

Aviation Sustainability: Is it an Oxymoron?

**8th National Aviation System Planning Symposium
Galveston, Texas**

May 22, 2012

Mary Ellen Eagan

Harris Miller Miller & Hanson Inc.

Topics

www.hmmh.com

- **What is sustainability?**
- **Overview of sustainability practices at airports**
- **Sustainability design guidelines and codes**
- **Systems for measuring environmental performance**
- **Ongoing ACRP research/efforts to watch**

Sustainability Defined

www.hmmh.com

“Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”

- Brundtland Commission, 1983



Tools for Identifying Sustainability Practices

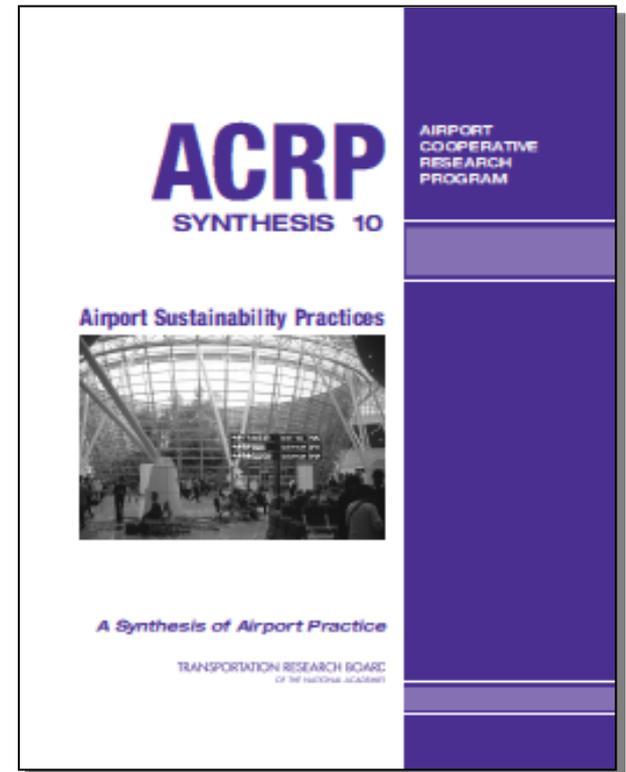
www.hmmh.com

- **ACRP research reports**
- **Airport sustainable design guidelines**
- **Airport sustainability master plans**
- **SAGA database**

ACRP Synthesis 10: Airport Sustainability Practices

www.hmmh.com

- Documents range of airport sustainability practices from literature review and web survey
- 25 survey respondents
- Responders identified regulation and airport policy as key drivers for implementation of sustainability practices
- Funding is predominant barrier to implementation of sustainability practices.



Airport Sustainable Design Guidelines

www.hmmh.com

- Los Angeles
- Chicago
- Massport
- San Francisco



FAA Sustainability Master Plan Pilot Program

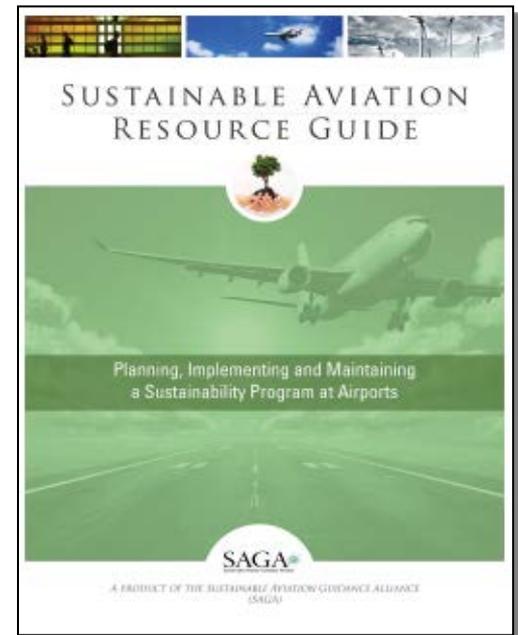
www.hmmh.com

| Airport | State |
|--------------------------------------------------|--------------|
| Denver International Airport | Colorado |
| Fresno Yosemite International Airport | California |
| Hartsfield-Jackson Atlanta International Airport | Georgia |
| Ithaca-Tompkins Regional Airport | New York |
| Nashville International Airport | Tennessee |
| Newark Liberty International Airport | New Jersey |
| Newport News/Williamsburg International Airport | Virginia |
| Newton City-County Airport | Kansas |
| Northeast Florida Regional Airport | Florida |
| Outagamie County Regional Airport | Wisconsin |
| Renton Municipal Airport | Washington |
| Teterboro Airport | New Jersey |

SAGA Database

www.hmmh.com

- **Objective:** consolidate existing sustainable guidelines and practices into a comprehensive, searchable resource that can be tailored to the unique requirements of individual airports of all sizes and in different climates/regions in the United States
- **Participants:**
 - ACI-NA
 - AAAE
 - ACC



SAGA Screenshot

www.hmmh.com

SAGA Sustainability Database_09-18-09 v2RA [Read-Only] [Compatibility Mode] - Microsoft Excel

File Home Insert Page Layout Formulas Data Review View

Clipboard Font Alignment Number Styles Cells Editing

B133 Work with area police and fire departments, notifying them of any road closures or heavy construction traffic.

| SAGA Sustainability Database | | | | | | | | | | | | | | | |
|-------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-----------------------|-------------------------------|-------------|--------------------------|------------------------------|---------------------------------|---------------------------------|---------|-----------------------|------------------|----------------|------------------------|-----------------------------------|
| Sustainable Practices for the Aviation Industry | | | | | | | | | | | | | | | |
| Practice | LEED | | | Activity | | | | Functional Area | | | | | | | |
| | Potential LEED Applicability | Planning & Design | Construction Activity | Day to Day Airport Operations | Maintenance | Administration & Finance | Community & Public Relations | Terminal Buildings & Concourses | Gate Areas & Passenger Handling | Offices | Tenants / Concessions | Baggage Handling | FIS / Security | HVAC & Other Utilities | Cargo houses / Freight Forwarders |
| 121 | Work with area police and fire departments, notifying them of any road closures or heavy construction traffic. | | | ✓ | | | ✓ | ✓ | | | | | | | |
| 122 | Record and submit weekly reports summarizing all safety incidences as well as all events which may have resulted in an accident and an evaluation of what steps can be taken to prevent those events in the future. | | | | | | | ✓ | | | | | | | |
| 123 | Measure and communicate healthcare cost impacts. | | | | | | | ✓ | | | | | | | |
| Stormwater Management | | | | | | | | | | | | | | | |
| Erosion and Sedimentation Control | | | | | | | | | | | | | | | |
| 124 | Develop and maintain a Soil Erosion and Sedimentation Control (SESC) plan consistent with EPA regulations on stormwater management for construction activities. | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 125 | Incorporate temporary sedimentation basins, temporary ditch checks, diversion dikes, temporary ditches, sediment traps, silt fences, and/or pipe slope drains into construction plans. | ✓ | | ✓ | | | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 126 | Design for/Implement curb breaks and drainage ditches, and/or | ✓ | ✓ | ✓ | | ✓ | | | | | | | | | |

Ready | FULL Practices Only | 60%

Sustainable Design and Building Codes

www.hmmh.com

- **International Green Construction Code (IgCC)**
- **ASHRAE 189.1**
- **Architecture 2030**
- **Green Advantage**

International Green Construction Code of ICC

www.hmmh.com

- Sponsored by American Institute of Architects (AIA), ASTM International, ASHRAE, U.S. Green Building Council (USGBC), and Illuminating Engineering Society (IES)
- The IgCC is the first model code that includes sustainability measures for the entire construction project and its site — from design through construction, certificate of occupancy and beyond.
- Provides
 - Regulatory framework for new/existing buildings
 - Economic benefit (green jobs)
 - Professional development & tech support



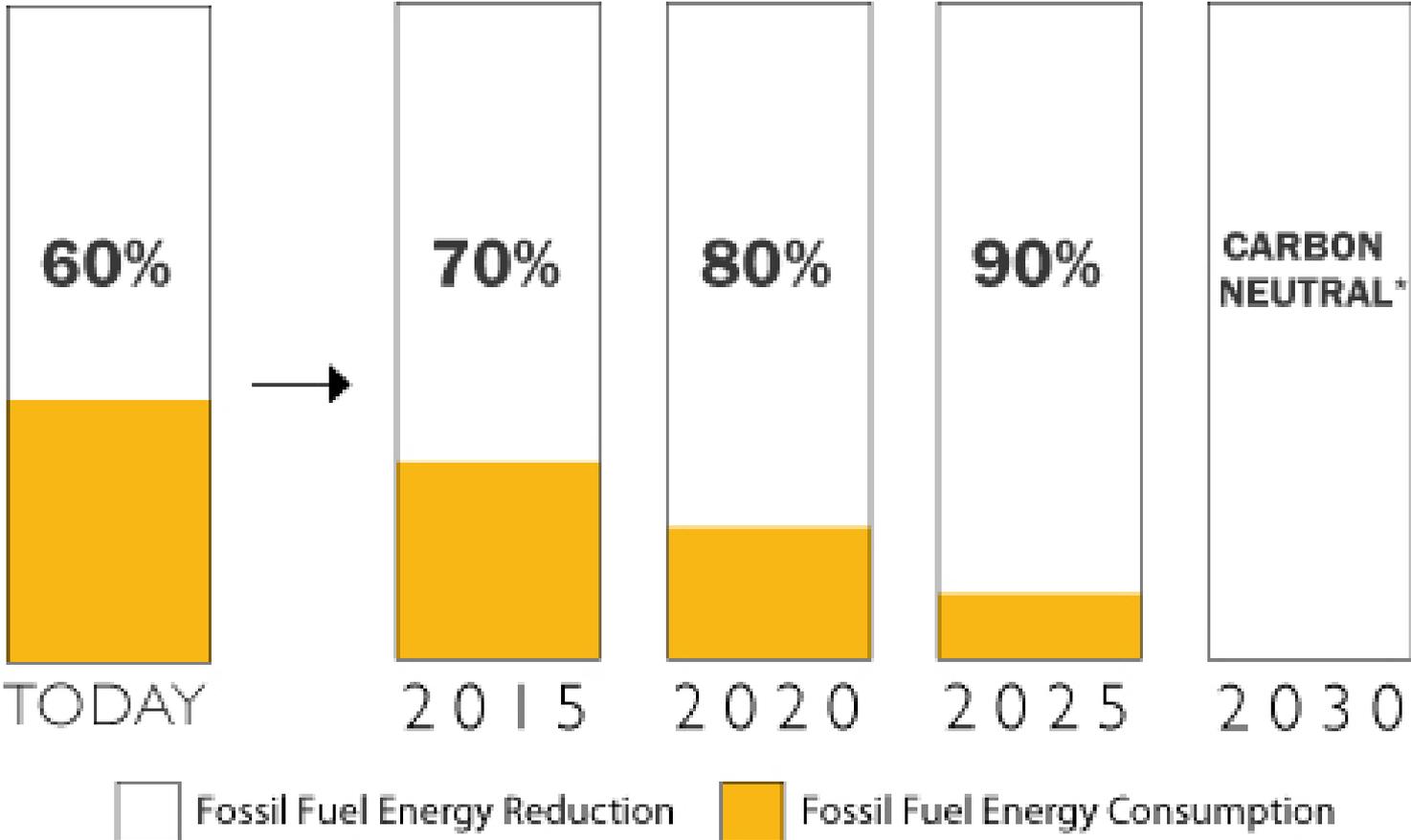
ASHRAE Standard 189.1-2011, Standard for the Design of High-Performance Green Buildings

www.hmmh.com

- ANSI standard developed in model code language
- Provides minimum requirements for high-performance, green buildings
- Applies to all buildings except low-rise residential (same as ASHRAE/IES Standard 90.1)
- Optional compliance path to the International Green Construction Code
- Not a design guide or a rating system



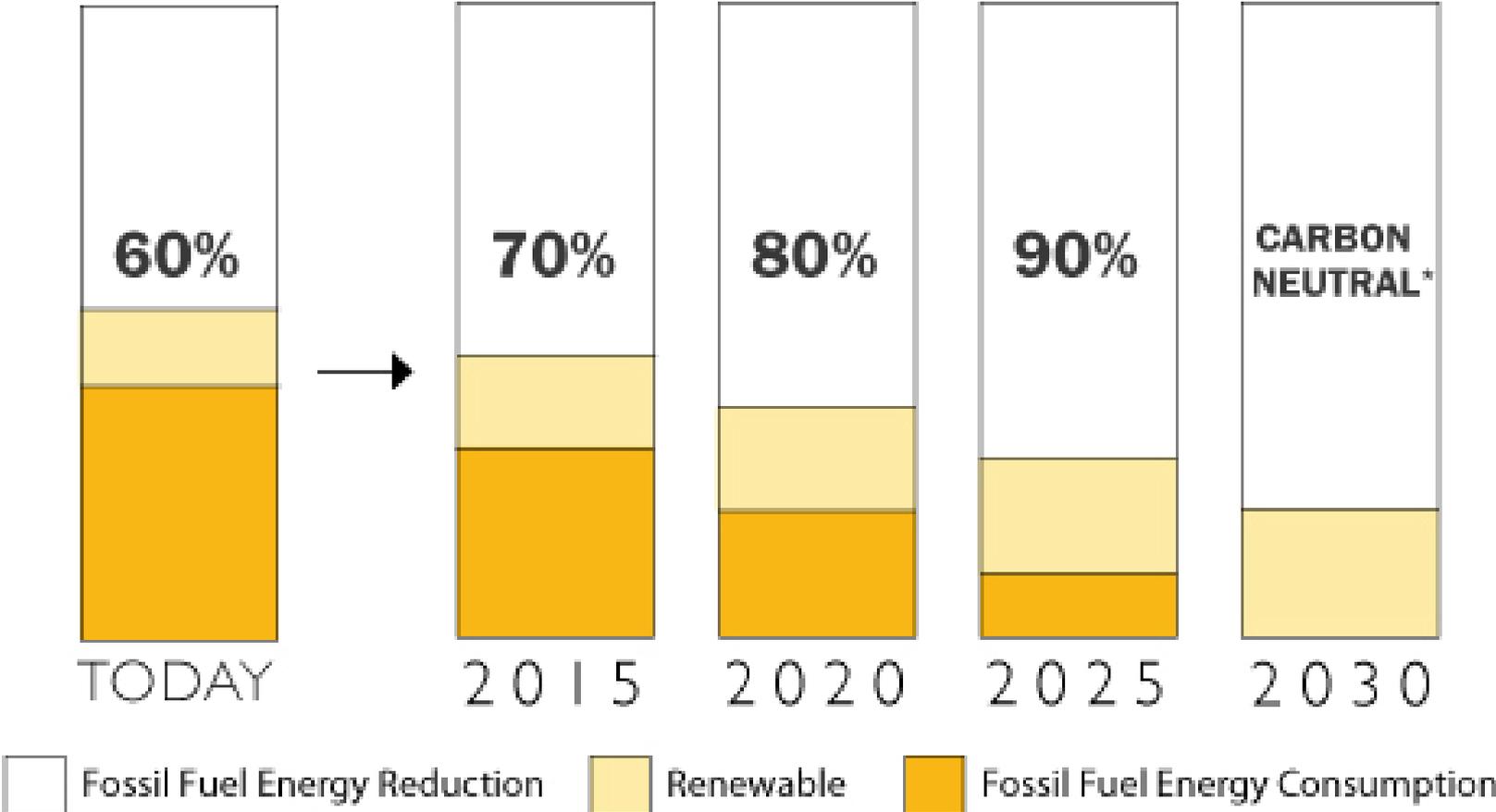
Architecture 2030



The 2030 Challenge

Source: ©2010 2030, Inc. / Architecture 2030. All Rights Reserved.
*Using no fossil fuel GHG-emitting energy to operate.

Architecture 2030



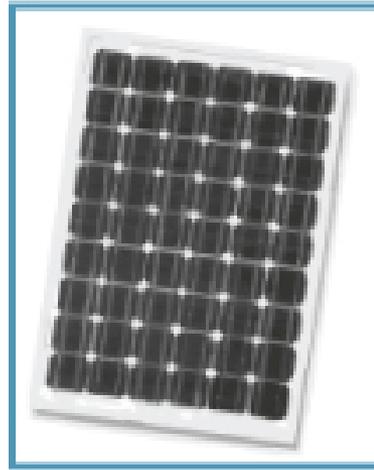
The 2030 Challenge

Source: ©2010 2030, Inc. / Architecture 2030. All Rights Reserved.
*Using no fossil fuel GHG-emitting energy to operate.



DESIGN STRATEGIES

The largest energy reductions can be achieved through design.



TECHNOLOGIES AND SYSTEMS

Including on-site renewable energy systems.



OFF-SITE RENEWABLE ENERGY

20% maximum.

Meeting the 2030 Challenge

Source: ©2010 2030, Inc. / Architecture 2030. All Rights Reserved.

Green Advantage Environmental Certification

www.hmmh.com

- **VISION:** Our vision is that buildings throughout the world are constructed in an environmentally sensitive manner that supports social and economic sustainability.
- **MISSION:** The Green Advantage mission is to be an exemplary certifier of building-related practitioners nationally and internationally.
- **STATEMENT OF DELIVERABLES:** Green Advantage promotes green building education and stimulates the use of green building best practices by producing certification standards and assessments for building-related practitioners.



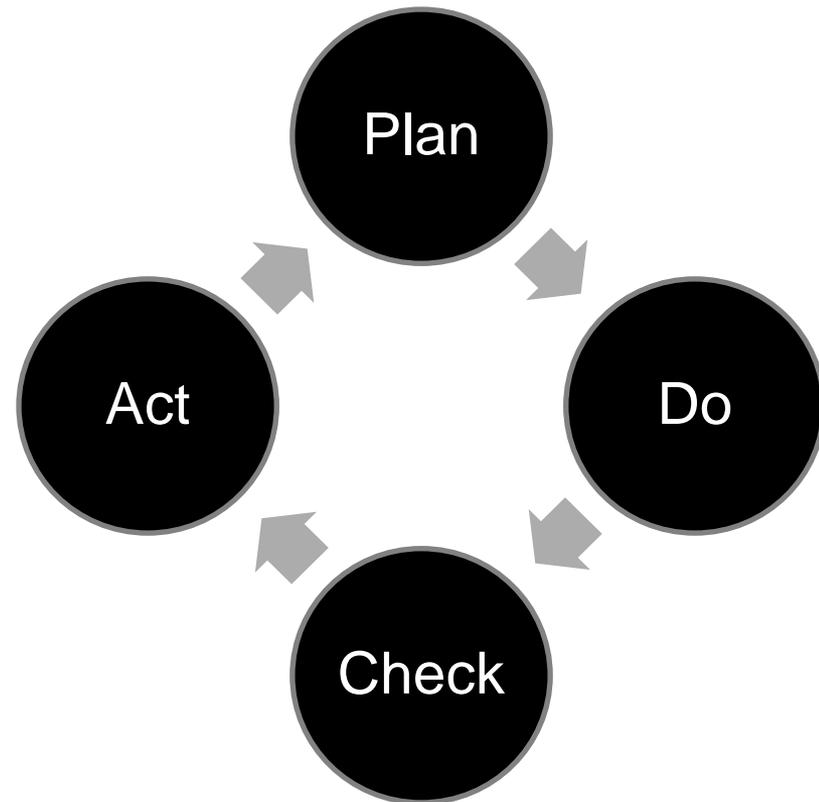
Sustainability Measurement Systems for Aviation

www.hmmh.com

- **Environmental Management Systems (EMS)**
- **Zofnass Rating System for Sustainable Infrastructure**
- **Global Reporting Initiative Airport Operator Sector Supplement (GRI AOSS)**

What is EMS?

- A systematic approach to manage complex environmental issues
- A “plan, do, check, act” process to continually improve and adapt
- A framework that integrates environmental considerations into business and operational decision-making



Zofnass Rating System for Sustainable Infrastructure

www.hmmh.com

- **The Zofnass Rating System is a voluntary certification process that assesses environmental sustainability and quality of life issues for infrastructure projects**
- **Set of guidelines to aid in optimizing the sustainability of a given infrastructure project during the planning and preliminary design phases, as well as a means to quantify the relative sustainability of the project**
- **What LEED™ has done for building-scale sustainability, Zofnass will do for infrastructure: educate citizens and increase public awareness, provide a means to quantify sustainability in infrastructure, and facilitate the adoption of sustainable design for infrastructure.**

Zofnass Rating System for Sustainable Infrastructure

www.hmmh.com

- | | |
|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Resource Allocation | <ul style="list-style-type: none">▪ MATERIALS: Use Materials Efficiently, Use Recycled + Reused Materials, Use Regional Materials,▪ ENERGY: Reduce Energy Use, Use Renewable Energy, Commission + Monitor Electrical/Mechanical Systems▪ WATER: Reduce Water Use, Utilize Water Efficient Landscaping, Commission + Monitor Water Systems |
| Natural World | <ul style="list-style-type: none">▪ SITE SELECTION: Prepare Site + Impact Assessment, Protect Wetlands and Water Bodies, Conserve Prime Habitat, Maximize Use of Developed Sites, Maximize Use of Contaminated Sites▪ HABITAT: Preserve/Protect Habitat Connectivity, Eliminate Invasive Species, Reduce Stormwater Runoff, Treat Stormwater, Treat Effluent, Balance Earthwork |
| Climate Change | <ul style="list-style-type: none">▪ EMISSIONS: Reduce Greenhouse Gas Emissions, Protect Air Quality, Enhance Public Transport, Enhance Pedestrian/Bicycle Routes, Mitigate Heat Island Effect▪ CLIMATE ADAPTABILITY: Assess Climate Change Threat, Design for Long Term Climate Change, Prepare for Extreme Weather Events |
| Community | <ul style="list-style-type: none">▪ COMMUNITY: Preserve Cultural Sites, Context Sensitive Design, Enhance Site/Neighborhood Safety, Enhance Public Space, Minimize Light Pollution▪ EDUCATION: Promote Sustainability Awareness, Implement Sustainable Practices Training, Solicit Community Feedback▪ VALUES: Plan for Growth Impacts, Reduce Demand, Implement an Integrated Project Approach, Encourage Local Employment |

Global Reporting Initiative (GRI) Airport Operators Sector Supplement

www.hmmh.com

- **GRI provides all companies and organizations with a comprehensive sustainability reporting framework that is widely used around the world**
- **The Airport Operators Sector Supplement (AOSS) was developed by a multi-stakeholder, geographically diverse Working Group, formed by volunteers from airport operators, investors, labor, non-governmental organizations and research organizations**
- **The Airport Operators Supplement covers key sector-specific issues that are unique to the airport environment**



GRI AOSS Metrics

| Issue | Metric |
|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Economic | <ul style="list-style-type: none">▪ Annual pax, broken down by international and domestic flights and by origin-and-destination and transfer▪ Annual number of aircraft movements by day and by night, broken down by commercial passenger, commercial cargo, general aviation and state aviation flights▪ Total amount of cargo tonnage |
| Environmental | <ul style="list-style-type: none">▪ Quality of storm water by applicable regulatory standards▪ Total direct and indirect greenhouse gas emissions by weight▪ Ambient air quality levels according to pollutant concentrations in microgram per m3 or parts per million (ppm) by regulatory regime▪ Aircraft and pavement de-icing/anti-icing fluid used and treated by m3 and/or tonnes▪ Number and % change of people residing in areas affected by noise |
| Society | Number of persons physically or economically displaced, either voluntarily or involuntarily, by the airport operator or on its behalf by a governmental or other entity, and compensation provided |
| Product Responsibility | Total annual number of wildlifestrikes per 10,000 aircraft movements |

Ongoing ACRP Research

www.hmmh.com

- **ACRP 02-22: Incorporating Sustainability into Traditional Airport Projects**
- **ACRP Project 02-28: Airport Sustainability Practices: Tools for Evaluating, Measuring, and Implementing**
- **ACRP Project 02-30: Enhancing the SAGA Database**

Questions?

Mary Ellen Eagan

Harris Miller Miller & Hanson Inc.

meagan@hmmh.com