

Benchmarking Terminal Energy End Uses: Determining Priorities for Future Upgrades

ACRP Staff Comments: There is some potential overlap with ACRP Project 07-07, Evaluating Terminal Renewal vs. Replacement Options. Funding seems high even with sub-metering requirements.

TRB Aviation Group Committees Comments: ENVIRONMENTAL IMPACTS OF AVIATION: Suggestions provided on how to improve the project statement provided in comments below. This is a hot topic. The results of this project would assist airports with examining energy reduction actions. The ROI evaluation has been of great interest. There is a definite need for available terminal energy use data that enables an apples-to-apples comparison. In addition, there is a lack of EnergyStar or CBECS data for airport terminals, which can be a stumbling block for airports pursuing LEED certification. The data resulting from this project would likely be accepted by USGBC as a replacement for the lack of CBECS data for terminals. It is recommended that the problem statement objective be expanded to address how the project will support the pursuit of energy performance credits (and prerequisites) under LEED. Suggest funding this project at \$600,000. Eight to 10 terminals is too many for demonstration of best practice to be implemented by others; suggest three to five, with one covering each class size, and representative of different geographic regions. Because this is not a new concept, it should summarize information from other airports that have conducted similar studies. DFW may be a good example, and there might be a few others. AIRPORT TERMINALS AND GROUND ACCESS: The committee does not support this problem statement. Although it focuses on a legitimate issue and presents the proposed research in a concise fashion, installation of metering equipment and implementing and tracking improvements are expensive. The proposed research goes well beyond research into physical impacts of existing operations. Installing sub-meters will turn out to be a much bigger effort (requiring contractors, permits, etc.) than anticipated. Airport business models (residual vs. compensatory) don't necessarily lend themselves to this information being useful.

Review Panel: Recommended — The proposed research bears some relevance to ACRP Report 68: Guidebook for Evaluating Terminal Renewal vs. Replacement Options. The title is good, but there needs to be a tighter definition of the problem statement and research method. Could use existing sub-metering data rather than install new sub-meters, which is not a useful expenditure; could use temporary measurements. The proposed research should focus on several different infrastructures that are common to most or all airports. Few organizations have data at the system level to actually do a comparison. The research could be expanded to other industries that are LEED certified and are relevant to airport analysis. The funding could be reduced without the permanent installation of sub-meters to the \$350,000 to \$400,000 range. The effort could be done in less than 24 months.

AOC Disposition: Approved and funded at \$400,000 as [ACRP Project 09-10](#). The research objective was considered useful for airports; it can build upon a previous, related ACRP Research Results Digest and Synthesis. The researchers should look for case study airports with submetering already in place to reduce research cost. It was agreed that the project has environmental implications.

I. PROBLEM TITLE

Benchmarking Terminal Energy End Uses: Determining Priorities for Future Upgrades

II. RESEARCH PROBLEM STATEMENT

A large number of airport terminals are 25 years old or more and are beginning to require large-scale upgrades to the envelope, Mechanical Electrical and Plumbing systems, baggage systems, transportation systems and technology. These upgrades are being driven by aging infrastructure, new technology and most importantly, the desire to decrease operational costs. Airport facilities are being asked to do more with less while upgrading their existing facilities and demonstrating an appropriate return on investment for identified capital projects.

The ability to calculate an accurate return on investment and prioritize these capital projects is greatly diminished if the airport facilities team does not have access to detailed energy end use data. For example, a measurement and verification program that tracks electricity use for lighting and baggage handling equipment separately can help a facilities team determine where to allocate funds and what type of payback will be realized. Accurate tracking of energy uses will also allow an airport to accurately structure Energy Performance Contracts, which are becoming more and more popular, for the facility.

III. OBJECTIVE

This research engagement seeks to accurately benchmark energy end uses of airport terminals that vary in size, passenger traffic and climate zone to help airport facility O&M teams prioritize capital improvement projects with the best possible return on investment (ROI) and payback.

IV. RESEARCH PROPOSED

The research team should execute the following tasks to ensure that the objective is achieved and the research problem is answered.

1. Identify a minimum of 8-10 target terminals that vary in size, passenger traffic and climate zone
2. Gather and review currently available industry data sets to determine applicable benchmarks
3. Install sub-meters and track performance for a minimum of one year at all targeted airport terminals
4. Compile data from the targeted airport terminals
5. Propose Energy Conservation Measures (ECMs) that can become standard practice with the best possible return on investment (ROI) and payback
6. Implement and track the proposed ECMs for at least a year to accurately capture the energy savings achieved for various energy end uses
7. Prepare a final report that can act as a roadmap for airport facility O&M groups seeking to upgrade their facilities and achieve the best possible ROI and payback

V. ESTIMATE OF THE PROBLEM FUNDING AND RESEARCH PERIOD

Recommended Funding: \$ 750,000

- \$250,000 existing research and report compilation
- \$500,000 sub-metering, airport engagement and ECM tracking

Research Period: 30 months

- 3-6 months kick-off, existing data set reviews, terminal identification and buy-in
- 1 year energy end use tracking
- 1 year ECM tracking and report compilation

VI. URGENCY AND PAYOFF POTENTIAL

With aging infrastructure and facilities, there is a great urgency for this type of information to be available to airport facility groups as soon as possible. Capital improvements are being approved if they decrease operational costs and show a payback. Many times, there is not a sufficient capital improvement budget and a performance contract is required to reduce operational costs. This research will allow for a more informed process related to capital projects, energy performance contracts and operational policies.

VII. RELATED RESEARCH

There is no known published research on this information. This is the reason why the proposal of this research is so important for the industry. Individual airports have been tracking this data, but it has not been reported in a comprehensive, comparative manner. Tracing new data and compiling the existing data that may exist is the key focus of this research.

VIII. PERSON(S) DEVELOPING THE PROBLEM

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IX. PROCESS USED TO DEVELOP PROBLEM STATEMENT

This problem statement is the result of a group of individuals that have been performing design and sustainability work for the Aviation industry.

X. DATE AND SUBMITTED BY

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