Future-Proof Your Airport – Integrating Airport Sustainability Projects

Tuesday, October 22, 2019
2:00-3:30 PM ET
Purpose
To discuss ACRP Research Report 205: Revolving Funds for Sustainability Projects at Airports and Synthesis 93: Sustainability’s Role in Enhancing Airport Capacity.

Learning Objectives
At the end of this webinar, you will be able to:
• Describe how to integrate sustainability processes within airport capacity-enhancing projects
• Discuss how to collaborate with internal and external airport stakeholders when incorporating sustainability principles in capacity-enhancing projects
• Describe how green revolving funds work
• Navigate the related airport financial requirements (e.g., FAA grants, airline contracts and performance tracking)
ACRP Webinar
Future-Proof Your Airport – Integrating Airport Sustainability Projects
October 22, 2019
Thomas Cuddy
FAA

- With FAA’s Airport Planning and Environmental Division (APP-400) responsible for national environmental policy and planning for U.S. airports
- promotes sustainability and resilience with industry and international partners through policies, infrastructure financing, and R & D
- holds a Ph.D. from Columbia University and has worked in the public and private sectors as well as academia
Five Ways to Get Involved!

1. Join the ACRP IdeaHub community
2. Volunteer for a project panel
3. Prepare a research proposal
4. Answer an ACRP survey
5. Apply the research results

Visit us online: www.trb.org/ACRP
Today’s Speakers

Adam Klauber, Rocky Mountain Institute and
Liza Milagro, Hartsfield-Jackson Atlanta International Airport

Presenting
ACRP Report 205:
Revolving Funds for Sustainability Projects at Airports

and

Oana Leahu-Aluas, Cadmus Group and
Ted Anasis, San Diego International Airport

Presenting
ACRP Synthesis 93:
Sustainability's Role in Enhancing Airport Capacity
Sustainability's Role in Enhancing Airport Capacity

Oana Leahu-Aluas
Cadmus
Associate, Sustainable Transportation Practice

Supported development of Virginia Department of Aviation Airports Sustainability Management Plan

Supported ACRP 06-05: Guidance for Diversity in Airport Business Contracting and Workforce Programs
ACRP Synthesis 93 Oversight Panel

Ted Anasis, San Diego County Regional Airport Authority
Erin Cooke, San Francisco International Airport
James Crites, Dallas/Fort Worth International Airport (retired)
Matthew DiScenna, Port Authority of NY & NJ
Aaron J. Frame, Chicago Department of Aviation- O'Hare International Airport
Carol Lurie, Vanasse Hangen Brustlin, Inc.
Narcrisha Norman, Embry-Riddle Aeronautical University
Mary L. Vigilante, Synergy Consultants, Inc.
Thomas Cuddy, FAA Liaison
Melinda Z. Pagliarello, Airports Council International – North America, Other Liaison
Gail R. Staba, ACRP Senior Program Officer
ACRP Synthesis 93: Sustainability's Role in Enhancing Airport Capacity

- Features seven case examples of airports successfully building sustainability concepts into capacity-enhancing projects
- Highlights benefits from adopting a sustainability approach
- Provides resources and tools for airport decision makers, including a preliminary checklist
- Includes a downloadable PowerPoint presentation geared toward an airport leadership audience on the benefits of incorporating sustainability in capacity-enhancing projects
- Published August 2018
Research Problem

Capacity Constraints at Airports

- Growth in air travel
- Local communities feel impacts from growth – both positive and negative
- Sustainability integration as part of addressing capacity needs

Sustainability and Capacity-Enhancing Projects

- Convey the “why”
- How communicating project benefits and sustainability metrics impacts stakeholder support of the project
How We Defined Sustainability and Capacity-Enhancement

**Sustainability**
- EONS: economic vitality, operational efficiency, natural resources, and social responsibility
- Airports have further refined and tailored this definition

**Capacity-Enhancement**
- Increase in the ability of airport facilities and systems to process passengers or cargo
- Infrastructure development, operational improvements, or changes to non-aeronautical airport services
Research Approach

Literature Search

- Identified airport initiatives
  - Enhanced capacity and incorporated sustainability concepts
- Reviewed project documentation
- Academic and transportation practitioner databases

Airport Interviews

- Developed interview questions
- Selection process
- Seven airports interviewed
## Featured Airport Case Examples

<table>
<thead>
<tr>
<th>Airport</th>
<th>Code</th>
<th>State</th>
<th>FAA Region¹</th>
<th>Enplanements (2016)</th>
<th>Project Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austin-Bergstrom International Airport</td>
<td>AUS</td>
<td>TX</td>
<td>ASW</td>
<td>6,095,545</td>
<td>Consolidated Rental Car Facility (CONRAC)</td>
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<tr>
<td>O’Hare International Airport</td>
<td>ORD</td>
<td>IL</td>
<td>AGL</td>
<td>37,589,899</td>
<td>O’Hare Modernization Program</td>
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<tr>
<td>Orlando International Airport</td>
<td>MCO</td>
<td>FL</td>
<td>ASO</td>
<td>20,283,541</td>
<td>Intermodal Terminal Facility</td>
</tr>
<tr>
<td>San Diego International Airport</td>
<td>SAN</td>
<td>CA</td>
<td>AWP</td>
<td>10,340,164</td>
<td>Green Build Project</td>
</tr>
<tr>
<td>Seattle-Tacoma International Airport</td>
<td>SEA</td>
<td>WA</td>
<td>ANM</td>
<td>21,887,110</td>
<td>Baggage Handling System Optimization</td>
</tr>
<tr>
<td>Tampa International Airport</td>
<td>TPA</td>
<td>FL</td>
<td>ASO</td>
<td>9,194,994</td>
<td>Three-Phase Capital Improvement Program</td>
</tr>
<tr>
<td>Vancouver International Airport</td>
<td>YVR</td>
<td>BC</td>
<td>N/A</td>
<td>22,284,496</td>
<td>Strategic Plan and project screening tool</td>
</tr>
</tbody>
</table>

¹ ANM, AWP, and AAL (Western); AGL, ACE, and ASW (Central); ANE, AEA, and ASO (Eastern)
Research Results: Sustainability Benefits

- Enhanced reputation
- Increased revenue flows
- Increased operational efficiency
- Regulatory cooperation
- Lower emissions
- Accountability
- Connectivity between stakeholders

Cost savings
- Waste reduction
- Community champions
- Facilitating innovation
- Differentiating factor
- Risk mitigation
Strategies and Practices from Interviews

- Framing sustainability as mitigating business risk
- Identify and evaluation social, fiscal, and environmental impacts
- Incorporating sustainability language into legal documents (and establishing compliance systems) to institutionalize practices
- Involving broad representation of airport departments in project planning

Stakeholder Communication

- High visibility sustainability information
- Airport representative participation in community meetings
- Inclusion of a variety of staff in sustainability goal development
- Internal sustainability training for airport staff
Research Observations from Airport Experiences

- Strong executive direction and culture of sustainability needed, in combination with meaningful policies
- Integration of sustainability measures is an iterative learning process
- Community-based governance supports sustainability
- Benchmarking sustainability performance is vital
- Early sustainability efforts often focus on environmental stewardship
- Sustainability encourages innovation
Quotes from Airport Case Examples

“Sustainability is just another way of saying innovative. Sustainability helps us define who we are and what we could become.”
- Marion Town, Director of Environment, Vancouver International Airport

“When you have a multi-year, multi-billion dollar construction program, there are a lot of jobs there. If we can find sustainable materials and use sustainable construction practices, that goes a long way.”
- Aaron Frame, Deputy Commissioner of Environment, Chicago Department of Aviation

“The more you can do, the better. However you can reach your community audience – whether it’s social media, local events, sponsorship participation – helps them realize the significant sustainability work happening at the airport.”
- Melissa Solberg, Sustainability Manager, Tampa International Airport

On sustainability: “It’s culture. It’s who we are. It’s the right thing to do. So, let’s do it.”
- Mike Tasker, Senior Manager of Facilities and Infrastructure, Port of Seattle
Takeaways for Your Airport: Case Examples

Case Examples

- Key highlights
- Sustainability and capacity-constraint contexts
- Takeaways and lessons learned
- Interviewee Information
**Framework for Future Sustainability Checklist**

- For use in the context of capacity-enhancing projects
- Intended as an initial starting point
- Based on the EONS framework
- Can help broaden perspectives and reveal opportunities

### Economic Vitality

<table>
<thead>
<tr>
<th>Questions to Consider for Incorporating Sustainability</th>
<th>Relevant?</th>
<th>Where to look for more information (document, person, process, meeting minutes, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>How will this project affect passenger or tenant retention rates?</td>
<td>☐</td>
<td></td>
</tr>
<tr>
<td>How will this project affect airport operations’ cost per passenger?</td>
<td>☐</td>
<td></td>
</tr>
<tr>
<td>Is there potential for non-aeronautical development and attracting local businesses as part of this project?</td>
<td>☐</td>
<td></td>
</tr>
<tr>
<td>Does the project planning incorporate asset management and resilience to mitigate business risk? What types of risks and hazards have been considered in the project planning and design?</td>
<td>☐</td>
<td></td>
</tr>
</tbody>
</table>

### Operational Efficiency

<table>
<thead>
<tr>
<th>Questions to Consider for Incorporating Sustainability</th>
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</thead>
<tbody>
<tr>
<td>Does the project harness opportunities to reduce costs by decreasing resource usage, increasing energy efficiency, or switching to renewable energy sources? (Resources could include: electricity, natural gas, water, transportation fuels, among many others)</td>
<td>☐</td>
<td></td>
</tr>
<tr>
<td>Does the project facilitate additional service offerings to enhance customer experience (such as concessions, business areas, educational displays, children play areas, etc)?</td>
<td>☐</td>
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</tr>
</tbody>
</table>

### Natural Resources

<table>
<thead>
<tr>
<th>Questions to Consider for Incorporating Sustainability</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Does the project incorporate alternative energy or fuels to reduce emissions?</td>
<td>☐</td>
<td></td>
</tr>
<tr>
<td>Does the project consider the airport’s generation of waste sent to landfills, and undertake measures to reduce waste and increase the airport’s rate of recycling and reuse?</td>
<td>☐</td>
<td></td>
</tr>
<tr>
<td>Does the project recycle construction and demolition waste?</td>
<td>☐</td>
<td></td>
</tr>
</tbody>
</table>

### Social Responsibility

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Is this project part of a FAR 150 program? Will the project affect noise levels around the airport? If so, what strategies will be used to minimize noise increases and how are community members being engaged on the project?</td>
<td>☐</td>
<td></td>
</tr>
<tr>
<td>How will the airport reflect the region’s or surrounding communities’ unique culture in the operation and management of the capacity-enhancing project (such as through local art, music, comedic communications, etc)?</td>
<td>☐</td>
<td></td>
</tr>
</tbody>
</table>
Resources and Tools

- For airport decision-makers involved in selection and application of sustainability approaches and measures
- Intended to be applicable across a variety of circumstances
- Include resources for communicating sustainability approaches

### Additional Resources and Tools

This appendix provides resources and tools for airport decision-makers involved in selecting, applying, and communicating sustainability approaches and measures as part of capacity-enhancing projects. Because every project is different and every airport may require different guidance, the focus of the chapter is on resources and tools that can be applied across a variety of circumstances and that fit a variety of airport needs. Table 2 provides descriptions of each resource and tool.

<table>
<thead>
<tr>
<th>Year</th>
<th>Name</th>
<th>Responsible Entity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>ACRP Report 56: Guide for Incorporating Sustainability into Traditional Airport Projects</td>
<td>ACRP</td>
<td>This guide provides strategies for incorporating sustainability into traditional airport projects.</td>
</tr>
<tr>
<td>2014</td>
<td>ACRP Report 14: Mitigating Environmental Impacts of Airports</td>
<td>ACRP</td>
<td>This report provides strategies for mitigating the environmental impacts of airports.</td>
</tr>
</tbody>
</table>
| 2016 | ACRP Report 15: Sustainability Practices: Mitigating Environmental Impacts | ACRP | This report provides strategies for mitigating the environmental impacts of airports.

(continued on next page)
Executive-Level Presentation

- Intended for an airport leadership audience
- Focuses on benefits of incorporating sustainability into capacity-enhancing projects
- Includes airport case examples and funding opportunities
Sustainability's Role in Enhancing Airport Capacity

Case Study: San Diego International Airport

Ted Anasis, AICP
Manager – Airport Planning
San Diego International Airport (SAN) Case Study

Ted Anasis, AICP – Manager – Airport Planning & Environmental Affairs

- Leads long-range planning and California state environmental review of airport projects

**SAN’s downtown location surrounded by coastal resources**

- 661 acres, single runway (9,401 feet); two terminals, 51 gates
- Adjacent to San Diego Bay and Interstate 5
- Surrounding terrain constraints and downtown urban footprint, SAN must be innovative to meet growing air service needs of San Diego region
SAN adopts Sustainability Policy in 2008

Sustainability Policy adopted; elements posted at www.san.org

- Sustainable practices integrated into project planning
- Deeply rooted in both policy and culture; framework to address airport’s needs

Adopted plan elements guide Airport sustainability programs

- Water Stewardship Plan, Strategic Energy Plan, Carbon Neutrality Plan
- Clean Transportation Plan
- Climate Resilience Plan
- Zero Waste Plan and Biodiversity Plan: public review plans available
SAN adopted Master Plan and implemented major projects:

- **Green Build**
  - Terminal 2 Expansion
  - 2013

- **Rental Car Center**
  - 2016

- **Parking Plaza**
  - May 2018

- **International Arrivals Facility**
  - June 2018
The Green Build LEED Platinum Terminal
The Green Build LEED Platinum Terminal

- 10-gate Terminal Expansion
- Elevated Departure Roadway “California Curb”
- 85 New Concessions
Rental Car Center LEED Gold
Rental Car Center LEED Gold
Rental Car Center Public Art

Photo by Pablo Mason

Photo by Steve Uzzell
Parking Plaza LEED Silver

Photos by Pablo Mason
International Arrivals Public Art

Photo by Pablo Mason

Photos by Pablo Mason
Recognized Leader in Airport Sustainability

- 100% Clean Fuel Bus & Shuttle Fleet
- LEED Gold or Better (New Construction)
- 80% Renewable Electricity
- Taxi & Rideshare GHG Reduction Incentives
Reduce Demand for Energy & Water Resources

12-kV Micro-grid
Campus-wide Distribution

5.5 MW Solar Photo Voltaic
Rooftop & Carports

Onsite Water Reuse
Pre-conditioned air at gates captures condensate for reuse
Next phase of airport master planning includes sustainable programs

- Hydrant fueling at existing and future terminal gates
- Stormwater capture and reuse system – Three 3 million gallon underground cisterns
- Electric shuttle bus fleet connecting passengers to Old Town Transit Station
- Consistency with the City of San Diego Climate Action Plan
FOR ADDITIONAL INFORMATION

www.san.org

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Revolving Funds for Sustainability Projects at Airports

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Rocky Mountain Institute
Adam Klauber, CEM, LEED A.P.  
Principal Investigator

- Technical Advisor, Aviation for Rocky Mountain Institute
- Current PI for Airport Microgrid Implementation Toolkit (ACRP 10-26)
- Contributor, Panelist or Co-Principal Investigator on 4 additional ACRP projects
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  Aaron Karp
Frasca & Associates, LLC:
  Ken Cushine
Captures Lessons Learned from non-airport Green Revolving Funds

Provides insights from two existing airport examples on revolving funds and sustainability funds.

Offers a Frequently Asked Questions (FAQ) section to address common questions that airports will have regarding GRF compatibility at their location.

Identifies key stakeholders

Presents an implementation progression and guidance in easy-to-understand steps

Details project performance tracking best practices

Published September 2019
Why Might This Project Be Useful to You? Because Airport Sustainability Funding Sources are Limited

- **OPERATIONAL BUDGET (SMALLER PROJECTS)** – Funds limited; efficiency competes with revenue generating priorities.

- **CAPITAL BUDGET (LARGER PROJECTS)** – Require alignment within larger long-duration construction efforts.

- **AIRPORT BOND ISSUANCE** – Debt burden reduces future options; significant cost and labor requirements to complete.

- **GOVERNMENT GRANT (E.G., FAA AIP, PFC & VALE)** – Multiple restrictions regarding use of funds; competitive application process.

- **PERFORMANCE CONTRACTING** – Contractor prioritizes based on ROI; Administrative burden high; ~10-year implementation intervals.
Green Revolving Funds Well Established in Academia

<table>
<thead>
<tr>
<th>Harvard University</th>
<th>Denison University</th>
<th>Lane Community College</th>
<th>60+ Higher Education and Municipal Participants</th>
</tr>
</thead>
</table>

- **Harvard University**
  - [Image Source](source1)

- **Denison University**
  - [Image Source](source2)

- **Lane Community College**
  - [Image Source](source3)

- **60+ Higher Education and Municipal Participants**
  - [List of Institutions](source4)

**SOURCE:** Screenshot from Presentation delivered by Adam Klauber at TRB 2019
Research Approach

Phase 1 – Feasibility Research

- Literature review
- Feasibility consultation (FAA and airport finance experts)
- Case examples

Phase 2 – Guidance Document

- Fund initiation
- Identifying funding sources
- Tracking performance
- Stakeholder education

Phase 3 – Testing and Refinement

- Airport review and feedback
- Final document

SOURCE https://green.harvard.edu/programs/green-revolving-fund
What can be expected for financial performance?

- GRFs achieve a range of 1.8-7.8 years payback (~20% ROI)

What are other benefits associated with GRFs?

- Establishing durable funding source outside of the budget allocation process
- Integrating continuous sustainability performance improvement (and tracking) as part of the culture
- Advancing sustainability impacts such as greenhouse gas reduction

Types of projects

- Lighting upgrades, water savings, building efficiency and alternative fuel vehicles
- Other types include solid waste reduction and renewable energy installations

Which airports are ideal candidates:

- Airports with utility spending >$1 million annually on utilities/fuel
- Smaller airports that can participate in a state-system pooled fund
Example 1: Flexible Funding
Hartsfield-Jackson (ATL) has deployed the “Sustainable Resource Fund” capturing revenue from new Ad-space (and other sources) to use for energy and environmental projects.

Example 2: Revolving Funding
Virginia’s State Department of Aviation (DOAV) provides low-interest loans for its airports that are not eligible for federal funding.
Findings – Compatibility with Airport Finance

Frequently Asked Questions about Funding

1. How can my airport begin?  ‡  Understand the governance structure, identify existing contractual requirements and coordinate with Finance office from start.

2. Does a GRF affect the Operating or Capital budgets?  ‡  Both. The three components that influence both are Seed Funding, and Reclaimed Savings.

3. Will GRFs affect Federal grant assurances?  ‡  Airport Improvement Program (AIP) Grants may not be used as seed capital; Operational savings resulting from projects that received FAA funding may be captured.

4. What about Passenger Facility Charges (PFCs)?  ‡  Like Federal grants PFCs funded projects could generate savings that could be reclaimed. Direct use of PFCs to a GRF is not permitted.

5. Are there other sources of allowable funding to capitalize the GRF?  ‡  External funding from state grants, utility rebates or other non-airport programs is acceptable. Airline revenue, non-aeronautical revenue and bonds could also work depending on the context.

DISCLAIMER – this ACRP PowerPoint Presentation Slide should in no way substitute for the full guidance within Report 205 or in person consultation with airport finance officers.
What are the steps to implement a GRF at my Airport?

GREEN REVOLVING FUND IMPLEMENTATION STEPS

1. PERFORM RESEARCH
2. SELECT A GRF MODEL
3. ASSESS INVESTMENT POTENTIAL
4. ENGAGE STAKEHOLDERS / BUILD BUY-IN
5. SECURE SEED CAPITAL
6. LAUNCH THE FUND
7. ESTABLISH FUND GOVERNANCE AND PROCEDURES
8. IMPLEMENT PROJECTS
9. TRACK, ANALYZE, AND ASSESS PERFORMANCE
10. OPTIMIZE AND IMPROVE
Seed fund from either Non-Federal or Federal sources
Or, capitalize by reclaiming savings from future projects.
Effective tracking of project performance is essential

Airports need robust system to assess GRF Performance

**Option 1:** Front-end Analysis – engineering estimates for potential projects.

**Option 2:** Retro-actively calculate performance (Submetering or utility bills).

**Hybrid:** Initial estimates for small projects and actual measurements for large.

Pre-built tools to track and report results save time and maximize transparency. (GRITS example on right →)

SOURCE: Screenshot from Presentation delivered by Adam Klauber at TRB 2019
GRF’s at Airport Require Effective Airline Collaboration

**Airport Aeronautical Revenue**
- Terminal Rents
- Landing Fees
- Ramp Fees
- Hangar Fees

Rates generally set by airline agreement

**Federal Regulations**
- Concessions
- Parking
- Rental Car Operations
- Advertising
- Land Rent

Charges must be fair and reasonable

**Airport Non-Aeronautical Revenue**

Charges may be set based on the market rate

**Airline Agreements**
- Subject to revenue sharing with air carriers

**Green Revolving Fund**

No regulatory barriers to GRF capitalization

No revenue sharing

**Compensatory**
- No agreement barriers to GRF capitalization
- Revenue sharing

**Residual**
- Highest potential agreement barriers to GRF capitalization
- Revenue sharing

**Hybrid**
- Moderate potential barriers to GRF

**TRB**

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• Ted Anasis, tanasis@san.org
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- Publishes and disseminates research results through free publications and webinars.
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Visit ACRP’s Impacts on Practice webpage to submit leads on how ACRP’s research is being applied at any airport.

Visit us online: www.trb.org/ACRP
Additional ACRP Publications Available on Today’s Topic

Report 117: *Airport Escalators and Moving Walkways—Cost-Savings and Energy Reduction Technologies*

Report 119: *Prototype Airport Sustainability Rating System—Characteristics, Viability, and Implementation Options*

Report 124: *Airport Parking Garage Lighting Solutions*

Report 139: *Optimizing Airport Building Operations and Maintenance Through Retrocommissioning: A Whole-Systems Approach*

Report 141: *Renewable Energy as an Airport Revenue Source*

Report 151: *Developing a Business Case for Renewable Energy at Airports*

Synthesis 21: *Airport Energy Efficiency and Cost Reduction*

Synthesis 24: *Strategies and Financing Opportunities for Airport Environmental Programs*

Synthesis 66: *Lessons Learned from Airport Sustainability Plans*

Synthesis 69: *Airport Sustainability Practices—Drivers and Outcomes for Small Commercial and General Aviation Airports*

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November 7
Comprehensive Renewable Resources Strategy for Airports

November 20
Using GIS for Land Use Compatibility Planning Near Airports

December 10
Give the ‘All Clear’—Hazard Zoning at GA Airports
TRB turns 100 on November 11, 2020

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