TRB Annual Conference: January 25, 2012
Session 782: Climate change adaptation for airports

(12-0751)

Dr Tim Ryley, Loughborough University

Co-Authors:
Prof. Paul Stewart, University of Lincoln (AETN Director)
Prof. Savvas Tassau, Brunel University
Dr Mike Bennett, Manchester Metropolitan University
Dr Jun Chen, University of Lincoln
Dr David Waugh, University of Lincoln
Dr Paul Chan, University of Manchester
Ms Vivian Liang, University of Manchester

Focus of the paper

Methods for integrating the physical, operational & planning process effects of climate change on aviation activities into a viable management program for the environmental impact of an airport

Outlines the Airport Energy Technologies Network (AETN) & 6 associated projects

It provides useful lessons from the UK in terms of developing management practices and applying them to climate change effects

Six dimensions of an airport

1. Airport terminal
2. Airport site (including runway)
3. Airport system (including extra organizations)
4. Community surrounding airport
5. Catchment for staff
6. Catchment for individuals (travelers and other users)

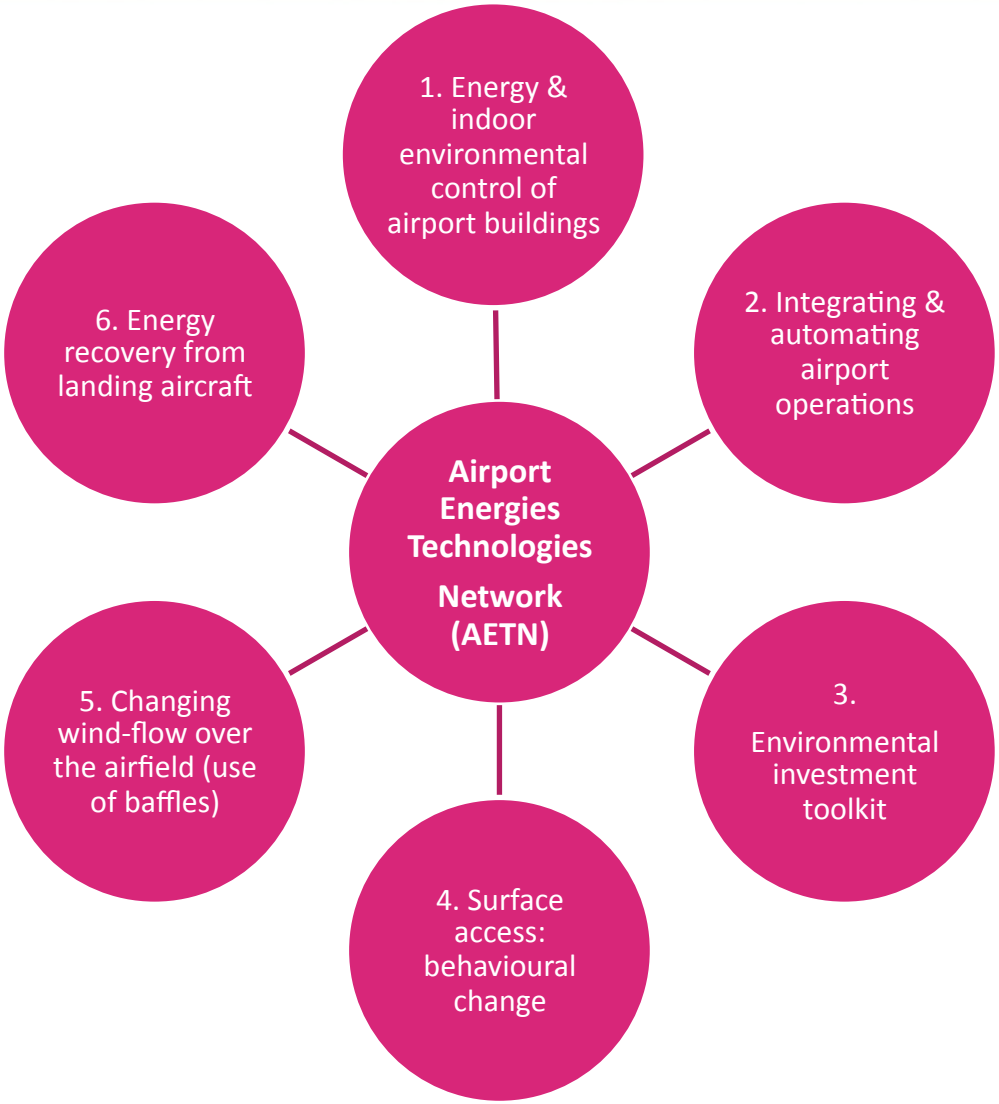
Background to the AETN

- Airport Operations identified as research gap
- 'Sandpit' event in November 2008 funded 7 research projects ~$4.8 million (2009-2012/2013)
- AETN (Airport Energy Technologies Network) project is the network project
- Attendees included academics & industry/ commercial collaborators (e.g. BAA, Manchester Airport, Department for Transport, Aviation Environment Federation)

Approach of the projects

- Plan to tackle long-term climate change energy programme by reducing environmental impact of an airport
- Focus is mid-term, the year 2020
- Some projects are in direct collaboration with airports, others experimental
- Some engineering / scientific approaches, others use methodologies from the social sciences

Diagram of the linkages between projects



1. Energy within airport buildings

Energy and indoor environmental control of airport buildings

- Management of passive & active indoor thermal environment control systems
- Energy savings can be: lighting, daylight, construction methods, thermal energy storage, renewable energy
- More focus on retrofit applications to existing airport buildings

2. Integrating airport operations

Integrating & automating airport operations

- More efficient airport operations decision support systems can maximize utilization of existing resources
- Integration across four key airport operations: take-off scheduling, landing scheduling, gate assignment & baggage flow

3. Environmental investment toolkit

Understanding airport operator decision-making for future sustainable technologies

Includes semi-structured interviews & ethnographic observations. Two stories:

1. Airport environmental department: tensions regarding noise & wider environmental concerns, plus pressure for financial savings
2. Over-complex management structure for airport recycling

4. Surface access: behavioural change

Airports & Behavioural Change (ABC): towards environmental surface access travel

- Reduce drop off/pick up
- Incorporate technology
- Understand deeper motivations of individuals

5. Changing wind-flow over the airfield

Practical abatement techniques for exhaust jets from commercial aircraft

- Enhance buoyant rise of exhaust emissions to improve local air quality
- Includes a field trial of wind baffles

6. Energy recovery from landing aircraft

Feasibility study of energy recovery from landing aircraft

Discussion of potential techniques to harvest kinetic energy from landing passenger aircraft:

- Regeneration:- piezoelectric effect & moving runway
- Arrestor cable method

AETN project

- Network support
- Specific events
- PhD for PhD workshop
- Dissemination

Day 1 – Wednesday 1st February 2012

Update on Research Activity in the AETN Network: Each research team to update the network on key findings to date (~20 minutes) followed by a discussion led by an airport operations practitioner (~20 minutes)

10:30	Arrival and coffee
10:30- 11:00	Introduction and Welcome – Professor Paul Stewart
11:00-11:40	Surface Access and Behavioural Change – Dr Tim Ryley
11:40-12:40	Environmental Investment Toolkit –Dr Francesca Medda, Dr. Adam Boies and Dr Paul Chan
12:40-13:45	Lunch and Networking
13:45-14:25	Energy and Indoor Environment Control of Airport Buildings – Professor Savvas Tassou
14:25-15:05	Integrating and Automating Airport Operations - Professor Edmund Burke
15:05-15:45	Changing wind-flow over the Airfield (use of baffles) – Dr Mike Bennett.
15:45 -16:15	Coffee and Networking
16:15-16:55	Energy Recovery from Landing Aircraft - Professor Paul Stewart

Close

Day 2 – Thursday 2nd February 2012

09:15	Coach departs hotel foyer to venue
09:30- 10:00	Arrival and Coffee
10:00-10:15	Roundup an intro – Dr Tim Ryley/Professor Paul Stewart
10:15-11.15	Environmental Management in Aviation: Successes and Strategies Ahead
11:15-11:30	Coffee and Networking
11:30-13:00	Knowledge Transfer and Funding Opportunities - Aerospace, Aviation and Defence KTN
13:00-13:45	Lunch and Networking
13:45-14:30	Tour of Concorde Hanger
14:45	Return coach to Manchester airport

About the AETN

The Airports Energy Technologies Network (AETN) formed in 2008 through the Engineering and Physical Sciences Research Council (EPSRC) programme on improving the environmental and energy efficiency of airport operations. Six projects have been funded out of this programme. The purpose of this network meeting is to disseminate key interim findings so as to engage with airport practitioners to identify routes to exploitation.

www.energy-institute.eu/AETN

Contact the AETN

Please contact Denise Bateman, the AETN Co-ordinator

email:dbateman@lincoln.ac.uk

AETN Director

Professor Paul Stewart – Pro Vice Chancellor Research
School of Engineering
University of Lincoln
LN6 7TS
email: pstewart@lincoln.ac.uk

AETN Co–director

Dr Tim Ryley – Senior Lecturer in Transport Studies
School of Civil and Building Engineering
University of Loughborough
LE11 3TU
Email: t.j.ryley@lboro.ac.uk
Tel +44 1509 223422

Attend the event

Attendance at this event (not including accommodation) is free. To attend either or both days, please book in advance by emailing Denise Bateman (dbateman@lincoln.ac.uk)

EPSRC Loughborough University University of Lincoln

Discussion points

- Importance of airports: quantify & assess role in reducing environmental impact
- Types of insights:
  - Series of mitigation measures: surface access, buildings & operations
  - Overall decision-making: environmental toolkit
  - Technical from wind baffles / energy recovery project

Discussion points

- Importance of collaboration & stakeholders (particularly airports)
- Challenges:
  - Multi-disciplinary nature & communication, although synergies from different disciplines
  - Linking with airports, which have a short-term focus compared to projects 2020 vision
- Opportunity that airports could become a beacon of good practice
- The projects tend to focus on mitigation measures, but what about adaptation?

Thank you

Any questions?

Dr Tim Ryley

T.J.Ryley@lboro.ac.uk

Transport Studies Group
School of Civil & Building Engineering
Loughborough University

Airport Energy Technologies Network project website:
http://www.energy-institute.eu/AETN