

ACRP Problem Statement: 82

Recommended Allocation: \$480,000

Benchmarking Energy, Water, Waste, and Greenhouse Gas Emissions for Operational Improvements

Click here to see problem statement in IdeaHub: <http://ideascale.com/t/UKsrZBU5a> (Note: you must be a registered user in myACRP/IdeaHub.)

TAGS: Air Quality, Airport Planning, Construction, Design, Environment, Maintenance, Operations, Sustainability, Synthesis, Terminal, Water Quality

STAFF COMMENTS

No comments.

AVERAGE INDUSTRY RATING SUMMARY

	Committees¹	Airport Community²
Achievable	3.67	3.62
Applicable	3.67	4.43
Implementable	3.33	3.68
Understandable	3.33	4.20
OVERALL	3.50	4.02

Notes: 1. Includes TRB aviation committees and committees from ACI-NA and AAAE.

2. Includes airport employees serving on active ACRP project panels.

[USE THIS LINK TO SEE DETAILED INDUSTRY RATINGS.](#) Click on the arrow in the Problem Statements dropdown menu in the upper right and select the problem statement number.

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ACRP OVERSIGHT COMMITTEE (AOC) DISPOSITION

The average AOC rating among its voting members was 3.1 on a scale of 1 to 5. While the idea of benchmarking was favorably received, the sense was that it would be technically difficult to do. Additionally, there was uncertainty that, even if it could be achieved, airports may not choose to adopt the practices. The problem statement was not selected for ACRP funding and will be returned to the idea collection phase of ACRP's IdeaHub.

Benchmarking energy, water, waste, and greenhouse gas emissions for operational improvements

TAGS: Air Quality, Airport Planning, Construction, Design, Environment, Maintenance, Operations, Sustainability, Synthesis, Terminal, Water Quality

OBJECTIVE

The objective of this research is to create a database of performance benchmarks for airport facilities. Airport staff need a better understanding of key operational metrics associated with building performance in order to improve efficiency, decrease operating costs, and reduce environmental impacts. A standard system which normalizes for weather, location, carbon intensity of utility supplied energy, and airport specific use characteristics needs to be developed for the use of all airports. This benchmarking system would provide a means for airports to evaluate the performance of existing facilities and assets, compare the benchmark performance with similar airports and airport facilities, and plan and execute improvement projects to reduce the energy, water, waste, and GHG emissions associated with those facilities and assets. A benchmark system that is specifically designed for use at airports would enable better design and construction processes with more realistic performance targets for new construction projects.

BACKGROUND

Various building rating systems exist for evaluating and reporting the energy, water, waste, and greenhouse gas performance indicators in buildings. However, none of the existing methods are appropriate for airport facilities and environments. The most widely accepted benchmark platform in the United States, ENERGY STAR's Portfolio Manager, currently compares the energy performance of an airport terminal to that of a bus or train station and does not include airport specific facilities such as cargo hangars, vehicle checkpoints, and air traffic control towers. The operation and performance of Airport facilities varies widely from building to building within a campus and Airports need a consistent, standardized methodology which for creating benchmark metrics on a per-square-foot and perpassenger basis. Once established, the database and standards can be shared and employed by airports of all sizes and geographies. Only then will staff at individual airports be able to accurately gauge the performance of their facilities with the performance of similar facilities at peer airports.

APPROACH TO RESEARCH

As many Airports embark upon Capital Programs and significant renovations, a need exists to develop a standard set of performance targets for new construction that are specific to airport facilities, measurable, and achievable in a variety of climates and geographic locations. Current benchmarking systems and standards attempt to extrapolate criteria for office buildings and bus or rail stations to airport facilities with limited success. Airport-specific criteria benchmarked against existing facilities needs to be developed to provide airport operators with realistic and achievable performance targets in order for airports to improve efficiency, decrease operating costs, and reduce environmental impacts. The performance targets should be normalized on a per-square-foot and per-passenger basis and reflect constraints such as carbon intensity of supplied utilities and airport specific use characteristics.

The objective of the research is to provide a standard set of benchmarks for energy, water, waste, carbon and GHG emissions for several airport-specific facility use-types such as terminals, cargo hangars, vehicle checkpoints, air traffic control towers, and aircraft maintenance, among others.

PROPOSED TASKS

Research (12 weeks):

1. Identify federal, state and local environmental compliance standards in five areas: energy, water, waste, carbon and greenhouse gas (GHG) emissions.
2. Identify upcoming (5-10 year planning horizon) state and federal energy efficiency and environmental legislation/regulations that will impact airports.
3. Compile data from prior research and studies.

Analysis and reporting (14 weeks):

1. Identify and obtain commitment from 10-12 airports in each category for inclusion of data in each benchmarking category for aggregation and analysis
2. Mine data from participating airports for energy, water, waste consumption.
3. Metering facilities for data where gaps exist.
4. Create database of information from prior benchmark studies according to approved analysis protocol
5. Analyze and normalize data to develop baselines and comparisons on a per-square-foot and per-passenger basis.

DELIVERABLE:

1. Research report.
2. Database of airport benchmarks for energy, water, waste, carbon and GHG emissions.
3. Update ACRP CD-ROM 178 benchmarking tool to include water usage, waste, carbon, and GHG emissions.

COST AND JUSTIFICATION

Estimated problem funding: \$480,000

Justification: Allocation based upon similar ACRP projects. Budget includes time and travel for up to three (3) researchers performing statistical analysis based upon data collection for up to 10 airports.

RELATED RESEARCH

- ACRP 09-10 Methodology to Develop the Airport Terminal Building EUI (ATB-EUI) Benchmarking Tool
- ACRP CD-ROM 178 Tool for Benchmarking and Profiling Airport Terminal Energy End Uses
- NCFRP 27 Promoting Environmental Goals in Freight Transportation through Industry Benchmarking
- ACRP 02-13 A guide for Improving Environmental Performance at Small Airports
- ACRP Synthesis 42 Integrating Environmental Sustainability into Airport Contracts
- ACRP 11-02/Task 32 Airport Environmental Research Roadmap
- ACRP Report 141 Renewable Energy as an Airport Revenue Source
- ACRP Report 108 Guidebook for Energy Facilities Compatible with Airports and Airspace
- ACRP Report 151 Developing a Business Case for Renewable Energy at Airports
- ACRP Research Results Digest 2 Model for Improving Energy Use in U.S. Airport Facilities - ACRP Synthesis 21 Airport Energy Efficiency and Cost Reduction
- Berger, R., Presentation entitled "Energy and Carbon Benchmarks for North American Airports" Airport Energy Management Forum, ACI Operations and Technical Affairs Conference, April 17, 2012
- El Choufani, Elie, Technical Symposium White Paper "Energy Reduction in Airports", Chartered Institution of Building Services Engineers (CIBSE), December 2016.

- Ahn, J. and Cho, S. “Energy Performance Benchmark Model for Airport Terminal Buildings”, North Carolina State University, Raleigh, N.C., Proceedings of BS 2015: 14th Conference of International Building Performance Simulation Association, Hyderabad, India, Dec. 7-9, 2015.
- Marshal, Charles, Presentation entitled “Utility Management and Energy Benchmarking for Airports” for Cx Energy 2014 Conference hosted by AABC Commissioning Group (ACG), April 24, 2014.
- McNamee, K. and Sanderson, K. and Reynolds, J., “Define Energy and Green House Gas Intensity Benchmarks for North American Airport Terminals”, ACC/AAAE Young Professionals Competition, 2013.

IDEA CREATOR

Person who first shared the idea with the IdeaHub community.

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OWNER/SUBMITTER

Person who volunteered to be responsible for developing the idea into a problem statement.

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