehicles/ground support equipment belonging to the airport
- 02 On-site waste management
- 03 On-site waste water management
- 04 On-site power generation
- 05 Firefighting exercises
- 06 Boilers, furnaces

**Scope 2**

Emissions from purchased electricity

- 07 Off-site electricity generation
  - A Heating
  - B Cooling
  - C Lighting

**Scope 3**

Emissions from other sources related to the activities of an airport

- 08 Aircraft landing
- 09 Aircraft taking off
- 10 Aircraft ground movements
- 11 Auxiliary Power Unit
- 12 3rd party vehicles/ground support equipment
- 13 Passenger travel to the airport
- 14 Staff commute
- 15 Off-site waste management
- 16 Off-site water management
- 17 Staff business travel

*Some examples of possible emissions sources in the airport*
Airport Carbon Emissions and Reporting Tool (ACERT)

- A simple IT solution designed by airports for airports
- Calculates Greenhouse Gas (GHG) emissions at and around the airport
- Produces a comprehensive emissions inventory and supporting information
- Compatible with all levels of Airport Carbon Accreditation and provides relevant information required
Renewable Energy at Airports in Africa
ACI’s work on renewable energy at airports

- Co-lead of ICAO CAEP WG2 Task O.08 Eco Airport Toolkit E-collection
  - E-publication on renewable energy at airports finalized (to be published soon)
Case: Airports Company South Africa

- Operator of 9 airports in South Africa
- ACSA’s 2025 vision on environment
  - Minimize environmental impact and strive to be carbon neutral
  - Target: At minimum, 1 airport certified with Airport Carbon Accreditation Level 3: Optimization
  - Achievement so far: 4 airports certified at level 1: Mapping
- Renewable Energy Deployment
  - 3 solar farms generate 1750 kW/day
  - 3 more solar farms planned for 2018 & 2019
- Energy Consumption
  - 22.8% energy reduction in 2017
  - Considering the use of Trigen gas to precool or preheat ventilation systems and provide back-up electricity capacity
The ICAO-EU project is a pilot project that will demonstrate the use of solar energy for the provision of ground power and preconditioning air to aircraft at the gate. (1st of its kind in Africa)

- Solar capacity is 500 kW: a solar facility with airport electric gate equipment
- This equipment will allow aircraft serving international flights to switch off their Auxiliary Power Unit (APU) when parked at the gate, thus reducing carbon dioxide (CO₂) emissions from international aviation activities.
Case: Operated by Office National des Aeroports, Morocco

- Solar panels installed across major airports in Morocco (inc. Casablanca, Oujda, Marrakech, Tangiers, Rabat)
- Boutique solar panels mixing aesthetics and energy saving for the airport
Case: Ahmed Ben Bella (Oran) Airport, Algeria

- Operator (Egsa Oran) in charge of 11 airports in Algeria
- The NEW Ahmed Ben Bella (Oran) Airport of Algeria to have solar panel on the roof
- Set to be the second biggest solar installation on roof in Algeria
- 1.39 MW rooftop PV to be installed
- Around 2 million kWh per year thus being able to cover approximately 30% of the power needs of the facility
- In compliance with the environmental requirements of HQE (High Environmental Quality) certification for new buildings
Case: Enfidha-Hammamet International Airport, Tunisia

- Photovoltaic panels along fences, lights, and bird-hazard equipment
- Solar water heaters
AGES-Simulation
AGES-Simulator (AGES-S)

- A brand-new IT solution developed by Zurich Airport for other airports
- Assess economic and environmental benefit of substituting aircraft APU usage with aircraft ground energy systems
  - Such as the case of Solar@gate project!
- Based on the advanced emissions calculation approach of ICAO Doc 9889 Airport Air Quality Manual

ages@aci.aero
AGES-Simulator

• Ground energy systems can lead to up to 90% fuel savings and associated air pollutant emissions such as NOx

• AGES-S is a scenario-based simulation:
  • Baseline – electricity and PCA from APU
  • Scenario 1: Electricity from mobile Ground Power Unit and PCA from APU
  • Scenario 2: Electricity from fixed AGES and PCA from APU
  • Scenario 3: Electricity and PCA from AGES

<table>
<thead>
<tr>
<th>Scenario</th>
<th>NOx (% on total impact relevant emissions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>APU use only</td>
<td>14.1%</td>
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<tr>
<td>ZRH Case</td>
<td>2.5%</td>
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<tr>
<td>All AGES use</td>
<td>0.6%</td>
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</table>

Zurich Airport, 2016

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Electricity (115V-400Hz)</th>
<th>Pre-Conditioned Air</th>
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<td>Baseline: APU</td>
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<td><img src="image2" alt="Image" /></td>
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<tr>
<td>GPU / APU</td>
<td><img src="image3" alt="Image" /></td>
<td><img src="image4" alt="Image" /></td>
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<tr>
<td>Stationary / APU (ACU)</td>
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<tr>
<td>Stationary</td>
<td><img src="image7" alt="Image" /></td>
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AGES-Simulator

- Provide a snapshot information for aircraft and airport operators on:
  - Fuel savings,
  - GHG emissions reduction
  - Expected financial savings

Costs include financial costs, maintenance, electricity. Negative means: airport (or system provider/operator) makes profit.

Airlines flying international routes that are part of ICAO CORSIA can benefit from using AGES by reducing their offsetting obligations.
Airport Carbon Accreditation in Africa
Airport Carbon Accreditation: Overview

249 airports in the programme
In over 68 countries across the world
Welcoming 3.5 billion passengers a year
That's 42.9% of the global air passenger traffic

Level 3+
Offsetting own Scope 1 & 2 emissions

Level 3
Engagement of 3rd parties & measurement of their emissions

Level 2
Emissions reduction target, carbon management plan & annual reductions

Level 1
Carbon footprint & policy

Figure 4: Accredited Airports Over Time - Global

<table>
<thead>
<tr>
<th>Year</th>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
<th>Level 3+</th>
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<tr>
<td>Year 9</td>
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<td>19%</td>
<td>26%</td>
<td>31%</td>
</tr>
</tbody>
</table>
Airport Carbon Accreditation in Africa

10 Airports certified in Africa

7 airports have mapped their carbon footprints

2 airports actively reduced their CO₂ emissions

1 carbon neutral airport

30.9% of air passenger traffic

AIRPORTS AFRICA 2018

- ABIDJAN PORT BOUET (ABJ)
- CAPE TOWN (CPT)
- CASABLANCA (CMN)
- ENIFDHA-HAMMAMET (NBE)
- KING SHAKA (DUR)
- LIBREVILLE (LBV)
- MARRAKECH (RAK)
- PORT ELIZABETH (PLZ)
- SSR AIRPORT MAURITIUS (MRU)
- TAMBO INTERNATIONAL AIRPORT (JNB)
AIRPORT
- Takes decision to engage in Airport Carbon Accreditation
- Selects the level and works on the requirements
- Calculates carbon footprint either using
  - ACERT
  - Consultant
  - Completes in house
  - Engages a verifier

VERIFIER
- Participates in Webinar
- Passes exam and becomes approved

ADMINISTRATOR
- Provides webinar
- Approves verifier

AIRPORT
- Applies for online account
- Pays participation fee
- Fills in online application
- Submits application online

VERIFIER
- Verifies required information

ADMINISTRATOR
- Approves online account

ACI:
- Is notified
- Awards certificate
ACERT Output for ACA Online Application

Data and information is automated generated for the ACA Online Application

* Refer to the ACA Guidance Document for further information

acert@aci.aero
Fees to consider for Accreditation

- Participation fee*
  - Differ by accreditation level (1, 2, 3, and 3+) and airport size
- Costs for the independent verification
- Internal costs/resources for the preparation
- Implementation cost of:
  - Emissions Reduction measures: for Level 2 and above
  - Offsetting: for Level 3+

* For specific fee, please contact ACI
Level 3+ Case: Félix Houphouet-Boigny
Abidjan International Airport, Côte d’Ivoire

- Operated by AERIA (International Airport of Abidjan)
- The only in the African region to ever reach Level 3+: Neutrality (July 2017) and maintained
- AERIA’s commitment from the highest strategic level
  - Carbon reduction plan implementation (strategy for reducing energy consumption / creation of a committee with the stakeholders to fight against climate change / construction of a new taxiway parallel to the runway for LTO cycle time reduction)
  - Remaining emissions offset through the purchase carbon credits approved by UNFCCC
- Critical factor to attain Level 3+ accreditation:
  - More commitment from stakeholders (Implementation of their carbon reduction plan)
Level 2 Case: Enfidha-Hammamet International Airport, Tunisia

- Operated by the TAV Tunisia
- The first African airport to participate in the Airport Carbon Accreditation programme
- Achieved Level 1: Mapping and Level 2: Reduction in 2013 from its outset in the region and maintained ever since

Enfidha Hammamet International Airport is proud to be the very first airport in Africa to be certified by Airport Carbon Accreditation. We played an important role in the expansion of the programme into Africa and we encourage other African airports to follow our lead. We made this decision in order to demonstrate our on-going commitment to manage our environmental obligations, as well as to build on a solid framework for our social aspirations and commitments.
Level 2 Case: Libreville Leon Mba International Airport, Gabon

• Operated by Airport de Libreville (ADL)
• Situated close to the city center of Libreville, the capital of Gabon, serving almost half of the country’s population
• Obtained Airport Carbon Accreditation Level 1: Mapping in 2015, and set its objective to pass to Level 2: Reduction in 2016
• ADL elaborated a Carbon Management Plan to better structure emissions reduction efforts and energy man
Level 1 Case: Operated by Office National des Aeroports, Morocco

- Current accreditation at Level 1: Mapping for Casablanca and Marrakech
- Short term plan to:
  - Move to Level 2 for Casablanca and Marrakech
  - Plan to expand Level 1 accreditation to other airports to Fez, Agadir, Rabat, Oujda, and Tangier
- Mid-term objective to achieve neutrality
- Compliant with national policies to establish strategic priority on environment protection and renewable energy deployment
- Key lessons learned on effective data management
Thank you!

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