

Airport **Sustainability** Guidebook



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INTRODUCTION TO THE GUIDEBOOK

PURPOSE OF THE FLORIDA AIRPORT SUSTAINABILITY GUIDEBOOK

The Florida Department of Transportation (FDOT) Aviation and Spaceports Office (ASO) developed this *Florida Airport Sustainability Guidebook* (Guidebook) to lead Florida's airports into a successful and sustainable future. To do so, this Guidebook presents airports with recommended methods and guidance for developing an effective sustainability plan and implementing sustainability initiatives. Its primary goal is to give airports the opportunity to become as sustainable as possible, thus enhancing the airport's economic prosperity and operational efficiency.

Though the term "sustainability planning" is used often throughout this Guidebook to describe sustainability efforts, it is important to note that this term does not refer solely to the traditional definition of planning but rather relates to sustainability in the context of all of the functional areas of an airport, such as administration, procurement, planning, design, construction, maintenance, and operations. Sustainability plan, sustainability program, and sustainability initiatives are just some of the commonly-used terms throughout this Guidebook that, for the purposes of this document, are interchangeable.

In the past, the common perception is that sustainability has been almost exclusively a practice for larger commercial service airports. This Guidebook highlights the potential for all airports, including general aviation (GA) and small commercial service airports, to develop a sustainability plan and implement sustainability initiatives. Although this Guidebook presents

This Guidebook is not to plan and define sustainability for Florida's airports, but rather to provide a foundation and framework for airports to do so individually on their own.



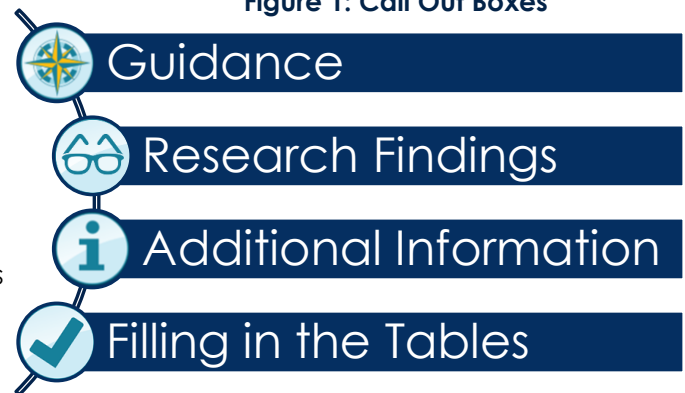
recommended methodology for sustainability planning, it is important for airports to understand the flexibility of tailoring their sustainability plan to meet the specific characteristics and needs of their organization and local community. **Further, the intention of this Guidebook is not to plan and define sustainability for Florida's airports, but rather to provide a foundation and framework for airports to do so individually on their own.**

The effectiveness of this Guidebook relies on the commitment of the airport and key stakeholders. Without purposeful buy in from airport management, stakeholders, staff, and the local community, the sustainability plan could be less effective. Further advice for outreach will be addressed in subsequent chapters of this Guidebook.

Documents related to sustainability planning have been developed in the past; however, this Guidebook was developed to assist Florida's public-use airports in developing customized and implementable sustainability plans. To accomplish this, existing resources, many of which are referenced throughout this Guidebook, provide useful tips and information on developing specific elements of a sustainability plan. The **Appendices** provide multiple resources for airports to reference throughout the process; where applicable, these resources have also been identified.

Call-out boxes are provided throughout the Guidebook to enhance the surrounding information with guidance, research findings, and additional information. Additional call out boxes are provided for guidance on filling in template-type tables. As shown in **Figure 1**, call out boxes contain four types of information: Guidance, Research Findings, Additional Information, and Filling in the Tables. The content of these four types of text boxes is described below. The information provided in these text boxes comes from the substantial outreach effort and research that was conducted at the onset of this Guidebook.

Figure 1: Call Out Boxes



"Guidance" boxes provide useful information about the section that can be used by airports when developing a sustainability plan. This information ranges from brief explanations of topics to tool descriptions.



"Research Findings" boxes discuss information related to sustainability found in numerous documents such as ACRP and NCHRP Reports. These boxes are beneficial to airports in all aspects of sustainability planning.



"Additional Information" boxes contain a relevant assortment of sustainability information. This information generally highlights items related to sustainability that project teams might overlook and should consider.



"Filling in the Tables" boxes are provided to help project teams fill in the sustainability development tracking table found in later chapters of this Guidebook. The tables are meant to give project teams a system of tracking the development of their sustainability plans.

Throughout the Guidebook, you will notice emboldened words or phrases – often, this indicates that there is a complementary call-out box to offer additional information on this item. These boxes are intended to provide project teams with resources, considerations, and useful information regarding sustainability to enhance the overall process of sustainability planning. These boxes can enhance the team's basic understanding of the process as well as aid in supporting key decisions. It is highly recommended that project teams consider the call-out boxes throughout this Guidebook to fully understand the section they are working through at that time.

WHY SUSTAINABILITY IS IMPORTANT TO FLORIDA AIRPORTS

In 2016, Florida's 20 commercial service airports had over 84 million enplanements — a 4.5% increase over the previous year and their highest total in history. In fact, this growth rate is a continuation of the relatively steady trend of growth in Florida's annual enplanements. While Florida's commercial service airports are challenged with the demand of accommodating increasing passenger growth, all of Florida's airports, both commercial service and general aviation (GA), are faced with daily challenges of meeting roles and expectations within the Florida aviation system, meeting the demands of their community, increased operations, and increased pressure to become as financially self-sufficient as possible.

The benefits of the economy of scale related to sustainability planning can clearly help improve the quality of Florida's large and medium hub commercial service airports and the State's larger

GA airports may actually be at an advantage in sustainability as the lower number of departments and staff can make it easier to obtain internal buy in, communicate information, and coordinate initiatives.



GA airports; however, **the benefits of sustainability planning also extend to the small and non-hub commercial service airports of Florida, as well as all GA airports.** As demand at the larger airports in Florida continues to increase, causing a decrease in available capacity, the reliever airports around the State will continue to experience increasing traffic. Sustainability planning can help handle increased air traffic, as well as create a strong public image of the airport, while simultaneously decreasing costs. Being such a diverse and important player in the national aviation system and to the

State's economy, Florida's aviation system needs to evolve in concert with modern initiatives and strategies to enhance the overall system. These initiatives can be identified, selected, and tracked by developing and implementing an airport sustainability plan. If sustainability initiatives are pursued with persistence and dedication by the airport, Florida's aviation system can continue to lead the nation as the premier system in successful and efficient aviation practices.

As traffic and passenger demand continue to increase for Florida's aviation system, it is vital that airports pursue an efficient, healthy, and overall sustainable system. There are countless benefits for airports pursuing sustainability plans including:

- Reduction of operating costs
- Better utilization of airport assets
- Protection from fluctuating energy costs
- Enhanced community support
- Reduced environmental impacts
- Efficient use of Airport Improvement Program (AIP) and FDOT funding
- Increased resourcefulness

These benefits can apply to all of Florida's airports, regardless of their size and role in the aviation system. Sustainability can provide airports with improved operations and ensure continued success throughout Florida's diverse aviation system.

In addition to the above-mentioned benefits of airport sustainability, grant assurances – both the Federal Aviation Administration (FAA) Sponsor Assurances and the FDOT Aviation Program Assurances – contain multiple assurances that can be tied to sustainability. For example, FAA Sponsor Assurance 24 and FDOT Aviation Program Assurance 10 – both titled “Fee and Rental Structure” – reference an airport's ability to be as self-sustaining as possible.

WHY SUSTAINABILITY IS IMPORTANT TO FDOT

With over \$1.5 billion in the Aviation Work Program over the last five fiscal years and over \$800 million programmed over the next four fiscal years (including Strategic Intermodal System funds dedicated to Aviation¹), it is important for FDOT to invest in projects that will support the long-term financial viability of Florida's airports. By assisting airports in undertaking comprehensive sustainability initiatives and strategies, FDOT seeks to increase the efficacy of its financial investment in Florida's airports by providing the tools and resources necessary for airports to increase their financial self-sufficiency, operational efficiency, social responsibility, and environmental awareness. The four focus areas correlate closely to the mission of FDOT², which states:

"Ensuring the mobility of people and goods, enhancing the economic prosperity, and preserving the quality of our environment and communities."

This mission is taken into consideration with every project proposed and supported by FDOT. With such high potential to enhance multiple facets of Florida's aviation system, FDOT strongly supports the pursuit of sustainability at all airports in Florida.

On a statewide level, the Florida Transportation Plan (FTP) "...defines Florida's future transportation vision and identifies goals, objectives, and strategies to accomplish that vision." The most recent FTP was published in 2015 and provided the state with seven transportation goals. Of these, the goal of **"developing Transportation solutions that support Florida's environment and conserve energy"** is specifically developed to support the development of sustainable infrastructure. Having such a provision in a plan as significant as the FTP lends a great deal of support to investing in sustainability projects at airports.

We want Florida's transportation system to preserve and enhance Florida's unique environment. This requires sustainable infrastructure and investments to preserve, or where possible, restore the function and character of wildlife habitat, watersheds, and other important natural systems. Each transportation investment is an opportunity to advance environmental stewardship goals by incorporating materials, technologies, and design features that reduce energy consumption and air quality pollutant and greenhouse gas emissions, and avoid creating barriers to (or possibly restore) movement of wildlife and water. Our broader transportation plans – in coordination with land use and development decisions – are opportunities to strategically align the overall footprint of the state's development so our economy and environment continue to thrive side by side.



To support the FTP, the Florida Aviation System Plan (FASP) is currently being updated to provide goals and objectives for Florida's aviation system. Within the FASP there is one goal that was developed to support sustainability initiatives. The goal of "Contribute to operational efficiency, economic growth, and competitiveness while remaining sensitive to Florida's natural environment" directly supports this Guidebook.

¹ <http://www.fdot.gov/WorkProgram/default.shtm>

² <http://www.fdot.gov/info/moredot/mv.shtm>

SUMMARY OF OUTREACH EFFORTS

The development of this Guidebook began with numerous outreach efforts to ensure recommendations and ideologies surrounding sustainability were accounted for. The following are summaries of the different outreach efforts that ultimately shaped this final Guidebook.

ONLINE SURVEY

To develop this Guidebook, a survey was administered to Florida's airports to better understand current airport practices and organizational structures relevant to sustainability planning. The survey identified the general organizational structure of airports, as well as information on environmental, social, operational, and economic challenges, opportunities, and practices. The responses from the survey were used to detail sustainability practices and initiatives throughout this Guidebook. The survey was advertised at the Florida Airports Council (FAC) Specialty Conference in October 2015 and was distributed to airport representatives via the statewide Continuing Florida Aviation System Planning Process (CFASPP) database. Through these methods, all 128 public-use commercial service and GA airports, airport consultants, and additional CFASPP members were notified of the survey. In total, there were 39 responses representing 44 airports. These consisted of GA and commercial service airports, as well as numerous multi-airport systems. A complete summary of the online survey can be found in **Appendix 1**.

LITERATURE REVIEW

To gain a better understanding of what resources currently exist, a literature review was completed to document existing research, data, and information on sustainability resources that have been completed. To accomplish this, five distinct groups of resources were reviewed including:

- Transportation Research Board (TRB)
 - Airport Cooperative Research Program (ACRP)
 - National Highway Cooperative Research Program (NCHRP)
- Federal Aviation Administration
- Florida Department of Transportation
- Sustainable Aviation Guidance Alliance (SAGA)
- Additional Resources

In total, 25 documents and resources were reviewed and summarized as they apply to the development of the *Airport Sustainability Guidebook*. The summaries introduce each of the reviewed documents, summarize the tools and resources provided by each document, and identify how airports completing sustainability plans or initiatives can access these resources for more information and leverage them in developing their own sustainability programs. The complete literature review can be found in **Appendix 2**.

AGENCY STAKEHOLDER INTERVIEWS

To better understand how sustainability plans and programs can be developed to help Florida's airports, seven stakeholder interviews with non-aviation entities were conducted to assess the resources and tools that may exist for airports that are not available through the FDOT Aviation and Spaceports Office. To prepare for these stakeholder interviews, a series of questions and discussion topics was developed and distributed to participants. Participants in the stakeholder interviews included representatives from:

- Federal Aviation Administration – the Orlando Airports District Office and the Headquarters Office of Airport Planning and Programming, Planning and Environmental Division
- FDOT Environmental Management Office
- FDOT Office of Policy Planning
- Florida Department of Agriculture and Consumer Services
- Florida Department of Economic Opportunity
- Florida Department of Environmental Protection
- National Oceanic and Atmospheric Administration

A complete summary of these stakeholder interview can be found in **Appendix 3**.

AIRPORT CASE STUDIES

Six airport case studies were completed to better understand specific aspects of the airports' sustainability initiatives. These case studies were conducted with airports of varying sizes and roles, ranging from general aviation airports to large hub commercial service airports. This broad spectrum of airports was specifically selected to provide guidance for all of Florida's airports and to provide anecdotal evidence of what airports are currently doing related to sustainability. Case studies were conducted with the following airports:

- Naples Airport
 - In-house Development of a Sustainability, Conservation, and Social Responsibility Plan
- Venice Airport
 - Effective Community Engagement Practices for Small Airports
- Albert Whitted Airport
 - Effects of a Municipal Sustainability Executive Order on Airport Operations and Development
- Greater Orlando Aviation Authority (GOAA)
 - Successes and Challenges of the GOAA Green Team
- Miami-Dade Aviation Department (MDAD)
 - Managing Reporting Challenges and fostering a Sustainability Mindset Throughout the Organization
- Hartsfield-Jackson Atlanta International Airport (ATL)
 - How ATL Tracks and Reports Sustainability Performance

A complete summary of these case studies can be found in **Appendix 4**.

AIRPORT STAKEHOLDER INTERVIEWS

To begin the project, eight stakeholder interviews were held with airports and airport authorities around the state. The intent of these interviews was to obtain a better understanding of sustainable practices implemented by each airport, as well as to determine what, if anything, Florida's airports were looking for as part of the development of the Guidebook. Airport stakeholder interviews were held with the following airports and airport authorities:

1. Lee County Port Authority (RSW and FMY)
2. Sarasota-Bradenton International Airport (SRQ)
3. Greater Orlando Aviation Authority (MCO and ORL)
4. Broward County Aviation Department (FLL and HWO)
5. Hillsborough County Aviation Authority (TPA, VDF, TPF, and PCM)
6. Vero Beach Regional Airport (VRB)
7. Tallahassee International Airport (TLH)
8. Jacksonville Aviation Authority (JAX, CRG, VQQ, and HEG)

A complete summary of these stakeholder interview can be found in **Appendix 5**.

OVERVIEW OF AIRPORT SUSTAINABILITY

TYPES OF SUSTAINABILITY PLANNING EFFORTS

Implementing sustainability at an airport is not intended to be done in a single or rigid way. In fact, there are currently three identified methods of incorporating sustainability into the traditional airport planning process:

1. Airport Sustainability Plans
2. Sustainable Airport Master Plans
 - a. Stand-Alone Chapter
 - b. Interwoven Throughout Master Plan
 - c. Hybrid Approach
3. Ad-hoc Airport Sustainability

Airports are encouraged to evaluate the three approaches to sustainability planning to accurately determine which would be most appropriate given airport characteristics and the current situation and opportunities at the airport. Although these methods of sustainability planning are most commonly recognized, airports are free to go about planning and implementing sustainability initiatives by any means determined to be most effective and beneficial. Further, the three types of sustainability planning efforts analyzed in this chapter can be applied interchangeably as well as simultaneously. **Appendix 8** contains example samples and templates for the development of various types of sustainability initiatives.

Currently, the FAA has provided 44 airports with AIP grant funds for the development of airport sustainability plans and sustainable airport master plans. The potential for AIP funding based on the development of sustainability documentation provides further incentive for airports to evaluate the following types of sustainability planning efforts.

AIRPORT SUSTAINABILITY PLANS

Airport sustainability plans demonstrate an airport's commitment to strongly pursue sustainability initiatives in a productive and organized manner. These plans are typically stand-alone documents created by airports to directly plan, implement, and track sustainability initiatives. Sustainability plans are developed as a separate process from other airport projects and plans, though it is recommended that these plans encompass the airport goals and priorities as expressed in other airport planning documents and be coordinated with those documents to ensure proper consideration is given to the airport's overall strategy. This method of sustainability planning ensures that sustainability is a primary focus and not just a concept intertwined with other airport projects. This type of sustainability planning can be implemented by all airports despite size or role. It is strongly recommended that airports consider developing a sustainability plan if possible.

This method of sustainability planning is the focus of this Guidebook. Though an airport can select components as needed, this Guidebook was developed primarily to assist airports in planning and implementing stand-alone sustainability plans.

Developing a sustainability plan is an important process that guides sustainability efforts of the airport and requires the commitment and understanding of the whole airport and its

stakeholders. Additionally, sustainability plans are typically ongoing efforts that require recurring development and evaluation. While this type of planning effort is generally assumed to provide the airport with the most extensive and accurate sustainability plan, the other methods of sustainability planning can also have many advantageous effects for the airport.

SUSTAINABLE AIRPORT MASTER PLANS

Sustainable airport master plans incorporate sustainability initiatives into the existing airport master planning process. This type of effort is not a stand-alone initiative that is recorded and organized in a separate document; rather, this type of sustainability planning directly implements sustainability into the existing master plan documentation and identifies sustainability initiatives and strategies to incorporate into preferred development alternative. This approach to sustainability planning can be utilized by airports that may not have the funding or resources to develop a sustainability plan but would still like to incorporate sustainability practices into their planning processes. There are two recognized methods of incorporating sustainability into an airport master plan:

1. A stand-alone sustainability plan chapter
2. Sustainability interwoven throughout

The FAA's *Report on the Sustainable Master Plan Pilot Program and Lessons Learned*³ discuss the feasibility of this method of sustainability planning by stating:

"Despite the challenges, integrating sustainability into a master plan affords more opportunities to align sustainability and planning. Airports that chose to prepare a Sustainable Master Plan were pleased with their decision to do so. With one document to work from, it was easier for airport management and consultants to marry needed development with sustainability initiatives."

THE STAND-ALONE SUSTAINABILITY PLAN CHAPTER

Developing a sustainable airport master plan involves providing an actual sustainability plan that can be summarized and displayed in a stand-alone chapter of the airport's master plan. By utilizing this method, airports have an entire section dedicated to outlining the airport's sustainability plan, past efforts, and future initiatives in the master plan. This method can provide a more organized communication of the airport's sustainability plan to the reader of the airport master plan. Further, utilization of this method can allow airport's to more closely follow the process of developing a separate sustainability plan as described in this Guidebook. For airports that intend to seek funding for sustainability planning, this method of developing a sustainable master plan may be more easily approved. Though the benefits of a stand-alone sustainability chapter are clear—a deliberate focus on sustainability, the development of a chapter that can be used as a mini airport sustainability plan, etc.—there are some drawbacks. For example, having a stand-alone sustainability chapter may lead to a failure of some aspects of the master plan—from the alternatives analysis and environmental considerations to the facilities implementation plan and financial analysis—to consider sustainability. This is reiterated in the FAA's *Lessons Learned* as noted in the next section.

³ <https://www.faa.gov/airports/environmental/sustainability/media/SustainableMasterPlanPilotProgramLessonsLearned.pdf>

SUSTAINABILITY INTERWOVEN THROUGHOUT

Interweaving the airport's sustainability plan throughout the master plan is another effective method for communicating the airport's priorities, plans, and projections for sustainability. This method involves discussion of pertinent aspects of sustainability where the airport sees fit throughout the sustainability plan. For example, an airport may decide to incorporate sustainability initiatives into the "Alternatives Analysis" section of the master plan to suggest the anticipation of future sustainability integration. This method of developing a sustainable airport master plan is less organized than other forms of sustainability planning, though still effective at displaying the airport's sustainability goals, priorities, and initiatives.

The FAA discusses the success of the airports that chose this method of sustainability planning in their *Report on the Sustainable Master Plan Pilot Program and Lessons Learned*⁴ that states:

"Based on the master plans we've reviewed, those that intersperse sustainability throughout the document are more effective than ones that devote a chapter to the topic."

THE HYBRID APPROACH TO INTEGRATING SUSTAINABILITY INTO THE MASTER PLANNING PROCESS

While there are two recognized methods of integrating sustainability into traditional master plans as detailed above, some airports may find it beneficial to adopt a hybrid approach. Instead of choosing a "one or the other" method, airports can scope their master plan to both intersperse sustainability throughout the plan as well as provide a stand-alone chapter. This approach increases the flexibility of sustainability efforts in the master planning process and ultimately results in more functional tools and resources once the plan is complete.

Airports should work with their consultants, FDOT District Aviation Coordinator, ADO Planner, and relevant stakeholders to determine which approach to incorporating sustainability into the master planning process best fits with the airport's goals, capabilities, desires, and overall strategy.

AD-HOC AIRPORT SUSTAINABILITY

Ad-hoc airport sustainability is currently the most common form of sustainability planning and implementation at airports. In this type of sustainability planning, decisions to implement sustainability initiatives are made on a case-by-case basis without a comprehensive planning process or even necessarily a deliberate approach to sustainability. For example, if an airport determines that its taxiway edge lighting needs to be replaced, the airport might analyze and decide to implement new LED lighting for potential cost-benefits or environmental purposes. Although this action would be considered a sustainability initiative, it was not determined by means of an extensive sustainability plan.

The ad-hoc approach to airport sustainability can be beneficial to airports with limited resources who are still interested in integrating sustainable approaches into their daily management of the airport. Airports that lack the time, money, or knowledge can quickly and easily implement simple sustainability initiatives with a high likelihood of success— these "easy wins" or "low

⁴ <https://www.faa.gov/airports/environmental/sustainability/media/SustainableMasterPlanPilotProgramLessonsLearned.pdf>

hanging fruit" initiatives are extremely beneficial not only in getting started in sustainability but also help to build support for the airport's sustainability efforts as these successful efforts provide validation and support for an airport's efforts.

Although there are benefits to this form of sustainability implementation, a comprehensive planning effort can yield better results based on having more information and being able to apply the sustainability plan across all airport projects. A major benefit of developing a sustainability plan is stakeholder awareness that results in better support, further leading to more successful implementation and community support for the airport. In cases where airports wish to pursue sustainability planning, the efforts undergone can greatly benefit from an organizational process, full airport buy in and education, and community and agency recognition.

Table 1 provides a description as well as a brief pro/con analysis for each of the types of sustainability planning.

Table 1: Types of Sustainability Planning

Type of Plan	Summary	Pros	Cons
Airport Sustainability Plans	Stand-alone documents created by airports to directly plan, implement, and track sustainability initiatives. Sustainability plans are developed as a separate process from other airport projects and plans, though it is recommended that they incorporate airport goals and priorities as expressed in other airport planning documents. This method of sustainability planning ensures that sustainability is a primary focus and not just a concept intertwined with other airport projects. This type of sustainability planning can be implemented by all airports despite size or role.	<ul style="list-style-type: none"> Increased organization Easily presentable document Easy to update continuously as sustainability develops at the airport 	<ul style="list-style-type: none"> Requires more airport commitment Could take longer to develop Possible higher costs in development
Sustainable Airport Master Plans Stand-Alone Chapter	Developing a sustainable airport master plan involves providing an actual sustainability plan that can be summarized and displayed in a stand-alone chapter of the airport's master plan. By utilizing this method, airports have an entire section dedicated to outlining the airport's sustainability plan, past efforts, and future initiatives in the master plan. For airports that intend to seek funding for sustainability planning, this method of developing a sustainable master plan may be more easily approved.	<ul style="list-style-type: none"> Can provide a more organized communication of the airport's sustainability plan to the reader of the airport master plan Can allow airport's to more closely follow the process of developing a separate sustainability plan as described in this Guidebook 	<ul style="list-style-type: none"> Potential failure of some aspects of the master plan – from the alternatives analysis and environmental considerations to the facilities implementation plan and financial analysis – to consider sustainability
Sustainable Airport Master Plans Interwoven Throughout Master Plan	This method involves discussion of pertinent aspects of sustainability where the airport sees fit throughout the master plan. For example, an airport may decide to incorporate sustainability initiatives into the "Alternatives Analysis" section of the master plan to suggest the anticipation of future sustainability integration.	<ul style="list-style-type: none"> Incorporates sustainability into all aspects of the master plan Keeps reader engaged and aware of sustainability efforts 	<ul style="list-style-type: none"> Less organized than other forms of sustainability planning, though still effective at displaying the airport's sustainability goals, priorities, and initiatives Lacks specific recognition of sustainability planning within the master plan

Table 1 Cont.: Types of Sustainability Planning *(continued)*

Type of Plan	Summary	Pros	Cons
Sustainable Airport Master Plans Hybrid approach	Airports can scope their master plan to both intersperse sustainability throughout the plan as well as provide a stand-alone chapter.	<ul style="list-style-type: none"> More effectively highlights the sustainability planning efforts within the master plan Increases the flexibility of sustainability efforts in the master planning process Results in more functional tools and resources once the plan is complete 	<ul style="list-style-type: none"> Potential lack of organization between the stand-alone chapter and the information interwoven throughout
Ad-Hoc Airport Sustainability	In this type of sustainability planning, decisions to implement sustainability initiatives are made on a case-by-case basis without a comprehensive planning process or even necessarily a deliberate approach to sustainability.	<ul style="list-style-type: none"> Does not require extensive organization efforts Most cost-efficient form of planning Based solely on Airport needs at any given time 	<ul style="list-style-type: none"> Lacks organizational framework Potential to miss sustainability opportunities

FOCUS AREAS OF SUSTAINABILITY

Many industries approach sustainability with the “Triple Bottom Line” mindset of environmental stewardship, economic growth, and social responsibility. While this approach has proven beneficial, the aviation industry, through guidance provided by Airports Council International – North America (ACI-NA), in their white paper “Airport Sustainability – A Holistic Approach to Effective Airport Management,” has gone further by developing and adopting the “EONS” approach. EONS stands for the following focus areas of sustainability shown in **Figure 2**:

Figure 2: Focus Areas of Sustainability



The EONS approach builds off the Triple Bottom Line by adding “Operational Efficiency,” a rather important focus area for airports and the airline industry. While all four focus areas of EONS play a vital role in airport sustainability, it is generally noted that operational efficiency has an auspicious effect on the three other focus areas. Together, the focus areas of EONS provide a solid and comprehensive framework for airports to develop and implement sustainability plans. The following sections provide more information on the four focus areas of EONS.

Overall, the four focus areas of sustainability should work in concert with one another to create a sustainable organization. By pursuing one focus area, others should in turn benefit from the accomplishments. For example, an airport that takes measures to reduce noise pollution to pursue natural resource conservation could also see high benefits in the focus area of social responsibility.

Salt Lake City International Airport (SLC) remarks on the four EONS categories in their sustainability plan by saying:



“A key element of sustainability is recognizing that addressing one aspect does not necessarily come at the expense of another. Optimally, evaluating a project or activity based on environmental, economic, social, and/or operational concerns will spur innovation that ultimately reduces costs and enhances benefits over the life of the project.”



ECONOMIC VIABILITY

Economic viability involves the ongoing pursuit of airport financial self-sustainability. This focus area means increasing fiscal self-sufficiency and profitability by decreasing costs through sustainability initiatives to develop the most economically efficient airport possible. According to SAGA, the following are major aspects, considerations, and directives of this focus area:

- Job creation
- Local purchasing
- Advancing new markets
- Increasing GDP
- Total cost of ownership
- Initial costs
- Life-cycle costs
- Staff training
- Revenue generation
- FAA funding eligibility

Economic viability should be a priority for all airports in Florida during the development of the sustainability plan. Running cost-benefit analyses and life-cycle analyses on sustainability initiatives is an important step in achieving and maintaining economic viability while pursuing sustainability. More information on these analyses will be discussed in later sections of this Guidebook. The Greater Orlando Aviation Authority (GOAA) notes the balance between sustainability and cost efficiency in their Sustainability Plan:

“GOAA recognizes that there is a balance to integrating conservation and sustainable programs, community awareness, and preserving the airport's financial health. This is accomplished through proactive and cost effective solutions, as well as using a phased and logical approach to our programs.”

Many sustainability initiatives will suggest methods for achieving economic viability; however, some methods may result in up-front costs for the airport to fulfill the needs of another focus area. These initiatives should include a cost-benefit analysis to determine the potential for future cost savings and even revenues. Further, a phased approach to costlier initiatives should be considered to ensure the financial feasibility of the initiative.



OPERATIONAL EFFICIENCY

Operational efficiency at airports can be defined as daily success across all facets of the airport in achieving a functional and efficient system of moving parts. Airports often have many divisions that must cohesively work together to produce a productive and safe environment for airport users. Implementing sustainability initiatives is similar to changing the oil in an engine. To receive the most efficient operation of the system as a whole, each component must work well with the others. Sustainability planning can ensure that the “engine” of the airport continues to run at its peak performance far into the future. Operational efficiency is not limited to the efficiency of airport management – in fact, it can have dramatic benefits for aircraft operations, passenger processing, motor vehicle circulation, and other external areas. SAGA lists the following major aspects, considerations, and directives of sustainable operational efficiency:

- Roadway congestion
- Intermodal transportation access
- Air travel delay
- Customer service
- APUs, gates, GSE equipment efficiency
- Energy conservation

These aspects make up just some of the many aspects of sustainability that can be incorporated within the focus area of operational efficiency. As the four focus areas work in concert with and complement each other, achieving operational efficiency can greatly benefit economic viability, natural resource conservation, and social responsibility.



NATURAL RESOURCE CONSERVATION

Florida is home to a diverse and unique natural ecosystem. In fact, Florida's natural environment is one of the driving factors that supports the State's tourism industry. Because of the need to balance the requirements of an airport and the environment, airports should strive to conserve Florida's natural resources through sustainable practices. This is a wide-ranging focus area that covers many aspects of the airport as well as many aspects of the environment. In GOAA's *Sustainable Management Plan*, the Authority defines sustainability as:

"...the responsibility to construct and operate our airport facilities in a manner that ensures future generations will enjoy the same environment that we experience today."

SAGA lists the following as major aspects, considerations, and directives of sustainable natural resource conservation:

- Air quality and climate change
- Water quality and conservation
- Wildlife hazards and management
- Landscape and vegetation management
- Solid waste and recycling
- Hazardous materials and chemical management

These aspects make up just some of the many that can be incorporated within the focus area of natural resource conservation. While natural resource conservation is vital as a stand-alone focus area, it is important to note that pursuing natural resource conservation can also benefit social responsibility and economic viability.



SOCIAL RESPONSIBILITY

Social responsibility encompasses everything having to do with the public perception of the airport, including overall community and customer satisfaction and the relationship with surrounding communities, businesses, and residents. It is the responsibility of the airport to consider the local community throughout all airport projects including sustainability planning. SAGA lists the following major aspects, considerations, and directives of social responsibility:

- Land use compatibility
- Community benefits
- Quality of life
- Employee welfare
- Diversity and environmental justice
- Education and public outreach
- Public relations
- Innovation and industry leadership
- Transparency and information sharing
- Regional economic benefits
- Noise abatement

It is anticipated that in most cases, sustainability planning itself will increase the positive public perception of the airport and its operations. However, to achieve that result from the sustainability planning process, it is vital that airports make an effort to regularly report on the progress of sustainability efforts in a manner the public can perceive and understand and to work *with* the public throughout their sustainability efforts. This Guidebook helps airports address their social responsibility as well as maintain it in a sustainable manner that will carry into the future. Further, this Guidebook provides methods of reporting sustainability progress for outside entities and the public.

USING THIS GUIDEBOOK

HOW TO USE THE SUSTAINABILITY GUIDEBOOK

This Guidebook provides airports with a step-by-step process to develop a customized sustainability plan. It is strongly recommended that prior to beginning the process, airports read each step thoroughly to gain a clear understanding of the entire process, as well as what each step entails. Further, helpful resources and best management practices pertaining to each sustainability planning step are found in call-out boxes throughout the Guidebook. While these resources are optional for airports to utilize, they can provide useful information and tools that enhance the final outcome of the airport's sustainability plan.

This Guidebook was developed using an extensive outreach and data collection effort that included a comprehensive stakeholder outreach process, a review of existing research, airport case studies, a suite of ACRP reports and tools, and more, as a foundation in developing the sustainability planning process for airports. When appropriate, these resources can be accessed in the Appendices located in the back of this Guidebook. These resources can be beneficial sources of information for airports to utilize throughout the entire planning process. It is strongly recommended that airports consult the Appendices often to enhance the product of their sustainability plan.

At the onset of the sustainability planning process, airports should select a sustainability champion to lead the project team through the multi-faceted process of sustainability planning. This champion should be well-versed in this Guidebook and its subsequent steps to lead the airport project team into a sustainable future. Having an appointed champion and sustainability project team (if possible) is an important aspect of the sustainability planning process to increase project organization and overall efficiency throughout planning, implementation, and performance monitoring.

As part of the development of this Guidebook, a case study was conducted with the Greater Orlando Aviation Authority (GOAA) on "How GOAA has formed its 'Green Team' to help implement sustainability at Orlando International Airport (MCO)." Below are the key findings of that case study:



- Airports are encouraged to identify a **Champion** for ongoing sustainability implementation and specific initiatives. This Champion, working with other dedicated individuals throughout the facility (tenants, airlines, staff, etc.), will increase the chances for a successful sustainability program.
- Authority employees from all departments and divisions, as well as tenants, concessionaires, and airlines, were encouraged to join the Green Team, GOAA's team charged with developing and implementing the Authority's sustainability program. Participation from the Authority's Communications Department has been vital to advertise the group and its efforts.
- Meaningful, yet attainable, goals should be created for Green Team activities so participants feel a sense of accomplishment and the Airport's sustainability efforts can be advanced.
- Internal recognition and appreciation of the Green Team is important to promote and encourage participation.

WHO SHOULD USE THIS GUIDEBOOK?

Sustainability planning is something that should be undertaken by airports of all sizes and roles. However, depending on the airport, there are several differences in the sustainability planning process between general aviation and commercial service airports and between airports of different sizes and roles within those groups. Although these differences can result in different sustainability plans and programs, they can be advantageous for the airports if approached reasonably. The major differences and advantages were analyzed through airport responses, interviews, and case studies during the project survey portion of this study.

The first notable difference that can potentially have an impact on the outcomes of any sustainability project is airport staffing. Based on the project survey, most GA airports generally identified having far less full-time staff compared to commercial service airports. While more staff can aid in the formation of a sustainability project team and a wide-range of airport coordination/delegation, a small number of airport staff gives GA airports the opportunity to allow specific employees to become involved in training and sustainability development. Further, GA airports can maintain a singular point of reference for sustainability through the designated champion and the focus and efforts of that champion are confined to a much smaller area, both in terms of physical airport layout as well as a smaller number of airport employees and airport tenants.

A similar difference between GA and commercial service airports is the number of specialized airport departments. Based on the project survey, GA airports generally do not have multiple specific airport departments that specialize in certain aspects of the airport system. These departments can be a major benefit to commercial service airports in terms of specialized sustainability implementation and organization; however, the lack of these departments can also benefit GA airports. It can be easier to obtain internal buy-in and to educate airport staff on sustainability when there are fewer departments to communicate across and coordinate between. This can make the process of sustainability implementation easier, quicker, and less costly for GA airports.

Through the project survey, both commercial service and multi-airport systems identified facilities and maintenance as the primary departments responsible for the physical facilities at their airports. The City/County was listed multiple times by GA airports as the responsible party for managing physical facilities. This external responsibility has corresponding pros and cons. The disadvantage is that many of the people who would be responsible for implementing, overseeing, and reporting sustainability initiatives would be separated and external from the airport. However, the advantage is if the governing body has an overlying sustainability program, those removed workers are most likely pre-trained by the city/county. Further, implementing airport sustainability in this situation would naturally increase the working relationship between the airport and the local governing body.



While commercial service versus GA airports was used as an example of varying capabilities, opportunities, and limitations, airports within each group can experience varying levels of opportunities and limitations based on their role, size, and ownership structure. For example, a large GA airport, owned and operated by an authority, might more closely relate to a large or medium hub commercial service airport in terms of staffing, departmentalization, and resources. Vice versa, a small or non-hub commercial service, owned and operated by a municipality, might relate more to those opportunities and limitations tied to GA airports above. Airports should be cognizant not only of their role but also of their governance, ownership structure, size, and organizational makeup up when beginning any process, especially sustainability planning.

COORDINATION WITH OTHER PLANS

The airport sustainability planning process should consider the context of other planning guidance, as well as the regulatory framework to ensure they are in accordance with existing plans related to the airport in addition to meeting state and federal rules and regulations. The following plans and their related goals, objectives, recommendations, policies, and their relationship to the sustainability planning process are discussed in this section:

- Airport master plans
- Airport layout plans
- Strategic plans
- National Environmental Protection Agency (NEPA) studies
- Capital improvement programs
- Grant management plans
- Airport business planning

It should be noted that additional plan and project types, including local government comprehensive plans, Florida Administrative Codes, Florida Statutes, and long-range transportation plans were also evaluated as part of the development of this Guidebook. To streamline the delivery, these plans are not detailed in this section, more information on these plans and project types can be found in **Appendix 6**.

AIRPORT MASTER PLANS

WHAT IS AN AIRPORT MASTER PLAN?

An airport master plan is the primary guiding document for an airport's long-term development. Two resources that can be used during the sustainability planning process to understand the role and importance of an airport master plan to Florida airports are FAA Advisory Circular (AC) 150/5070-6, *Airport Master Plans*, and FDOT's *Guidebook for Airport Master Planning*. According to the **FDOT Guidebook for Airport Master Planning**, the overall purpose of an airport master plan is “to provide the framework to guide future airport development that will meet existing and future aviation demand in a safe and cost-effective manner.” This purpose is also, at its core, served by the development of a sustainability plan.

The master plan considers a variety of factors, including environmental, socio-economic, and community development factors, as well as other modes of transportation. Because master plans are required for airports and provide the long-term blueprint for their success, there are many required components. An airport master plan typically addresses future development of an airport, as well as the infrastructure needs required for the airport's future success. There is also a required financial

Guidebook for Airport Master Planning

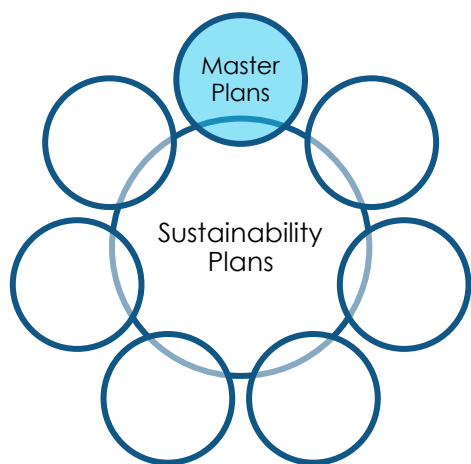


The *Guidebook for Airport Master Planning* was developed as a singular reference for Florida airports completing an airport master plan. Complementing the existing resources provided by the FAA, the Guidebook provides Florida-specific information related to the additional requirements of FDOT, State Statutes, Administrative Codes, and other state agencies. When reviewing the major components of a master plan, many similarities can be identified between the organizational layout and berth of information provided in a sustainability plan. By working together, these documents can become more organizationally sound as well as more beneficial in relaying pertinent airport information.

aspect to an airport master plan – the financial feasibility analysis and the subsequent capital improvement plan (CIP).

An airport master plan should always support a community's comprehensive plan, recognizing that the airport master plan is one of the community's most valuable guiding documents and the airport itself being one of the community's most important assets and economic engines. The local comprehensive plan should support and protect the viability of the airport so it can appropriately support the local community. Master plans differ from a community's comprehensive plan in that they identify the existing airport conditions, forecasted activity, and future development plan to support the aviation needs at the facility. A comprehensive plan may address similar needs for an entire community (land-use, infrastructure, transportation, natural resources, etc.), not solely needs specific to aviation infrastructure and facility development.

MASTER PLAN RELATIONSHIP TO A SUSTAINABILITY PLAN



Incorporating sustainability into the master planning process can be done in two ways: 1) infusing sustainability throughout the entire master plan or 2) providing a stand-alone chapter for sustainability in the master plan report. FAA's *Lessons Learned from the Sustainable Master Plan Pilot Program* notes the following about the two methods:

"Based on the master plans we've reviewed, those that intersperse sustainability throughout the document are more effective than ones that devote a chapter to the topic. Ithaca was one plan that fully interspersed sustainability considerations. Appendix D (of the Lessons Learned document) displays their procedural framework."

Recently, there was the development of a hybrid approach to incorporate sustainability into the master planning process. An airport will incorporate sustainability throughout the entire document as well as devote a stand-alone chapter to sustainability. That stand-alone chapter is developed to meet all the requirements of an airport sustainability plan and can effectively be taken out of the master plan and serve as a stand-alone airport sustainability plan. The incorporation of sustainability throughout the entire master plan increases the efficacy of the sustainability effort while the stand-alone chapter effectively serves as the development of an airport sustainability plan that can be used independent of the master plan by those involved with sustainability at the airport. **As noted in the "Types of Sustainability Planning Efforts" section, Tallahassee International Airport utilized this hybrid approach when developing the scope for their master plan.**

There are no specific guidelines on the incorporation of sustainability planning efforts into an airport master plan; however, there are many corresponding features of both, including:

- Public involvement program
- Common baseline inventory/existing conditions data collection
- Developing overall project goals and justifications
- Inclusion of sustainability evaluation criteria in master plan alternatives evaluation
- Environmental considerations
- Addition of sustainability elements and projects in the capital improvement program (CIP) and financial feasibility



Tallahassee International Airport (TLH) initiated an update to their master plan in late 2015. The City of Tallahassee – owner and operator of the airport – has adopted a proactive approach to sustainability and the airport took the same initiative during the scoping phase of their sustainable master plan. Instead of choosing to either develop a stand-alone sustainability chapter or intersperse sustainability throughout the entire plan, TLH opted to integrate sustainability throughout the entire document as well as develop a stand-alone sustainability plan. This sustainability plan will be included as an appendix (in the master plan) so that it can be physically removed from the master plan and serve as a stand-alone document, guiding the airport's sustainability efforts now and in the future. Sustainability will also be integrated throughout the entire document to ensure that sustainable opportunities are afforded the proper attention at all stages of the development of the master plan. The TLH Sustainability Plan will also be consistent and support the City of Tallahassee Green Print – the City's strategic sustainability plan. For more information about TLH's sustainable master plan, please visit <http://tlhmasterplan.mbakerintl.com/Pages/Home.aspx>.

The FDOT *Airport Guidebook for Airport Master Planning* identifies the need to ensure integration and collaboration between comprehensive planning and master planning efforts. This level of coordination and collaboration should also be carried over to the sustainability planning process. Typically, various representatives from local municipalities may be jointly involved in these types of planning efforts, sometimes concurrently if the sustainability plan is being developed as part of the airport master plan. Sharing of information and strategic coordination, especially during the establishment of a vision, goals, or objectives, is important to ensure that the efforts of a master plan and sustainability plan support the municipality's comprehensive plan.

Coordinating efforts and development/implementation schedules between master plans and sustainability plans will help ensure the goals of an airport are implemented in a practical manner. If a sustainability plan is being completed as part of a master plan, the

According to FAA's "Report on the Sustainable Master Plan Pilot Program and Lessons Learned", key strategies for effective concurrent development of sustainability and master plans include:

- Develop a white paper that identifies project similarities and communications for the study teams; and
- Interact regularly and deliberately to ensure both projects' processes are completed effectively and efficiently.



recommendations of the airport master plan should be completed before the sustainability planning process is initiated. If included within the master plan, it is also recommended that language be added suggesting the sustainability plan section be reviewed at least on an annual basis to reflect current conditions versus being updated with the master plan itself. It is critical that the development

needs of the airport, including identification of future projects and their timing as they related to the airport's master plan, are considered during the development of a sustainability plan.

AIRPORT LAYOUT PLANS

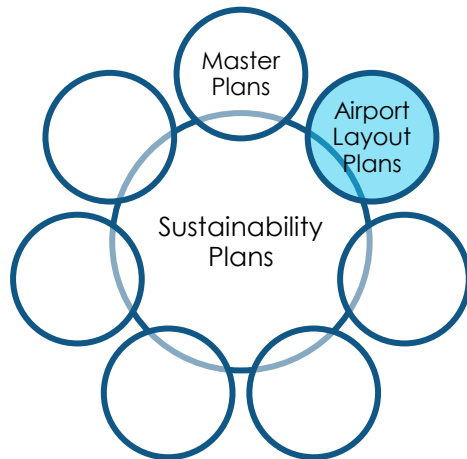
WHAT IS AN AIRPORT LAYOUT PLAN?

According to the FAA, an airport layout plan (ALP) is “a scaled drawing (or set of drawings), in either traditional or electronic form, of current and future airport facilities that provides a graphic representation of the existing and long-term development plan for the airport and demonstrates the preservation and continuity of safety, utility, and efficiency of the airport to the satisfaction of the FAA.” (FAA AC 150/5070-6, *Airport Master Plans*) As noted by the FAA, the ALP should identify existing and planned development and land uses. These can include unimproved land, terminal office space, corporate hangars, tie-downs, ramps, and fuel and support facilities.

The FAA requires that all federally obligated airports have an FAA-approved ALP on file that conforms to FAA airport design standards available at the time of the ALP's approval. The airport design standards are outlined in FAA AC 150/5300-13A – Change 1, *Airport Design*.

AIRPORT LAYOUT PLAN RELATIONSHIP TO A SUSTAINABILITY PLAN

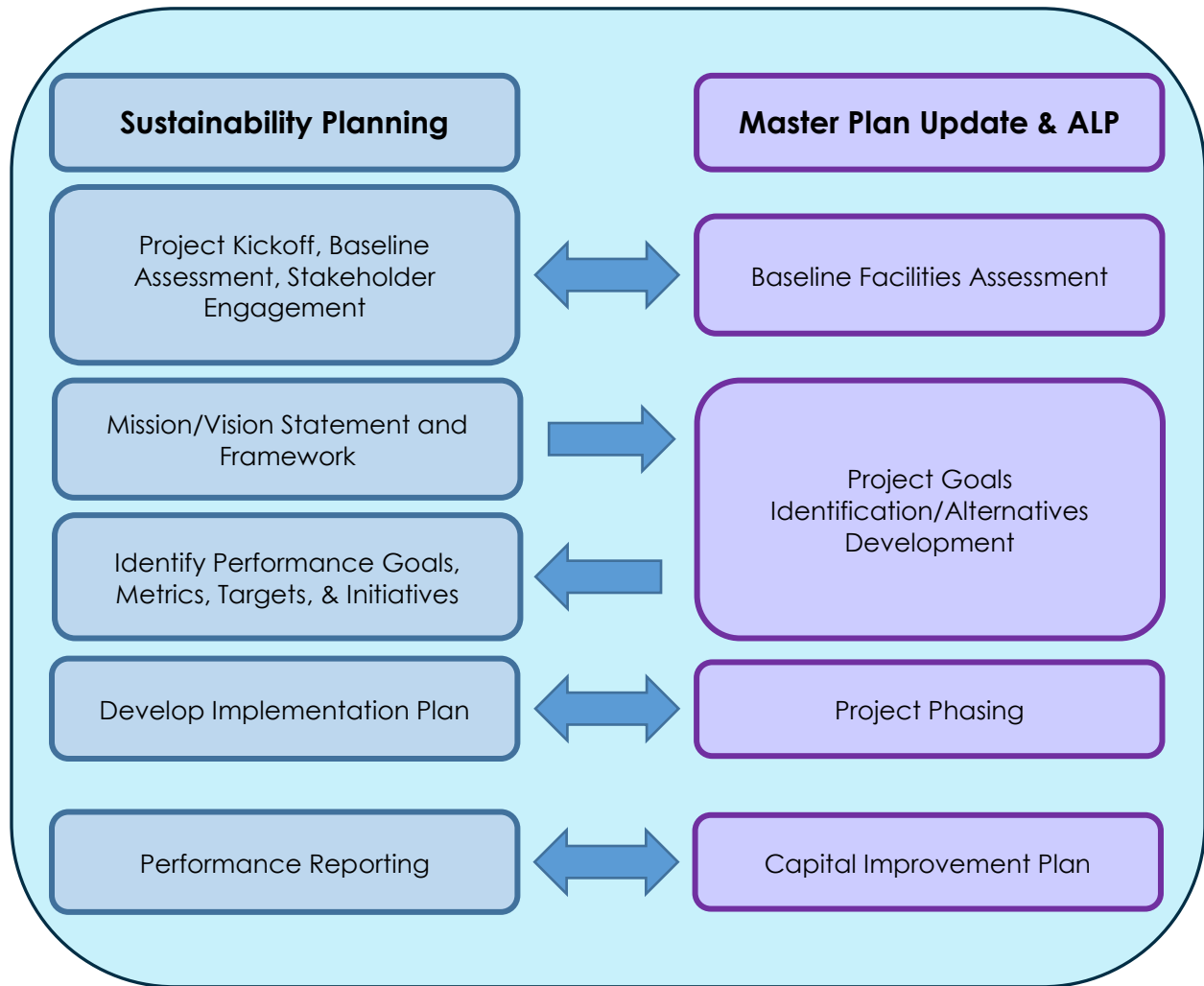
Because the ALP acts as a blueprint for development at an airport, integration of the sustainability plan recommendations with the ALP is suggested. An ALP should identify what land is intended to be used for aeronautical versus non-aeronautical uses, what land is owned or



identified to be acquired by an airport, and land uses surrounding an airport. Before a sustainability plan is developed, the project team should consult and review the ALP to ensure that the recommendations made in the sustainability plan support the proposed development depicted on the ALP. Additionally, understanding potential hazards (incompatible land uses and obstructions to navigable airspace, for example) will allow the project team to use the sustainability plan as an opportunity to mitigate these potential hazards. When an ALP is updated, the project team should review the sustainability plan to ensure that the ALP

supports the recommendations of the sustainability plan. **Figure 3** provides a visual comparison of the aspects of a master plan and ALP that can and should correlate with sustainability planning.

Figure 3: Master Plan/ALP Relationship to Sustainability



AIRPORT STRATEGIC PLANS

WHAT IS A STRATEGIC PLAN?

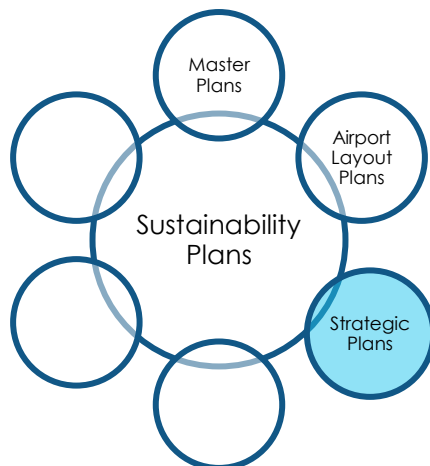
Integration of sustainability into an airport's strategic planning can be the most effective planning process integration because it provides an overarching vision and goals for the operation and development of an airport that can filter into all other planning efforts.



Strategic planning can be defined as the process to determine an organization's future, while developing a guide to help the airport improve from its current state to its future vision.⁵ These plans differ from long-term facilities planning (master plans) as they account for the dynamic and

changing environment of an airport. Airport strategic planning encompasses all areas of airport operation and development at a high level.

AIRPORT STRATEGIC PLAN RELATIONSHIP TO A SUSTAINABILITY PLAN

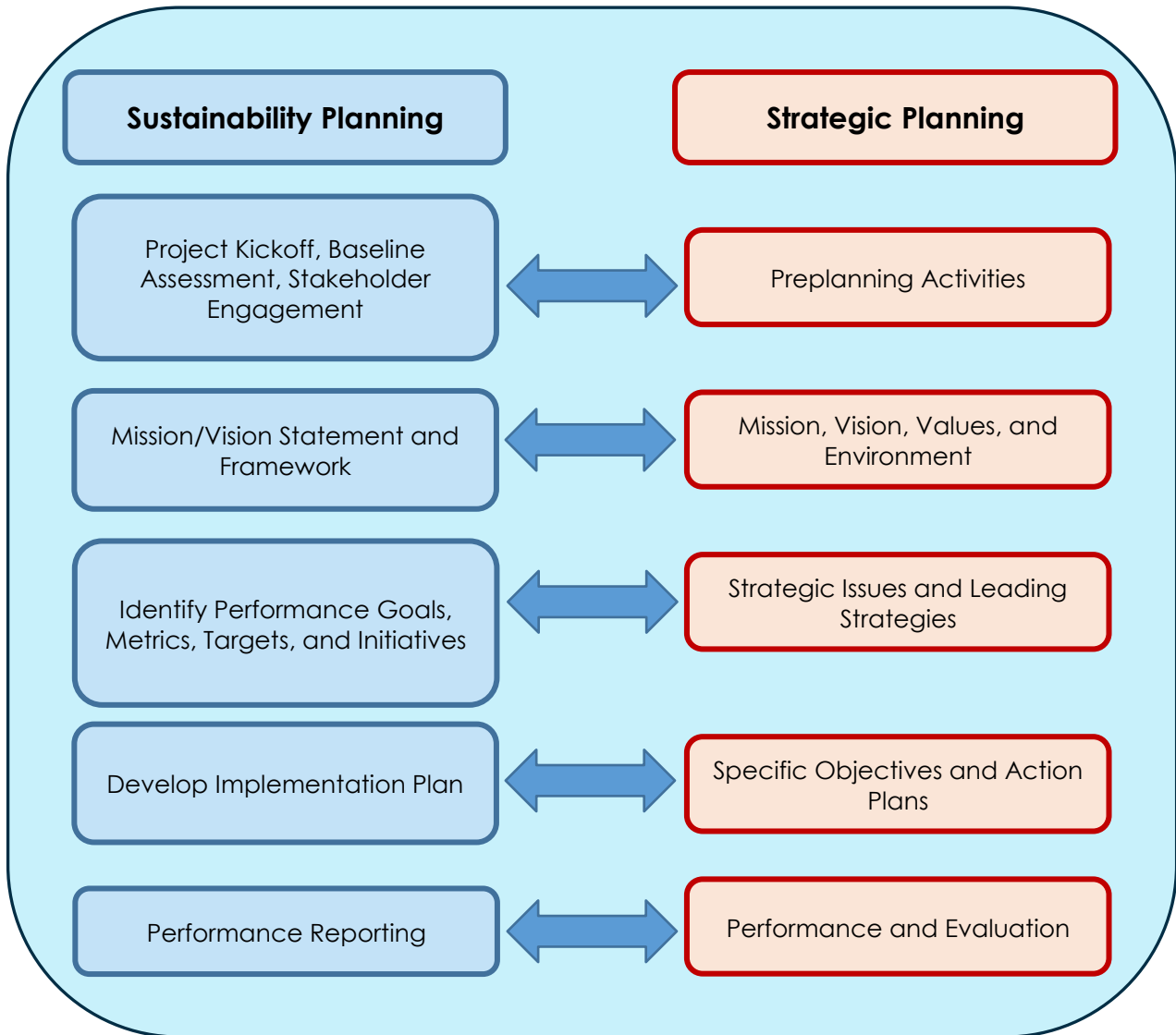


Strategic plans generally follow similar developmental steps to those of sustainability plans. In particular, both types of plans set a baseline, identify existing conditions, develop a mission/vision statement and associated goals, and identify strategies to meet those goals. Further, both types of plans implement monitoring and/or reporting to ensure the continuation of those efforts. Integration of the steps of both planning processes can streamline the overall process while ensuring the airport is focusing on its sustainability and continuous improvement.

Four benefit categories of strategic plans are identified by ACRP Report 20, *Strategic Planning in the Airport Industry*. The categories include: organizational benefits, operational/managerial benefits, community stakeholder benefits, and economic benefits. Note that three of the four categories within sustainability are addressed: economic viability, operational efficiency, and social responsibility. Environmental stewardship is not included within the listed benefits; however, if sustainability were incorporated into the strategic planning process, environmental stewardship could potentially be included as a benefit. **Figure 4** provides a visual comparison of the aspects of strategic planning that can and should correlate with sustainability planning.

⁵ ACRP Report 20 Strategic Planning in the Airport Industry: http://onlinepubs.trb.org/onlinepubs/acrp/acrp_rpt_020.pdf

Figure 4: Strategic Planning Relationship to Sustainability Planning



NEPA STUDIES

The National Environmental Policy Act of 1969 (NEPA) process provides a specific method of evaluating the potential environmental impacts associated with federal actions, including FAA-funded airport projects and revisions to ALPs. Specific NEPA guidance for airport projects is provided in FAA Orders 1050.1F, *Environmental Impacts: Policies and Procedures*⁶, and 5050.4B, *NEPA Implementing Instructions for Airport Actions*⁷, as well as the FAA's *Environmental Desk Reference for Airport Actions*. A comparison of these three documents is provided in **Table 2**.

Table 2: NEPA Studies

	1050.1F	5050.4B	Environmental Desk Reference
Primary User	FAA	Airports	FAA
Description	Serves as the policy and procedures for compliance with the National Environmental Policy Act (NEPA) and implementing regulations issued by the Council on Environmental Quality (CEQ). The provisions of this Order and the CEQ Regulations apply to actions directly undertaken by the FAA and to actions undertaken by a non-Federal entity where the FAA has authority to condition a permit, license, or other approval.	Provides information to ARP personnel and others interested in fulfilling National Environmental Policy Act (NEPA) requirements for airport actions under FAA's authority. This Order is part of FAA's effort to ensure its personnel have clear instructions to address potential environmental effects resulting from major airport actions.	Summarizes applicable special purpose laws in one location for convenience and quick reference. Its function is to help FAA integrate the compliance of NEPA and applicable special purpose laws to the fullest extent possible. This integration should ensure that all environmental review procedures applicable to an airport action run concurrently rather than consecutively.

⁶ FAA Order 1050.1F – *Environmental Impacts: Policies and Procedures*:

http://www.faa.gov/documentLibrary/media/Order/FAA_Order_1050_1F.pdf

⁷ FAA Order 5050.4B – *National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions*:

http://www.faa.gov/airports/resources/publications/orders/environmental_5050_4/media/5050-4B_complete.pdf


NEPA STUDY RELATIONSHIP TO A SUSTAINABILITY PLAN



Sustainability can be incorporated into the NEPA process to account for innovative measures taken by an airport to mitigate the environmental effects of a proposed project. The evaluation of alternatives under NEPA can include the identification of sustainability initiatives for the eventual mitigation or reduction of environmental impacts or just effective ways to implement a proposed project. Sustainability initiatives can, therefore, be incorporated into the NEPA alternatives development, proposed project development, affected environment documentation, impact assessment, and mitigation plan. Alternatives

development should also consider the airport's sustainability goals and objectives. The preferred alternative can then be selected based on a number of considerations, including the level and effectiveness of sustainability measures incorporated into the alternative, or how the alternative contributes to the sustainability of the airport. While alternatives development is a major facet of the NEPA process that can benefit from a sustainability plan, there are other aspects of NEPA that can benefit from or be a benefit to airport sustainability planning. The aspects of NEPA that can work in concert with aspects of sustainability planning are displayed in **Figure 5**.

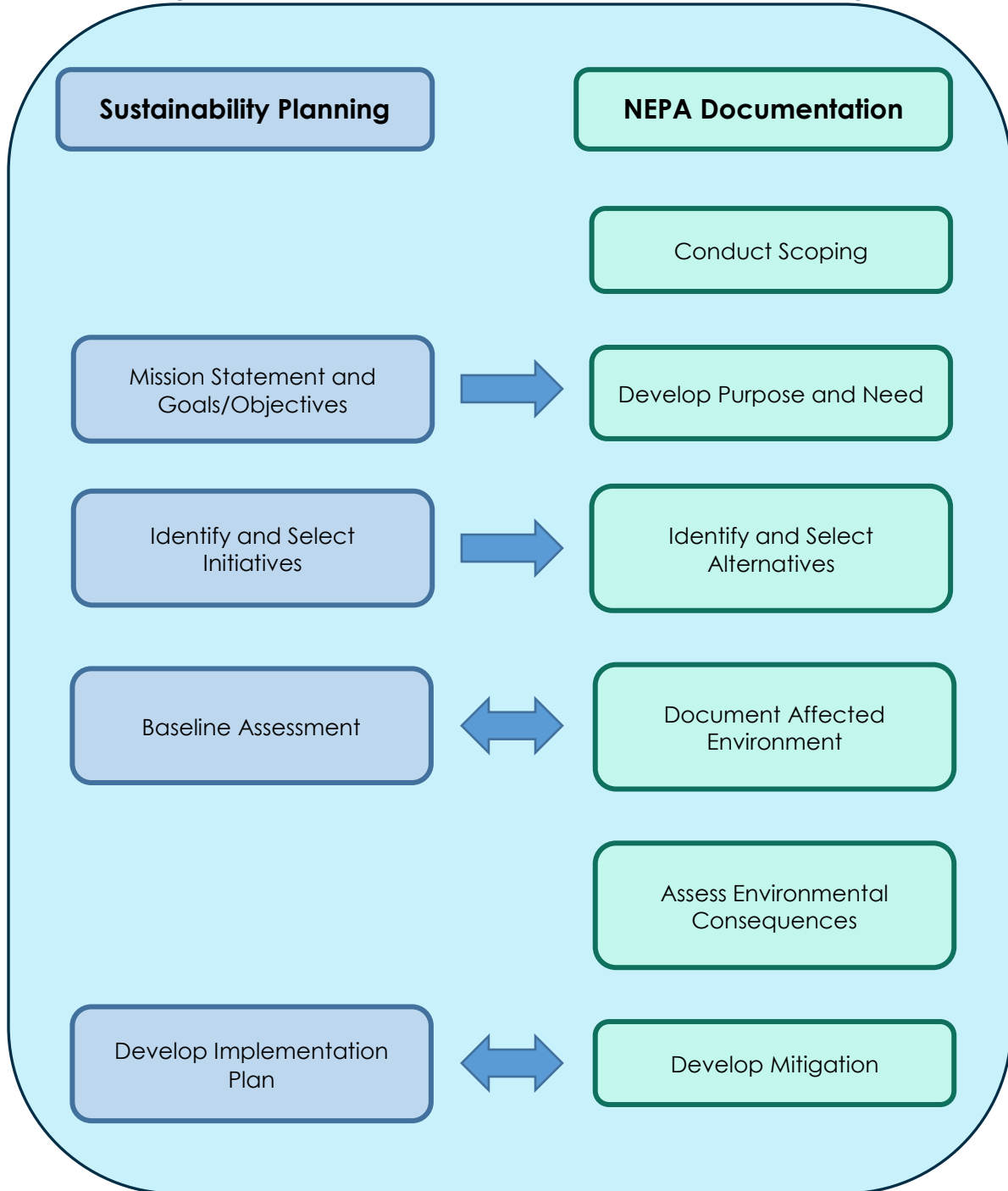
It is important to note that prior sustainability efforts cannot be “banked” and credited during the NEPA process. The NEPA process will always compare all proposed alternatives to the no action alternative. However, an airport can leverage sustainable initiatives to their benefit. For example, if an airport were preparing an Environmental Assessment for a runway extension, the airport could propose to retrofit the entire runway with LED lights since the runway would be closed for a period of time anyway. **This sustainable design element, if added to the initial project, is likely to result in a net reduction (or at least no increase) in energy use, one of the environmental impact categories examined during the NEPA process.** ACRP is currently underway with Project 02-69, *Integrating Airport Sustainability and the NEPA Process*, which will examine the opportunities to leverage sustainability throughout the NEPA process. The project is anticipated to be complete in early 2018. For more information about ACRP 02-69, please visit:

 Orlando Sanford International Airport converted 75% of their airfield lighting and 42% of their airfield signage from incandescent to LED during the same period in which they extended two runways, extended two taxiways, and added four new taxiways on the airport. Despite the significant increase in lighted pavement at the airport, the airport's electricity use did not increase.

Airports and consultants should consider implementing sustainable design elements to traditional airport projects in an effort to reduce or eliminate environmental impacts or perhaps even decrease them compared to the no action alternative. ACRP Report 80: *Guidebook for Incorporating Sustainability into Traditional Airport Projects*, serves as an excellent reference for such an effort.

<http://apps.trb.org/cmsfeed/TRBNetProjectDisplay.asp?ProjectID=4015>

Figure 5: NEPA Assessment Relationship to Sustainability Planning



CAPITAL IMPROVEMENT PLANS (CIP) AND GRANT MANAGEMENT

Airports develop Capital Improvement Plans (CIPs) as a short-, mid-, and long-term projection of anticipated airport improvement projects contained in an airport's master plan and the desired funding sources for each project. These plans are submitted to the FAA where they are aggregated and synthesized for the development of the FAA's Airports CIP (ACIP). Individual airport CIPs are also submitted to FDOT through the Joint Automated Capital Improvement Program (JACIP) to aid FDOT in planning the Five-Year Work Program. ACIP and JACIP are the ultimate guides for the distribution of Federal and State grant funding. Individual CIPs require a comprehensive analysis of the airport as well as substantial coordination with stakeholders to determine the future of the airport's expected growth/decline.

As part of this process, airports generally analyze previous financial management practices and determine the proper method of funding for upcoming capital improvement projects. In other words, airports are systematically taking an economic approach to improving the operational efficiency of the airfield.

CIP AND GRANT MANAGEMENT RELATIONSHIP TO SUSTAINABILITY PLANNING



Many aspects of the capital improvement planning process can be coordinated in concert with the sustainability planning process. Specifically, analysis of past financial management practices can be collaborative with the airport's baseline assessment effort of the sustainability plan. The economic focus area of the baseline assessment can provide airports with substantial knowledge to use in approaching and developing a capital improvement plan.

Projects identified by the airport for inclusion in the CIP should be developed alongside sustainability

initiatives. Airports can utilize the CIP as an opportunity to receive Federal or State funding for sustainability planning and initiative implementation. It is recommended that airports consider the sustainability plan's goals, objectives, performance measures, and initiatives through all processes of the CIP.

AIRPORT BUSINESS PLANNING

Although not directly related to the master planning process, business planning plays an important economic role to airports and ties in well to the economic focus area of sustainability. An airport business plan should be analyzed and discussed as part of the airport sustainability project. Further, the sustainability plan should reflect the goals and priorities of the airport business plan in an effective and useful manner.



In its most basic form, an airport business plan is a document that lays out the goals and objectives of the airport sponsor and a corresponding action plan to help the airport:

- Generate more revenue
- Reduce expenses
- Secure additional capital funding
- Rely less (or not at all) on subsidies
- Create more jobs

An airport business plan uses a logical and disciplined structure to set out goals, objectives, and action plans that drive the day-to-day operation and management of the airport. An airport business plan transforms the vision and the long-term strategic goals for the airport into specific goals and actions within each functional area of the airport. Typically, an airport business plan has a time horizon of one year, although it may take longer to achieve certain goals and realize the vision for the airport. **FDOT developed the *Florida General Aviation Airport Business Plan Guidebook* to assist Florida's airports in developing tailored business plans.**

Business Plan Guidebook

An airport business plan transforms the vision and long-term monetary strategic goals for the airport into specific goals and actions within each functional area of the airport. The *Florida General Aviation Airport Business Plan Guidebook* was developed by FDOT to assist primarily Florida's GA airports participating in the business planning process. The primary goal of the Business Plan Guidebook is stated as, "assisting airports in efforts to become as financially self-sustaining as possible." Specifically, the Business Plan Guidebook helps airports identify opportunities of revenue generation.



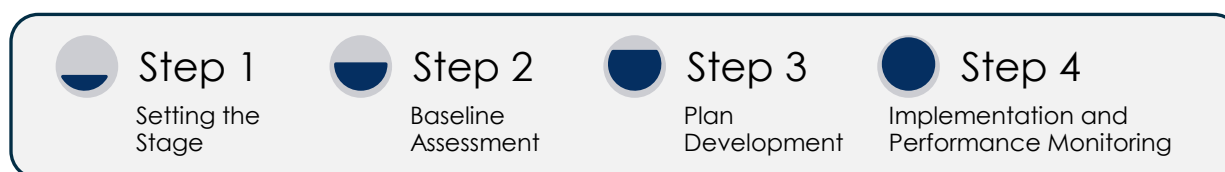
THE SUSTAINABILITY PLANNING PROCESS

The remainder of this Guidebook is divided into four primary phases:

1. Setting the Stage
2. Assessment
3. Plan/Program Development
4. Implementation and Monitoring

Each of these phases plays a vital role in the development of airport sustainability plans. At the onset of the sustainability planning process, team members should be familiar with each phase and the general process involved. Ultimately, these phases will be the developmental guidance for airports as they develop their respective sustainability plans. Many tools have been developed that can aid airports in each of these phases of the sustainability planning process. Examples of specific tools and their corresponding phase of sustainability planning are displayed in **Figure 6**.

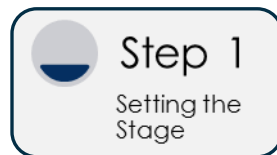
Figure 6: Specific Tool Examples & Corresponding Phase



Although these steps are broad in defining the sustainability planning process, they present the basic layout and foundation from which the rest of the sustainability plan will be built. As airports complete each of these primary steps, they will begin to see the airport sustainability plan take shape and become a functional and effective document that will guide them to a sustainable

future. Throughout the development of these steps, airports are encouraged to utilize the numerous tools that already exist. A list of these tools and the components of a sustainability plan to which they apply is found in **Table 3**.

STEP 1: SETTING THE STAGE

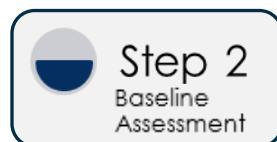


Sustainability planning begins with a preliminary analysis of the airport and its ideas, goals, and vision of sustainability, or "setting the stage." This section will walk airports through the beginning steps of developing a strategy to follow throughout the sustainability planning process.

A major aspect of "setting the stage" is to develop a unique definition of sustainability that encompasses the airport's mindset towards this pursuit. An airport's definition of sustainability provides the necessary framework for the development of a plan. After the airport has developed a base definition of sustainability, the next step is to identify and convene stakeholders within the airport organization and tenants, within the community, and within relevant agencies.

Once the airport has developed a custom definition of sustainability and held conferences with relevant stakeholders, the next steps for setting the stage include identifying a vision, priorities, focus areas, goals, objectives, performance measures, and performance indicators. These steps should be pursued with the stakeholder and airport mentality and priorities toward sustainability. All of these steps lead to a solid foundation for the airport to build a successful and effective sustainability plan.

STEP 2: BASELINE ASSESSMENT



After the stage has been set for the rest of the sustainability planning process, the project team can begin the airport baseline assessment. This baseline assessment involves a comprehensive data collection of sustainability-related airport metrics. These metrics are categorized into the four major focus areas of EONS. In this section of the sustainability planning process, project teams are encouraged to incorporate the airport's goals, objectives, performance measures, and performance indicators to collect the most relevant and accurate data possible.

To aid airports in the data collection process, this Guidebook presents airports with a baseline assessment checklist. The checklist presents airports with numerous data metrics categorized by the focus areas of EONS to provide an organized approach to sustainability data collection. The purpose of this section and the corresponding checklist is to provide airports with a base understanding of the current state or benchmark of airport sustainability and help to identify potential metrics within the EONS focus areas that could benefit from prioritization in the sustainability planning process.

STEP 3: PLAN DEVELOPMENT



This step focuses on utilizing the previously completed baseline assessment to prioritize and select sustainability initiatives that would be most appropriate and beneficial to the specific airport. If necessary, goals, objectives, performance measures, and performance indicators can be revisited in this step to ensure airport and stakeholder prioritizations are still accounted for.

After selecting initiatives, the Guidebook walks airports through selecting action items such as: 1) who will perform chosen initiatives, 2) what is the timeline for the initiatives, and 3) how the initiatives will actually operate. Further, the airport will be instructed to develop performance targets for the initiatives plus develop a comprehensive monitoring plan to track the initiatives. This step thoroughly lays out the airport's overall plan to become more sustainable and will be vital to the future of the airport as a whole.

STEP 4: IMPLEMENTATION AND PERFORMANCE MONITORING

Step 4 Performance Monitoring

After filtering through potential sustainability initiatives, airports can begin to implement the ones deemed most suitable for them. It is vital that airports have a monitoring system set before implementing, to ensure the monitoring process is effective and accurate. Monitoring should involve evaluating the airport's sustainability goals and objectives to analyze the effectiveness of each initiative. Continuous evaluation of the initiatives in progress can allow airports to make small adjustments to the sustainability plan to better acclimate to the new system.

Another component of this step involves communicating the progress and achievements of the working sustainability plan. The progress of the sustainability plan should be communicated both internally and externally to raise awareness and increase appreciation for the airport's efforts. External communication of the sustainability plan's progress is an excellent method for increasing public reputation, especially by highlighting the benefits to the local community. Further, consistent progress reporting to the FAA can support future AIP funding requests for further sustainability projects at the airport.

THE RECURRING PROCESS

Sustainability planning is an active and recurring process that doesn't end after initiative implementation. Once a sustainability plan is implemented and monitored continuously, the airport should immediately begin considering adjustments or changes to the plan. This can be best achieved by consistent evaluation of the airport's goals and objectives and how well the implemented initiatives are achieved. By re-assessing performance metrics, the airport can alter current initiatives or select new initiatives and begin implementing and monitoring their success.

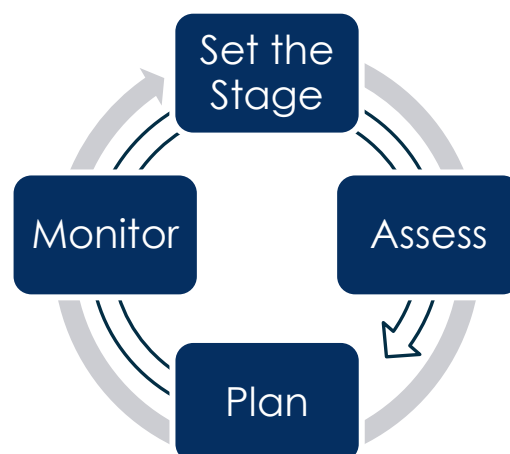
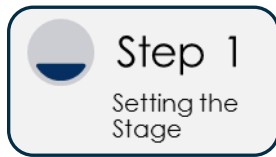


Table 3: Useful Tools for Sustainability Planning

Source	Tools	Setting the Stage	Baseline Assessment	Plan Development	Performance Monitoring
https://sftool.gov/	Sustainable Facilities Tool	→			
ACRP Synthesis 10	Airport Sustainability Practices Matrix	→	→	→	
ACRP Synthesis 77	Airport Sustainability Practices	→	→	→	→
ACRP Report 19	Airport Performance Indicators		→		
ACRP Report 64	Tool for Evaluating Emissions and Costs of Auxiliary Power Units and Alternative Systems (TEECAAS)		→		
ACRP Report 86	Departure Optimization Tool (DOIT)		→		
ACRP Report 102	Airport Construction Emissions Inventory Tool (ACEIT)		→		
ACRP Report 138	General Aviation Airport Preventative Maintenance Checklists		→		
ACRP Report 154	End Use Water Audit Tool		→		
ACRP Report 178	Airport Terminal Building Energy Use Intensity (ATB-EUI) Benchmarking Tool		→		
Chicago Department of Aviation	The Sustainable Airport Manual		→	→	→
ACRP Report 42	Sustainable Airport Construction Filterable Spreadsheet			→	
ACRP Report 43	Environmental Stewardship Practices at Small Airport			→	
ACRP Report 56	Airport Greenhouse Gas Emission Assessment and Reduction (GEAR) Tool			→	
ACRP Report 80	Airport Sustainability Assessment Tool (ASAT)			→	
ACRP Report 139	Airport Facility Optimization Ranking Tool			→	
ACRP Report 147	Airport Climate Risk Operational Screening (ACROS)			→	
ACRP Report 151	Renewable Energy Project Evaluation Criteria Template			→	
NCHRP Report 708	Performance Measures Compendium			→	→
ACRP Report 110	Evaluation Process (EP) and Cost Benefit Tool (CBT)			→	→
ACRP Report 119	Prototype Airport Sustainability Rating System: Characteristics, Viability, and Implementation Options		→	→	→
http://www.energystar.gov	Energy Star® Portfolio Manager®				→

PHASE I: SETTING THE STAGE

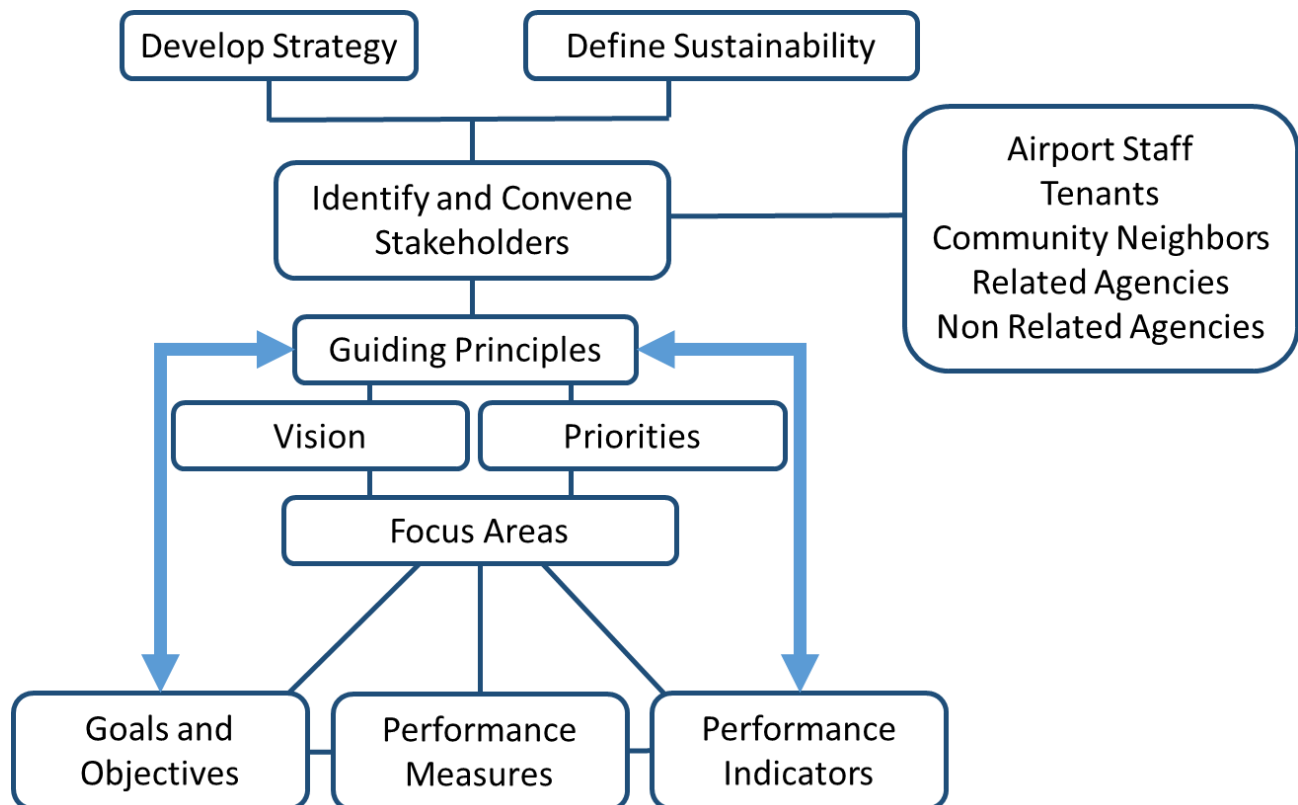


The first phase in developing a successful sustainability plan is to create a solid foundation for the rest of the plan to build upon. This phase is vital to further developmental components or aspects of the planning process. **Figure 7** displays an overall flow of developing the airport's tailored foundation for sustainability. This phase of the planning project is typically comprised of the following elements:

- Develop a strategy and define sustainability
- Identify and convene stakeholders
- Develop guiding principles
 - Vision
 - Priorities
- Develop focus areas
 - Goals and objectives
 - Performance measures
 - Performance indicators

This process is meant to promote self-identification among the airport and stakeholders to determine the overall direction and priorities the sustainability plan will have. It is important to understand that the "Guiding Principles" and "Focus Areas" work in concert with each other and can evolve or adapt throughout the sustainability planning process as situations occur.

Figure 7: Phase I: Setting the Stage for Sustainability



DEVELOP THE STRATEGY

DEFINE 'STRATEGY'

For purposes of this Guidebook, "strategy" can be defined as the agreed upon approach the airport and relevant stakeholders will take to develop a custom sustainability plan. This definition is similar in nature to the traditional definition of the term, but gives way to a more applicable customization for airport sustainability planning. Two key words that should be considered alongside strategy are: consistent and systematic.

APPROACH TO DEVELOPMENT OF A SUSTAINABILITY STRATEGY

Developing a strategy for sustainability planning can be a guiding resource for airports throughout the planning process. Further, the airport's strategy can be communicated with all internal staff and relevant external entities to obtain buy in and ensure everyone involved understands the intended direction for the airport through sustainability planning.

The five aspects of a successful sustainability strategy listed in **Figure 8** were developed by Harvard University for businesses or organizations to utilize in the development of their respective sustainability strategies. Thus, airports should consider these five aspects during the strategizing process to ensure the most effective strategy possible. The aspects begin with maintaining a positive view towards sustainability. As stated by Harvard University, it is best to concentrate on improving processes within the organization rather than fixing problems.⁸

"A systematic approach makes managing a business both easier and more effective. A consistent approach reduces the number of mistakes and the cost of correcting problems. It also reduces the level of risk and ensures compliance with legislation."



Source: ACRP Synthesis 10: Airport Sustainability Practices

Figure 8: Five Aspects of a Successful Sustainability Strategy



Source: Harvard University: <http://isites.harvard.edu/fs/docs/icb.topic717020.files/PositiveStrategyNarrative.pdf>

⁸ <http://isites.harvard.edu/fs/docs/icb.topic717020.files/PositiveStrategyNarrative.pdf>

A systematic approach to developing a strategy for sustainability implementation and planning should be consistent with past airport project and plan developments. The strategy should incorporate the airport and stakeholder priorities and values while being realistic about the airport's resources and capabilities. Ideally, the strategy should be coordinated between the sustainability champion and/or project team along with appropriate airport staff and stakeholders.

DEFINING SUSTAINABILITY FOR THE ORGANIZATION

To begin an airport sustainability plan or identify potential sustainability initiatives, it is important for an airport to introduce and explain how its organization views, applies, and defines sustainability. Developing a **sustainability definition** tailored for the specific airport or system of airports is a crucial step in the process of creating a sustainability plan. This information will also support the overall purpose by providing a baseline justification for the development of the sustainability plan.

What is Sustainability?

The National Environmental Policy Act of 1969 committed the United States to sustainability, declaring it a national policy "to create and maintain conditions under which humans and nature can exist in productive harmony, that permit fulfilling the social, economic, and other requirements of present and future generations."



PURPOSE

An airport's definition of sustainability provides the necessary framework for the development of a plan. The definition serves to educate airport staff, tenants, and the community about sustainability, what it means to the specific airport, and what the ultimate intent of the program is. A customized explanation of sustainability allows airports to focus on issues that are relevant to their setting, operation, and environment. For example, the Hillsborough County Aviation Authority (HCAA) defines sustainability at Tampa International Airport (TPA) in its Sustainable Management Plan as:

"Sustainability is about making decisions that meet our needs today without compromising the ability to meet our needs, and future generation's needs, in the future. It is more than just "being green." It means planning ahead and thinking holistically about the social, economic, environmental, and operational elements of business at the Airport."

HCAA identifies that, to the airport, sustainability is "more than just 'being green.'" By declaring the airport's high prioritization of sustainability, airport staff, tenants, and the community will better understand the importance of sustainability to the airport and understand why the sustainability plan is being implemented. Furthermore, HCAA's definition highlights the airport's understanding of the four focus areas of sustainability: "the social, economic, environmental, and operational elements of business at the Airport." Airports should strive to incorporate and recognize all elements of sustainability as HCAA did in their sustainability definition.

GOAA defines sustainability as:

"We define sustainability as the responsibility to construct and operate our airport facilities in a manner that ensures future generations will enjoy the same environment that we experience today. Sustainability efforts are achieved by a balance between the environment and community outreach, and the economics of managing the airport."

In this sustainability definition, GOAA displays its focus on development, construction, and operations to enhance the future. Like HCAA, GOAA mentions its consideration of the different focus areas of sustainability by noting the balance between environment, community outreach, and economics. By custom defining sustainability, airports will have begun designing the framework on which to build the rest of the sustainability plan. Sustainability at the airport will be progressed while considering those aspects of sustainability that are important to the airport, its community, and its leaders and neighbors. This step is crucial to the future success of a sustainability program as well as providing outside interested parties with a general idea of how the airport plans to approach such an effort.

DEVELOPING A SUSTAINABILITY DEFINITION

Developing a sustainability definition will vary depending on the role, size, and function of an airport. The process should involve input from airport stakeholders and the community to ensure its alignment with the overall goals of the users. As all airports have varying characteristics, it is important to consider different developmental approaches to create a more accurate definition. This step will also help to identify the level of effort, based

on conditions at the airport, which may be needed to complete a sustainability plan. This is done by understanding the context in which an airport will be developing a plan. At a minimum, airports should involve staff, tenants, concessionaires (if applicable), and the local community in developing their sustainability definition. There are tools available for airports to aid in producing a tailored definition of sustainability. Among these tools includes **Defining Sustainability for Your Agency** from NCHRP Report 708: *A Guidebook for Sustainability Performance Measurement for Transportation Agencies*.

How Can Airports Be More Sustainable?



Airport sustainability goes beyond environmental consideration. By drafting an airport sustainability plan, airports can begin to reduce environmental impacts, realize economic benefits, increase efficiency in their operations, and improve community relations. Sustainability is not an effort to be pursued by one person or entity, but by the organization as a whole.

NCHRP Report 708: A Guidebook for Sustainability Performance Measurement for Transportation Agencies



provides step-by-step instructions on how to define sustainability for transportation agencies.

The steps include:

- Review Sustainability Principles
- Consider the Context
- Identify Goal-Related Keywords/Phrases
- Develop Sustainability Definition

For each of the identified steps, detailed instructions are provided on tailoring the definition to an individual agency. Please see **Appendix 7** for further information and identification of existing tools.

EXAMPLE OF DEVELOPING A SUSTAINABILITY DEFINITION⁹

This example is provided to illustrate the recommended steps for airports to develop a coherent and effective sustainability definition. Following this process can ensure that the airport produces a definition that accurately reflects the goals and priorities of the airport staff and stakeholders. Having an effective sustainability definition can set the standard for upcoming phases of sustainability planning and provide a great start for the airport.

Airport X is a small hub commercial service airport serving a metropolitan statistical area of 300,000 people, focused mostly on local efficiency.

Step 1 – Airport X reviewed the principles of sustainability to develop an understanding of the subject.

Step 2 – Airport staff identified the following issues of relevance: (1) small urban area, (2) multiple avenues of airport accessibility, (3) focus on planning, and (4) include local stakeholders

Step 3 – The following were identified as goal-related keywords to be incorporated into the definition: accessibility, economic development, environment

Step 4 – The airport staff developed the following definition/statement:

“Airport X pursues sustainability by providing an efficient air transportation system for citizens while working with local and regional stakeholders to promote accessibility for all, to support economic development, and to protect the environment for current and future generations.”

ORGANIZATIONAL READINESS

Before an airport begins the development of a sustainability plan, it needs to identify the organization's overall level of readiness. It is likely that

all airports that consider developing a plan or implementing strategies will already have, at least, considered sustainability as it pertains to improving the overall function and operation of an airport.

Organizational readiness for sustainability planning can be measured in multiple ways depending on the size, function, ownership and management structure, and type of airport under consideration. This preliminary step of determining the level of organizational readiness plays a significant role in the development of an airport's sustainability plan.

Is Your Organization Ready for Sustainability?

An understanding of the airport's level of readiness to implement an airport sustainability plan will aid in the effectiveness and practicality of the plan.



CONSIDERATIONS

Organizational readiness is the amalgamation of numerous factors of an airport including: staff understanding/preparation, identification of a sustainability definition, financial feasibility, and identification of purpose of pursuit. **It is recommended that airports understand and can gauge their level of organizational readiness early in the process.**

⁹ NCHRP Report 708: A Guidebook for Sustainability Performance Measurement for Transportation Agencies

Staff understanding and preparation is vital to identifying organizational readiness for sustainability planning. It is recommended that airports educate all staff on the concept of airport sustainability and what it entails. Further, it is recommended that airports hold sustainability workshops for the separate classifications of staffing (e.g., operations, maintenance, finance, etc.) to discuss potential sustainability practices relevant to each respective classification and the potential benefits. Of chief importance is understanding the level of support from airport management and executive leadership. Ultimately, if the airport decision makers do not support the plan, it will be very difficult to implement. It is likely that if an airport is considering developing a sustainability plan, there is some form of support from airport decision makers; however, understanding their overall desires for the plan (e.g., promote cost savings vs. promote environmental stewardship) as well as their level of support to fund and implement sustainability projects will ultimately determine how quickly and effectively the project moves forward.

Assessing Organizational Readiness:



1. Has the airport implemented any sustainability initiatives?
2. Does the airport leadership understand and support the concept of sustainability?
3. What aspects of sustainability are most important and applicable to the airport (environment, social, economic, and/or operational)?
4. Does the surrounding municipality or county have a sustainability plan/program?
5. Are there any organization-wide planning efforts implemented (Ex: strategic planning)?

In determining organizational readiness for sustainability, it is recommended that an airport reviews its specific sustainability definition. Before moving forward with the sustainability planning process, a clear understanding of the goals and considerations outlined in the sustainability explanation is important. Along with an understanding of the sustainability definition, knowledge of the airport's sustainability evolution is recommended. Sustainability evolution is referring to the questions in **Table 4** that define the evolution of sustainability efforts within an airport or organization. It is the broad overview of what airports are suggested to analyze in this section of the sustainability plan. In analyzing the evolution, the airport should strive to answer three questions, as identified in **Table 4**.

Table 4: Airport Sustainability Evolution Questions

Evolution Questions
Where have we come from?
Where are we now?
Where are we going?

How these questions are answered will play an important role in determining the evolution and organizational readiness of an airport to implement sustainability practices.

Another consideration of organizational readiness is financial feasibility. Implementation of certain sustainability practices can have a significant initial cost to airports. Before beginning the planning process, airports should determine the budget for sustainability and analyze the specific current financial situation. This consideration will help airports determine which sustainability initiatives to pursue later in the planning process. Additionally, cost savings realized

by early successes with lower cost sustainability initiatives can be the catalyst for future larger investments in an airport's sustainability program.

CONCLUSION

The above considerations will play an important role in identifying an airport's level of organizational readiness for developing and implementing a sustainability program. It is recommended that airports allocate dedicated time on each consideration to ensure effectiveness and determine if the airport is prepared to continue with the sustainability planning process. Other factors may be identified for an airport at their discretion to produce a better understanding of the level of organizational readiness.

IDENTIFY AND CONVENE STAKEHOLDERS

Selecting stakeholders to be involved in the project development process is an integral part of developing an effective sustainability plan. Before initiating development of a sustainability plan, airport managers are strongly encouraged to gather input from airport tenants, FBOs, local residents, and state and local officials. Discussing project ideas and goals with participants early during the life of the project will reduce conflicts and allow for a more successful sustainability plan. Stakeholders should be selected based on the perceived impact that recommendations in the sustainability plan will have on the surrounding area and community.

The FDOT Guidebook for Airport Master Planning provides a comprehensive list of entities to be considered as potential stakeholders. The Guidebook categorizes them into the following categories:



- Airport Sponsor Organization Representatives
- FDOT Personnel
- Interested Groups
- Resource Agencies
- Users and Tenants

Source: <http://www.fdot.gov/aviation/flipub.shtm>

For example, if an airport is trying to attract a large-scale distribution warehouse to locate on its property, the suggested stakeholder groups would see the proposal from different angles. Airport sponsors would want to attract business to bring additional revenue and users to the airport, FDOT and FAA representatives would want to make sure the airport remained compliant with standards, interested groups would want to know how the development could potentially affect them, and users and tenants would want to know if the current demand for their services will be affected. For purposes of sustainability planning, the following groups should be considered for stakeholder identification:

- Members within the airport organization
 - Airport staff
 - Tenants, FBOs, and users (pilots and passengers)
- Local community and surrounding neighbors
- Adjacent agencies (such as city/county staff, regional task forces, universities, etc.)
- Other agencies (such as Department of Environmental Protection)

Project teams should select the stakeholders they feel are the most appropriate for accomplishing the goals and objectives of their sustainability plan. There is no set list of who should be involved in the sustainability planning process. It is ultimately up to the project team and airport manager to create the most comprehensive group while being sensitive to the

project budget and scope. The project team may consider hiring a consultant to assist with the public involvement, even if the rest of the sustainability plan is developed in house.

As part of the development of this Guidebook, a case study was done with Venice Municipal Airport on "How has Venice Municipal Airport actively engaged the community to improve relations." Below are the key findings of that case study:



- GA airports need to find ways to communicate the importance of their facilities to community members who aren't pilots. One way that has been successful at Venice Municipal Airport is to relate the interlinked history of the airport and the city to the community and to take a proactive approach to engaging the airport's neighbors.
- Typically, the main deterrents to community engagement include airport management's perceived lack of time, personal skills that might not align with community engagement needs, and an external view of an airport as being "fenced off" from the rest of the community.
- An Airport Director can't do it all by themselves – airport businesses and proponent groups (pilot clubs, etc.) can be valuable extensions of staff to help with community engagement efforts.
- Elected officials need to be educated on the importance of General Aviation airports and their operational and development needs.

The full case study is provided in **Appendix 4**.

IDENTIFY GUIDING PRINCIPLES

An airport's vision, priorities, and guiding principles make up part of the framework that the airport needs to establish with the stakeholders to appropriately mold the sustainability planning process. These values are generally interwoven into other airport plans and projects; however, the onset of sustainability planning is a necessary time to revisit and possibly edit the values.

VISION

An airport should develop a simple vision statement that accurately reflects the identified values between the project team, airport staff, and airport stakeholders. The vision should be a brief statement that gives insight into the airport's intended future with sustainability.

Although many airports have already developed vision statements for master planning or for other projects, it is recommended that a unique vision statement is developed for sustainability. Due to the complexity of airports, a vision statement can provide a top-level understanding of the airport's foreseen direction of future sustainability efforts. A vision statement can have both internal and external applications and benefits.

Externally, vision statements can be used as a public awareness tool, communicating the airport's future in sustainability and gaining support. Internally, the vision statement can be used as an educational asset for airport staff. Further, the vision statement can be a solid resource in strategic decision making processes. Finally, an airport's vision will help the airport in defining priorities for the rest of the sustainability plan.

"A vision is a statement about what your organization wants to become. It should resonate with all members of the organization and help them feel proud, excited, and part of something much bigger than themselves."



Source: Harvard University

AIRPORT & STAKEHOLDER PRIORITIES

Using the airport's definition of sustainability along with the developed vision statement, it is suggested that the project team and/or champion develop priorities of sustainability. Priorities provide the basis for creating goals and objectives in future steps. Further, developing priorities can help guide and track sustainability as it develops at the specific facility. The following considerations need to be incorporated into the priorities:

- What areas of the airport could benefit from sustainability initiatives?
- What role does the airport staff play in the upcoming sustainability plan?
- How does the vision statement affect the future of the sustainability plan?
- What values and ethical requirements need to be incorporated into the sustainability plan?

Priorities should be discussed frequently throughout the planning project to ensure they are staying consistent and up-to-date as well as ensuring the airport is striving to meet them. It is important that the project team takes note of the airport and stakeholder priorities and strives continuously to make sure the sustainability plan is consistent with them.

FOCUS AREAS

To provide a backbone for the rest of the sustainability plan, airports are encouraged to develop focus areas that include:

- Desired outcomes
- Mission statement
- Goals
- Goal-based objectives
- Performance measures/indicators

How Do You Structure Your Sustainability Plan?



It is important for the airport to have a solid structure off of which to develop a plan. Following this recommended structure will ensure a well-organized sustainability plan.

It is important for an airport to outline these factors in a way that best represents the airport's ideals and plans while setting the airport apart from others in a customized and unique way. Identification and analysis of these four factors can prove extremely beneficial in the development of a sustainability plan.

DESIRED OUTCOMES

The desired outcome of a sustainability plan is a factor that relies solely on an airport's self-identification. To identify desired outcomes, airports should consult with stakeholders, tenants, and staff to outline specific wants and needs. Desired outcomes of sustainability planning can include many things, such as: increasing revenue, decreasing environmental impacts, establishing better public relations, increasing efficiency, etc. Ideally, airports would like to see all of those mentioned outcomes come to fruition; however, an airport needs to be realistic when identifying a set of desired outcomes. Realistically identifying desired outcomes is an important step for continuing to establish specific goals.

MISSION STATEMENT

The purpose of the **mission statement** is to accurately describe the overall focus of the airport's sustainability plan based on prominent factors identified in the baseline assessment. The mission statement should encompass the airport's definition, vision, goals, and baseline assessment while incorporating information gathered from the baseline assessment. It provides a statement that the airport organization can follow and a pledge to the community about the airport's commitment to sustainability.

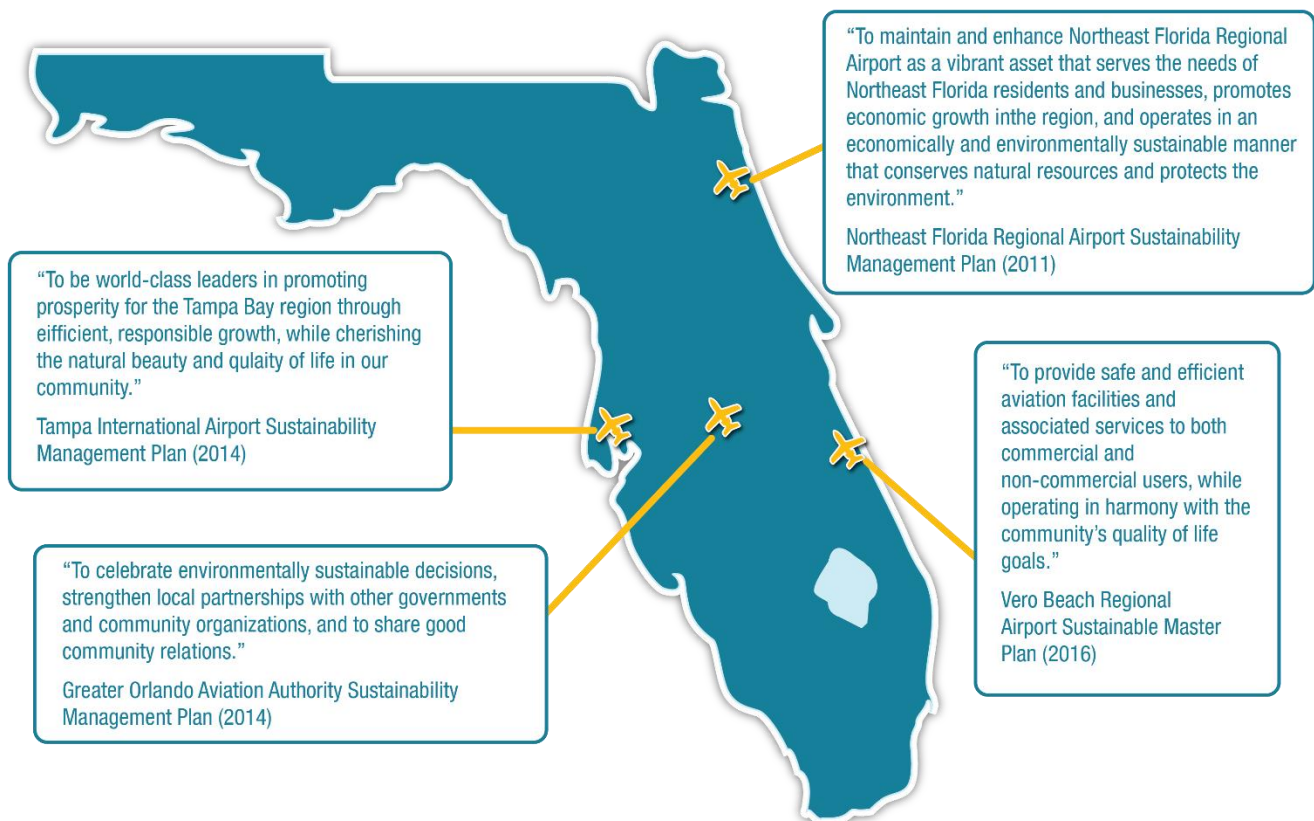
The mission statement should be developed by airport leadership and airport staff to ensure that it is appropriate and unique to the organization. Local sustainability goals and priorities should also be considered in the development of the mission statement to demonstrate consistency with efforts in surrounding jurisdictions. **Figure 9** shows the mission statements developed for four sustainability planning efforts at Florida airports.

What is a Mission Statement?

A properly crafted mission statement serves as a filter to separate what is important from what is not, clearly states which focus areas will be concentrated on and how, and communicates a sense of intended direction to the entire organization.



Figure 9: Sustainability Mission Statements for Florida Airports



Using the information gathered in the baseline assessment, airports should collaborate on a statement that best suits them. The mission, which should be developed to support the vision, should promote a sound business strategy and answer three primary questions (**Table 5**):

Table 5: Mission Questions

Mission Questions
What: What do we do?
For Whom: For whom do we do it?
How: How do we do it?

Source: ACRP Report 20 – Strategic Planning in the Airport Industry

How these questions are answered will vary by airport, as airports serve a multitude of different purposes. It is important for airports to be realistic when developing their mission so that it supports their vision. It is important to remember that both the vision and mission can change over time. As certain components of the sustainability plan are implemented, it may be necessary to revisit these statements and provide updates as conditions change.

A mission statement should present the big picture of what the airport would like to achieve. The mission does not need to be explicitly attainable; it should provide an aspirational image. With a mission in place, the airport can identify the goals that will help to achieve this vision. A sustainability plan, however, will not provide all of the recommendations needed to reach the mission. All plans developed by the airport will need to work in concert with each other when working toward the mission. **Table 6** presents some general guidelines to follow when developing a mission statement for the airport.

Table 6: Developing a Mission Statement

Developing a Mission Statement
Should be clear and concise
Should be future-focused and inspirational
Should explain what the airport will look like in the future

Source: ACRP Report 20: Strategic Planning in the Airport Industry

GOALS

As an end result of establishing the vision and mission, an airport can accurately develop **sustainability goals**. Goals should incorporate the airport's vision and mission and utilize the identified desired outcomes to produce specific goals. In the initial development of goals, airport strategic goals, if established, should be reviewed and considered during the development of sustainability goals. Strategic or sustainability goals defined by a city or county with jurisdiction over the airport should also be reviewed for applicability.

What is a goal?

A desired result that a person or a system envisions, plans, and commits to achieving.



It is recommended that airports draft a set of sustainability goals that are both quantitative and qualitative. These goals should be specific, objective based, and related to performance targets to gauge progress toward goal achievement. Goals should be developed based on the most important resource category groups that were identified in the baseline assessment.

Goals are essential for guiding decision-making processes and are required for the generation of an action plan that can be implemented to ensure an airport is continuing on a progressive path of improvement. **Goals should be developed, refined, and prioritized, and should ultimately provide a framework to create specific objectives that will meet these goals and help realize the overarching mission and vision.** GOAA outlined nine goals of its sustainability plan:

1. Reduce solid waste to landfills
2. Reduce energy use intensities
3. Reduce water consumption
4. Improve operations and maintenance plans
5. Improve sustainable construction, engineering and design practices
6. Develop sustainable concessionaire practices
7. Improve environmental practices
8. Reduce single occupancy commuting and increase alternative transportation
9. Improve alternative energy strategies

These nine goals are specific, yet broad enough to allow for action steps to be developed for each goal later in the process. GOAA developed goals after identifying four focus areas of sustainability that required the most attention: Energy, Waste, Water, and Environment. For some airports, similarly developing four or five categories of sustainability that seem most important to the airport before outlining goals within each category would be beneficial.

Table 7 should be implemented during the goal setting stage of sustainability planning. Within resource categories derived from the baseline assessment section, airports can start manually entering goals determined to be relevant and valuable to the airport and the surrounding community.

Table 7 is provided as a separate Excel document, available from FDOT. **Table 7** will be used throughout this chapter as an example of how the framework is used throughout the process. As shown, this structure organizes the goals of the airport by category and explicitly links them with their associated objectives, metrics, and targets. The remainder of this Guidebook will assist airports in filling out the information in **Table 7**.

Best Practices for Developing Goals and Objectives



- Goals should be based on the established guiding principles and are aimed to fulfill the mission statement.
- To help establish sustainability goals, establish a goal setting meeting. Send out recommended goals to the meeting participants prior to the meeting to allow for more efficient discussion during the meeting.
- Consider close coordination between the airport's existing goals and objectives from other processes (if available) to determine new/refined sustainability goals and objectives.
- Develop goals with open objectives instead of establishing absolute numbers. For example, "reduce waste generation and increase diversion from landfills".
- Consider establishing goals for dual scenarios to allow for uncertainties.
- Understand and be aware of other projects occurring at the airport. It may be possible to coordinate and develop goals and initiatives that will not be affected by current projects.
- An airport may be able to take sustainability goals from the municipality and modify them to fit the airport's context.

Table 7: Template for Developing Sustainability Initiatives

Resource Category	Goals	Objectives	Metrics	Current Level	Target	Initiatives	Action Steps
Information will be filled in throughout this chapter							

Resource Category

Airports are urged to identify resource categories deemed important and enter them into **Table 8** as the first step in filling out the sustainability planning table. These categories will serve as a foundation for the rest of the plan.



Goals

Within chosen resource categories that should be already entered into **Table 8**, airports should fill in chosen goals. The goals should be organized into the corresponding row of the relevant resource category. For example, a goal to reduce vehicle emissions would be entered in the environmental resource category's row.



Table 8: Sustainability Tracker

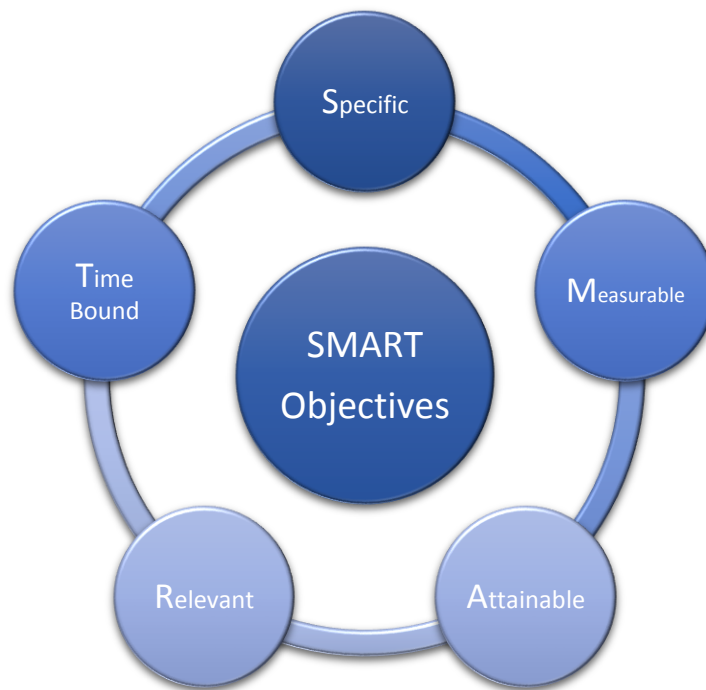
Resource Category	Goals	Objectives	Metrics	Current Level	Target	Initiatives	Action Steps
Energy (Environment)	Reduce the total energy use and demand of the airport and increase renewable energy generation on airport property						
	Leverage people (energy users) to promote energy efficiency						

GOAL-BASED OBJECTIVES

The process for developing goal-based objectives is provided in the *FDOT Florida General Aviation Airport Business Plan Guidebook* (Business Plan Guidebook). Though the Business Plan Guidebook was developed specifically for business planning purposes, to keep consistent with existing FDOT guidance, the same methodology will be used in this Guidebook.

Objectives are specific, tangible, short-term statements that help to achieve the established goals of an airport. It is not uncommon to have multiple objectives for each goal. To develop objectives, it is recommended that project teams follow the SMART model, as described in the ACRP Report 77. **Table 9** provides more information on the SMART model. **Figure 10** displays the SMART model of developing objectives and how each aspect works together to form an effective objective.

Figure 10: SMART Objectives Model



After generating objectives, a ranking should be established to reflect the importance and feasibility under each goal. This ranking will help to ensure that priorities are considered during implementation. To assist in the ordering and weighting of the objectives, the following questions should be considered (**Table 9**).

Table 9: Objective Ordering Questions

Objective Ordering Questions
What is hoped to be done? (long-term, hope-based objective)
What should be done? (Intermediate-term, benefit-based objective)
What must be done? (Short-term, necessity-based objective)

Source: Adapted from ACRP Report 77

This prioritization process will more clearly communicate the priorities of the objectives that are to be achieved. Salt Lake City International Airport developed numerous goals as part of the airport's Sustainability Plan. Two of these goals and their associated objectives are detailed below for reference:

GOAL NUMBER 1:

Reduce the total energy use and demand of the airport and increase renewable energy generation on airport property.

OBJECTIVES:

- Complete energy efficiency projects to reduce energy use in airport facilities
- Increase renewable energy generation on airport property
- Leverage people (energy users) to promote energy efficiency

Objectives

The objectives section of **Table 10** should be filled in with identified airport objectives that correspond with previously chosen goals. Similar to the example, the purpose is to organize chosen objectives into the goals to which they apply. Further, identified metrics in which one would measure chosen objectives should be filled in to the correct corresponding row.



GOAL NUMBER 2:

Reduce waste generation and increase diversion from landfills

OBJECTIVES:

- Engage employees, passengers, and tenants in waste reduction and recycling efforts
- Develop capacity for composting or recovering energy from food scraps and other compostables
- Increase the landfill diversion

It is important to note that there is no set number of goals or objectives that should be developed. Therefore, each project team should determine the depth needed to achieve the airport's goals. **Table 10** should be re-used in this section to build upon entries made in preceding sections. Specifically, while developing goal-based objectives, airports are encouraged to update the table to maintain a cohesive, organized outline that lays out the airport's goals and objectives for identified important resource categories.

Further additions to **Table 10** will take place in upcoming sections of the sustainability planning process. The metrics section of the table is simply to define how selected objectives would be measured. For example, for the objective "complete energy efficiency projects to reduce energy use in airport facilities," Salt Lake City International chose total electricity use per passenger as one of several metrics to measure the objective.

After identifying applicable objectives and their corresponding metrics, airports can note the current level of measurement at their airport. The current level of measurement under analysis can be easily derived from the baseline assessment portion of the sustainability plan. Further analysis of current airport conditions may be necessary in identifying the current level of measurement under analysis. The current level aids an airport in determining a target to associate with the chosen objectives and goals and to measure progress from the baseline. A target should be set to identify a time by which the airport organization would like to achieve specific objectives and initiatives. Targets should be set to be both reasonable and attainable. Setting targets that are not attainable may ultimately reduce the viability of the sustainability program and sets the program up for failure from the beginning.

Table 10: Sustainability Tracker

Resource Category	Goals	Objectives	Metrics	Current Level	Target	Initiatives	Action Steps
Energy (Environment)	Reduce the total energy use and demand of the airport and increase renewable energy generation on airport property	Complete energy efficiency projects to reduce energy use in airport facilities Develop energy efficiency tracking system to track future projects and their effects	Total Electricity use per Passenger (MMBTu/passenger)	0.16/ Passenger	Reduce overall energy consumption by 25% by 2020		
	Leverage people (energy users) to promote energy efficiency	Host internal staff meetings to educate and discuss energy efficiency Increase customer education of energy waste to promote energy conscious mindset	Customer knowledge of energy waste on 1- 10 scale based on brief survey of five customers	Average = 4	Increase average customer knowledge of energy waste to 8 by the end of the year		

PERFORMANCE MEASURES AND INDICATORS

For the purposes of this Guidebook, a performance measure or indicator can be defined as the metric used to assess the effectiveness of the sustainability strategy and upcoming sustainability initiatives. The difference between the two is that an airport can theoretically influence a performance measure whereas a performance indicator cannot inherently be influenced by an airport, though they are still of great use in determining the ultimate success or progress towards an objective or goal. For simplicity, from here on out the term “performance measure” will be used to include performance indicators, as well.

Performance measures can range from staff evaluation regarding sustainability performance to numerical quantification of related data. Although they can change and evolve as the project develops, it is suggested that project teams discuss and consider adopting performance measures at this early stage of the process. In essence, performance measures and indicators should be an expanded view of the previously determined goals of the sustainability plan.

Performance measures will vary among airports and the recommendations in the airport's respective sustainability plan. While certain performance measures may be similar in nature among various airports, the goals and their respective performance measures should be specific to the airport. When assessing and adopting performance measures, it is important to ensure that they are identified for each goal and the corresponding objectives. Performance measures can be based on a variety of metrics, which should be identified within the sustainability plan and repeatable over time.

IDENTIFICATION AND ALLOCATION OF RESOURCES

At this early stage of the planning project, the project team should begin identifying resources that might be necessary for the successful completion of upcoming phases. For example, an airport identifies that the staff and stakeholders collectively prioritize the natural resource conservation focus area of EONS. Because of the high priority, the airport should begin to identify appropriate staff members that show interest in environmental initiatives, as well as internal and external resources to aid in potential environmental initiatives.

Further, airports should identify key assets that can be useful to the airport in all facets of the sustainability planning project. At this early stage of the project, this identification of resources can be a broad overview and a relatively simple walkthrough of the possible resources for the project. After this initial identification and allocation, it is important that airports continuously seek staff and resources to aid in the sustainability project. It should be among the airport's priorities to utilize every possible asset throughout this process to ensure the most efficient and successful sustainability plan possible.

Phase I Checklist

☐

Develop a Sustainability Strategy

☐

Develop a Sustainability Definition

☐

Determine Organizational Readiness

☐

Identify and Convene Stakeholders

☐

Identify Vision and Guiding Principles

☐

Identify Focus Areas (Outcomes, Mission, Goals, Objectives, Performance Measures/Indicators)

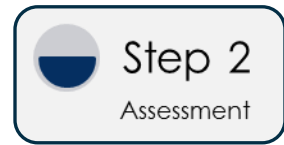
☐

Identify and Allocate Resources

PHASE II: BASELINE ASSESSMENT

The next phase of the project involves completing a baseline assessment to evaluate the airport's current standing in regard to sustainability. Specifically, this baseline assessment is broken into the four focus areas of sustainability:

- Economic viability
- Operational efficiency
- Natural resource conservation
- Social responsibility



The extent to which the airport will assess each focus area's current standing is contingent upon identified airport needs as well as goals, objectives, performance measures, and performance initiatives. **Figure 11** displays the process map of the baseline assessment portion of the sustainability planning process. Ultimately, once an airport has completed the process detailed in Phase II, it should have full documentation of how to develop and implement a sustainability plan.

Figure 11: Phase II: Assessment of Airport Sustainability Standing

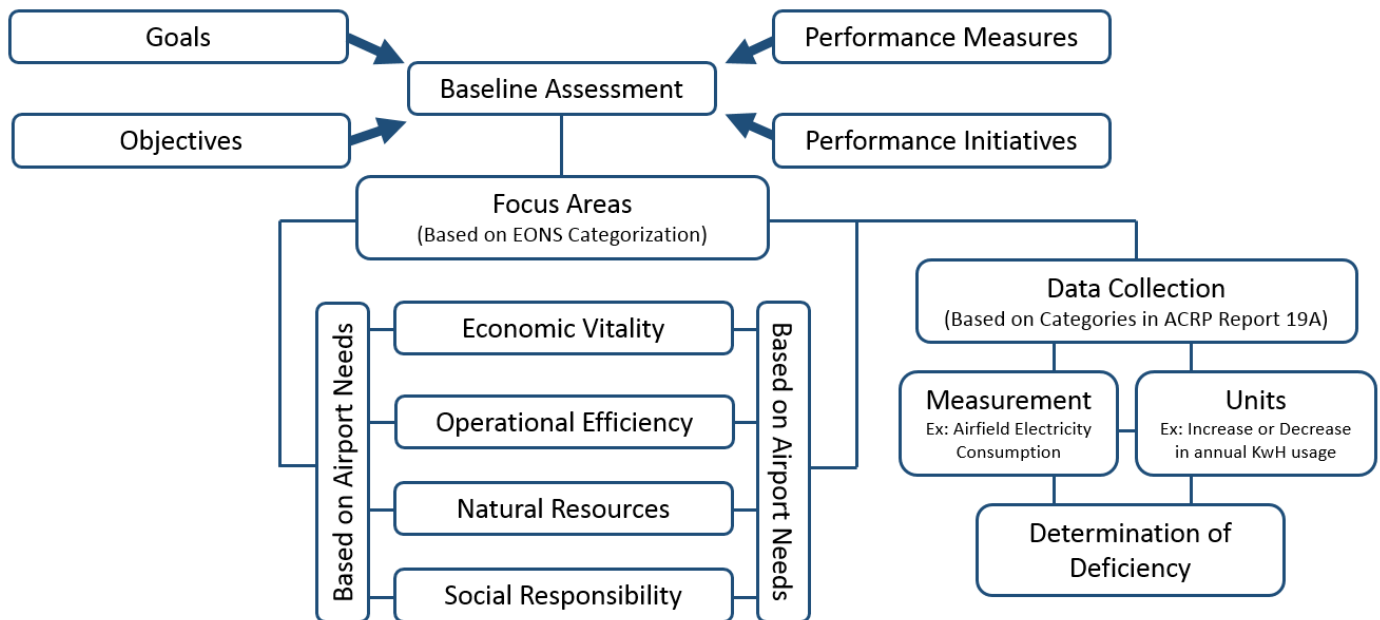


Figure 11 provides an example of how this structure will be used to develop the framework to develop goals, metrics, targets/objectives, and initiatives based on specific airport categories.

BASELINE ASSESSMENT

The **baseline assessment** covers a wide variety of facets of the airport system and identifies strengths and weaknesses. It analyzes historic and existing data related to the range of sustainability categories chosen by the airport as its focus area(s). Also, it creates the framework for the plan and demonstrates historical sustainability performance and trends that the planning process can address.

How Sustainable is Your Airport Now?

Identifying areas in need of a higher level of sustainability focus is a prerequisite to drafting a more effective sustainability management plan.



Best Practices for Developing a Baseline Assessment

- Determine what you can and, as importantly, *want* to assess and track. What message do you want to convey? Who is your audience?
- Understand what data is available and what format it is in. Not all data will be available in the format that you request it in, so you may need to adjust to what is available.
- Be prepared to provide justification for the data that you are requesting.
- Sequence baseline assessments to allow for realistic and accurate targets to be determined.
- Determine the baseline year early in the planning process to improve the data collection for all team members.
- Create a central data collection/management center or program to minimize duplication of data collection. Dedicate 1 or 2 individuals to manage and update the data collection center/program.
- Develop a list of data that needs to be collected and create checklists or a tool for individuals collecting data to increase efficiency.
- Ensure coordination between consultants and the airport prior to the development of the data needs list to identify what data are easy to collect, what data are more challenging to collect, and what data are not available.
- Use local experts to assist in data collection. This will increase efficiency and could reduce costs during data collection.
- Develop a shared webpage between all project team members (airport staff and consultant team) to enhance the efficiency of baseline data collection.
- If conducting a waste audit, understand the scope of janitorial services performed to know the locations of where collection and separation of trash can occur.
- Identify what data can, has been, or will be collected during other efforts/projects: master planning, Part 150 studies, business/strategic plans, NEPA documentation, etc.



Development of a baseline assessment will be used to create goals and objectives that make up the backbone of the sustainability plan. The focus areas of a baseline assessment should be derived from the information obtained in Phase I: Setting the Stage. Based on information gathered in Phase I, the steps for developing a sustainability plan will vary depending on the individual conditions of an airport. Specifically, there will be major differences in sustainability planning between commercial service and general aviation airports (note: to the extent feasible, categories for completing a baseline assessment have been provided for commercial service and general aviation airports).

Another important recommendation is to ensure that the appropriate airport staff and consultants are continually communicating and developing a checklist or action plan to ensure the correct data is collected in a timely manner. In some cases, local experts (on-call planning and/or engineering firms) may be of great value to assist in the collection of data.

It is suggested that all airports begin their baseline assessment by defining their overall approach to their project. For example, Tampa International Airport chose to separate its baseline assessment into “people, planet, and prosperity.” In its plan it is stated:

Establishing current and future business-as-usual performance provides an understanding of the airport's performance today with respect to sustainability priorities and provides an indication of how the airport may perform in the future.

This broad overview indicates the overall intent of the baseline assessment and provides justification for completing the remainder of the plan. Similarly, as part of its Sustainability Management Plan (SMP), Salt Lake City International Airport (SLC) stated:

The Salt Lake City Department of Airports (SLCDA) has committed to a long-term, comprehensive, and integrated approach to sustainability that considers economic viability, operational efficiency, natural resource conservation, and social responsibility (EONS). The focus areas of the baseline assessment were selected by the SLCDA Project Management Team because of their relevance to SLC's and the City's sustainability priorities and consistency with past sustainability evaluation efforts.

This clearly states the overall focus areas that its SMP will concentrate on, as well as how the categories were selected. Having this supporting documentation included as part of the baseline assessment will ultimately help support the development of the plan.

The overall approach that is selected to complete the baseline assessment will differ for each airport; however, a set of overall categories in which to conduct a baseline assessment will be similar for all airports.

To accommodate the differing needs of all airports, this section provides identifiers and specific information to help airports of all sizes conduct a baseline assessment that is most beneficial to their airport. To accomplish

this, it is recommended that the airport structure data collection in four separate categories or groups:

- Economy
- Operations
- Community
- Environment

Using these categories will help airports of all sizes organize the baseline assessment and determine areas in which they are deficient. Airports should utilize all available and relevant tools in the baseline assessment of developing a sustainability plan. For each of the previously stated categories, information will be collected to assist the airport organization in determining in what area they are deficient. **Table 11** provides an example taken from the baseline assessment

As part of the development of this Guidebook, a stakeholder interview was completed with the Florida Department of Environmental Protection (FDEP). To assist with the data collection effort associated with the baseline assessment, FDEP provide a large library of geographic information system (GIS) interactive maps that can be used. These can be found at: www.dep.state.fl.us/gis/.



For more information on the interview with FDEP, please refer to **Appendix 3**.

spreadsheet that is provided as a separate Excel document, available from FDOT. This sample will be referenced throughout this section to assist users throughout the process of filling in the prescribed sections.

Table 11: Sample Baseline Assessment Collections Form

Measurement	Units	Baseline Year	Deficient	Target
		2015	Y/N	20XX
Airport Statistics				
Total Revenue	\$			
Annual Operations	Number			
Average Seats per Flight	Number			
Annual Passengers	Number			

The remainder of this section was developed to help airports select and understand the components of their airport that require a baseline assessment. To remain consistent with existing industry documentation, ACRP Report 19A: Resource Guide to Airport Performance Indicators will be utilized for the baseline assessment. This report was developed to “provide depth and detail on airport performance indicators (APIs) for use in benchmarking and performance measurement.”

The comprehensive listing of metrics provides detailed information on categories that should be considered for measurement as well as how to measure their performance. Performance measures are provided for nearly all functional areas at an airport and this Guidebook correlates the measures to the four-focus area of economy, operations, community, and environment.

ECONOMY



The first initiative of the baseline assessment involves quantifying the airport's economic situation. Analyzing components such as current and potential funding opportunities can help an airport to better analyze the concepts in **Table 12**. Outlining airport revenues (federal/state funding, aeronautical and non-aeronautical revenue, etc.) and how they can be utilized is a major component of the economic assessment.

Table 12: Funding Questions

Funding Questions
What are our current revenue/funding sources?
How much do we receive in revenue/funding from each source?
What are additional revenue/funding opportunities?

Airports are also advised to analyze revenue and costs based on peak hour, day, and season to obtain a better understanding of financial “hot spots.” Other economic factors such as asset management, passengers, and leases should be examined in this portion of the baseline assessment. By obtaining an overall understanding of the airport’s economic situation, an airport can infer which financial initiatives will benefit from applying sustainability practices.

Table 13 provides an example of economic baseline assessment measures that are included in the full spreadsheet provided in a separate Excel document, available from FDOT. This format should be utilized in performing the baseline assessment.

Table 13: Example Economic Checklist

Measurement	Units	Baseline Year	Deficient	Target
		2015	Y/N	20XX
Revenues and Costs				
Non-Aeronautical Operating Revenue as % of Total Operating Revenue	Total non-aeronautical operating revenue as a percentage of total operating revenue			
Fuel Sales Net Profit/Loss or Fuel Flowage Fees	Airport's net profit or loss from the sale of aviation fuel plus gallonage fees for fuel sold and dispensed on airport property. Also includes the fees the airport charges to aircraft owners, operators, and fuel providers, such as the fuel flowage fees charged to FBOs for fueling aircraft on airport property			
Airport Cost per Enplanement	Airport total costs per enplanement (operating cost plus non-operating cost divided by enplanements)			

Note: These measures were taken from ACRP Report 19A: Resource Guide to Airport Performance Indicators.



OPERATIONS

For the purpose of this Guidebook, day-to-day airport operations and maintenance (O&M) is defined as “those functions and activities performed by facility O&M staff that routinely keep the facilities operating and in good condition, such as maintaining buildings, grounds, utilities, pavement, and equipment; operating public spaces such as terminal roadways/curbs, passenger terminal lobbies, and bag claim areas; and operating non-public secured areas such as baggage handling areas, aircraft aprons, taxiways, runways, and landscapes included within airport perimeter fencing.”¹⁰

Airport O&M departments are asked to support and maintain new systems, practices, or pieces of equipment as a result of integrating sustainability practices. However, they do not always have an opportunity to evaluate or raise concerns associated with the required support or maintenance prior to implementation. It is important for airports to assess the full lifecycle operational implications of various sustainability practices, as some may require more operational oversight, maintenance effort, and upkeep than originally anticipated. Therefore, it is also important for an airport to perform a baseline assessment of its operations and maintenance to gain an understanding of the airport's overall performance. Based on unique conditions at the airport, the sponsor must determine which indicators require a baseline assessment to be completed. **Table 14** provides an example of O&M baseline assessment measures that are included in the full spreadsheet provided in a separate document, available from FDOT. This format should be utilized in performing the baseline assessment.

Table 14: Example Operations Checklist

Measurement	Units	Baseline Year	Deficient	Target
		2015	Y/N	20XX
Activity				
Runway/Taxiway Maintenance Cost	Total annual cost of maintaining runways and taxiways.			
Airport Vehicles – Average Age	Average age of airport vehicles, typically by type of vehicle			
Runway Practical Hourly Capacity (PHOCAP)	Average number of operations that can be performed in one hour on a runway with an average delay per operation of four minutes			

Note: These measures were taken from ACRP Report 19A: Resource Guide to Airport Performance Indicators.

¹⁰ ACRP Report 110 – Evaluating Impacts of Sustainability Practices on Airport Operations and Maintenance



COMMUNITY

Many identify positively with airports, understanding that they serve as the gateways that connect us to our families, the facilities from which we begin our vacations, or launching points to new and exciting experiences. Still others associate airports with negatives. For this reason, airports should actively strive to align with the community in all sustainability initiatives. By analyzing past community meetings, public workshops, and small group meetings, the airport can better understand what needs to be improved in further outreach practices. Records of past public outreach can also provide useful insight to public concern (although airports should already have knowledge of those concerns) and set the stage for sustainability initiatives that need to be implemented to mitigate those concerns.

In addition to community outreach, the community baseline assessment should include past and potential noise studies.

Noise issues are of continued importance in airport management and should be actively pursued and analyzed. In relation to noise, but not exclusive, land use compatibility techniques should be considered in the baseline assessment. Past and future land use compatibility processes undertaken by the airport should be fully considered in the development of the community baselines assessment. As airports fully understand, the community component of a sustainability program is very important to the overall sustainability plan.

Table 15 provides an example of community-related baseline assessment measures that are included in the full spreadsheet provided in a separate Excel document, available from FDOT. This format should be utilized in performing the baseline assessment.

Airport noise serves as an example of a measurement that can apply to multiple focus areas of sustainability. While noise is a concern for airports and their surrounding communities, making "social responsibility" a logical focus, noise is also an environmental consideration.



For some measurements, such as noise, consideration to all relevant focus areas should be given with particular attention to what the primary and secondary focus areas are at a specific airport. Noise might be a major social issue at one airport while at another, the environmental impacts of noise might be the primary concern.

Table 15: Example Community Checklist

Measurement	Units	Baseline Year	Deficient	Target
		2015	Y/N	20XX
Noise				
Number of Homes Within DNL dBA 65	Number of homes subjected to noise resulting from aviation activities of 65 dBA DNL or above			
Night Operations - % Using Preferential Runways	Percent of time preferential runways are used during night operations			
Customer/Passenger				
Airport Cleanliness	Measures passenger perception of airport cleanliness - Airport survey records or results of participating in industry surveys such as ACI-ASQ.			

Note: These measures were taken from ACRP Report 19A: Resource Guide to Airport Performance Indicators.

ENVIRONMENT



Based on an airport's goals, the environment may be one of the primary concerns as it relates to sustainability.

Airports should begin by recognizing and

outlining all areas of environmental resources to be considered as they pertain to the airport. Generally, these include categories such as emissions, land use, noise, **energy/water consumption**, fuel usage, and waste disposal, among others. Based on conditions at an airport, the sponsor must determine which

indicators require a baseline assessment to be completed. **Table 16** provides an example of environmental baseline assessment measures that are included in the full spreadsheet provided in a separate Excel document, available from FDOT. This format should be utilized in performing the baseline assessment.

For each area, the airport should compose an analysis of:

- Current conditions
- Potential environmental resources to be considered
- What has been/is being done
- What could be improved

By isolating each area of environmental considerations relating to an airport, the project team can more easily determine which areas could benefit the most from implementing sustainable practices. Data collection should take time and be thorough in order to not overlook areas of needed environmental consideration. **Many tools are available to airports to use for environmental assessment** such as the ACRP Tool 178: Airport Terminal Building Energy Use Intensity (ATB-EUI) Benchmarking Tool.

Airport Terminal Building Energy Use Intensity (ATB-EUI) Benchmarking Tool



Utilization of this tool provides airports with energy usage separated by buildings/stations and grouped by airport size and climates. After inputting data via the "input form", an airport can compare its energy use intensity to an average calculated between ten airports who originally participated in the program.

As part of the development of this Guidebook, a stakeholder interview was completed with the FDOT Office of Policy Planning (OPP). To assist with the data collection effort associated with the environmental baseline assessment, OPP developed the Sea Level Scenario Sketch Planning Tool (A planning tool for preliminary assessment of vulnerable transportation infrastructure due to sea level change). This tool can be accessed at: <http://sls.geoplan.ufl.edu/#intro>



Table 16: Example Environmental Checklist

Measurement	Units	Baseline Year	Deficient	Target
		2015	Y/N	20XX
Energy				
Airfield Electricity Consumption – Change over Prior Period	Increase or decrease in annual kWh for the airfield			
Renewable Energy Generated by the Airport	Amount of renewable energy generated by the airport, as a percentage of total energy consumed by the airport			
Waste				
Percentage of total tons of solid waste that is recycled/composted	Percent of annual tons			

Note: These measures were taken from ACRP Report 19A: Resource Guide to Airport Performance Indicators.

CONCLUSION

Once a baseline assessment has been conducted for each of the previously identified sections, the airport should select the categories and corresponding components that they identify to be most appropriate for implementation. Selecting components for implementation will require the airport to utilize information determined as part of Phase I, including identifying areas that are most important to and valued by the airport and its surrounding community. This is important because the baseline measurements that are selected must be tailored to the individual airport/community.

For example, some municipalities may value their airport for being as “green” as possible and will want to select baseline measurements that focus on reducing greenhouse gas emissions and promoting sustainable infrastructure. Other airports may value initiatives that reduce costs or enhance the customer experience. Each airport will need to identify what is important to them and their stakeholders.

The baseline assessment is a key step in the sustainability planning process. Further steps in the sustainability plan will build on top of the baseline assessment; therefore, airports are strongly recommended to thoroughly consider and research each category of the baseline assessment.

As part of the development of this Guidebook, a case study was done with Albert Whitted Airport on “How St. Petersburg’s Albert Whitted Airport is accommodating the City’s new Executive Order on Sustainability.” Below are the key findings of that case study:



- Airport staff and their consultants should involve appropriate city departments early in the planning process to review relevant plans, community input, codes, and other factors that may affect design, scope, and budget. This is especially important for urban and waterfront airports where the facility is closely connected to other dynamic developments and communities.
- Airport staff should assess the level of effort for city and airport personnel, as well as consultants, during scope, schedule, and fee development to consider sustainable development and consistency with other city policies/plans. All parties will have varying levels of work depending on roles and responsibilities. For example, city staff do not usually have the capacity to design and certify projects depending on workload, but can review scopes, coordinate key staff and experts, participate in design meetings, and offer lessons learned from other city activities or examples.
- If Leadership in Energy and Environmental Design (LEED) or other “green” certification is being sought, contractors need to have qualifications and provide competitive bids. In addition, the project needs to be scoped appropriately for certification requirements which will include documentation for the contractor and subcontractors for certification.
- Using the sustainability approach should result in lifecycle costs savings and/or other benefits important to the role of federal, state, and local government.

Phase II Checklist

☐

Assessment of Economic Viability

☐

Assessment of Operational Efficiency

☐

Assessment of Natural Resource Conservation

☐

Assessment of Social Responsibility



Has your airport completed the baseline assessment?

Have you worked with all relevant airport departments,
city/county divisions, and local stakeholders?

PHASE III: PLAN DEVELOPMENT

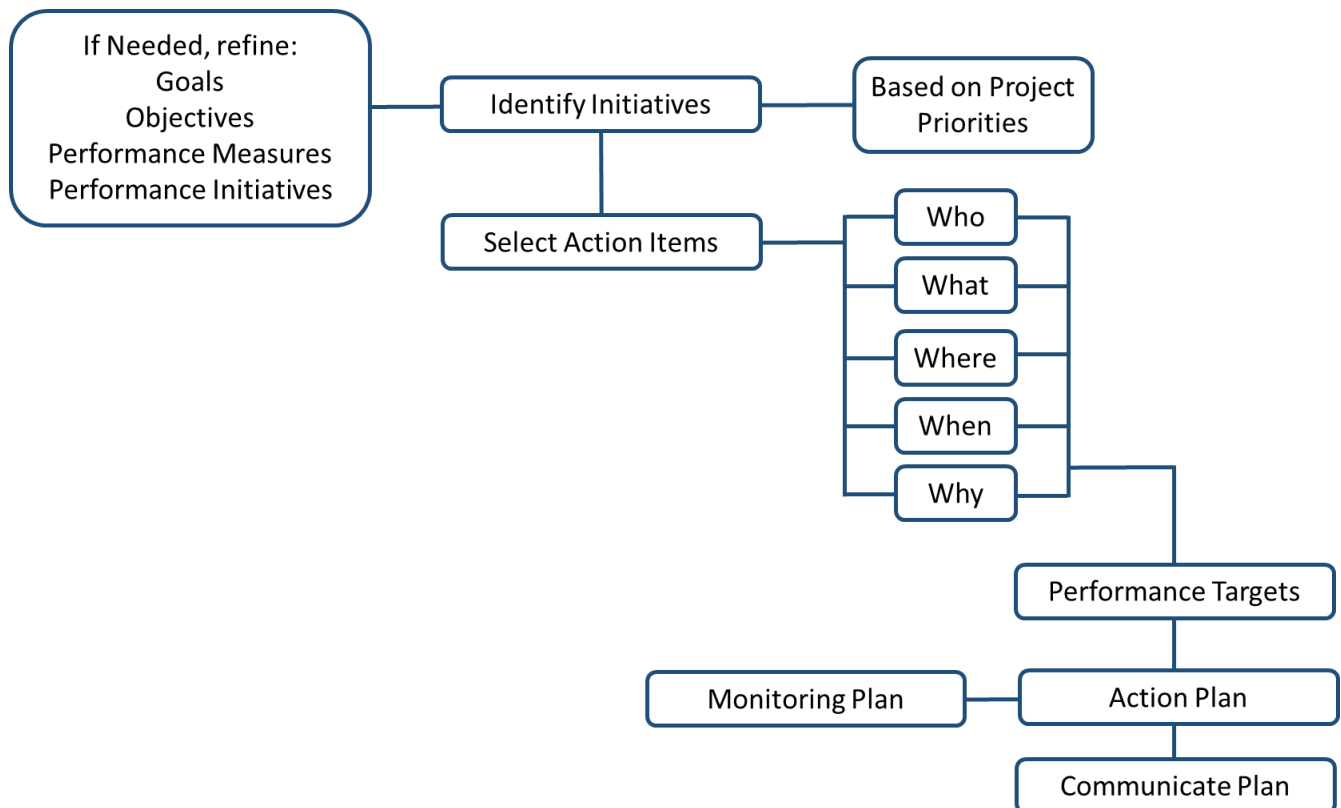
Step 3 Plan/Program Development

The development of the sustainability plan is the phase of the project where all preliminary efforts and developments, such as identifying goals and performing a baseline assessment, come together to mold the future of the airport's sustainability. **Figure 12** displays the organizational structure of Phase III. The components of this phase include:

- Identify Initiatives
- If necessary, refine goals, objectives, performance measures, and performance initiatives
- Select action items (who, what, when, where, why, how)
- Set performance targets
- Develop an action plan and a monitoring plan
- Complete the plan/program

As the program develops in this phase, it is important that airports continuously seek engagement from the stakeholders. This engagement should include re-visitation of the airport's goals and objectives to ensure they are still current and continue to adequately reflect the aggregate priorities of the airport and stakeholders.

Figure 12: Phase III: Plan/Program Development Organizational Structure



INITIATIVES

Building on the previous steps of conducting a baseline assessment, developing specific goals, and outlining a vision-based mission statement, it is now time to select sustainability initiatives to implement at the airport. This is an extremely important step since the airport gets to decide which sustainability practices will best benefit it.

CONSIDERATIONS

When selecting sustainability initiatives to implement, the airport should take several factors into account. The airport should strive to select initiatives that will provide the best cost-benefit, help achieve outlined goals, appeal to the local community, and overall benefit the airport as a whole. The steps in the planning process leading up to this point should all be referenced and considered in the decision-making process of this step. Input from stakeholders, staff, and the local community should all be taken into account when considering sustainability initiatives.

INITIATIVE SELECTION

The sustainability initiative selection process should be broken into four steps:

1. Identify – involves collaboration with airport staff, stakeholders, and the public during early visioning workshops
2. Review – the airport reviews previously identified initiatives, consolidates similar actions, and adds new initiatives based on experience at other airports and in other industries
3. Screen – staff and the project team review and screen the initiatives to identify those initiatives that are not feasible.
4. Evaluate - the initiatives are evaluated qualitatively against criteria representative of the airport's goals, and final initiatives are identified for implementation

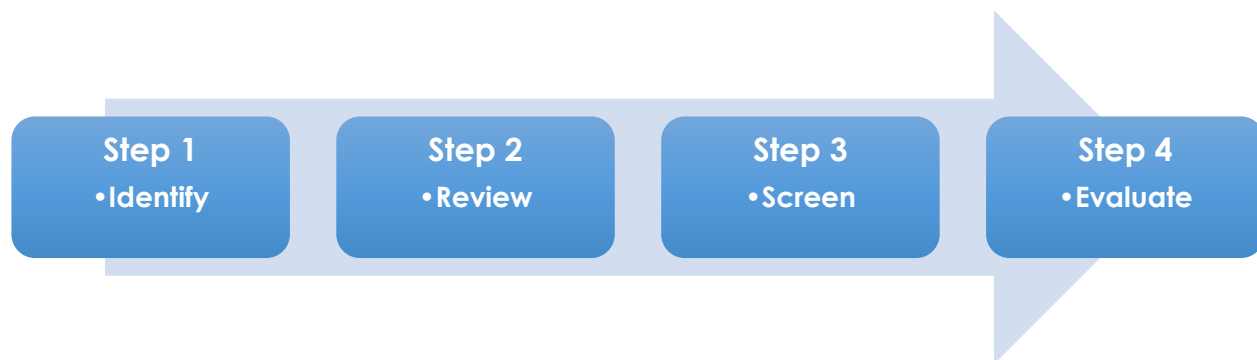
Throughout the steps of the process of selecting the most appropriate initiatives, the airport should gradually weed out initiatives. **Figure 13** shows the steps of the initiative selection process. Selecting which initiatives are most beneficial will vary based on airport size, type, function, and characteristics. All airports will identify different initiatives according to their respective identified needs and goals.

Best Practices for Initiative Selection



- Identify initiatives appropriate to your airport. For example, an airport may need to account for limited financial and human resources.
- Focus initially on initiatives that achieve the objectives with low implementation costs.
- Small airports may consider focusing strategies on economic development that minimize impacts and on strategies with little or no cost to implement and maintain.
- Plan for initiatives that can be incorporated as the airport expands.
- Ensure thorough communication between the airport's upper management, airport staff, consultants, and any related city/county departments to approve and review initiatives before the screening process.
- Incorporate existing and ongoing initiatives into any tools, data collection, documentation, etc.
- Understand how utilities, waste, and water are monitored, collected, and utilized. This will help identify opportunities to increase efficiencies and track performance improvements.
- Utilize sources such as the Sustainable Aviation Guidance Alliance or the Airport Cooperative Research Program to assist in the identification of sustainability initiatives.

Figure 13: Initiative Selection Process



Tampa International Airport remarks on its initiative selection process:

As a first step in the initiative identification and evaluation process, over 425 initiatives were identified. Through the review, the list was distilled to 168 initiatives. In a third screening step, staff reduced the draft list to just over 100 initiatives. In the final step, 36 top-ranking initiatives were identified for implementation.

There are numerous tools available to airports to aid in the sustainability initiative selection process. **One of the many applicable initiative selection tools is the Airport Sustainability Assessment Tool (ASAT) from ACRP Report 80: Guidebook for Incorporating Sustainability into Traditional Airport Projects. This tool along with others available could be utilized in the initiative selection process.**

Airport Sustainability Assessment Tool

The ASAT allows users to evaluate which sustainability practices would be most applicable based on the conditions at their airport and includes a comprehensive list of suggestions for incorporating sustainable initiatives into traditional airport projects. ASAT is available as a CD Rom or Excel file download. The program is extremely specific and user friendly. Using the ASAT, airport managers and other decision-makers can:



- 1) Identify sustainable design concepts and technologies that can be considered for implementation in unique operating environments
- 2) Provide information about sustainable design concepts and technologies that are already under consideration by other airport managers and decision-makers.

Please see **Appendix 7** for further information and identification of existing tools.

As part of the development of this Guidebook, a stakeholder interview was completed with the Florida Department of Agriculture and Consumer Services (DACS). To assist with selecting sustainability initiatives, DACS provided a number of programs to help fund and implement initiatives. These can be found at: www.freshfromflorida.com/#Energy/.



Additional resources identified by DACS include:

Energy Audits: Energy saving companies will come in and perform an audit on energy usage and offer guaranteed savings on their services.

www.dms.myflorida.com/business_operations/state_purchasing/vendor_information/state_contracts_and_agreements/state_term_contracts/energy_savings

Energy Database: Database of energy efficiency and renewable energy incentives
www.dsireusa.org

Energy Efficiency Programs: Energy efficiency programs provided by the US Department of Energy

<http://energy.gov/eere/better-buildings>

Rural Energy for America Program (REAP): Finances energy efficiency improvements for rural areas (all rural areas other than cities of greater than 50,000 population and their adjacent urbanized areas)

www.rd.usda.gov/fl

To aid airports in identifying beneficial sustainability initiatives, a sustainability initiative organizer is provided by SAGA at: <http://www.airportsustainability.org/sustainable-practices>. This source provides a compilation of initiatives that are sorted based on the following categories:

- Economic viability (capital cost, O&M cost, payback period)
- Operational efficiency (staffing requirements, reportability of metrics, maturity of practice)
- Natural resources (energy reduction, environmental benefits)
- Socioeconomic responsibility (social benefits)

It is strongly recommended that airports utilize the initiative organizer in selecting applicable sustainability initiatives that will aid in accomplishing goals, objectives, and action steps identified in early phases of the sustainability plan.

Table 17 should be utilized again at this step in the sustainability planning process. Initiatives should be selected based on their suitability and potential to meet the previously stated airport goals, objectives, and targets. Using **Table 17** to organize chosen initiatives to show exactly where they fit in with the airport's objectives is a beneficial and crucial step in developing the sustainability plan. It is important to note that multiple initiatives can apply to one row of selected goals, objectives, and action steps. This table can be accessed in a separate document, available from FDOT.

Initiatives

As airports select initiatives determined suitable to apply to a sustainability plan, it is suggested to complete **Table 17** by sorting the initiatives into their respective rows according to the goals, objectives, and action steps.



Table 17: Sustainability Tracker

Resource Category	Goals	Objectives	Metrics	Current Level	Target	Initiatives	Action Steps
Energy (Environment)	Reduce the total energy use and demand of the airport and increase renewable energy generation on airport property	Complete energy efficiency projects to reduce energy use in airport facilities	Total Electricity use per Passenger (MMBTu/passenger)	0.16/Passenger	Reduce overall energy consumption by 25% by 2020	Select a power-down or "sleep mode" feature on the computer central processing unit and monitor	
	Leverage people (energy users) to promote energy efficiency	Host internal staff meetings to educate and discuss energy efficiency Increase customer education of energy waste to promote energy conscious mindset	Customer knowledge of energy waste on 1-10 scale based on brief survey of five customers	Average = 4	Increase average customer knowledge of energy waste to 8 by the end of the year	Post posters and handout brochures related to specific areas of frequent energy waste	

CONCLUSION

There are many tools available to help airports select sustainability initiatives, such as ASAT and the SAGA database and its associated tools, which can be very useful to airports undergoing this process. It is important for the project team to collaborate with stakeholders, staff, and the local community during this task to cover all areas of input.

Once the initiatives have been selected and sorted, it is recommended that the project team revisits the airport and stakeholder goals, objectives, and performance measures to ensure compliance and achievement. At this point in the process, the project team should also give the airport and stakeholders an opportunity to reconsider and change certain goals and objectives to communicate as the newly identified direction the airport plans on taking with the sustainability project. Although it is recommended to remain consistent with the goals and objectives set at the beginning of this process to the extent possible, revisiting and altering the goals and objectives can provide a clearer understanding of the airport's intended future and ultimately result in a more beneficial sustainability plan for the airport.

DEVELOPING AN ACTION PLAN

It is vital to develop action targets that an airport deems important based on the previously chosen initiatives. The action steps will serve as the backbone to the plan, outlining what the airport plans to implement based on chosen sustainability initiatives.

An action plan lays out the incremental steps needed to achieve an airport's goals and objectives. Following the creation of goals and objectives and the selection of relevant initiatives, the project team can begin to develop an action plan with action items that will lead to the ultimate achievement of those chosen sustainability initiatives. Ideally, an action plan should answer the four questions identified in

Table 18.

How Will We Implement Our Chosen Initiatives?

Developing an action plan is a preliminary step in the process of implementing chosen sustainability initiatives. Before implementing initiatives, it is vital for airports to identify and coordinate:

- What needs to be done?
- Who needs to do it?
- When it needs to be done?
- What is needed to do it?



Table 18: Action Plan Questions

Action Plan Questions
What action(s) are necessary for an objective to be accomplished?
Who on the project team or identified outside resource will be responsible for specific objectives?
When (timeframe) does the objective need to be achieved?
What resources are needed for the objective to be achieved?

Answering these questions is important so that the project team has a clear understanding of all of the required elements of the action plan and what is required to implement the actions. To make the action plan more useful, the components should be developed as realistically as possible. GOAA developed a matrix, seen in **Table 19**, to answer the questions listed above relating to its performance targets. This matrix also provides some action steps GOAA identified from the goals it set. Each airport will need to develop an action plan that is appropriate for their specific needs. A sample action step matrix, similar to the matrix seen in **Table 19**, can be found in a separate Excel document, available from FDOT.

Table 19: GOAA Action Step Matrix

Action Steps (How will you get to where you want to be?)	Responsibility (Who will make it happen?)	Timeframe (When will it happen?)
Benchmark current waste diversion rates	Airline Operations Environmental Solutions Group	2013
Meet with the airport's stakeholders	Environmental Solutions Group	2013
Develop a waste management plan with attainable goals	Environmental Solutions Group Airline Operations	2013-2018
Perform and report waste audit reports (annual review)	Airline Operations Environmental Solutions Group	2013-2018
Work with food court vendors to divert food waste from landfills and increase recycling in food courts	Concessions Environmental Solutions Group	2013-2018
Expand recycling efforts to surface parking areas, garages and cell phone lots	Airline Operations Environmental Solutions Group Airport Operations Parking Division	2013-2018
Provide ongoing diversion rate reporting	Environmental Solutions Group	2013-2018
Increase education and participation in public awareness	Environmental Solutions Group	2013-2018

Source: Greater Orlando Aviation Authority Sustainability Management Plan

When developing an action plan, some objectives may need to be addressed independently of others, while some may be dependent on or build upon other components. An action plan must identify which projects, action items, or objectives are dependent versus independent. An example of a dependent project could be a taxiway leading to a hangar facility while an independent project could be a newly developed facility site.

Table 20, seen below, should be incorporated again at this step of the sustainability planning process for airports to organize action steps or targets into applicable resource categories, goals, and objectives. The full document containing **Table 20** can be found in a separate Excel document, available from FDOT. At this time in the sustainability plan, airports should have identified valued resource categories, goals, objectives, and metrics to build upon in identifying targets to enter into the table.

Action Steps

Action Steps bring specificity to Table 19 upon entering them into the correct row. It is important to ensure targets are being entered into the correct row of the corresponding objective. Filling in the action steps row with aspects from a developed action plan will aid the airport in staying organized and coherent.



Table 20: Sustainability Tracker

Resource Category	Goals	Objectives	Metrics	Current Level	Target	Initiatives	Action Steps
Energy (Environment)	Reduce the total energy use and demand of the airport and increase renewable energy generation on airport property	Complete energy efficiency projects to reduce energy use in airport facilities	Total Electricity use per Passenger (MMBTu/passenger)	0.16/ Passenger	Reduce overall energy consumption by 25% by 2020	Select a power-down or "sleep mode" feature on the computer central processing unit and monitor	Who: Office Staff When: Immediately Resources Needed: None
	Leverage people (energy users) to promote energy efficiency	Host internal staff meetings to educate and discuss energy efficiency Increase customer education of energy waste to promote energy conscious mindset	Customer knowledge of energy waste on 1-10 scale based on brief survey of five customers	Average = 4	Increase average customer knowledge of energy waste to 8 by the end of the year	Post posters and handout brochures related to specific areas of frequent energy waste	Who: Office Staff When: Throughout the next 2 months Resources Needed: Poster paper; Brochure paper; Glue/Tape

CONCLUSION

The action plan component of an airport's sustainability plan should be based on realistic and financially feasible goals. The development of action steps incorporated into an action plan that answers the four questions listed above will provide a launching pad for implementing sustainability initiatives that will address the specific goals of the airport. As always, the airport should consult with stakeholders, staff, and the local community in creating goals and action steps for the sustainability plan. Having identified action steps through the development of an action plan will allow for more effective and coherent selection of initiatives in later sections of the sustainability management plan.

Additionally, it is important that the action steps are effectively communicated to those who are expected to implement them. This is different from performance monitoring and tracking in that this measures the progress of the actual implementation whereas performance monitoring measures the effects of each initiative. It is also important to develop a mechanism that those responsible for implementing action steps can utilize to report efforts, share ideas, or request assistance from the sustainability team.

MONITORING PLAN

Based on chosen initiatives and the developed action plan, the project team should now consider options for sustainability monitoring. As the project is implemented at the airport, the benefits of the sustainability initiatives generally develop rapidly. To ensure the airport and project team are able to monitor and track the progress successfully, the project team should decide on the methodology and frequency to track specific initiatives before implementing them.

Depending on the initiatives the airport plans to implement, monitoring can be done in many ways. A common method of tracking is done through the use of airport-developed matrices. A customized matrix can provide airports with a method for tracking the progress of sustainability initiatives in a format that best suits the airport. To develop a sustainability tracking matrix, the airport must identify and answer the following questions:

- **What aspect of the airport will be affected by the initiative?**
- How can the effect of the initiative be quantified?
- What is the current status of the aspect?

For example, if an airport has chosen the initiative of implementing LED taxiway edge lighting to decrease the airport's electricity costs, the airport could answer these questions with:

- Monthly airfield electricity bill
- U.S. dollars
- \$1,200 a month

This same scenario could be looked at from a different perspective and answered as follows:

- Monthly electrical consumption for the taxiway's circuit
- Kwh
- 20,000 Kwh a month

This simple example provides the airport with the information needed to develop a matrix for tracking the future progress of the sustainability initiative. The airport will be able to enter in monthly electricity bill information and compare it to the previous month to determine the affect the sustainability initiative is having. More information about matrix selection and development is provided in upcoming sections of this Guidebook.

It is important to look at an initiative from multiple perspectives as was done with this example. Airfield electrical use can be looked at from an economic perspective as in the first method, from an energy use perspective as in the second, or both. That all depends on an individual airport's focus and goals.



This provides a great example of how one initiative can impact multiple focus areas. Even though this airport might be focusing their sustainability program to impact economic viability, they are still going to realize benefits across all four focus areas.

As part of the development of this Guidebook, a case study was done with the Miami-Dade Aviation Department (MDAD) on "How MDAD manages reporting challenges and fosters a sustainability mindset throughout the organization." Below are the key findings of that case study:



- Tracking sustainability performance can be a challenge because of the resources that are required to ensure complete and accurate reporting.
- Formal processes like an Environmental Management System (EMS) and International Organization of Standardization (ISO) Certification can be used to formalize environmental stewardship practices, identify responsible parties, and track environmental progress.
- Airports need to include all organizational levels when working to implement environmental stewardship and sustainability initiatives. Particular attention should be paid to appropriate training of "front line" workers that implement most initiatives and strategies. Two-way communication channels should also be fostered to allow for identification of potential strategies/initiatives from all organizational levels.
- Sustainability strategies/initiatives can be difficult to implement at smaller airports within a system because of fewer resources at the general aviation and reliever airport facilities.

For each chosen sustainability initiative, the project team should determine how the airport will monitor it before implementing it. This process is vital to ensure accurate identification of sustainability progress and positive communication of results. Although matrices are useful for this aspect of sustainability planning, the project team may feel other methods of monitoring will be more beneficial to their respective airports.

COST-BENEFIT ANALYSIS (CBA)

After identifying sustainability initiatives perceived to be beneficial to the airport, a cost/benefit analysis should be completed for the initiatives to determine the economic feasibility of implementing said initiatives. For example, an airport may choose to convert all taxiway edge lighting to LED light fixtures to reduce energy usage and their annual electricity costs. Before moving forward with the project, the airport should perform a cost-benefit analysis (CBA) to determine the economic benefit of the project based on cost and the life cycle of the equipment. In this scenario, it is recommended that the airport use the cost-benefit equation to accurately calculate the monetary value of the chosen sustainability project. It is important to note that sustainability initiative cost/benefit may not be measured in the same manner as other initiatives.

THE CBA

A CBA is a systematic process for calculating and comparing benefits and costs of a project or decision. A CBA helps predict whether the benefits of a project or decision outweigh its costs, and by how much relative to other alternatives. A CBA serves two purposes:

1. To determine if the project or decision is a sound investment or decision
2. To provide a basis for comparing projects or decisions, it involves comparing the total expected cost of each option against the total expected benefits, to see whether the benefits outweigh the costs, and by how much.

Following a cost-benefit outline will provide cost and benefit information that can be used to analyze and evaluate alternative approaches to projects or decisions. A sample template of a cost-benefit outline, adapted from the University of Pennsylvania, goes as follows:

- A. Executive Summary
 - a. Recommendation
 - b. Supporting reasons
- B. General Information
 - a. Purpose
 - b. Overview
- C. Description of Alternatives Considered
- D. Costs
 - a. Development costs
 - b. Operational costs
 - c. Non-recurring costs such as capital investment costs
 - d. Recurring costs such as leases, utilities, and other overhead

E. Benefits

- a. Cost reductions such as value enhancement
- b. Recurring benefits, such as lower overhead
- c. Labor costs reductions

F. Comparative Cost/Benefit Summary

- a. Cost of each alternative over its estimated lifetime
- b. Expected benefits of each alternative over its estimated lifetime
- c. Comparison of the two
- d. Recommendation based on the comparison
- e. Additional reasons for the recommendation, if any

This outline provides a well-structured template for airports to follow when performing a CBA. *ACRP Synthesis 13: Effective Practices for Preparing Airport Improvement Program Benefit-Cost Analysis*, *ACRP Web-Only Document 22: Passenger Value of Time, Benefit-Cost Analysis and Airport Capital Investment Decisions*, and the *FAA's Airport Benefit-Cost Analysis Guidance* can also serve as helpful resources.

COST-BENEFIT EQUATION

The cost/benefit equation uses four simple variables to calculate the financial benefit of performing a sustainability initiative:

- a. Current annual cost
- b. Implementation cost
- c. Future annual cost
- d. Annual cost difference

This information can be obtained by a number of sources depending on the chosen sustainability project. In the example above pertaining to the airport installing LED light fixtures, the airport would assess the current annual electricity cost, the cost of purchasing and installing LED light fixtures, and the anticipated future annual electricity cost (can be derived from the manufacturer).

Once the above variables are defined, they can be plugged into the following equation:

$$\begin{aligned} \text{Current Annual Cost} - \text{Future Annual Cost} &= \text{Annual Cost Difference} \\ \text{Implementation Cost} \div \text{Annual Cost Difference} &= \text{Years until Monetary Benefit} \end{aligned}$$

Source: Kimley-Horn and Associates, Inc.

CONCLUSION

Utilizing the above equation can accurately inform an airport of the time it will take to make back the total implementation costs of the sustainability project. After the implementation costs have been made back, the airport will begin saving money due to the implementation of the sustainability project. This method is only applicable to certain projects. Some projects may not be capable of numerically measuring the benefit of the project or could provide benefits alternative to monetary value (e.g., social return on investment, increased customer satisfaction, decreased noise complaints, etc.). It is strongly recommended that airports partake in some type of cost/benefit analysis before implementing sustainability practices to ensure motivation to implement the selected initiative.

COMPLETE THE PLAN

The project team can now begin the process of finalizing and completing the sustainability plan to begin implementation. Although this section is “completing” the plan, it is important to understand that sustainability planning should never be “complete”. Sustainability should be an ongoing process that, once started at airports, should never finish.

The project team needs to complete several steps before implementing the newly-developed sustainability plan. First, the project team needs to obtain buy in from all entities involved with the airport. This includes the airport sponsor/board, stakeholders, and management. Through the analysis performed by the project team in this planning process, the sustainability plan should be easily accepted by any stakeholder group if well-developed. Although some entities may be hesitant based on the potential upfront costs of some sustainability initiatives, project teams should have already analyzed if that would be an issue for their respective airport and developed the plan and communication approach accordingly.

Simultaneous to obtaining acceptance for completion, the project team should also initiate airport-wide notification and education for all aspects of the sustainability plan. This effort can include flyers, pamphlets, internal workshops, public meetings, etc. It is important to educate the airport staff and community to obtain full support of upcoming sustainability initiatives. Communicating the sustainability plan is vital to its success and potential benefits.

In concert with staff education, it is recommended that the project team begin communicating roles and responsibilities to the appropriate staff. In earlier stages of the planning process, the project team should have identified resources and staff for potential utilization. It is important that staff members understand their specific roles as they pertain to the future sustainability project. Sustainability is an airport-wide effort. It requires that everyone is on-board and understands the teamwork required to make the efforts as successful and beneficial as possible. Obtaining buy in and ensuring all members understand their roles/responsibilities are vital to the airport's future in sustainability.

The Greater Orlando Aviation Authority (GOAA) has a Green Team responsible for coordinating daily sustainability initiatives and reporting sustainability efforts. As part of this effort, the Green Team developed a seasonal newsletter they call “The DIRT” to distribute information regarding sustainability efforts at both Orlando International Airport (MCO) and Executive Airport (ORL).



The DIRT highlights current sustainability efforts going on around GOAA, as well as recognizes those involved. The newsletter includes images of staff and customers working together to promote sustainability both at the airports and in the community.

To view the Winter Edition (January 2017) of The DIRT, please visit:
https://www.orlandoairports.net/site/uploads/The_Dirt_201701.pdf

Phase III Checklist

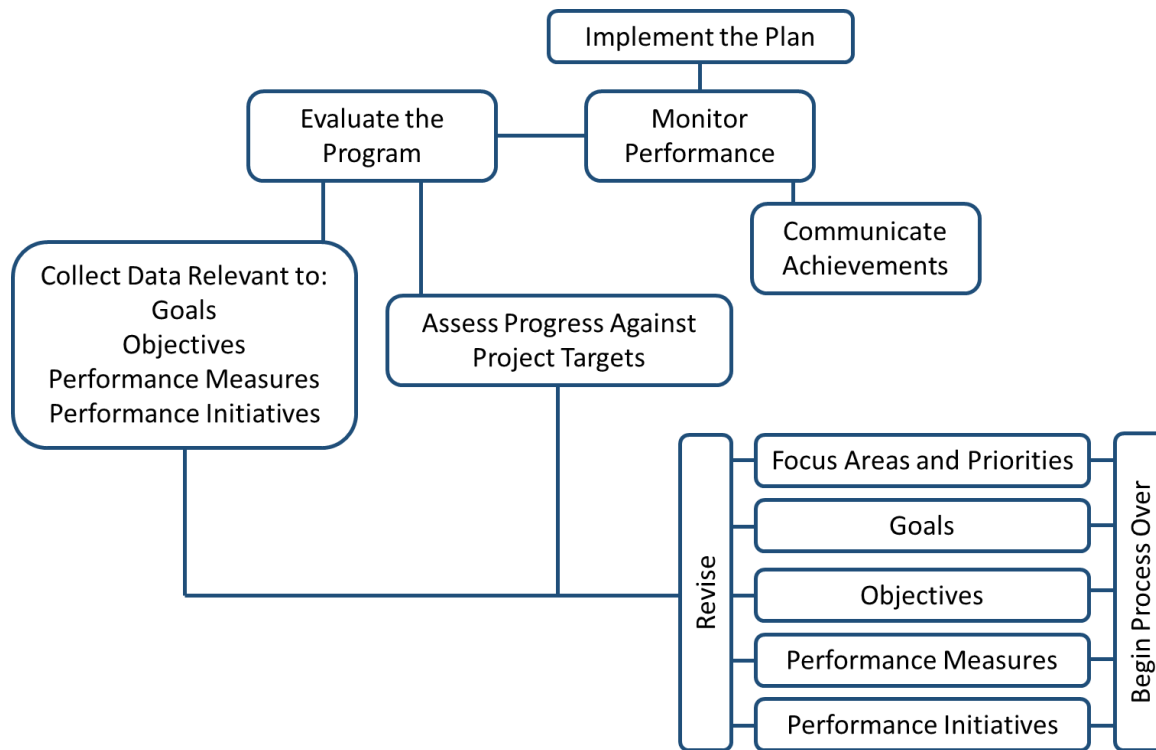
<input type="checkbox"/>	Identified and Selected Sustainability Initiatives
<input type="checkbox"/>	Developed an Action Plan
<input type="checkbox"/>	Developed a Monitoring Plan
<input type="checkbox"/>	Reconsidered Goals, Objectives, and Performance Measures
<input type="checkbox"/>	Performed a Cost-Benefit Analysis on Selected Initiatives
<input type="checkbox"/>	Obtained Airport Owner, Stakeholders, and Management Acceptance and Buy In
<input type="checkbox"/>	Begun Staff Education and Sustainability Training

PHASE IV: PERFORMANCE MONITORING

Performance monitoring is crucial to ensuring the sustainability plan is successful on a recurring basis. Developing a tracking system that fits for the airport can be crucial for future development of airport sustainability. Further, performance monitoring is useful for communicating the ongoing benefits of the sustainability initiatives both internally and externally. **Figure 14** displays the organizational structure of Phase IV.



Figure 14: Phase IV. Implementation and Monitoring Organizational Structure



As previously mentioned, it is highly recommended that airports **identify a monitoring effort** for each sustainability initiative before implementing it. In doing so, airports will have a defined way to track and gauge the progress of the initiative. Tracking efforts should be coordinated by the sustainability champion with the airport staff. At larger airports, the designated sustainability team should operate and perform sustainability tracking with the help of those identified in the implementation plan as being responsible for individual action items.

Best Practices for Performance Monitoring

- Identify what should be and can be monitored, and what the airport *wants* to monitor
- Identify who will monitor each initiative
- Develop a tracking system (matrix development) for each initiative
- OODA (Observe-Orient-Decide-Act) loop analysis
- Stop-Start-Continue
- Setting up a recurring check-in



IMPLEMENTATION

The next step of the sustainability plan is the actual implementation of the chosen initiatives. It is important for airports to have pre-determined timeframes for each initiative that they can strive to achieve. Meetings and workshops should be held for specific initiative-related airport staff at the beginning of each initiative to explain how the initiative will affect them and the role they will play. This is the exciting step of the process where airports get to implement sustainability initiatives and watch them in action. Selected initiatives should be evaluated and, if appropriate, added to the airport's CIP at the airport's discretion. Some sustainability projects may be eligible to be included in the CIP, therefore all initiatives should be evaluated.

DOCUMENTATION

Before beginning implementation of chosen sustainability initiatives, it is recommended that airports thoroughly outline the order in which initiatives will be implemented. Determining the order will be based on factors such as: financial feasibility, competing needs, local community input, stakeholder opinion, organizational readiness, airport goals and priorities, resource availability (such as financial, staff, and knowledge), and the airport action plan. All initiatives should be ordered and prioritized using the goals and objectives of the airport. This order can provide airports with a good list to publish and follow along throughout the implementation process.

Selecting a Champion

Before implementation of sustainability initiatives, an airport staff member should be designated as the sustainability champion. The champion will act as the head of the internal structure of sustainability and coordinate all sustainability efforts. Airports should select a person who understands and displays ambition towards sustainability initiatives. Larger airports should consider designating a sustainability team to assist in the day-to-day sustainability coordination efforts and support the champion. Additionally, developing co-champions in each division/department will help to promote airport-wide participation and education. Collectively, these champions and participating staff members will form the airport's sustainability team.



KEEP IN MIND

- Because some sustainability initiatives cost more than others, airports should wait to implement an initiative until it is financially feasible.
- Don't bite off more than you can chew. It is recommended that airports ease into sustainability initiatives rather than overload initiatives to ensure greater success. It is more beneficial to focus on a vital few initiatives and harness an airport's efforts towards successfully implementing those than selecting a large number of initiatives and spreading the available resources too thin.

- Educate relevant staff on initiatives before they get implemented to ensure cooperation and mitigate confusion.
- Educate the local community about the goals, objectives, and implementation of each initiative to boost public perception, mitigate confusion, and answer questions.
- Have a monitoring system for each initiative before implementation to ensure more accurate monitoring.
- Identify the airport's sustainability champion and develop division-specific co-champions to assist in the airport's sustainability efforts.

PERFORMANCE MONITORING AND PLAN EVALUATION

There are numerous methods to monitor performance of an airport's sustainability plan. The sustainability project team should work together to decide which methods work best for the respective airport and for the respective sustainability initiatives. Performance monitoring of the sustainability plan is extremely important as it can dictate the future of the airport's sustainability efforts as well as control internal and external support of airport efforts.

If done correctly and accurately, performance monitoring of sustainability initiatives will be a highly beneficial effort for the airport. Having a statistical analysis of the benefits of sustainability will increase the airport's public perception, as well as help obtain buy in for the continuing process of sustainability planning.

Airports should use the results of performance monitoring to compare with the previously set airport goals and objectives. It is important to track the airport's progress towards achieving the goals and objectives to decide if adjustments need to be made. The primary goal of the project team should be to get as close as possible to achieving airport goals and objectives through sustainability.

As part of the development of this Guidebook, a case study was done with the Hartsfield-Jackson Atlanta International Airport (ATL) on "How ATL Tracks and Reports Sustainability Performance." Below are the key findings of that case study:



- Sustainability performance tracking informs educational outreach efforts (internally and externally).
- Compliance with sustainability goals and objectives lies within the contracts and leases with vendors, tenants, and service providers.
- Building Information Modeling (BIM) systems can be used to gather valuable performance data but they can be underutilized if they are not programmed and managed properly.
- Utility Management Systems, EPA's Portfolio Manager, and ISO 50001 can be used to formalize environmental stewardship policies, identify responsible parties, and track environmental progress.

MATRIX DEVELOPMENT

Airports are urged to develop a matrix to be used in sustainability performance monitoring. This matrix should have the initiative at the top with a brief description. Below, numerous categories should be outlined to aid in ranking sustainability initiatives. An example matrix developed to measure management sustainability performance is provided in *ACRP Synthesis 10: Airport Sustainability Practices* (Appendix B of the ACRP Synthesis). The scale rates three characteristics of sustainability management practices on a scale of 1-5 based on achievement of characteristics. **Figure 15** shows a piece of the management performance scale.

Figure 15: Management Performance Scale¹¹

	1	2	3	4	5
Program and Policies	No formal policy or program in place	Limited program or policy in place to address issues	Policy or programs are well-developed and reflects good practice	Policy or program embedded in airport operations and reflects best practice.	Industry-leading policy or program. Long-term planning horizon.
Performance Monitoring and Reporting	Risks have not been assessed and performance is not monitored	Risks have been assessed and a baseline established. No ongoing monitoring of performance	Goals and targets established. Performance is monitored but is not reported either internal or external to the organizations.	Continuous monitoring of performance against goals and targets that are updated regularly. Performance is reported internally within the organization.	Includes mechanism for continuous performance improvements. Performance goals aligned with strategic planning/corporate level goals and targets. Performance is reported externally to stakeholders and general public.
Incentives and Awareness	Issue not on radar screen, relevancy to the organization undetermined. No budget allocation for activity	Problems identified. Stakeholders take the lead in raising issue. Limited budget allocation for managing issue	Some awareness of issue inside organization. Policy or program is communicated and enforced. Funding allocation to manage issue established on annual basis	Strong internal awareness, recognition and understanding of issue. Investment deemed a priority.	Feedback loops in place, continuous surveying of stakeholders. Performance goals incentivized

It is recommended that airports develop similar, but more in-depth and tailored, matrices to monitor sustainability. The matrix developed should be specific for the sustainability initiative selected and include measures chosen by the project team. Further, measures of sustainability performance should be individually chosen based on airport preference and applicability to the initiatives under analysis. **One of many excellent examples of a sustainability measurement matrix can be found in the Chicago Department of Aviation's Sustainable Airport Matrix (SAM).**

¹¹ Source: ACRP Synthesis 10: Airport Sustainability Practices (Appendix B)

Sustainable Airport Matrix (SAM)



This matrix is one of many available examples of an efficient and well-organized sustainability performance monitoring system. Chicago O'Hare International developed this matrix to better understand and stay up-to-date on the airport's chosen sustainability initiatives. Airports can download a copy of the SAM at: <http://www.airportsgoinggreen.org/sustainable-airport-manual.aspx>

The customizable Excel sheet, seen in **Figure 16** below, allows users to enter a brief description of the sustainability initiative to be measured with a correlating potential applicable points section. There is a correlating tracking sheet, shown in **Figure 17** below, that allows the airport to add up points currently earned by the initiative based on the category it belongs to.

Figure 16: SAM Customizable Excel Sheet

APPLICABLE POINTS	CREDIT DESCRIPTION	POINTS	NARRATIVE
APPLICABLE POINTS		POINTS	
5.0	Indoor Environmental Quality	13	
5.1	Prerequisite 1 - Outdoor Air Introduction and Exhaust Systems To establish minimum indoor air quality (IAQ) performance to enhance indoor air quality in buildings, thus contributing to the health and well-being of the occupants.	Prereq	Fill in scope of work
5.2	Prerequisite 2 - Environmental Tobacco Smoke (ETS) Control Prevent or minimize exposure of occupants, indoor surfaces, and ventilation air distribution systems to Environmental Tobacco Smoke (ETS).	Prereq	Fill in scope of work
5.3	High Performance Cleaning Reduce the exposure of occupants and maintenance personnel to potentially hazardous chemical, biological, and particulate contaminants, which adversely affect air quality, human health, and the environment.	2	Fill in scope of work
5.4.1	Indoor Air Quality (IAQ) Best Management Practices: IAQ Management Program To enhance indoor air quality by optimizing practices to prevent the development of IAQ problems in indoor spaces, correcting indoor air quality problems when they occur, and maintaining the well-being of the occupants.	4	Fill in scope of work
5.4.2	Indoor Air Quality (IAQ) Best Management Practices: Outdoor Air Delivery Monitoring To provide capacity for ventilation system monitoring to help sustain occupants' comfort and well-being.	1	Fill in scope of work

Figure 17: SAM Tracking Sheet

5.0	Indoor Environmental Quality	13
5.1	Prerequisite 1 - Outdoor Air Introduction and Exhaust Systems	Required
5.2	Prerequisite 2 - Environmental Tobacco Smoke (ETS) Control	Required
5.3	High Performance Cleaning	2
5.4.1	Indoor Air Quality (IAQ) Best Management Practices: IAQ Management Program	4
5.4.2	Indoor Air Quality (IAQ) Best Management Practices: Outdoor Air Delivery Monitoring	1

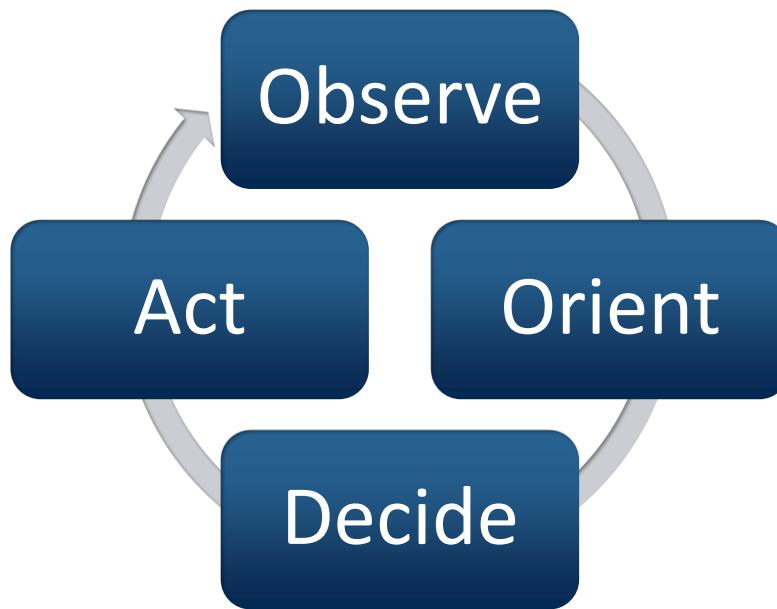
Please see **Appendix 7** for further information and identification of existing tools

By utilizing existing sustainability performance tracking tools such as the SAM, airports can efficiently keep record of how chosen sustainability initiatives are performing. It is recommended that airports consult existing performance measuring tools presented in **Appendix 7** to develop a unique performance tracking system that best suits the individual airport.

THE OODA LOOP (BOYD'S CYCLE)

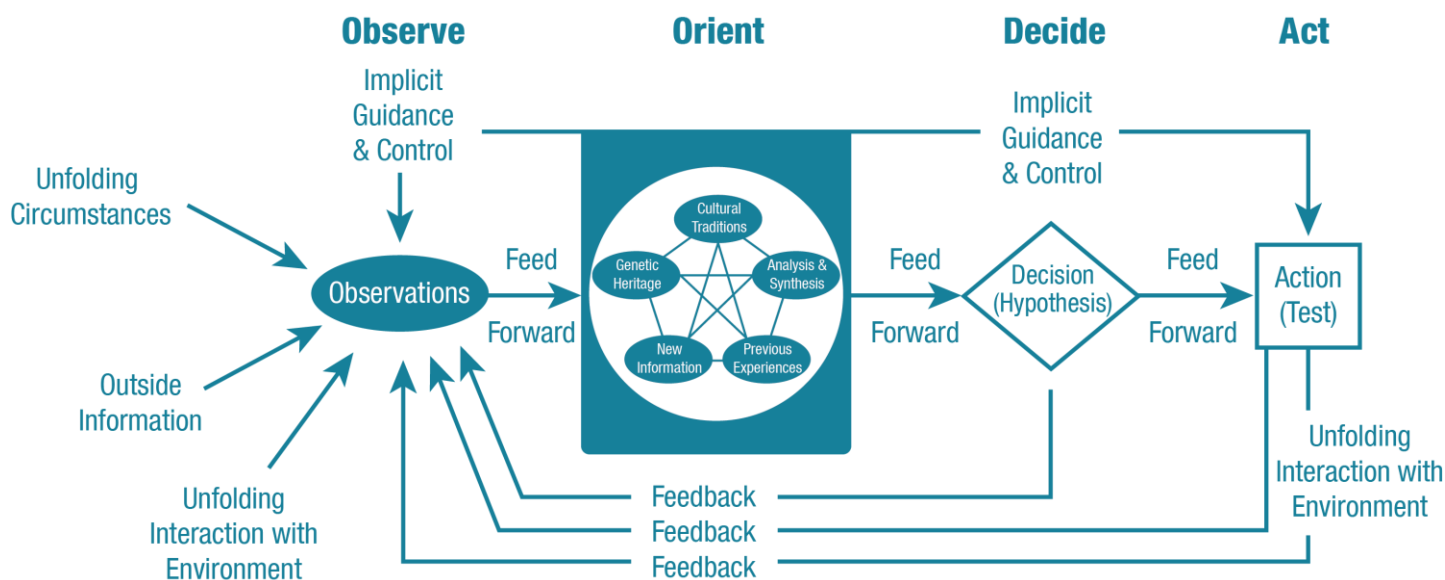
The performance monitoring portion of the sustainability plan can be associated with Boyd's OODA loop. OODA is a decision-making cycle of **O**bserve, **O**rient, **D**ecide, and **A**ct (seen in **Figure 18**). This loop was identified by United States Air Force Colonel John Boyd.

Figure 18: The OODA Loop



Boyd's Cycle shows that all decisions are based on observations of the evolving situation tempered with implicit filtering of the problem being addressed. The observations are the raw information (input) on which decisions and actions are based (output). The observed information must be processed to orient it for making a decision. Boyd's diagram can be seen in **Figure 19**. This cycle of decision making can be a beneficial method of thought for airports in sustainability planning. By observing the performance of sustainability initiatives, airports can actively adapt to changing circumstances at the airport as a result of sustainable pursuit.

Figure 19: Boyd's OODA Loop



STOP-START-CONTINUE

A useful tool in performance monitoring is the Start-Stop-Continue model. Throughout the implementation and monitoring phases of a sustainability plan, airports should ask themselves three questions:

1. What should I start doing? What actions am I not doing that might assist the airport in achieving its goals and objectives?
2. What should I stop doing? Those actions that are not beneficial to program or are not helping an airport achieve its goals and objectives*.
3. What should I continue doing? What actions are effectively assisting the airport in achieving its goals and objectives?

**Note: There are some actions that might not be producing results but, with some changes, could assist the airport in achieving its goals and objectives. While such an item would not inherently fall into the "continue" basket, it is not a good idea to completely dismiss it and put it into the "stop" basket. Before stopping a particular action, examine whether or not changes can be made to the approach of a certain initiative to make it more effective.*

REVISE AND REPEAT

Following performance monitoring of sustainability initiatives, the project team should begin revising the plan and repeating the process of implementation with additional initiatives. As stated before, sustainability is an ongoing process, therefore it is vital that project teams continue to pursue implementing the best sustainability practices at the airport. Once an initiative is in place and yielding positive results, the project team should immediately begin setting another initiative in place.

As part of the development of this Guidebook, a case study was conducted with the Naples Municipal Airport on "How Naples Municipal Airport has developed and updated its own 'Sustainability, Conservation, and Social Responsibility Plan'." Below are the key findings of that case study:



- It is important for an Airport to communicate with the public about its environmental stewardship and other positive impacts on the community.
- An Airport may not be able to fully change the perception of the entire community or its most critical opponents by advertising its sustainability performance, but it may develop support amongst those that are typically ambivalent about the Airport.
- If an Airport develops its own sustainability report, then one person should be assigned the responsibility of leading that effort and the report should be updated regularly.
- The designated Airport representative in charge of updating a sustainability plan should keep track of accomplishments and performance throughout the year to allow for a more efficient and accurate report update process.

On a larger scale, the planning process can be repeated from earlier phases if need be. For example, if an airport determines that the implemented sustainability initiative is not adequately fulfilling the goals and objectives of the airport and stakeholders, the project team may back track to the initiative selection process. Although this means extra effort for sustainability project teams, it is absolutely necessary for ensuring a successful and beneficial sustainability plan.

DEVELOPING A RECURRING CHECK-IN PROCESS (PERFORMANCE REPORTING)

To ensure the active pursuit of sustainability at an airport, it is recommended that airports develop a recurring check-in process at defined intervals. By having a check-in set at recurring intervals, airports can actively pursue sustainability initiatives and remain focused on specific goals with specific "due dates" in mind. Intervals should be designated at the airport's discretion based on chosen initiatives. The check-in should be coupled with previously mentioned performance monitoring techniques to provide a simple and technical overview of how the airport is doing with chosen sustainability initiatives. To assist with this, ACRP Report 119: Prototype Airport Sustainability Rating System was developed to allow airports to track sustainability performance internally. By using this resource, airports are able to utilize the established scoring framework in a flexible and individualized manner to better evaluate their sustainable performance. Airports are also able to make use of the sustainable best practices section of the report to improve the implementation of sustainability measures at the facility.

PROGRESS COMMUNICATION

In performance reporting, it is recommended that airports develop a sustainability reporting mechanism as part of their recurring sustainability check-ins. By developing a concise and visually appealing yet informative and complete reporting system, the airport can present information pertaining to the chosen sustainability initiatives to airport staff, customers, stakeholders, partners, the local community, and the sponsors. This can serve both as a way to reengage interested stakeholders as well as a platform to educate and inform those less familiar with the sustainability plan, communicate those efforts undertaken and the results achieved since the last check-in, and to brag about the accomplishments of the program.

Many airports that have already implemented sustainability plans have developed some form of a “report card” to fulfill this purpose. The sustainability report cards are visually grasping pamphlets that accurately reflect the progress and benefits of the airport’s sustainability plan. This method of performance reporting can be very beneficial to the airport as it displays the overall success of having developed a sustainability plan and ultimately a sustainable airport.

PUBLIC INVOLVEMENT

Although the project team should have been pursuing public involvement efforts throughout this planning process, it is recommended that extra focus is given at this time. At this point of the sustainability planning process, the airport should be functioning at a much more sustainable level than before. The airport should have a formal sustainability management plan in place, and the airports and stakeholder goals and objectives are being realized. The public should be given the opportunity to see and understand the benefits that the sustainability planning process has had on the airport as well as the local community. Achieving public support on past sustainability initiatives will be an excellent asset for the airport as it continues the on-going process of sustainability planning in the future.

CONCLUSION

The Florida Department of Transportation (FDOT) Aviation and Spaceports Office (ASO) developed this Florida Airport Sustainability Guidebook (Guidebook) to lead Florida's airports into a successful and sustainable future. To do so, this Guidebook was developed with a standardized methodology and guidance for developing an effective sustainability plan and implementing sustainability initiatives. It was the goal of FDOT to assist airports and their related staff to develop financial strategies geared at a broad range of topics affecting an airport and its overall fiscal sustainability.

This Guidebook was developed specifically for Florida's airports and for use in educating and informing entities and individuals interested in sustainability including airport managers, airport authorities, and local governments. To be as user-friendly as possible, the Guidebook was developed in two distinct sections: "Introduction to the Guidebook" and "Sustainability Planning". "Introduction to the Guidebook" introduces the project and the methodologies undertaken during its preparation and public outreach and provides general information on sustainability planning. The "Sustainability Planning" section provides detailed information on the steps an airport should follow to develop a complete sustainability plan. Great effort was taken to make the Guidebook as flexible and customizable as possible. This was done with the intent of providing a resource for ALL Florida airports, not just airports that can afford to fund an entire stand-alone sustainability plan.

The Guidebook was developed using a wide range of stakeholder comments, issues, and opportunities in identifying possible strategies for consideration and implementation. The Guidebook is also intended to provide a framework within which to proactively plan, develop milestones, and identify potential strategies to assist airports in becoming (maintaining) financial self-sufficiency.

At its core, this Guidebook provides a basic structure for developing, implementing, and monitoring sustainability projects and initiatives at an airport. To accomplish this, the Guidebook was developed using four distinct sections:

1. Setting the Stage
2. Baseline assessment
3. Plan Development
4. Implementation and Performance Monitoring

Together, these sections detail the most current information on sustainability planning and provide step-by-step guidance on successfully developing a sustainability plan. To support this, information from numerous research documents, including ACRP Reports and those from the FAA and FDOT, provide information on specific components that are integral to sustainability planning. In addition, other airport sustainability plans were utilized to during the development of the Guidebook.

This Guidebook is not intended to require or recommend that all the information presented be included in an airport's sustainability plan. It should be understood that not all airports will require the same level of detail, and certain aspects may not need to be included within a plan based on the airport's size and scope of operations. Each airport undertaking this process should determine what components and recommendations are important and should be considered for implementation. Based on stakeholder interviews and reviews of available resource

materials, recommendations are provided which allow the reader to understand which components of the sustainability planning process are inherently necessary. However, the degree and depth to which they are analyzed should be left to the discretion of the airport/airport sponsor and the project team.

It is FDOT's goal, through this Guidebook, to provide the framework for airports to more easily and effectively develop sustainability plans and implement sustainability initiatives throughout all functional areas of an airport. This effort is part of an even larger goal of making Florida aviation the model to lead the state's transportation system into a more economically self-sufficient, environmentally friendly, operationally efficient, and socially responsible future. As airports begin to utilize this Guidebook, positive outcomes and sustainable benefits will begin to be seen.

APPENDIX 1

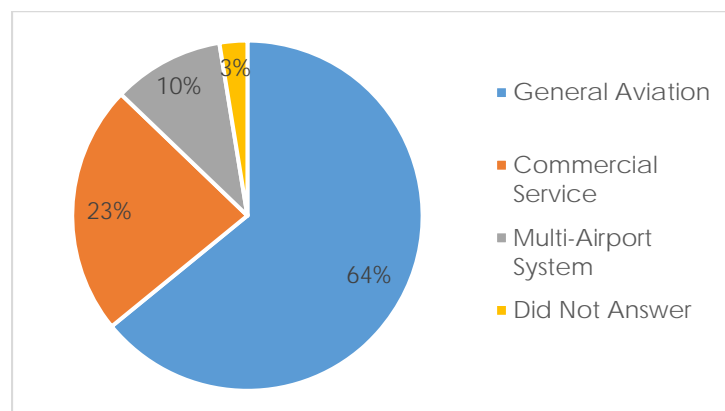
AIRPORT ONLINE SURVEY

The purpose of this survey is to help understand current airport practices and organizational structures relevant to sustainability planning. The survey identified the general organizational structure of airports, as well as information on environmental, social, operational, and economic challenges, opportunities, and practices. Responses from the survey will be used to detail sustainability practices and initiatives at airports in FDOT's Airport Sustainability Guidebook. The survey was advertised at the Florida Airports Council (FAC) Specialty Conference in October 2015 and was distributed to airport representatives via the statewide Continuing Florida Aviation System Planning Process (CFASPP) database. Through these methods, all 128 public use commercial service and general aviation (GA) airports, airport consultants, and additional CFASPP members were notified of the survey.

There were 39 responses to the survey that consisted of the respondent types shown in **Figure 1**. It should be noted that there were more than 39 total respondents, but in some instances there were multiple respondents for the same airport. In general, the responses from the same airport were similar, but when discrepancies existed, the responses were combined. In other instances, multi-airport systems would respond and a general GA or commercial service airport within the system would also respond individually. In these instances, both the multi-airport system and the GA/commercial service airport were counted. For example, if a response was received for Tampa International Airport and a separate response was received for Hillsborough County Aviation Authority, one would be counted as a commercial service airport and one would be counted as a multi-airport system. If multiple airports that are part of a multi-airport system responded on behalf of their individual airport within the system, those responses were coded as either commercial service or GA. In total, 44 airports were represented by the 39 respondents.

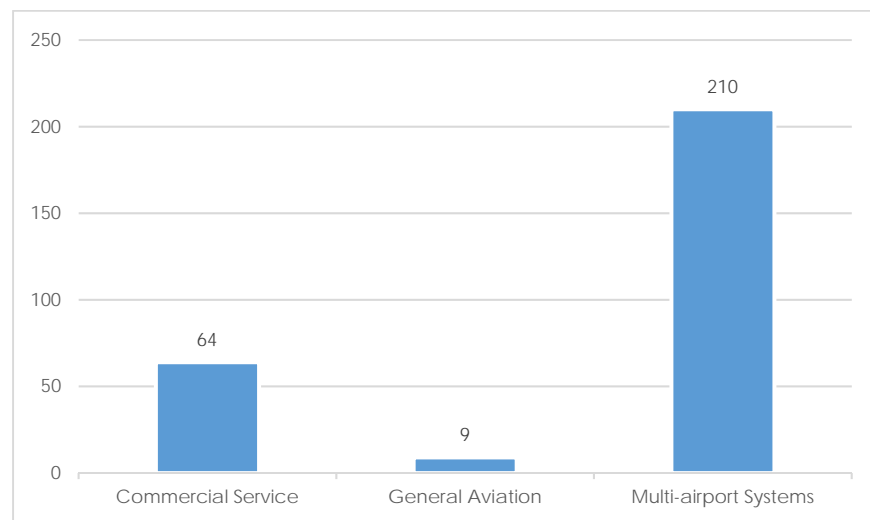
For some questions, the responses given for multi-airport systems were identified as being for either a commercial service or GA airport in the system. When this occurred the responses were grouped as either commercial service or GA airports. Based on this information, when reviewing this section, there are some questions where multi-airport systems are not represented. In these cases the responses have been grouped with either commercial service or GA airports, whichever is more appropriate.

Figure 1: Type of Airport Respondents



Of importance to airports when implementing sustainability initiatives is the availability of staff members available to work on the initiatives. Based on the information collected as part of the development of this Guidebook, it can be assumed that the more staff an airport or airport system has to dedicate to certain initiatives, the more likely it is that the initiative will be successful. Therefore, knowing the number of full-time staff at an airport is important in understanding the potential limitations that may affect airports. A summary of the average number of full-time staff members that work for the three respondent airport types is shown in **Figure 2**. As shown, GA airports have much fewer full-time staff than both commercial service and multi-airport systems. This supports the evidence that GA airports do not have the staff resources needed to implement large scale sustainability programs or initiatives.

Figure 2: Average Number of Full-Time Staff Members by Airport Type



Based on this overall airport demographic information, the following questions summarize the current airport practices and organizational structures at Florida airports. In total, there were 16 questions designed to gauge the current and desired levels of airport sustainability practices, guidance, and understanding at Florida's airports.

**1. What are the major divisions or departments within your airport organization (if applicable)?
For example: Finance; Operations; Maintenance; Planning; Engineering**

Among all airport types, the four most common responses were:

- Operations
- Finance
- Maintenance
- Administration

For GA airports, the next most common responses were the City/County and the airport manager, while commercial service and multi-airport systems listed specialized departments including capital programs and public relations. These responses highlight the difference in staffing levels between commercial service and GA airports.

The major department differences seen at airports sets the foundation for the differences between commercial service and GA airports that are evident throughout this survey. In general, commercial service airports have staff or departments dedicated to individual functions of their airport, while GA airports often have only the core departments responsible for overseeing all activity at the airport.

QUESTIONS 2 - 4

The following three questions were developed to expand on the information gathered in Question 1. In these questions, respondents were asked what divisions, departments and/or staff positions were responsible for various activities at their airport. The differences between GA airports and commercial service airports is highlighted by the fact that for GA airports the same departments identified in Question 1 were also identified for these questions, while commercial service and multi-airport systems had dedicated staff or departments for different activities. The following is a summary of the responses.

2. What divisions, departments and/or staff positions are responsible for managing physical facilities owned by the airport, including utility consumption (energy, water, etc.)?

Both commercial service and multi-airport systems identified facilities and maintenance as the primary departments responsible for the physical facilities at their airports. Alternatively, GA airports identified administration, operations, and management as those responsible for the physical facilities. These responses indicate that, in general, GA airports often have smaller budgets and staffing levels, meaning that their staff will likely serve in generalist positions charged with multiple responsibilities. For commercial service and multi-airport systems, no other responses had more than one mention; however, the City/County was listed multiple times by GA airports as being responsible for managing physical facilities.

3. What divisions, departments, and/or staff positions are responsible for long-term airport planning and development?

Responses to this question varied greatly across respondent types as commercial service and multi-airport systems are likely to have dedicated planning departments. As such, the most common response from multi-airport systems included their planning/development departments, while commercial service airports listed the engineering, capital programs, and operations departments as responsible for long-term planning and development. In contrast, the most common response for GA airports was that management was responsible for long-term planning and development, with operations and administration also being noted. In general, the breakdown of responses by respondent type highlights the difficulty that GA airports face. Without a dedicated staff assigned to planning efforts, it may be difficult to be actively engaged in the planning process.

4. What divisions, departments, and/or staff positions are responsible for public engagement with the local community and other interested members of the public?

Responses to this question varied greatly across respondent types as commercial service and multi-airport systems are likely to have departments dedicated to public engagement. For this question, the most common response from multi-airport systems included a Public/Governmental Affairs or Public Relations/Communications Department, while commercial service airports listed the Marketing and Operations Departments as responsible for public engagement. In contrast, the most common response from GA airports was Airport Management or Administration.

5. What types of tenant businesses does your airport have? (For example: airlines, airline support providers, FBOs, rental car operators, retail, food concessions/service, etc.) Please list the types and the approximate number of each type.

Tenant types vary greatly based on the type of services that an airport provides. In general, commercial service airports focus on serving airlines and passengers, while GA airports offer services such as flight school and training facilities. Survey respondents confirmed this breakdown of tenant types; the following were the most common responses from commercial service and GA airports (note: responses from multi-airport systems were disaggregated and included with their appropriate airport type):

Commercial Service Airports

- Airlines
- Airline service providers
- Rental car companies
- Concessionaires

GA Airports

- Fixed base operators
- Flight schools
- Maintenance/paint/interior shops
- Local, state, and federal field offices

The airports that responded as multi-airport systems included a mix of these responses due to the fact they include both commercial service and GA airports. This data further exemplifies that the needs of GA airports are typically focused on businesses operating at the airport, while the Commercial and multi-airport systems deal primarily with airlines and supporting businesses that facilitate the movement of people.

QUESTIONS 6 - 8

The following three questions were developed to determine what challenges airports are facing or anticipate facing in the future. The differences between GA airports and commercial service airports is highlighted by the fact that the responses from GA airports focus on keeping the airport open and operational, while commercial service airports are primarily focused on expanding and diversifying their air service options. The following is a summary of the responses.

6. Please describe 2-5 of the most pressing core business-related or operational challenges that your airport currently faces. (Possible examples might include: diversifying revenue sources; competition for tenants; facility maintenance and upkeep; obtaining local financial assistance).

The business issues facing airports can vary greatly based on the location and situation at an airport. Additionally, as shown throughout the survey, issues also vary greatly between commercial service and GA airports. As the results of this question show, commercial service airports are primarily focused on increasing revenues, while GA airports are concerned about increasing rental capacity and infrastructure development/maintenance. The following is a summary of the responses that were received:

Commercial Service Airports

- Revenue diversification
- Expansion of infrastructure
- Air service development
- Providing services/hangar space to meet demand

GA Airports

- Revenue diversification
- Financial assistance
- Maintenance of facilities

7. Please describe 2-5 of the most pressing non-financial or operational challenges that your airport currently faces. (Possible examples might include: noise concerns from the community; meeting regulatory obligations; employee health and safety; environmental impacts).

Among all three respondent types there is a shared concern over environmental issues and the ability to grow and expand on the lands surrounding their facilities based on regulations. The property concerns noted by airports stemmed from community encroachment, inability to expand, noise concerns, and wildlife hazard mitigation. Employee development and retention was also noted by all respondent types as being a key operational challenge. Specific to commercial service and multi-airport systems, security challenges imposed by the Transportation Security Administration (TSA) was the most pressing issue. Although GA airports shared many of the same concerns as commercial service airports, the challenge of meeting regulatory requirements was highlighted as the most common concern. Additionally, the following were also identified as challenges by airports:

Commercial Service Airports

- Cost of health care
- Control of airspace
- Cost of utilities

GA Airports

- Community support through the Economic Development Council
- Keeping up with technology (landing and approach aids)
- Intrusions into imaginary surfaces

- 8. Please describe 2-5 of the most important challenges to your airport's business and operational continuity that are not pressing now, but you anticipate may become so in the future.**

Responses to this question, regardless of respondent type, varied greatly; however, some responses were noted by multiple airports. Across all respondent types the following were the most common responses:

- | | |
|--|--|
| <ul style="list-style-type: none"> ○ Fuel prices ○ Aging pilot population/pilot shortage ○ Decreases in GA airport activity ○ Accommodating growth | <ul style="list-style-type: none"> ○ FAA/FDOT funding and regulatory requirements ○ Sea level rise ○ Land use compatibility |
|--|--|

- 9. If your airport plans and implements sustainability, what department/division of your organization leads those efforts? (Example: Operations, Planning, Environmental, Facilities, Finance, etc.)**

Of the responses received, only one respondent indicated the presence of a sustainability manager in their organization as being responsible for implementing sustainability initiatives (Hillsborough County Aviation Authority). For this question, both commercial service and GA airports listed operations as a department that is responsible for implementing sustainability initiatives. Outside of operations, the responses from commercial service and GA airports differed greatly. Below is a summary of the most common responses:

Commercial Service Airports

- Facilities
- Engineering
- Planning/Environmental

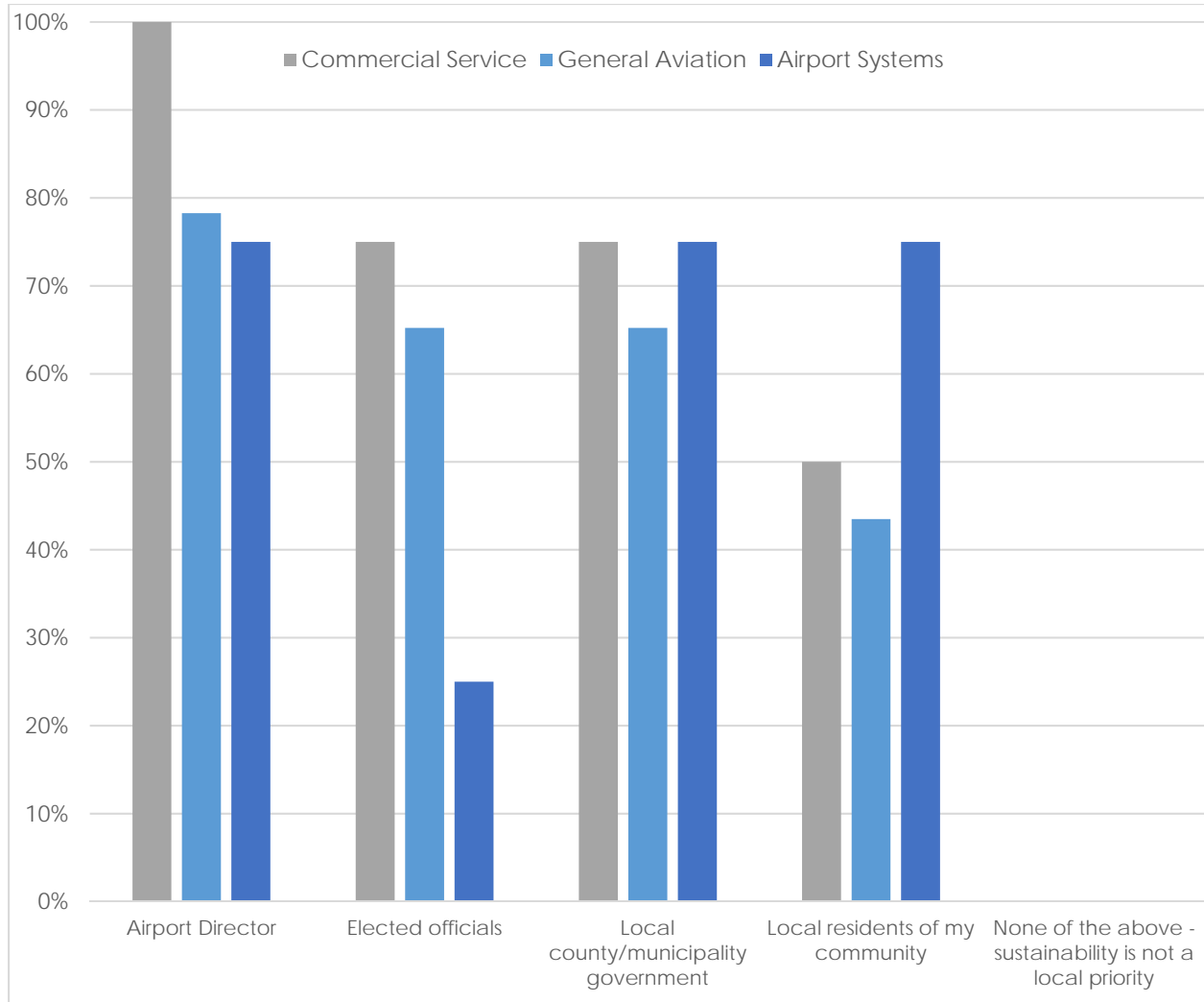
GA Airports

- Management
- Municipal Administration
- Finance

- 10. At my airport, sustainability is important to my... (Pick all applicable answers)**

Responses varied greatly among the different respondent types, but general themes were identifiable from the responses. **Figure 3** shows that sustainability is important to all commercial service Airport Directors and close to 80 percent of all others. The response to elected officials varied greatly between airport types with only 25 percent of multi-airport systems identifying sustainability as being important to elected officials. The importance of sustainability to local governments was uniform across all respondent types. The importance of sustainability for local residents also had significant variability; in general, multi-airport systems felt that sustainability was important to their local community, possibly illustrating the fact that operating multiple airports makes more members of the community aware of what the airport is doing.

Figure 3: Airport Sustainability Importance



QUESTIONS 11-15

For the following five questions, respondents were asked to list and describe any activities that their airport or airport system has undertaken to accomplish a variety of sustainability or sustainability related initiatives. For these responses, respondents were able to input anything that they felt was appropriate. Because these questions had such a high level of variability, grouping responses based on airport type was difficult. As such, for each question the most common responses across all respondent types are shown.

Please briefly describe activities, initiatives, or studies that your airport has undertaken to:

11. Make capital improvements or financial investments that have led to, or that you anticipate will lead to, reduced costs or expenses:

- LED lighting
- HVAC upgrades/improvements
- Solar panels
- Sustainability planning documents
- LEED standards on new buildings
- Low-flow water fixtures
- Exit lane monitoring
- Upgraded chillers
- Automatic lights
- Life-cycle costs analysis

12. Improve efficiency of airport operations:

- Update master plan and ALP
- Construct service road to reduce runway crossing
- Wildlife hazard mitigation
- Rehabilitate runways/taxiways for increased capacity
- Developed airport operation center
- Traffic control devices
- Airfield emergency action planning
- Upgraded baggage claim and concessions
- Upgraded parking and people mover system

13. Reduce the negative environmental impacts of airport activities:

- Establishing natural wetland area
- Reducing power consumption
- Environmental Sustainability Master Plan/Master Plan
- Reduce utility usage
- Stormwater Pollution and Prevention Plan
- Coordinate with the local Environmental Department
- Solar panels
- Culvert and drainage pond reconstruction
- Environmental training
- Electric car charging station

14. Improve relationships with customers, employees, community members, and others:

- Outreach to the community
- Website updates
- Automated baggage timer
- Automated pay for parking
- Noise committee
- Host community events
- Use of social media
- Publicly support local job creation
- Promote low fuel prices
- Meet with airport tenants and businesses
- Guest service kiosks
- Provide WiFi

15. Prepare the airport to be more resilient to future physical, economic, or regulatory changes (such as increased extreme weather events, trends in travel patterns, or land-use developments near the airport):

- Develop new airport hazard zoning ordinance
- Revenue/development diversification
- Partnerships with local businesses for exchange of information and resources
- Develop facilities at higher than the minimum requirements
- Update lease terms on airport property
- Hold economic development meetings
- Preparation for sea level rise
- Various studies
 - Hurricane Manual
 - Emergency Plan
 - Part 139 Compliance
 - Pavement studies
 - Sustainability Management Plan

16. Are you aware of any environmental or sustainability-related goals, programs, mandates (or similar) in your local municipality or county, which may affect activities at the airport? Examples could include a municipal long-term development plan, recycling goals, a city greenhouse gas reduction target, or other local ordinances.

Though only 40 percent of respondents noted that they were aware of any local sustainability-related initiatives, at least one airport in each respondent type noted that they were aware of some form of local environmental or sustainability initiative. The most common response was participation in local waste reduction strategies typically in the form of recycling programs managed by the City/County. Additionally, the following responses were provided:

- County and City plans regarding:
 - Recycling (Multiple Airports)
 - Environmental overlay districts (Gainesville Regional Airport)
 - Tree ordinances and mitigation requirements (Gainesville Regional Airport)
 - Comprehensive wetland regulations (Gainesville Regional Airport)
- Environmental and Sustainability Management Plan (ESMP) (Ft. Lauderdale Executive)
- International Organization for Standardization (ISO) ISO 9001 – Quality Management certification process (Ft. Lauderdale Executive)
- City has long-term development plan for beach and commercial corridor (Atlantic Blvd.) (Pompano Beach Airpark)
- City has plans for increasing the availability of residents to tie into the reuse water system to get residents off potable water for irrigation (Pompano Beach Airpark)
- Recycling goals and a solar farm (Vero Beach Regional Airport)
- Florida Green Building Coalition (Witham Field)
- Leadership in Energy and Environmental Design (LEED) (Witham Field)
- Recycling Program (Witham Field)
- Keep Martin Beautiful (Witham Field)
- Statewide reduction in solid waste – 75% by 2020 (Hillsborough County Aviation Department)
- Tampa Bay Clean Cities Coalition (TBCCC) (Hillsborough County Aviation Department)
 - Works with vehicle fleets, fuel providers, community leaders, and other stakeholders to reduce petroleum use in transportation
- 2013 Lee County Sustainability Plan (Lee County Port Authority)

APPENDIX 2

LITERATURE REVIEW

Based on the information that has been gathered in Phase I of the FDOT Airport Sustainability Guidebook, a literature review was completed to document existing research, data, and information on sustainability resources that have been completed. To accomplish this, four distinct groups of resources were reviewed including:

- Transportation Research Board
- Federal Aviation Administration
- Florida Department of Transportation
- Additional Resources

In total, 25 documents and resources were reviewed and summarized as they apply to the development of the FDOT Airport Sustainability Guidebook. The summaries provided in this section introduce each of the reviewed documents, summarize the tools and resources provided by each document, as well as identify how airports completing sustainability plans or initiatives can access these resources for more information.

TRANSPORTATION RESEARCH BOARD RESOURCES

The Transportation Research Board (TRB) was developed to provide leadership in transportation innovation through research and information exchange. Within TRB, the Airport Cooperative Research Program (ACRP) was developed as an industry-driven, applied research program that develops near-term, practical solutions to problems faced by airport operators. In total, nine (9) TRB resources were reviewed and summarized for their applicability to sustainability efforts for Florida's airports. Many of these documents are explicitly related to sustainability and airports; however, some simply provide useful tools or materials that could be applied to airports implementing and tracking sustainability initiatives. To access these reports and to find out more information on the TRB or ACRP, please visit: www.trb.org.

1. Report 141: Renewable Energy as an Airport Revenue Source

Prepared by: Transportation Research Board, 2015

http://onlinepubs.trb.org/Onlinepubs/acrp/acrp_rpt_141.pdf

Report 141 contains information on using renewable energy sources at airports through case studies and feasibility assessments of multiple renewable energy options. Key components of *Report 141* include:

- Evaluation of the airport factors that influence what forms of energy are feasible at an airport
- Guidance on conducting financial assessments of chosen renewable energy sources
 - Guidance on renewable energy implementation
- A Renewable Energy Funding Matrix
- Sample Request for Proposals are referenced within and are available at:
http://onlinepubs.trb.org/Onlinepubs/acrp/acrp_rpt_141_AppendixF.pdf

Report 141 outlines the benefits of a renewable energy project and how it can be applied to airport operations and facilities. The document introduces numerous types of renewable energy sources and provides evaluation factors that assist in deciding which, if any, renewable energy sources could be implemented at an airport. *Report 141* also provides guidance on the implementation process for renewable energy from conducting financial assessments through the stakeholder input and final approvals.

Airports considering the implementation of renewable energy are encouraged to reference *Report 141*. When implemented properly, renewable energy can lead to financial benefits, reduction of environmental damage, and improve the public opinion of the airport. Renewable energy sources are becoming ever more politically and financially feasible; this report contains the guidance necessary for the introduction of renewable energy at airports.

2. **Synthesis 66: Lessons learned from Airport Sustainability Plans**

Prepared by: Transportation Research Board, 2015

<http://www.trb.org/Main/Blurbs/172887.aspx>

Synthesis 66 provides a summary of the lessons learned from a sustainability implementation survey sent to airports around the nation. This report organized information from 31 medium and small general aviation and commercial service airports from 20 states. Based on the survey results Synthesis 66 provides the following:

- Advice on the development of sustainability plans
- Typical drivers, aids, and barriers to implementation
- Sustainability implementation lessons learned
- Airport sustainability case studies

This summary was developed to aid airports in the implementation of sustainability by summarizing the information received from the survey, and providing case study examples from airports who have already completed sustainability initiatives. This report promotes sustainability as a process of continued improvement and displays the different ways in which sustainability has been implemented at airports.

Airports are encouraged to consult this report before, and while sustainability initiatives are being implemented. Airports may find the case studies useful as they briefly summarize the local conditions, and provide case by case advice on the implementation of sustainability.

3. **Report 110: Evaluating Impacts of Sustainability Practices on Airport Operations and Maintenance**

Prepared by: Transportation Research Board, 2014

http://onlinepubs.trb.org/onlinepubs/acrp/acrp_rpt_110.pdf

Report 110 provides guidance on the proper function and use of two tools developed to monitor the impact of sustainability on airports' operations and maintenance; these tools are:

- **Evaluation Process (EP)**: Guides users to scope the analysis and collect relevant data, as it relates to sustainability practices for use in the Cost Benefit Tool

- **Cost Benefit Tool (CBT):** Helps users categorize the data collected in the EP to support the assessment of potential impacts resulting from the implementation of sustainability initiatives on maintenance budgets and resources

http://onlinepubs.trb.org/onlinepubs/acrp/acrp_rpt_110.iso¹

Video tutorial on how to use the CBT: <http://vimeo.com/116156429>

The proper use of these tools assists airports by ensuring operations and maintenance considerations are included within the sustainability initiatives' decision-making process. The document identifies that a proper implementation of sustainability practices (1) assesses the full budgetary and operational lifecycle implications, and (2) engages operations and maintenance department personnel early in the process. The CBT allows users to compare traditional operations actions against those with sustainability measures applied. The proper use of this tool helps each user decide whether a new initiative will be a benefit or a detriment to the operations at the airport.

When considering sustainability initiatives, it is encouraged that airports reference *Report 110* to aid in the implementation of new operation and maintenance methods or systems. It should also be noted that airports with existing EP and CBT tools may also find this document useful as its contents may be used to improve their existing tools.

4. **Report 119: Prototype Airport Sustainability Rating System – Characteristics, Viability, and Implementation Options**

Prepared by: Transportation Research Board, 2014

http://onlinepubs.trb.org/onlinepubs/acrp/acrp_rpt_119.pdf

Report 119 contains an exploration and explanation of the Prototype Rating System (Prototype) and how it can be used by airports. The primary components of *Report 119* include:

- The methods used to create the Prototype
- A user's guide for the Prototype
- A list of sustainability best practices
- Sustainability activity definitions and performance metrics

Report 119 was developed to provide information on implementation options for the Prototype. The purpose of this rating system is to focus on high-level sustainability performance allowing for the flexibility of airports to choose the most appropriate strategy. The intent of this approach is to integrate sustainability throughout the airport's functions and sphere of influence while guiding airports through documentation and verification of their sustainability initiatives. The Prototype was developed to allow airports to track their sustainability performance internally, but also for comparative purposes.

Using the information within *Report 119*, airports are able to utilize the established scoring framework in a flexible and individualized manner to better evaluate their sustainable

¹ Accompanying the report, [CD-149: Evaluation Process and Cost-Benefit Tool](#) contains spreadsheet tools and an instructional video that demonstrates how to use data from an example project. CD-149 is available for download from TRB's website as an ISO image. Instructions for burning a CD-ROM from an ISO image can be found here: <http://onlinepubs.trb.org/Onlinepubs/create-and-burn-iso.pdf>

performance. Airports are also able to make use of the sustainable best practices section of the report to improve the implementation of sustainability measures at the facility.

5. Report 80: Guidebook for Incorporating Sustainability into Traditional Airport Projects

Prepared by: Transportation Research Board, 2012

http://onlinepubs.trb.org/onlinepubs/acrp/acrp_rpt_080.pdf

Report 80 provides guidance on incorporating sustainability into airport projects using the Airport Sustainability Assessment Tool (ASAT) developed as part of this report. To accomplish this, *Report 80* provides the following tools and supplemental information:

- **Airport Sustainability Assessment Tool (ASAT)**: Allows users to evaluate which sustainability practices would be most applicable based on the conditions at the airport and includes a comprehensive list of suggestions for incorporating sustainable initiatives with traditional airport projects

http://onlinepubs.trb.org/onlinepubs/acrp/acrp_rpt_080.xls

Report 80 and the ASAT were developed to allow users to assess the practices that would be most applicable and practical for the airport situation/environment, while also eliminating the need to research all relevant material, a savings of airport employee time and expense. Sustainability initiatives provided in *Report 80* can be incorporated into both new construction projects, the retrofitting of existing facilities, as well as be applied to airport equipment.

Report 80 is recommended for airports that are already considering sustainability initiatives, those searching for ideas or sustainable strategies, and those who would like to know what sustainability measures have been implemented at other airports. *Report 80* also highlights the need for a sustainability champion or sustainability plan/vision statement for an airport to fully make use of the document and implement a comprehensive initiative that addresses the airport's unique needs.

6. Report 19A: Resource Guide to Airport Performance Indicators

Prepared by: Transportation Research Board, 2011

http://onlinepubs.trb.org/onlinepubs/acrp/acrp_rpt_019A.pdf

Report 19A provides users with a list of Airport Performance Indicators (APIs) that can be used to accurately measure an airport's performance across multiple functional areas including general aviation, human resources, and operations. APIs are provided in the following categories:

- **Core APIs**: Important for overall operation or otherwise important to the airport executive level and/or the airport governing board
- **Key APIs**: Important for the operations of key airport departments or functions
- **Other APIs**: Not considered as useful for airport overall operation, to the executive level, or to key airport departmental functions

Report 19A was developed to supply airport sponsors with the information for developing and implementing strategic planning and performance-measurement systems. *Report 19A* has compiled and categorized a list of APIs that airports can use for benchmarking their

performance. *Report 19A* also provides guidance on the use of the APIs and how they can be applied to individual airports.

When considering the implementation of sustainable initiatives, each airport is encouraged to have a thorough understanding of their existing performance to ensure future efforts will be beneficial. *Report 19A* should be referenced by airports that are developing performance measures as part of a sustainability plan. This document organizes the APIs by functional area of the airport and provides descriptions of what the indicator is, where to find the information, which airports will use the information, and how the information can be used.

7. **Synthesis 42: Sustainable Airport Construction Practices**

Prepared by: Transportation Research Board, 2011

http://onlinepubs.trb.org/onlinepubs/acrp/acrp_rpt_042.pdf

Synthesis 42 organizes 480 sustainable construction practices into three categories: Pre-Construction, During Construction, and Commissioning/Post Construction. Additionally *Synthesis 42* contains a thorough list of sustainable construction case studies, and includes the following informational matrices that sort sustainable construction practices in a variety of ways:

- Categorized by practice category (Policies and regulations, construction methods, logistics, etc.)
- Categorized by construction implementation stage categories (Pre, during, and post construction)

Synthesis 42 is a summary of sustainable construction practices (referred to as the "collection") available for stakeholders involved in the planning, design, and/or construction, and post construction activities related to airport development or redevelopment projects.

Airports should reference *Synthesis 42* when planning and designing any construction projects, as it provides a list of practices that can be applied to enhance the sustainability of the project as well as the airport. Using this report allows airports to deviate from traditional construction methods and potentially see increased benefits through the application of sustainable construction practices.

8. **Report 20: Strategic Planning in the Airport Industry**

Prepared by: Transportation Research Board, 2009

http://onlinepubs.trb.org/onlinepubs/acrp/acrp_rpt_020.pdf

Report 20 contains information and guidance on strategic planning and how to properly implement the strategic planning process. The Report provides airports with the tools necessary to appropriately incorporate their sustainability goals into their overall strategic plan. Within *Report 20*, the following tools and information are provided to assist airports in the strategic planning process:

- A step-by-step framework that allows an airport to efficiently navigate the strategic planning process

http://onlinepubs.trb.org/onlinepubs/acrp/acrp_rpt_020workbook.pdf

- Information and guidance to aid in the understanding or implementation of strategic planning at airports
- Case studies outlining the strategic planning efforts of airports and airport systems around the country

Report 20 was developed to provide a comprehensive, user-friendly management tool that could be used to design, implement, and manage the strategic planning process, leading to the development of an airport strategic plan. As defined in this report, strategic planning is the “process undertaken by an organization to define its future and formulate a road map to guide the organization from its current state to its visions for the future.” *Report 20* provides an overview and examples of planning techniques, including a baseline process to undertake the strategic planning process. A model framework that identifies steps to develop a strategic plan is also provided, including pre-planning activities; mission, vision, values, and airport environment; strategic issues and leading strategies; specific objectives and action plans; and performance and evaluation measures. As noted in *Report 20*, there are numerous factors that can influence the strategic planning process, including the size and type of airport, type and availability of stakeholders, airport activities and services, and the regulatory environment. Case studies of several airports are provided to aid in the understanding of the report.

Airports developing sustainability plans should use the information contained within this document to ensure that the goals are consistent with and incorporated into its strategic planning framework.

9. **Synthesis 10: Airport Sustainability Practices**

Prepared by: Transportation Research Board, 2008

http://onlinepubs.trb.org/onlinepubs/acrp/acrp_syn_010.pdf

Synthesis 10 was developed to inform interested users on a range of airport sustainability initiatives collected from a comprehensive literature review and online survey. *Synthesis 10* provides the following tools to assist airports when developing and implementing sustainability plans and initiatives:

- **Management Performance Scale**: Helps assess the extent to which sustainability management practices are integrated into the business process at airports (Appendix B of ACRP Synthesis Report 10)
- **Airport Sustainability Practices Matrix**: Catalogues sustainable airport practices by commercial hub size, location (domestic or international), and type of sustainable practices (land use, waste, noise, etc.) (Appendix D of ACRP Synthesis Report 10)

Synthesis 10 documents a range of airport sustainability practices developed for airport operators to focus on their triple bottom line (environmental, economic, and social). The literature review was performed to identify existing sustainable practices and gather the information necessary for the development of the online survey. Based “on overall sustainability performance, respondents from international airports and large U.S. airports rated their airports’ performance higher than those from small and medium U.S. airports.” It was commonly agreed that regulation and airport policies were the main reasons the airports have implemented sustainability practices. Both large and international (non-US)

airports identified environmental sustainability as a priority while the smaller airports tended to focus on economic priorities. All of the respondents identified funding as the primary inhibitor to sustainability implementation.

Airport sponsors are encouraged to reference this document when considering the implementation of sustainable practices. *Synthesis 10* details the drivers, priorities, and barriers to sustainability practices by using data from existing airports around the world. The document also outlines sustainability practices within the three areas of the triple bottom line: environmental, economic, and social. Understanding these three types of sustainability can be used at airports is essential for the success of any airport sustainability plan or initiative.

10. NCHRP Report 708: A Guidebook for Sustainability Performance Measurement for Transportation Agencies

Prepared by: Transportation Research Board, 2011

http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_708.pdf

NCHRP Report 708 was developed to provide transportation agencies with tools to apply concepts of sustainability in core activities through performance measurement. To assist in this, *Report 708* includes the following:

- Sustainability definitions and issues background
- Theories on the application of sustainability
- A sustainability performance measurement framework
- Methods to evaluate sustainability initiatives and determine effectiveness

NCHRP Report 708 describes the principles of sustainability as they relate to various transportation agencies. Included with this is a set of possible goals that can be used to address those principles, as well as performance measures. *NCHRP Report 708* serves users that have some understanding of performance measurement, but still require guidance on providing this information to agency leadership. *NCHRP Report 708* provides a framework for transportation agencies to apply sustainability initiatives and generate performance measurements.

If the airport is familiar with sustainability concepts and ready to design sustainability performance measures, *NCHRP Report 708* should be referenced for information on establishing performance measures to evaluate the program, as well as gauge the effectiveness of the strategies in implementing sustainability.

FEDERAL AVIATION ADMINISTRATION RESOURCES

The Federal Aviation Administration (FAA) is responsible for the advancement, safety, and regulation of civil aviation in the US. The FAA is also one of the primary funding sources for all airport projects. To support the FAA's goals, the agency has developed numerous documents and resources to assist aviation entities. For this document, seven (7) FAA documents and resources were reviewed and summarized for applicability to sustainability efforts. Some of the documents are explicitly related to sustainability and airports; however, some simply provide useful tools or information that could be used when implementing and tracking airport sustainability initiatives. To access these reports and to find out more information on the FAA, please visit: www.faa.gov

Report to Congress: National Plan of Integrated Airport Systems

Prepared by: The FAA, September 30, 2014

http://www.faa.gov/airports/planning_capacity/npias/reports/media/npias-2015-2019-report-narrative.pdf

The *National Plan of Integrated Airport Systems (NPIAS)* provides an overview and evaluation of the public-use airports that are important to national air transportation and eligible for AIP funding. Within this document, the following are included:

- An overview of the composition of the national airport system
- Overall objectives of the NPIAS and an evaluation of the system's performance
- Aviation forecasts and how this information will affect airports
- The overall development requirements and estimates for future costs

The *NPIAS* also lists each airport, its role, and ASSET classification for general aviation airports.

The NPIAS was developed to support the strategic priorities and key initiatives identified in the FAA Administrator's Strategic Initiatives for safety, access, and global leadership by identifying the needs of the system to meet those priorities. Airports that receive funding due to their inclusion in the NPIAS are encouraged to be familiar with this document and how it relates to their airport.

Airports are encouraged to reference this document to understand their projected development, and how the airport fits into the national system.

1. *General Aviation ASSET Documents:*

General Aviation Airports: A National Asset (ASSET 1)

Prepared by: The FAA, May, 2012

ASSET 2: In-Depth Review of the 497 Unclassified Airports (ASSET 2)

Prepared by: The FAA, March 2014

http://www.faa.gov/airports/planning_capacity/ga_study/

ASSET 1 was completed by the FAA to explore the role that general aviation airports play in the National Air Transportation System. *ASSET 1* provides users with an overview of the types of services general aviation (GA) airports provide within the national airport system and categorizes the GA airports that facilitate this activity. *ASSET 1* outlines the following information:

- The societal importance of GA airports
- Four new ASSET categories to organize GA airports by activity: National, Regional, Local, and Basic
- The identification of 497 GA airports that did not fit within the four categories (Unclassified) and the plan to address these airports within another study

This report documents important aeronautical functions that are economically and effectively supported at general aviation airports. These functions range from emergency preparedness and response to the direct transportation of people and freight, as well as commercial applications such as agricultural spraying, aerial surveying, and energy exploration.

ASSET 2 documents the review of the 497 facilities that could not be categorized in 2012 as part of *Asset 1*. Key information from this report includes:

- 212 of the previously unclassified airports were classified within one of the four ASSET categories
- 281 of the unclassified airports will remain unclassified within the NPIAS
- A matrix showing the breakdown of the categories of the NPIAS airports organized by state

ASSET 2 provides an additional review of the 497 airports that did not meet the criteria necessary to be designated under one of the four airport categories detailed in *ASSET 1*. The FAA teamed with an in-depth stakeholder process to conduct the review and were able to classify an additional 212 airports within the four ASSET categories. Those airports that are not classified in one of the four categories will be eligible for federal funding when they are able to meet the criteria for one of the four ASSET categories.

The information included in these studies should be referenced for GA airports considering the implementation of sustainability plans and initiatives. This information will help airports understand what similarly sized airports have also done as it related to sustainability. Additionally, airports identified within one of the four ASSET categories will have access to federal funding opportunities, which may increase their ability to implements sustainability initiatives.

2. **Airport Improvement Program Handbook**

Prepared by: The FAA, September 30, 2014

http://www.faa.gov/airports/aip/aip_handbook/media/AIP-Handbook-Order-5100-38D.pdf

The Airport Improvement Program Handbook (AIP Handbook) provides guidance on the types, eligibility, and steps necessary to receive funding through the AIP. The AIP Handbook outlines the following:

- Types of sponsors and entities eligible for grant funding
- Type of projects eligible for funding
- Types of AIP funding available
- Guidance on the grant process

Airports considering sustainability initiatives are encouraged to reference this document and be familiar with the funding opportunities that are available from the federal government. Of particular importance to sustainability projects is the fact that AIP funds are available for the participation in the Voluntary Airport Low Emission Program (VALE), the Zero Emission Vehicle Program (ZEV), and the development of comprehensive planning study documents, including sustainable master plans. More information on the funding requirements of these projects can be found in Appendix S of the AIP Handbook.

3. **FAA AC 150/5070-6B: Airport Master Plans**

Prepared by: The FAA, July 29, 2005

http://www.faa.gov/documentLibrary/media/Advisory_Circular/150-5070-6B-Change-2-Consolidated.pdf

Advisory Circular 150/5070-6B outlines the features and content necessary for an airport to complete the master planning process. The following are included within this document:

- Guidance on the necessary steps and elements of an airport master plan
- Guidance on the development of individual components of an airport master plan
- A listing of potential stakeholders to include in the master planning process
- Guidance on the specific requirements of an airport layout plan set

The purpose of this AC is to provide Federal guidance to airports of all sizes on the preparation of airport master plans. This AC outlines the required steps and important features that must be included within the FAA's prescribed airport master planning process. This AC also outlines the needs and requirements of the airport layout plan (ALP) drawings. Airport master planning is an important step for airports to undertake to ensure that they are meeting the needs of the national airspace system; as such the master plans must be kept current to reflect existing conditions of the airports and associated communities. As all airports are unique, the scope and content of each master planning process must be tailored to the individual airport's needs.

The only specific reference to sustainability planning that this AC provides is in the Facility Requirements section. It states that a master plan should identify or consider practices that enhance the airport's overall sustainability, including initiatives that maximize linkages with public transportation to reduce private vehicle trips to the airport, promote recycling and waste minimization, increase energy efficiency (including the use of alternative energy sources), reduce airport-related emissions, facilitate airport-related community and economic development, and increase community engagement in the airport planning and development process. Of note, Airport Improvement Program (AIP) funding is available for the development of comprehensive sustainability planning documents. Traditionally, sustainability can be incorporated into a master plan either as a stand-alone chapter or as a component of each individual section of a master plan.

Airports are encouraged to reference this document to determine ways in which sustainability can be incorporated within the airport master planning process. Incorporating sustainability into the master planning process shows the airport's commitment to improving the economic, social, operational, and environmental conditions within the community into the future. In addition to this resource, the FAA also provides guidance related to sustainability in the FAA's *Recycling, Reuse, and Waste Reduction at Airports: A Synthesis Document* (detailed in this section).

4. Sustainable Master Plan Pilot Program (including Lessons Learned)

Prepared by: The FAA, December 17, 2012

Interim Guidance for FAA's Sustainable Master Plan Pilot Program (Interim Guidance):

http://www.faa.gov/airports/environmental/sustainability/media/interim_guidance_sustainable_master_plan_pilot.pdf

Lessons Learned from the Sustainable Master Plan Pilot Program (Lessons Learned):

<http://www.faa.gov/airports/environmental/sustainability/media/SustainableMasterPlanPilotProgramLessonsLearned.pdf>

The *Interim Guidance* and *Lessons Learned* contain a summary of the FAA's Sustainable Master Plan Pilot Program and information collected from the participants. Within the report, the following are included:

- An introduction of the Sustainable Master Plan Pilot Program
- Lessons learned from the participants of the Sustainable Master Plan Pilot Program
- A list of notable sustainability goals, targets, and initiatives found from the Sustainable Master Plan Pilot Program
- Links to documents completed during the Sustainable Master Plan Pilot Program

The Sustainable Master Plan Pilot Program began in 2010 with the intent of assisting airports in reducing their environmental impacts and improving community relationships while meeting operational and planning requirements. The goal of this program was to incorporate sustainability within traditional airport long range planning. Through the pilot program, selected airports had the option of developing a sustainable master plan or a stand-alone sustainable management plan. Sustainable master plans incorporate sustainable initiatives within the airport's traditional master planning document whereas the sustainability management plans are intended to be a separate document comprised entirely of sustainability content. The ultimate outcome of the Sustainable Master Plan Pilot Program is a list of best practices and lessons learned from the airports that participated in the program. These best practices and lessons learned include topics such as developing a sustainability mission statement, conducting a baseline assessment, and methods of public involvement. In total, there are 20 best practices and lessons learned that airports can reference in implementing sustainability initiatives. In Florida, Tampa International, Northeast Florida Regional, and Vero Beach Regional were selected to participate in the program.

This report and the associated case studies should be referenced by airports considering the inclusion of sustainable initiatives either within their master plans or in the creation of sustainability management plans. The lessons learned, examples of appropriate sustainable initiatives, and sustainability goals listed within this report could also save airports both time and money, by outlining the successes of the pilot program for others to follow. More FAA guidance on airport sustainability can be found at <http://www.faa.gov/airports/environmental/sustainability/>

5. **Recycling, Reuse, and Waste Reduction at Airports: A Synthesis Document (Recycling Synthesis)**

Prepared by: The FAA, April 24, 2013

<http://www.faa.gov/airports/resources/publications/reports/environmental/media/RecyclingSynthesis2013.pdf>

Recycling Synthesis provides guidance on the implementation of recycling and waste management programs at airports. The document contains three major sections for consideration:

- The establishment of municipal solid waste recycling programs
- The establishment of construction and demolition waste management programs
- A listing of airports that have implemented recycling programs and their lessons learned

The *Recycling Synthesis* is intended to be a “one-stop shop” for airports to review when considering recycling and waste reduction strategies. Contained within this document are recommendations and methods for the implementation of these management initiatives. The primary focus of the *Recycling Synthesis* is for the management of municipal solid waste (MSW) and reducing the volume sent to the landfill. In addition to MSW, construction and demolition waste at airports typically represents such a large volume that it was the secondary emphasis of the document.

Airports interested in implementing sustainability initiatives are encouraged to consider waste management strategies within their planning efforts. Properly implemented waste management strategies can provide economic, environmental, operational, and social benefits for the airport and surrounding community. The case study analysis contained within the *Recycling Synthesis* enables airports to reference real projects and utilize the information for waste management initiatives. Additionally, Section 122 of the *FAA Modernization and Reform Act of 2012* requires airports to prepare a Recycling, Reuse, and Waste Reduction plan as part of their master plan, sustainability plan, or as a standalone document. Included in the *FAA Modernization and Reform Act of 2012* is the provision that the following issues are required to be addressed as part of a Recycling, Reuse, and Waste Reduction plan:

1. Feasibility of solid waste recycling
2. Minimizing the generation of solid waste
3. Operation and maintenance requirements
4. Review of waste management contracts
5. Potential cost savings or generation of revenue

Understanding the required components of the *FAA Modernization and Reform Act of 2012* is important for airports to understand when developing either a master plan or sustainability plan. These provisions should be reviewed and understood prior to beginning any sustainability planning initiative at an airport.

FLORIDA DEPARTMENT OF TRANSPORTATION RESOURCES

The Florida Department of Transportation (FDOT) is responsible for coordinating the planning and development of a safe, viable, and balanced state transportation system serving all regions of the state. Within FDOT, the Aviation and Spaceports Office (ASO) is tasked with promoting the development and improvement of aviation facilities, regulating airports, and protecting approaches. To accomplish this, FDOT has developed numerous documents and resources to assist airports in a multitude of ways. For this report, six (6) FDOT documents and resources were reviewed and summarized for their applicability to sustainability efforts for Florida’s airports. Currently, FDOT does not have any documents or resources that are explicitly related to sustainability. As such, the information collected is linked and referenced throughout the Guidebook. Unless otherwise noted, to access these reports, please visit: www.dot.state.fl.us/aviation/flpub.shtm

1. Florida Transportation Plan

Prepared by: Florida Department of Transportation, 2010

<http://www.dot.state.fl.us/planning/FTP/>

The *Florida Transportation Plan (FTP)* defines the overall transportation goals of Florida and was developed to make it more economically competitive, livable, and environmentally sustainable for future generations. The FTP is updated every five years to accommodate and respond to new trends and challenges to meet future mobility needs. The current version of the report, 2060 FTP, provides the following vision for the future for airports and aviation facilities:

- A statewide, multimodal system of trade gateways, logistics centers, and transportation corridors to position Florida as a global hub for commerce and investment
- An evolving air and space transportation system enabling Florida to remain a global leader for moving people and cargo between Florida and destinations in other states, nations, and orbit

Currently, the FTP is being updated to provide direction to FDOT and all organizations that are involved in planning and managing Florida's transportation system, including statewide, regional, and local partners. For this FTP update, seven goals (desired outcomes) were developed to highlight Florida's transportation system over the next 50 years; these include:

- Safety and security for residents, businesses, and visitors
- Efficient and reliable mobility for people and freight
- Transportation solutions that support Florida's global economic competitiveness
- Transportation solutions that enhance Florida's environment and conserve energy
- Agile, resilient, and quality transportation infrastructure
- More transportation choices for people and freight
- Transportation solutions that support quality places to live, learn, work, and play

The development of the FDOT *Airport Sustainability Guidebook* will both compliment and supplement the overarching goals of the most current FTP. When feasible, there will be specific references and documentation as to how the FDOT *Airport Sustainability Guidebook* is supporting the FTP. For more information on the FTP, please visit:

www.dot.state.fl.us/planning/FTP/

2. Florida's Strategic Intermodal System Strategic Plan

Prepared by: Florida Department of Transportation, 2010

<http://www.dot.state.fl.us/planning/sis/>

The Strategic Intermodal System (SIS) is comprised of Florida's largest and most strategic air, space, water, rail, and highway transportation facilities. There are currently 19 airports that are included in the SIS. Of these 19 airports, seven are Commercial Service SIS Airports, and two are SIS General Aviation Reliever Airports. The remaining 10 are Commercial Service Emerging SIS Airports. Airport eligibility into the SIS and categorization must meet the identified criteria as updated. More information on the SIS criteria can be found on the SIS website: <http://www.dot.state.fl.us/planning/sis/>. SIS funds can be used for airport facilities in need of additional capacity. The SIS strategic plan creates the policies used to designate SIS facilities, where funding should be allocated, and how to establish priorities among these investments. The SIS has identified seven objectives within the strategic plan:

- Enhance connectivity between Florida's economic regions and between Florida and other states and nations for both people and freight

- Reduce delay on and improve the reliability of travel and transport using the SIS facilities
- Expand modal alternatives to SIS highways for travel and transport between regions, state, and nations
- Provide for safe and efficient transfers for both people and freight between all transportation modes
- Provide transportation systems to support statewide goals related to economic diversification and development
- Reduce growth rate in vehicle-miles traveled and associated energy consumption and emissions of air pollutants and greenhouse gasses
- Help ensure Florida's transportation system can meet national defense and emergency response and evacuation needs

Florida's airports that are designated or eligible for designation as SIS facilities are encouraged to become familiar with the SIS Strategic Plan and have an understanding of the prioritization standards for funding and improvements. Many of Florida's airports are identified as SIS and benefit from its emphasis on complete transportation systems. The SIS has been developed to support interconnectivity and economic development which greatly benefit airports considering the implementation of sustainability initiatives related to capacity-enhancing projects.

3. Florida Aviation System Plan 2025*

Prepared by: Florida Department of Transportation, 2012

*The FASP 2035, a comprehensive update, is currently underway.

www.dot.state.fl.us/aviation/flpub.shtm

The Florida Aviation System Plan (FASP) was developed through the coordination of the FDOT, the FAA, and Florida's public airports through the Continuing Florida Aviation System Planning Process (CFASPP). The FASP involves standard aviation system planning elements provided within most state aviation system plans, and assists in updating and maintaining the Florida Aviation Database (FAD), a comprehensive statewide aviation database. The FASP 2025 includes an analysis of the intermodal aspects of the state transportation system and a strategic aviation planning element that identifies seven strategic goals and the measurements, approaches, and recommendations to achieve these goals:

- Support new technologies and innovation in aviation
- Contribute to sustainable growth while remaining sensitive to the environment
- Provide efficient, safe, convenient, and secure airports
- Enhance Florida's leadership and prominence in the aviation industry
- Protect airspace and promote compatible land use planning around Florida airports
- Promote aviation to business, government, and the public
- Foster Florida's reputation as a military-friendly state

The Continuing Florida Aviation System Planning Process is a public involvement and communication process with tri-annual meetings to exchange information between federal, state, and local aviation planners and airport sponsors and reach consensus on comprehensive estimates of needed airport improvements and related capital costs, discuss funding strategies, trends, and concerns related to Florida's airports, and serve as a continuous stakeholder input process for the FASP. The FASP and CFASPP are excellent

examples of Florida's devotion to maintaining a robust aviation presence throughout the state. They are effective ways for airports to stay aware of current trends and to understand the funding, goals, and changes to Florida's aviation system. It is recommended airports reference this document to ensure that their sustainability initiatives aid in the promotion of Florida's aviation industry. Airports considering implementing or those that have already implemented sustainability initiatives are encouraged to be active participants within their CFASPP regions to ensure the sharing of knowledge and an understanding of their region's trends and conditions. Airports should take care to reference the most up to date version of the FASP as FDOT is currently working to update the document.

4. **FDOT Guidebook for Airport Master Planning**

Prepared by: Florida Department of Transportation, 2010

www.dot.state.fl.us/aviation/flpub.shtm

The *FDOT Guidebook for Airport Master Planning* was developed for use by airport owners/sponsors, operators, and consultants when developing Florida airport master plans to assist in effective and appropriate master plan studies. It is of the highest importance to FDOT that the *Guidebook for Airport Master Planning* be utilized to help the state meet its airport improvement needs in a logical and cohesive manner. To accomplish this, the *Guidebook for Airport Master Planning* provides the following:

- Guidance on the necessary steps of an airport master plan
- Guidance on the development of individual components of an airport master plan

Based on new federal regulations, airport master plans must incorporate sustainability if the airport does not have an adopted sustainability management plan. In a master plan, the sustainability element can either be a stand-alone section or combined with other sections, as appropriate. This FDOT Sustainability Guidebook includes suggestions and references regarding sustainability applicability and how it may affect master plans. Currently, the *Guidebook for Airport Master Planning* is being updated to account for changes since the 2010 version was developed. Please check with FDOT to ensure that the current version is used.

5. **FDOT General Aviation Airport Business Plan Guidebook**

Prepared by: Florida Department of Transportation, 2014

www.dot.state.fl.us/aviation/flpub.shtm

The *FDOT General Aviation (GA) Business Plan Guidebook* was developed as a resource to assist GA airports to develop financial strategies geared at a broad range of topics affecting an airport and its fiscal success. In an effort to remain financially self-sufficient, airports have focused on improving their financial health by diversifying their business models to include more non-aeronautical revenue. To accomplish this, the Guidebook provides the following key elements:

- Case studies on airports that completed business plans
- Step-by-step instructions on the business planning process
- Best management practices for airports completing a business plan

Additionally, it provides information on how airports interact with the community around them and assists airports in garnering support from the local community.

There are two ways in which airports can achieve financial self-sufficiency: increasing revenues and decreasing costs. The *GA Business Plan Guidebook* was developed to help airports increase revenues through diversification of the business model, while the FDOT Airport Sustainability Guidebook is being developed to help airports reduce costs. Whenever appropriate, references to the *GA Business Plan Guidebook* are provided in the Sustainability Guidebook.

6. Airport Compatible Land Use Guidebook

Prepared by: Florida Department of Transportation, 2012

www.dot.state.fl.us/aviation/flpub.shtm

The *Airport Compatible Land Use Guidebook* highlights important information and factors that must be considered when evaluating various land use and development decisions that have the potential to impact public-use airports or military airfields in Florida. Information in the *Airport Compatible Land Use Guidebook* is applicable to individuals, airport sponsors, land developers, professional aviation consultants, state agencies and planners, and local government officials and planners. To accomplish this, the *Airport Compatible Land Use Guidebook* is divided into four distinct sections:

- **Section One:** Provides detail on the specific areas around airports and airfields that need to be protected from tall structures that may interfere with navigable airspace and/or land uses that may jeopardize compatibility
- **Section Two:** Provides detail on state laws, federal regulations, and various processes in place to prevent incompatible development around airports/airfields
- **Section Three:** Provides an overview of the process that all local governments in Florida should follow when they review a development application in order to be compliant with existing state statutes and federal regulations
- **Section Four:** Discusses strategies to prevent or correct land use incompatibilities around airports/airfields and responsibilities related to compatible land use

The *Airport Compatible Land Use Guidebook* is based on current state law and existing federal regulations. The focus of the guidebook is on providing information that helps all applicable parties comply with existing laws and regulations. In order for any airport to be well integrated with the community around it, development at and surrounding the airport must be appropriately planned and implemented. Where appropriate, references to the *Airport Compatible Land Use Guidebook* are made that highlight the relationship between airport sustainability and land use compatibility at airports.

ADDITIONAL RESOURCES

In addition to the documents previously discussed, three additional sources were researched for their applicability to the FDOT *Airport Sustainability Guidebook*. The Sustainable Aviation Guidance Alliance (SAGA) Database, TRB Aviation Sustainability Subcommittee Materials, and the Florida Airports Council (FAC) Sustainability Initiatives Database all provide in detailed information related to sustainability and sustainability initiatives. More information on each of these resources is provided subsequently.

1. Florida Airports Council Sustainability Initiatives

www.floridaairports.org/sustainability.cfm

In 2010, the Florida Airports Council (FAC) initiated a program to document the sustainability plans, programs, and initiatives that had been completed at Florida airports. To accomplish this goal, a survey was developed by the FAC Sustainability Task Force and was distributed to all FAC member airports to gather information on sustainability policies, initiatives, energy/waste reduction goals, beneficial information, and local “green” or sustainability initiatives/policies. Of all airports, responses were received from 27 airports in Florida. From this survey, a list of airports with various sustainability programs was developed. These sustainability programs include:

- Sustainability or “green” policies
- Sustainable planning/design/construction guidelines or sustainability plans
- Airport and/or airline waste recycling programs
- Local procurement process
- Alternative energy production
- LED lighting (roadways or airfield)

Additional information on specific initiatives that individual airports have implemented are also provided. These include installation of high efficiency chillers, conducting a greenhouse gas inventory, and water conservation projects such as low-flow sinks, among many others. Any airport considering developing a sustainability plan or implementing sustainability initiatives should reference this site to see if any airport partners around the state have implemented a similar program. FAC’s Sustainability Initiatives website can be accessed at: www.floridaairports.org/sustainability.cfm

2. Sustainable Aviation Guidance Alliance Database

www.airportsustainability.org

The Sustainable Aviation Guidance Alliance (SAGA) was formed in 2008 to create consistent and consensus-based sustainability resources available for all airports. A web-based system was developed by SAGA members to provide users with an extensive list of sustainability actions and initiatives that can be implemented at airports. The SAGA website was developed to be interactive and allow users to learn about sustainability, share ideas and experiences, search sustainable practices based on custom information, and efficiently plan, implement, and monitor sustainability activities. To accomplish this, the website is divided into five modules:

- **Share:** This module allows users to add sustainable initiatives/practices to a library of sustainable initiatives as well as allows users to share case studies, documents, links, and comments on the initiatives/practices
- **Learn:** This module allows users to learn about the definition of sustainability, practical applications of sustainability principles at airports, and methods for integrating sustainability into existing business processes and an organization’s culture
- **Search:** This module allows users to search for sustainability initiatives/practices that are meaningful to their organization as well as identify, evaluate, prioritize, and select initiatives/practices that help the airport

- **Plan:** This module provides a scalable framework, based on an individual airport's culture and business model, to assist users in starting, implementing, improving, and maintaining sustainability initiatives/practices. The framework is a systematic approach to set goals, prioritize actions and monitor progress
- **Measure:** This module provides information and guidance on how to measure progress in sustainability, including steps to help airports identify key performance indicators (KPIs) and associated metrics for sustainability goals and practices

In total, the SAGA Database contains nearly 1,000 individual sustainability practices that can be utilized by airports. To assist users in navigating these practices, there are numerous search parameters that allow users to search for sustainability practices that are applicable to the airport. Parameters include climate, airport type (commercial, GA, military), and type of sustainability practice (energy use, economic performance, airport leadership, etc.).

Airports are encouraged to reference and utilize the SAGA Database and website both prior to and as part of any sustainability project or initiative. The SAGA website provides a user-friendly location for sustainability education and guidance on the overall development and implementation of sustainability initiatives. The SAGA website also provides templates for action monitoring and strategy development as well as numerous other resources. Prior to beginning any sustainability project or initiative, all airports should review the SAGA website to understand the resources that it provides. The SAGA website can be accessed at: www.airportsustainability.org

3. TRB AV030 Aviation Sustainability Subcommittee Materials

www.trb.org/AV030/AV030.aspx.

To provide airports with specific information and resources related to specific aviation topics, the Transportation Research Board (TRB) developed an Information Resource Series to highlight information on particular topic areas from a broad range of sources that are referenced throughout all TRB resources. Related to sustainability, the Committee on the Environmental Impacts of Aviation (AV030) focuses on environmental issues central to airport planning, design, construction, and operation as well as aviation system and aviation technology development issues. Within this Resource Series, TRB provides numerous resources, publications, and news sources on the environmental impacts of aviation. Reports and resources included in the Environmental Impacts of Aviation Information Resource Series include:

- TRB Publications (from all TRB programs)
- Transportation Research Record Series (peer-reviewed papers published in the journal of TRB)
- National Academies Publications (from other units of the National Academies)
- Other Publications (from outside TRB and the National Academies)

In total, there are over 50 resources provided in the Environmental Impacts of Aviation Information Resource Series. To further the priorities of individual components of the Environmental Impacts of Aviation Committee, five subcommittees were developed to promote understanding and research in individual fields. The five subcommittee fields are:

- Aviation Sustainability – Subcommittee AV030(1)

- Aviation Climate – Subcommittee AV030(2)
- Aviation Water – Subcommittee AV030(3)
- Aviation Noise – Subcommittee AV030(4)/ADC40(1)
- Alternative Aviation Fuels – Subcommittee AV030(5)

Within the Aviation Sustainability Subcommittee, a Sustainability Prioritization Matrix was developed and presented that includes 21 different sustainability subject areas and the current state of their development and use. The Aviation Sustainability Subcommittee seeks to:

- Learn about the current state of the art and practice of sustainability as applied to aviation
- Educate its members and TRB as a whole about opportunities and challenges of aviation sustainability
- Identify gaps in knowledge and research needed to effectively advance aviation sustainability

For more information on the Environmental Impacts of Aviation Committee, please visit: www.trb.org/AV030/AV030.aspx. For more information on the Aviation Sustainability Subcommittee, please visit: sites.google.com/site/trbav030/av030-subcommittees/sustainability

APPENDIX 3

AGENCY STAKEHOLDER INTERVIEWS

INTRODUCTION

In an effort to better understand how sustainability plans and programs can be developed to help Florida's airports, seven (7) stakeholder interviews were conducted to gather information. As part of Phase IA of this project, stakeholder interviews were conducted with airports and aviation entities; for this Phase, the stakeholder interviews were conducted primarily with non-aviation entities. This was done in an effort to assess the resources and tools that may exist for airports that are not available through the FDOT Aviation and Spaceports Office. To prepare for these stakeholder interviews, a series of questions and discussion topics were developed and distributed to participants to prompt the discussion. The stakeholder interviews that were completed include:

- | | |
|---|-------------------|
| ○ Federal Aviation Administration | October 28, 2015 |
| ○ Florida Department of Environmental Protection | November 16, 2015 |
| ○ FDOT Environmental Management Office | December 1, 2015 |
| ○ Florida Department of Agriculture and Consumer Services | December 2, 2015 |
| ○ Florida Department of Economic Opportunity | December 8, 2015 |
| ○ National Oceanic and Atmospheric Administration | December 9, 2015 |
| ○ FDOT Office of Policy Planning | December 10, 2015 |

OVERALL SUMMARY

The following is a summary of the input received from the interviews:

- In general, the agencies interviewed did not have a formalized definition of sustainability or a sustainability program
 - It was commonly stated that this was due to the overall direction provided by the Legislature
- Most of the agencies interviewed did incorporate practices that could be considered sustainable into their functions/operations, but not for sustainability reasons
- Many of the agencies had tools or programs that could be utilized by airports when implementing sustainable initiatives
 - Tracking tools
 - Funding programs
 - Data warehouses
- It was commonly stated that increased cooperation between FDOT, airports, and the agencies interviewed would help promote sustainability across all agencies

The following memorandum summarizes the information provided during the stakeholder interviews.

FEDERAL AVIATION ADMINISTRATION

Wednesday | October 28, 2015 | 3:30 – 5:00 PM

On October 28th, a stakeholder interview was held with the Federal Aviation Administration (FAA) for the FDOT Airport Sustainability Guidebook. Prior to the interview, a set of questions was sent to help facilitate the discussion. Attendees included:

- Marisol Elliot – FAA
- Rebecca Henry – FAA
- Stephen Wilson – FAA
- Pedro Blanco – FAA
- Jenny Iglesias-Hamann
- Thomas Cuddy – FAA (on phone)
- Jon Sewell – Kimley-Horn
- Pam Keidel-Adams – Kimley-Horn
- Zach DeVeau – Kimley-Horn
- Benjamin Siwinski – VHB
- Sierra Gaenicke – VHB
- Jim Halley – FDOT

The following is a summary of the input received from the interview.

- The FAA's sustainability efforts focus both on environmental and economic sustainability
 - It was noted that for both of these categories, it is all about efficiency
- The FAA's Recycling, Reuse, and Waste Reduction guidance is just now being incorporated into master plan scopes at a large scale, it will take a while for there to be enough information on the outcome of this program
- It was stated that the information provided in the Guidebook must be used to help airports enhance the value of the State and Federal funding that they receive
- The FAA noted that it is important for the Guidebook to be coordinated and integrated with other FDOT and FAA documents and guidance
- The FAA noted that numerous airports in Florida are unable to receive Federal funding because they cannot provide the local match
 - It was noted that an airport being able to save even a small amount of money through the implementation of sustainable initiatives may then be able to provide a local match
 - This would then make them eligible for more State and Federal funding, without having to use any additional local funds
 - Including this information, as well as how to convey it to local policy makers, would be a great help to airports
- It was noted that communication is very important
 - Often, different people are responsible for paying bills, management, and day-to-day operations

- Having open communication between all these players, as well as FDOT and the FAA, will help to eliminate inefficiencies
- Related to their sustainability efforts, the FAA noted that they are beginning to fund greenhouse gas (GHG) and carbon inventories
 - Under this program, certification will not be eligible for funding
 - Information from these studies could be extrapolated out and used for a wider audit
- The FAA also has a Zero Emissions Vehicle Pilot Program that airports can utilize for obtaining or converting vehicles to be zero emission
 - Currently, only one project has been completed - Inductive charging at Atlanta International Airport
- It was noted that there has been little participation due to the numerous requirements and provisions that must be met to participate in the program (Ex: Must buy-American)
 - Per 49 USC §47136b(2), airports that are air quality attainment or maintenance areas may now apply for funding under this program.

FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

Monday | November 16, 2015 | 1:00 – 2:00 PM

On November 16th, a stakeholder interview was held with the Florida Department of Environmental Protection (DEP) for the FDOT Airport Sustainability Guidebook. Prior to the interview, a set of questions was sent to help facilitate the discussion. Attendees included:

- Chris Stahl – DEP
- Jon Sewell – Kimley-Horn
- Zach DeVeau – Kimley-Horn
- Jim Halley – FDOT (on phone)
- Sierra Gaenicke – VHB (on phone)

The following is a summary of the input received from the interview.

- Currently, DEP does not have any formalized sustainability initiatives that they follow as an organization
 - Any initiatives that they would implement agency wide would have to come from the Governor's office
- DEP does not believe there are any limitations to implementing and promoting sustainability efforts at their organization
 - It is not DEP's role to promote and implement sustainability initiatives. DEP is responsible for helping people with the permitting process
- DEP currently participates in a program with Florida military bases to conserve and protect land surrounding the bases
 - When land becomes available for sale surrounding a base, the military buys it to protect the encroachment of incompatible land uses
 - In the future, when DEP has funds available, they purchase the land from the base for conservation through their Florida Forever program
 - Once purchased, the land is evaluated for its ecological characteristics and a management plan is developed for the land
 - The focus of purchasing this land is to protect the fence line around airports
 - If public-use airports were to participate in this, they would need to have the funds available to purchase the land and be able to hold onto it until DEP can buy it
- It was noted that in some areas of the state, DOTs have started working with water management districts and other state agencies to utilize regional stormwater basins for local water management
 - This helps cut down on local costs for projects and would reduce incompatible land uses around airports
- DEP provides a large library of geographic information system (GIS) files that can be utilized by airports or municipalities
 - Airports can access this data through the DEP website at: www.dep.state.fl.us/gis/
- DEP provides numerous tools to help outside agencies, including:
 - Recycling Business Assistance Center
 - Brownfield incentives

- Business Recycling Tracking Tool
- Online E-Permitting Tool
- With regards to future coordination on this project with DEP, it was suggested that all major plans and projects both at the state level and individual airport level be coordinated with DEP

FLORIDA DEPARTMENT OF TRANSPORTATION – ENVIRONMENTAL MANAGEMENT OFFICE

Tuesday | December 1, 2015 | 1:00 – 2:00 PM

On December 1st, a stakeholder interview was held with the Florida Department of Transportation (FDOT) Environmental Management Office (EMO) for the FDOT Airport Sustainability Guidebook. Prior to the interview, a set of questions was sent to help facilitate the discussion. Attendees included:

- Mariano Berrios – FDOT EMO
- Jon Sewell – Kimley-Horn
- Zach DeVeau – Kimley-Horn
- Jim Halley – FDOT

The following is a summary of the input received from the interview.

- Prior to beginning the meeting, Mr. Berrios commented that he was very impressed with the definition of sustainability provided in the project's white paper
- Currently, the FDOT EMO has nothing in the form of sustainability programs or guidance
 - It has been discussed in the past, but nothing has ever happened
- With regards to NEPA and requirements from the FHWA for incorporating sustainability into projects, no formal guidance is provided
 - It was stated that it was verbally suggested that sustainability be included within projects, but that is largely politically driven
 - It was also noted that some programs, such as recycling concrete/pavement during resurfacing projects, has been done for years, just not under the sustainability umbrella
- It was stated that EMO does not have any marketing tools that it uses to promote sustainability, but tying sustainability to financial cost savings would be a great way to promote sustainability
- It was stated that there are initiatives that are being promoted in Florida that support sustainability, but they are not being promoted in that way. Current initiatives include:
 - Limiting mowing and planting wildflowers along roadways
 - Decreases maintenance costs
 - Provides the public with a visual benefit
 - Use of wetland mitigation banks during projects
 - Wildlife/cultural resource protection during projects
- It was stated that because there is limited guidance related to sustainability, it is up to the agencies and individuals to decide if they “want the bar to be the floor or the ceiling”

DEPARTMENT OF AGRICULTURE AND CONSUMER SERVICES

Wednesday | December 2, 2015 | 2:00 – 3:00 PM

On December 2nd, a stakeholder interview was held with the Department of Agriculture and Consumer Services (DACS) for the FDOT Airport Sustainability Guidebook. Prior to the interview, a set of questions was sent to help facilitate the discussion. Attendees included:

- Michael Mitchell – DACS
- John Leeds – DACS
- Jon Sewell – Kimley-Horn
- Zach DeVeau – Kimley-Horn
- Jim Halley – FDOT

The following is a summary of the input received from the interview.

- Prior to the meeting, DACS provided the project team with a list of programs and grants that are available through their office, these include:
 - Florida Renewable Energy Tax Incentives
 - Natural Gas Fuel Fleet Vehicle Rebate
 - Renewable Energy and Energy Efficient Technologies (REET) Grant Matching Program
- It was stated in the meeting that some of these programs may be difficult to apply to airports on a large scale

Below is a summary of these programs and grants:

Natural Gas Fuel Fleet Vehicle Rebate

- This program is funded through FY 2017/18
- Six million dollars per year is appropriated for this rebate
 - 40 percent is allocated to public entities
 - 60 percent is allocated to private entities
- Rebate provides up to 50 percent or \$25,000, whichever is greater
- Each applicant can receive a total of \$250,000 per fiscal year
- Rebate is eligible for any vehicle registered in the State of Florida
 - Would include tugs (if registered)
- Rebate is given on a first come first serve basis
- Rebate is eligible for the follow natural gas types:
 - Propane
 - Compressed natural gas
 - Liquid natural gas
 - Bio-fuels
- Would be most useful at airports that already have gas systems

Renewable Energy and Energy Efficient Technologies (REET) Grant Matching Program

- This program provides matching funds for research and development projects
- This program requires a third party to participate in order to be eligible
 - Both FDOT and FAA would fulfill the third party requirement
- Applicants must have a “primary funder,” and can apply to DACS to receive cost-share or matching funds
- Funds are awarded only if the primary funder awards a grant
- Program may only be applicable to large research project taking place at spaceports, not necessarily airports throughout the state

Florida Renewable Energy Tax Incentives

- Consists of three different types of tax refunds:
 - Renewable Energy Technology Sales
 - Renewable Energy Technology Investment
 - Renewable Energy Production Credit

The impetus for developing these resources came from a variety of sources:

- The REET program was passed down by legislation
- Other programs, such as the Energy Efficient Retrofit program were developed through Federal programs
 - Program development, whether at the State or Federal level is really based on the needs and trends of the time
 - If an entity comes to DACS with a need/idea and they like it, it will be passed along to the legislature
 - Based on the priorities of the leadership at that time, the measure will be supported
 - In reality, it is based on what the industry wants at the time

Following the meeting, DACS provided the project team with the following information and resources that may be able to be utilized by airports:

Energy Audits: Energy saving companies will come in and perform an audit on energy usage and offer guaranteed savings on their services

http://www.dms.myflorida.com/business_operations/state_purchasing/vendor_information/state_contracts_and_agreements/state_term_contracts/energy_savings

Energy Database: Database of energy efficiency and renewable energy incentives

www.dsireusa.org

Energy Efficiency programs: Energy efficiency programs provided by the US Department of Energy

<http://energy.gov/eere/better-buildings>

Rural Energy for America Program (REAP): Finances energy efficiency improvements for rural areas (all rural areas other than cities of greater than 50,000 population and their adjacent urbanized areas)

<http://www.rd.usda.gov/fl>

DEPARTMENT OF ECONOMIC OPPORTUNITY

Tuesday | December 8, 2015 | 2:00 – 3:00 PM

On December 8th, a stakeholder interview was held with the Department of Economic Opportunity (DEO) for the FDOT Airport Sustainability Guidebook. Prior to the interview, a set of questions was sent to help facilitate the discussion. Attendees included:

- Ana Richmond – DEO
- Sean Reiss – DEO
- Zach DeVeau – Kimley-Horn

The following is a summary of the input received from the interview.

- DEO has no formal definition of sustainability, but that is because there are so many departments within the agency, there would be too many different definitions that would be developed
 - More realistically, definitions of sustainability would need to be developed for each department
- When the DEO Community Planning Department thinks about “sustainability,” it is under the umbrella of land use compatibility
 - Applied to airports, they try to think about planning for the future of airports, not necessarily what is there today
- Much of the efforts of DEO are related to Adaptation (Resiliency) Planning
 - Planning for Coastal Flooding and Sea Level Rise
 - Provide Technical Assistance Grant to assist communities with resiliency planning
 - Technical Assistance Grant is provided in consultant time, not monetary funding
 - Currently, three communities (Escambia County, St. Petersburg, and St. Augustine) are participating in a Pilot Program utilizing the Technical Assistance Grant
 - From the Pilot Program, a list of lessons learned and best management practices will be developed for others to use
 - Not anticipated to be completed by 2017
- The project team asked if the DEO had any effective methods for transmitting information to interested stakeholders. Though nothing has been developed specifically related to sustainability, DEO provided the following suggestions for successfully implementing any project:
 - Using face-to-face meetings in-lieu of webinars or teleconferences
 - Providing ready-made templates that users can populate with information that is pertinent to them
 - Provide a summary list of frequently asked questions

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

Wednesday | December 9, 2015 | 10:00 – 11:00 AM

On December 9th, a stakeholder interview was held with the National Oceanic and Atmospheric Administration (NOAA) for the FDOT Airport Sustainability Guidebook. Prior to the interview, a set of questions was sent to help facilitate the discussion. Attendees included:

- Paul Witsaman – NOAA
- Victor Murphey – NOAA
- Zach DeVeau – Kimley-Horn
- Brain Powers – Kimley-Horn

The following is a summary of the input received from the interview.

- NOAA indicated that they deal primarily with the Terminal Area Forecasts and the management of letters of agreement for weather warnings
- NOAA stated that they thought sustainability efforts should take airport weather systems into consideration, this included both:
 - AWOS – Automated Weather Observing System
 - ASOS – Automated Surface Observing System
- Joint Airport Improvement Program (AIP) funding and State clearinghouses can be a great funding mechanism for airport weather systems when coordinated effectively
 - Ex: The Texas Department of Transportation (TxDOT) coordinates with their airports to have combined applications for AWOS/ASOS system purchasing and installation
 - Generally, TDOT will wait for 3-5 applicants before applying for the AIP funding for these projects
 - By pooling resources and applying for a group of funding at one time, TxDOT is able to save airports time and money when acquiring weather systems
 - TxDOT receives the funds and disperses them out to the counties/cities that identified the need
 - The installation of these facilities is approximately \$100,000 per airport
 - These facilities have the capability to transmit weather data into a National/International system (not all airports use this feature)
- Correctly utilizing AWOS/ASOS systems can assist in economic growth
 - Pilots are able to determine the weather conditions from around the world, and able to chart flights accordingly
 - These systems increase visibility for the community, airport, and even aid medivac services
 - Increased airport activity has the potential to generate and enhance local commerce
- It was noted that numerous airports in Florida have spent the money to install AWOS/ASOS systems, but do not report the data to NOAA
 - Not reporting the data to NOAA limits the number of pilots who can access the information and cuts the airport off from outside users
- NOAA categorize their primary efforts into a three pronged approach:
 - **Commerce**: provide weather data to improve movement and safety of goods and people

Airport **Sustainability** Guidebook

Technical Appendices

- **Safety**: provide information that allows for safe air travel and meet FAA regulations
- **Emergency Management**: provide information for emergency services and increase early warning accuracy

FLORIDA DEPARTMENT OF TRANSPORTATION – OFFICE OF POLICY PLANNING

Thursday | December 10, 2015 | 2:30 – 3:30 PM

On December 10th, a stakeholder interview was held with the Florida Department of Transportation (FDOT) Office of Policy Planning for the FDOT Airport Sustainability Guidebook. Prior to the interview, a set of questions was sent to help facilitate the discussion. Attendees included:

- Maria Cahill – FDOT Office of Policy Planning
- Jon Sewell – Kimley-Horn
- Zach DeVeau – Kimley-Horn
- Jim Halley – FDOT

The following is a summary of the input received from the interview.

- It was explained that this project is intended to pull information from existing resources
 - The document will complement the Florida Transportation Plan (FTP) and other applicable state documents
 - This Guidebook will be developed to be consistent with and support the goals of the FTP
 - Multimodal transportation
 - Quality of life and quality places
 - Environment and energy conservation
- The project will be looked at as a financial document; other elements, such as the environmental benefits, will be included as added benefits
- It was recommended that one important factor is ensuring that facilities are resilient to future trends
 - It was noted that if an airport does not design its facilities for the potential for sea level rise, they could be limiting the return on investment in their facilities
 - Ft. Lauderdale-Hollywood International Airport built a runway to account for future flooding
- Currently, the FAA has not taken a stance on resiliency planning, but their sustainability focus has been on financial initiatives
- It was suggested that including sea level rise models into the Airport Layout Plans/Airport Master Plans alternatives would help airports plan for the future and develop more resilient facilities
- Related to assisting airports, it was noted that the Office of Policy Planning has developed two (2) tools to assist users in mapping and calculating sea level rise:
 - Florida Sea Level Scenario Sketch Planning Tool
 - Identifies transportation infrastructure potentially at risk from projected sea level changes
 - Sea Level Rise Inundation Surface Calculator
 - Assists users in creating GIS layers representing potentially inundated areas due to various sea level rise scenarios
 - Calculator provided for each FDOT District

- A pilot program was also developed to test these tools and develop vulnerability assessments
- A future phase of the project will be completed that updates the Sketch Planning Tool with new floodplain maps
 - Training has also be approved to teach Metropolitan Planning Organizations (MPOs) how to effectively use the tools
- Tools can be accessed here: <http://sls.geoplan.ufl.edu/#intro>
- It was noted that large-scale changes to how facilities are designed have not been implemented because designers and engineers do not think there is enough scientific advancement to change the design guidelines based on predicted sea level rise
- It was recommended that, at a minimum, the following types of facilities should be designed to be resilient to future sea level rise:
 - Evacuation routes
 - Barrier island bridges
 - Roads to airports
 - “Critical” facilities
 - Airports themselves are critical facilities, especially during times of emergency such as hurricanes, law enforcement/firefighting/medical response operations, etc.
- It was noted that, currently, no statewide sustainability policies have been implemented, just resiliency requirements in the FTP
 - The current political climate is not receptive to addressing these issues
- It was recommended that looking at vulnerability to climate change should be a part of the master planning process at Florida’s airports. At a minimum they should include design elements that address the following:
 - 100/500 year storm events
 - Projected sea level rise
- The Sketch Planning Tool could be used to understand future problems
 - Utilizing the tools would help airports and FDOT understand the implications on the design life of the facilities

APPENDIX 4

AIRPORT CASE STUDIES

NAPLES MUNICIPAL AIRPORT

How Naples Municipal Airport has developed and updated its own “Sustainability, Conservation, and Social Responsibility Plan”

Key Findings:

- It is important for an Airport to communicate with the public about its environmental stewardship and other positive impacts on the community.
- An Airport cannot change the perception of the entire community or its most critical opponents by advertising its sustainability performance, but it may develop support amongst those that are typically ambivalent about the Airport.
- If an Airport develops its own sustainability report, then one person should be assigned the responsibility of leading that effort and the report should be updated regularly.
- The designated Airport representative in charge of updating a sustainability plan should keep track of accomplishments and performance throughout the year to allow for a more efficient and accurate report update process.

Interviewee: Kerry Keith, Senior Director of Airport Development and Facilities, Naples Municipal Airport

Naples Municipal Airport is owned and operated by the City of Naples Airport Authority and is located two miles northeast of the central district of Naples. The Airport serves a wide variety of General Aviation, charter carriers, and nonscheduled commercial aircraft and includes an Air Traffic Control Tower, corporate/FBO hangars, and T-hangars. It also supports public services such as Medflights, Civil Air Patrol Squadrons, Collier County Sheriff’s Aviation Unit, AngelFlight Southeast, and the Museum of Military Memorabilia.

The City of Naples has a number of residents with a negative perception of the Airport that continue to express concerns about aircraft noise in the community. As a result, the Airport decided to provide the community with a report to describe and explain the Airport’s **sustainability** efforts: Sustainability, Conservation, and Social Responsibility Plan. The first version of the Plan was published online in 2009. The latest 2015 version includes the following sections and information²:

- *Sustainability:*
 - *Administrative Sustainability,*
 - *Stormwater Management,*
 - *Water Efficiency,*
 - *Development and Facilities, and*

² City of Naples Airport Authority, *Sustainability, Conservation, and Social Responsibility Plan*, March 2015 Update.

- *Safety Program.*
- *Conservation Measures*
- *Social Responsibility:*
 - *Noise Abatement,*
 - *Corporate Social Responsibility, and*
 - *Accolades.*

Kerry Keith, Senior Director of Airport Development and Facilities, is currently responsible for maintaining and conducting updates to the Plan. The creation of the Plan began prior to Mr. Keith's employment at Naples Municipal Airport by the previous Director of Airport Development and Facilities. The Plan is published every 1-2 years and takes 40 to 60 man-hours on each update to collect, format, and analyze data, as well as the finalization of the report. As each update is completed, the Airport provides hardcopies, presented by Mr. Keith, to the Authority Board during a meeting televised to the public. A copy of the report is also available on the Airport's website for the public to download. The Airport has recently decided to take a different approach to the formatting of the Plan in an effort to bring the plan more in line with the current concept of sustainability, to include: Economic viability, Operational efficiency, Natural resource conservation, and Social responsibility or EONS. In past years, the Airport has received little to no feedback from the community or the Authority Board.

The Airport currently sets performance goals, tracks water and electricity usage (as discussed in the Plan), and implements strategies to reduce utilities consumption. For example, the Airport **recently** purchased new pumps to assist in the control, monitoring, and tracking of the Airport's irrigation water consumption. Other strategies are outlined in the report.

In future **reports**, the Airport plans to provide more charts and graphs to demonstrate sustainability performance. Mr. Keith keeps a checklist/chart available throughout the year to check-off and note events and sustainability efforts as they occur to assist in efficient, accurate data collection and write-up of the report updates.

To gain support from the community and Authority Board, Mr. Keith stressed that it is important to clearly define **sustainability** and to provide frequent updates on the Airport's efforts and initiatives. The Airport has also been emphasizing sustainability education internally and to the public as an important strategy for general support. The Airport has received positive media coverage recently, and will consider issuing press releases to local media when future report updates are published.

Airports are encouraged to establish community outreach programs to obtain a greater understanding of their community's sustainability expectations. Incorporating these expectations will help garner support for the airport from the community.

The Airport Authority has been in the process of selecting a new Executive Director, and selection **criteria** related to sustainability implementation has been used in the process. The new Executive Director is expected to encourage the Airport's sustainability efforts and assist with the EONS Plan updates.

VENICE MUNICIPAL AIRPORT

How Venice Municipal Airport has actively engaged the community to improve relations

Key Findings:

- General Aviation airports need to find ways to communicate the importance of their facilities to community members that aren't pilots. One way that has been successful at Venice Municipal Airport is to relate the interlinked history of the Airport and the City to the community and to take a proactive approach to engaging the airport's neighbors.
- Typically, the main deterrents to community engagement include airport management's perceived lack of time, personal skills that might not align with community engagement needs, and an external view of an airport as being "fenced off" from the rest of the community.
- An Airport Director can't do it all by themselves – airport businesses and proponent groups (pilot clubs, etc.) can be valuable extensions of staff to help with community engagement efforts.
- Elected officials need to be educated on the importance of General Aviation airports and their operational and development needs.

Interviewee: Chris Rozansky, Airport Director, Venice Municipal Airport

Venice Municipal Airport was originally built in the early 1940s by the U.S. government during World War II, and is currently owned and operated by the City of Venice. It is located 1.7 miles south of downtown Venice along the coast of the Gulf of Mexico. The Airport serves the General Aviation community with two intersecting 5,000-foot runways and includes corporate/FBO hangars, T-hangars, and a restaurant. The Airport is self-sufficient and does not receive assistance from the City's General Fund.

Some members of the community have expressed concerns with aircraft noise, public safety, and **property** values and held misperceptions about past Airport development plans. Members of the community have been critical of the Airport's operations and development plans for different reasons – including aircraft noise, misperceptions of condemnation of residences, closure of a popular municipal golf course for future development, and use of the City's General Funds to support the Airport. It is important to understand community members' different concerns so they might be addressed effectively.

The most frequent concern/complaint from surrounding residents is aircraft noise. Chris Rozansky, the Airport Director, notes that frequently noise is simply a symptom of another **underlying** issue. Airport representatives need to understand that sometimes there are other issues (non-airport related) that affect a person's perception of the aircraft noise and those are separate issues that an Airport does not have the ability to address.

Mr. Rozansky was hired as the Airport Director in 2010 while the Airport was in the process of a Master Plan Update. At that time, area residents urged the City Council to consider **alternatives**

to the proposed development alternative in the Master Plan Update. As a result of the community's pressure, the Master Plan Update reviewed alternatives that would decrease the utility of the Airport, including a lowering of the primary runway critical aircraft category. To alleviate those concerns, the Airport proposed enhancements to the crosswind runway that enables all aircraft to operate over the Gulf of Mexico instead of over residential areas. The Airport garnered enough public and City Council support to implement this plan because of its many operational benefits, including the reduction of noise and overflights of residential communities. The improvements have been implemented and the pilot community and the many members of the public are pleased with the results.

In an effort to better the Airport's general perception within the community, Mr. Rozansky organized meetings with homeowners to discuss their concerns. Since local history is of strong **importance** to the community, Mr. Rozansky researched and provided examples of how the Airport has played a key role in the growth of the City, including:

- In 1936, Dr. Fred Albee, a renowned orthopedic surgeon and a pilot, established an airfield (predecessor to the current Airport) to bring patients to Venice and his practice;
- Venice Theater was started in a hangar on the "new" airport property; and
- The local Catholic Church used airport property to hold weekly services.

Airport staff should familiarize themselves with the history of their airport. Many of Florida's airports have long and illustrious histories including being military training airfields for World War II, hosting aviation "firsts" such as the first commercial flight, and many others.

In discussions with the community, Mr. Rozansky described the airport as a primary contributor to the City's increased development and tourism, as well as the promotion of commerce and business similar to what an interstate highway offers a community. This face-to-face interaction with the community explained in a relatable fashion worked best for Mr. Rozansky to be able to explain to those who are not pilots or involved in the aviation industry the importance of the Airport. For example, **highlighting** airport businesses/operators to the public such as Agape Flights, which provides flight support for Christian missionaries and hosts 80-100 volunteers weekly from throughout Sarasota County to support missions, can provide the public a different perspective about who is using the facility. Another tenant is the Sarasota County Sheriff's Office, who provides law enforcement, search and rescue, and firefighting services from the airport. During these meetings, Mr. Rozansky provides the public with hardcopy materials of facts, figures, and presentations for their reference.

In addition to in-person meetings with the public, the Airport offers events and provides services to promote and educate the community; these include:

Public Tours – helps to eliminate the feeling of separation between the airport and the **community**, as well as provides an educational opportunity to explain the financial and economic benefits of the airport (importing of goods, medical supplies, maintenance/overhaul, etc.). Key to the success of these tours is utilizing a van or tour bus to explore the airfield and visit tenants' facilities.

- Experimental Aircraft Association (EAA) – uses the Airport for educational opportunities including sessions and flights for children.
- Fairgrounds – airport property used for local fairs and events (Airport's name is used in association to promote Airport visibility).
- Venice Aviation Society, Inc. (VASI) – the largest promotor of the Airport; the group holds meetings, open to the public, to listen and discuss individual airport concerns and issues.
- Local public education – the Airport is coordinating with a local high school to develop a program for students to learn about different aviation-related professions.

The Airport staff also provides support with all community engagement efforts. Mr. Rozansky encourages his staff to become involved in all community outreach efforts, but emphasizes the importance of not becoming emotionally involved during interactions with the public.

Airport staff are encouraged to become familiar with community engagement techniques and may find some of the following resources useful:

- The Public Relations Society of American or the local chapter of the Florida Public Relations Association to increase their knowledge and skills.
- Working with City/County public affairs offices to utilize their expertise.
- The Florida Airports Council Noise Abatement and Community Affairs committee.
- Attending local college courses on communications and public relations.

ALBERT WHITTED AIRPORT

How St. Petersburg's Albert Whitted Airport is accommodating the City's new Executive Order on Sustainability

Key Findings:

- Airport staff and their consultants should involve appropriate city departments early in the planning process to review relevant plans, community input, codes, and other factors that may affect design, scope, and budget. This is especially important for urban and waterfront airports where the facility is closely connected to other dynamic developments and communities.
- Airport staff should assess the level of effort for city and airport personnel, as well as consultants, during scope, schedule and fee development to consider sustainable development and consistency with other city policies/plans. All parties will have varying levels of work depending on roles and responsibilities for example, city staff do not usually have the capacity to design and certify projects depending on workload, but can review scope, coordinate key staff and experts, participate in design meetings, and offer lessons learned from other city activities or examples.
- If Leadership in Energy and Environmental Design (LEED) or other "green" certification is being sought, contractors need to have qualifications and provide competitive bids. In addition, the project needs to be scoped appropriately for certification requirements which will include documentation for contractor and subcontractors for certification.
- Using the sustainability approach should result in lifecycle costs savings and/or other benefits important to the role of federal, state, and local government.

Interviewees: Richard Lesniak, Airport Director, Albert Whitted Airport

Sharon Wright, Sustainability Coordinator, City of St. Petersburg

Albert Whitted Airport is owned and operated by the City of St. Petersburg, and is located in the City's **downtown** core. The Airport serves the General Aviation community and includes a historic National Airlines hangar, contemporary terminal building with restaurant, an Airport Traffic Control Tower, as well as corporate/FBO hangars and T-hangars.

Downtown St. Petersburg has been redeveloped and grown extensively since the economic downturn in 2008. The growth in the City has led to increased tax revenues and a new demographic of residents that value environmental stewardship and sustainability. As a result of the community's desires and elected officials' motivations, the Mayor issued an Executive Order Establishing Policies Consistent with the City of St. Petersburg Sustainability Initiatives on August 18, 2015.³ The Executive Order includes many goals, initiatives, and actions, including the following policies:

³ EO-2015-07, www.stpete.org/docs/Sustainability_EO.pdf

- Obtain a Star Community Rating leadership certification⁴;
- Develop and implement a citywide Climate Action Plan;
- Apply the LEED program⁵ or the Green Building Initiative's Green Globes program⁶ for all new and existing city-owned and occupied buildings over 10,000 square feet; and
- Reduce greenhouse gas emissions, increase energy efficiencies, and utilize renewable energy sources.

Sharon Wright has served in the role of Sustainability Coordinator for the City since June 2015 and has been tasked with implementing the Executive Order. In her position, Ms. Wright has inventoried each City department to identify existing sustainability work and programs, developed key initiatives and implementation highlights for each strategic goal, assigned department liaisons to assist in community and department initiatives, and is working with leadership to incorporate life cycle cost analyses into the City's procurement process. While several City facilities like the Pier, Police Headquarters, and a Fire Station, were already planned to include sustainable design, the 2015 Executive Order has offered the opportunity to renew the approach and include more involvement from city departments to realize solutions. Moreover, the City is working toward the sustainable approach to activities and facilities as part of the City's "DNA" in how it meets economic, social, and environmental challenges and opportunities.

The Airport is currently in the pre-design phase for multiple, new hangars which are being partially funded with FDOT grants. During this phase, Richard Lesniak, the Airport Manager, became aware of the new Executive Order and realized that some of the new hangars may be greater than 10,000 square feet, which would trigger the LEED and/or Green Globes programs. Mr. Lesniak started coordinating with Ms. Wright and the City Engineering Department to determine the applicability. In addition, the Airport's engineering design consultant was brought in to help understand the implications to design, construction, and the overall costs of the added processes.

Though FAA and FDOT do typically view design and construction costs associated with green or sustainable guidelines such as LEED or Green Building Initiative (GBI) as grant eligible, neither organization will participate financially in the application and certification process.

The Airport Manager, the consultants, and city staff have been identifying the challenges associated with applying green building certification criteria to an airport facility, and are in the process of determining the best method of applying the City's Executive Order to the Airport's planned redevelopment. The sustainable design process for the future hangar facilities will continue in 2016. The Airport and the City are also in the process of determining how implementation of other components of the Executive Order will affect the Airport's operation, planning, and future development.

⁴ Sustainability Tools for Assessing & Rating Communities, <http://www.starcommunities.org/rating-system/>

⁵ U.S. Green Building Council, <http://www.usgbc.org/leed>

⁶ Green Building Initiative, <http://www.thegbi.org/green-globes-certification/>

GREATER ORLANDO AVIATION AUTHORITY

How GOAA has formed its “Green Team” to help implement sustainability at Orlando International Airport (MCO)

Key Findings:

- Authority employees from all departments and divisions, including tenants, concessionaires, and airlines, were encouraged to join the Green Team. Participation from the Authority’s Communications Department has been invaluable to advertise the group and its efforts.
- Meaningful, yet attainable, goals should be created for Green Team activities so participants feel a sense of accomplishment and the Airport’s sustainability efforts can be advanced.
- Internal recognition and appreciation of the Green Team is important to promote and encourage participation.

Interviewees: Jeff Daniels, Assistant Director of Maintenance and Operations, GOAA
Judith-Ann Jarrette, Noise Abatement and Sustainability Manager, GOAA
Chanel Jelovchan, Sustainability Specialist, ecoPreserve

GOAA began its sustainability-related efforts back in 2003 by establishing a formal solid waste recycling program at MCO. In 2013, GOAA developed its first Sustainability Management Plan (SMP). At the time, Jeff Daniels, the Assistant Director of Maintenance and Operations, was responsible for the SMP development and implementing sustainability at MCO. In March 2015, Judith-Ann Jarrette was hired as GOAA’s Noise Abatement and Sustainability Manager and sustainability planning and implementation responsibilities were shifted to the Operations Department. She was also tasked with management of the Green Team and its activities.

During the course of the initial SMP development, the GOAA Green Team was formed. The Green Team was created to help with portions of the SMP development and implement the plan. All departments, employees, tenants, and concessionaires were invited to attend. Approximately 100 people are signed up as volunteer members, and there are usually 15-20 active members of the Green Team. Committees were created to assist in the development of specific components of the SMP.

Ms. Jarrette is now responsible for managing the Green Team and its efforts. Before Judith-Ann was named the Noise Abatement and Sustainability Manager and after the original SMP **development**, the Green Team operated without a designated leader. Representatives from GOAA’s Customer Service Department assisted, as well as the Authority’s sustainability consultant (ecoPreserve), to continue the progress that the volunteer group was making.

The Green Team no longer is divided up amongst different committees because the same volunteers were active on each. The group now engages in all aspects of advancing sustainability with Ms. Jarrette’s guidance. The Green Team establishes goals each year for

completing initiatives and tracks performance based on the percentage complete. Each meeting includes a presentation on updates for each goal and a discussion of new and innovative ideas. Once a month, the Team holds a Sustainable Speaker Series, which is open to all GOAA and tenant employees as well as non-airport personnel, with speakers focused on how to implement sustainability in all aspects of daily life. The Green Team also publishes *The Dirt*, which informs GOAA employees and tenants about sustainability efforts and accomplishments at the Airport and is publicly available on GOAA's website. GOAA's sustainability consultant, ecoPreserve, assists in planning the Sustainable Speaker Series and article production for *The Dirt*.

The Green Team organizes two major events at MCO during the year:

- Earth Day – On April 22, approximately 80 exhibitors display in the MCO terminal lobby to educate GOAA staff, tenants, and the traveling public about environmental stewardship. In 2015, GOAA held its second Earth Day event.
- America Recycles Day – On November 13, GOAA held its second America Recycles Day. Approximately 20 exhibitors were displayed in the MCO terminal lobby to educate and promote waste management practice and recycling.

Both of these events provide valuable exposure of GOAA's commitment to environmental stewardship and sustainability to the public. These events could not occur without the volunteer efforts of the Green Team.

The interviewees offered three factors as reasons of why the Green Team has been successful:

- Motivation. The Green Team is encouraged and motivated by Ms. Jarrette, who recognizes the group's efforts at Team meetings and at Authority Directors' meetings. A recent Sustainable Speakers Series event was also dedicated as a Green Team Appreciation luncheon.
- Communication. The GOAA Green Team includes employees from the GOAA Customer Service and Operations Departments who assist in the promotion and advertisement of the Team and their efforts, including the online publication *The Dirt*.
- Continuous Activity. The Green Team stays very active with the two major events each year, the Sustainable Speaker Series, and activities associated with advancing the Authority's sustainability goals. Green Team leadership continually identifies new activities and initiatives to engage the group in – for example, assistance with waste audits and field trips to the solid waste transfer station.

Airports are encouraged to identify a Champion for ongoing sustainability implementation and specific initiatives. This Champion, working with other dedicated individuals throughout the facility (tenants, airlines, staff, etc.), will increase the chances for a successful sustainability program.

The interviewees recognize that one of the most important and challenging aspect of setting up a Green Team and implementing sustainability initiatives is to obtain senior leadership support.

Implementing the Green Team did not require the Authority to provide a large amount of money, however support is still needed to ensure the volunteer group can accomplish all of its activities and goals. A dedicated leader for the group is also very important to continuing the Green Team's activities and success.

MIAMI-DADE AVIATION DEPARTMENT

How Miami-Dade Aviation Department (MDAD) manages reporting challenges and fosters a sustainability mindset throughout the organization

Key Findings:

- Tracking sustainability performance can be a challenge because of the resources that are required to ensure complete and accurate reporting.
- Formal processes like an Environmental Management System (EMS) and International Organization of Standardization (ISO) Certification can be used to formalize environmental stewardship practices, identify responsible parties, and track environmental progress.
- Airports need to include all organizational levels when working to implement environmental stewardship and sustainability initiatives. Particular attention should be paid to appropriate training of “front line” workers that implement most initiatives and strategies. Two-way communication channels should also be fostered to allow for identification of potential strategies/initiatives from all organizational levels.
- Sustainability strategies/initiatives can be difficult to implement at smaller airports within a system because of fewer resources at the general aviation and reliever airport facilities.

Interviewees: Jose Ramos, Division Director for Aviation Planning, Land-Use and Grants, MDAD
Carlos Jose, Assistant Director of Facilities Management, MDAD
Pedro Hernandez, Assistant Director for Facilities Development, MDAD

Miami International Airport (MIA or the Airport) is a large hub airport that is owned by Miami-Dade County and operated by the MDAD, which also operates Miami-Opa-locka Executive Airport, Miami Executive Airport, Miami Homestead General Aviation Airport, and Dade-Collier Training and Transition Airport.

MDAD started to formalize an environmental stewardship program in the late 1990s after compiling a record of poor fuel containment practices at MIA. The organization decided to pursue International Organization of Standardization (ISO) certification. To achieve this certification, the Airport divided the airport departments into divisions, which are certified individually. Each division is then responsible for maintaining its ISO certification. MDAD has developed an Environmental Management Systems (EMS) as a part of the requirements of the ISO 14001.

The following units are already registered to ISO 14001:

- MIA Fuel Facility⁷
- MIA Civil Environmental Engineering Division⁸

⁷ http://www.miami-airport.com/library/mia_env_Fuel_Certificate.pdf

⁸ http://www.miami-airport.com/library/mia_env_Eng_Certificate.pdf

- MIA Facilities Maintenance and Engineering Division⁹
- MIA Commodities Management Division¹⁰

At the request of the Miami-Dade County Mayor, MDAD provides “scorecard” information to the County on a quarterly basis.¹¹ The interviewees noted that the reporting process is very challenging and time-consuming. Many other sustainability-related performance indicators go unreported because of the level of effort needed address the County scorecard requirements. The scorecard includes the following items:

1. Customer
 - a. Enhance customer service
 - b. Provide a secure environment at the airports
2. Financial
 - a. Enhance MDAD revenue
 - b. Sound financial strategies
 - c. Enhance MIA competitive position
 - d. Meet operating budget targets
3. Internal
 - a. Maintain a safe working environment
4. Learning and Growth
 - a. Comply with FAA requirement
 - b. Comply with Aircraft Operating Area (AOA) recertification requirements
5. Sustainability (ISO 14001 certifications, cardboard recycling initiative)

Sustainability-related efforts at MIA include:^{12,13}

- Recycling Program which includes the collection of cardboard (collects about 600 tons of cardboard per year), collection of domestic waste off of incoming aircraft (provide separate cans for trash and recycling), paper, wood pallets, electronics, the selling of comingled recycling material, and more.
- Electrical savings of roughly \$2.592 million per year. To achieve such a high energy savings, MDAD changed all airfield lighting and lamp fixtures in the terminals to LED lights, and replaced multiple terminal chillers.
- Decreased carbon footprint by purchasing hybrid electric vehicles (HEVs), and use of ground power units (equivalent of removing 5,001 gas-powered vehicles off airport roads).
- Internal and tenant auditing program.
- Aircraft noise abatement task force to address public comments and concerns and create mitigation measures.

⁹ http://www.miami-airport.com/library/mia_env_ISO_CERTIFICATE_for_Maintenance-1.pdf

¹⁰ <http://www.miami-airport.com/library/MIA-CMU-US-0464764-ISO-140012004-Final-Cert.pdf>

¹¹ Fiscal Year 2014-2015, Quarter 4 MDAD Scorecard: http://www.miamidade.gov/performance/library/quarterly-reports/FY2014-15/Q4/trans_aviation.pdf

¹² <http://www.miami-airport.com/environmental.asp>

¹³ Environmental Achievements @ Miami International Airport, 2007, http://www.miami-airport.com/library/MIA_Env_Report.pdf

- Green purchasing of environmentally-friendly products and materials.

While the Airport has achieved significant savings due to its successful sustainability efforts, it can be challenging to report every effort accomplished by the Airport. Challenges to comprehensive sustainability implementation and performance tracking include:

- **System-wide Sustainability Implementation:** The other airports within the MDAD system have fewer personnel and it can be a challenge for those individuals to complete their current work tasks and implement particular sustainability-related strategies/initiatives.
- **Performance Tracking:** Currently, proper resources for comprehensive sustainability tracking are not available to MDAD - only those required by the Mayor's "scorecard" are recorded and reported on a quarterly basis.
- **Encouragement and Organizational Buy-in:** All levels of airport employees need to be engaged in the organization's sustainability goals and strategies/initiatives to ensure successful implementation. In addition, ideas for efficient implementation of high-value strategies can be shared freely and acted upon.

Despite the challenges associated with reporting of the multitude of MDAD's sustainability efforts, the organization has done an excellent job in encouraging and promoting environmental stewardship and sustainability throughout all departments/divisions.

HARTSFIELD-JACKSON ATLANTA INTERNATIONAL AIRPORT

How Hartsfield-Jackson Atlanta International Airport Tracks and Reports Sustainability Performance

Key Findings:

- Sustainability performance tracking informs educational outreach efforts (internally and externally).
- Compliance with sustainability goals and objectives lies within the contracts and leases with vendors, tenants, and service providers.
- Building Information Modeling (BIM) systems can be used to gather valuable performance data but they can be underutilized if they are not programmed and managed properly.
- Utility Management Systems, EPA's Portfolio Manager, and ISO 50001 can be used to formalize environmental stewardship policies, identify responsible parties, and track environmental progress.

Interviewees: Michael Cheyne, Planning Director, Hartsfield-Jackson Atlanta International Airport
Charles Marshall, Utilities Manager, Hartsfield-Jackson Atlanta International Airport
Liza Milagro, Senior Sustainability Manager, Hartsfield-Jackson Atlanta International Airport

Hartsfield-Jackson Atlanta International Airport (ATL or the Airport) is a large hub airport that is owned and operated by the City of Atlanta's Department of Aviation. The Airport was part of the FAA's Sustainable Master Plan Pilot Program, which provided Airport Improvement Program (AIP) grant funding to develop a Sustainable Management Plan (SMP)¹⁴ in 2011. The SMP describes the Airport's existing sustainability practices, recent improvements, and opportunities for enhancements in the following areas: procurement, energy management, integrated water resources management, emissions, waste, "green" construction, noise and land use compatibility, and community involvement.

The responsibility to manage sustainability and related activities at ATL rests within its Asset Management and Sustainability (AMS) Division. The AMS Division combines the responsibilities of asset management, and sustainable development with measures to guide operational, planning, and business development decisions. It is made up of three business units: Asset Management, Facilities Management, and Sustainability. The mission statement for the AMS Division is:

"To lead the Department of Aviation to become one of the greenest airports in the world while maintaining and improving efficiency and proactively manage our aging infrastructure based on life cycle analysis, total cost of ownership, and sustainable development."

¹⁴ Hartsfield-Jackson Atlanta International Airport Sustainability Management Plan: <http://www.atlanta-airport.com/docs/Airport/Sustainability/Sustainable%20Management%20Plan.pdf>

The Airport has discovered that compliance with its sustainability goals and objectives is rooted in establishing policies that are incorporated into contracts and leases with vendors, tenants, and service providers. The Airport will be implementing a Sustainability Procurement Policy in 2016 that will further aid in meeting its sustainability goals and reporting/tracking requirements. In addition, the Airport publishes an Annual Sustainability Progress Update¹⁵ that focuses on procurement, construction, operation and maintenance, and policy. The Progress Update also includes a “scorecard” that quantifies achievements using the following metrics:

- Energy (BTU/Sqft)
- Water (Gallons/Passenger)
- Emissions (Tons CO₂e/Passenger)
- Waste (Lbs/Passenger Enplanement)

The Airport is dedicated to promoting recycling throughout the Airport campus. Waste management and recycling in the passenger terminal facilities is conducted by a third-party contractor hired by the airlines to collect and transport waste and recycling from the concourses. Additionally, the contractor promotes recycling at the Airport and is required to provide monthly reports on recycling data. All other waste and recyclables generated by employees, cargo, and other areas of the Airport is managed by the AMS Division. Management of waste and recycling by the AMS Division allows for accurate and efficient performance tracking.

In 2011, ATL previously won the Airports Going Green Award for implementing the Sustainable Food Court Pilot Program. The program required all food court vendors to use compostable packaging and service wares, and source-separate organics for composting collection.

The AMS Division converts the waste management and recycling data into educational materials to advertise and promote recycling efforts throughout the Airport. ATL is exploring opportunities to separate and compost organic materials throughout the Airport to support its Zero Waste Plan. The Airport’s goal is to divert 90% of waste from the landfills.

The feasibility of managing organics at ATL is hampered by the fact that there aren’t any nearby composting facilities. A potential strategy is to develop an on-site recycling center to manage recyclables and organics for the Airport *and* surrounding community. This would help the Airport to strengthen community relations and provide a more efficient diversion and recycling process for the Airport.

The AMS Division is responsible for tracking energy and water usage, which includes three important phases:

- Understand utility invoicing for each month,
- Identify conservation opportunities, and
- Identify efficiency opportunities.

An enterprise management system (Utility Management System) is used to track all energy and water use data. The system manages all utility invoice data (monthly) and stores utility meter locations throughout the Airport. Meter locations are also entered into the Airport’s Geographic

¹⁵ The current annual progress update can be found at: http://www.atlanta-airport.com/docs/Airport/Sustainability/2014_Sustainability_Progress_Update_rev5_green_LETTER.pdf

Information System (GIS). The GIS department inputs all metering information while also linking the data within the enterprise management system, maintenance data, and project data. This allows any airport employee with access to the system the opportunity to provide real-time updates to utility, maintenance, and project data into the GIS. The enterprise management system allows ATL to continuously improve its tracking and reporting process.

In December 2015, the Airport was certified under the International Organization of Standardization (ISO) as ISO 50001¹⁶. ISO 50001, Energy Management System standard, ensures that the entire organization works collaboratively to reduce energy usage. The certification requires the Airport to identify all significant energy users throughout the airport and implement a method of control. The Airport has completed this task and realized a decrease in energy usage from the major users. The Airport now has a tool to improve operations and reduce energy at the Airport, while identifying opportunities of improvement.

The City of Atlanta recently approved the *Atlanta Commercial Buildings Energy Efficiency Ordinance*¹⁷ on July 20, 2015 in conjunction with the Atlanta Building Efficiency¹⁸. It requires the use of EPA's Portfolio Manager as a tool to track and measure energy and water use for all buildings 25,000 square feet or larger (10,000 square feet or larger for city-owned buildings), however the Airport has decided to use the Portfolio Manager for *all* airport buildings that use energy.

¹⁶ ISO 50001 Energy Management System: <http://www.iso.org/iso/home/standards/management-standards/iso50001.htm>

¹⁷ Atlanta Commercial Buildings Energy Efficiency Ordinance: <https://atlantabuildingbenchmarking.files.wordpress.com/2015/05/15-o-1101-atlanta-commercial-energy-efficiency-ordinance.pdf>

¹⁸ Atlanta Building Efficiency - <http://atlantabuildingefficiency.com/about/>

APPENDIX 5

AIRPORT STAKEHOLDER INTERVIEWS

LEE COUNTY PORT AUTHORITY

Wednesday | September 16, 2015

Interviewed:

Ellen Lindblad, *Lee County Port Authority*

James Furio, *Lee County Port Authority*

Alicia Dixon, *Lee County Port Authority*

- LCPA had Sustainability Inventory and Analyses developed in 2012 and 2014 by interns; electronic version to be provided to project team
- Lee County has started a sustainability planning process (<http://www.leegov.com/environmentalpolicy/sustainability>)
- LCPA does not have a designated leader/champion of sustainability planning process (no directive from Executive Director or the Board)
- The idea of the guidebook sounds very good; it should focus on cost savings
- LCPA started the "Airport Conservation Team (ACT)" years ago but there was some apprehension about continuing further because the Authority didn't want to be held or forced into standards, targets, or goals
- Nice to have a template for a plan that is flexible
- Need to identify who spearheads the direction of the program
- Southwest Florida International Airport has implemented lighting changes by evaluating return on investment and life-cycle cost analyses; it is often more economical to install most efficient lighting into new construction as opposed to retrofitting existing facilities
- Existing Sustainability efforts
 - Training for Maintenance
 - Asset Management
 - Energy efficiency for any new spaces developed
- LEED certification for new aircraft rescue and firefighting facility (supported by County Commissioner)
- Helpful content for inclusion in the Guidebook
 - Sustainability is all encompassing
 - Comprehensive approach should be taken
 - Metrics
 - Convert to per passenger or per space
 - Need a guide for each department/division-specific role in sustainability

GIS tracking should be used where applicable

SARASOTA-BRADENTON INTERNATIONAL AIRPORT

Wednesday | September 16, 2015

Interviewed:

Lionel Guilbert, *Sarasota-Bradenton International Airport, Manager, Airport Operations*

- Impetus of sustainability
 - Efforts evolved over time during different projects
 - Since the airport is self-sustaining (no ad-valorem taxes to fund airport), the initiatives are economically driven
 - Understanding new tech and efficiencies is highly important
 - Economically driven as a decision
- The Airport tracks electricity usage on a weekly basis
 - The rate charged by the utility is based on peaks, so the Airport constantly tries to keep electrical use as constant as possible
 - Any spikes in electrical usage due to equipment malfunction or other temporary issue is brought to the attention of the utility as soon as possible so rates are not reset based on temporary condition
 - LEDs in taxiway lights and in 25% of airport signs
- Look into thermal storage (Atlas Consultant)
 - Store cold water from chillers and Recycle water through, based on peak energy usage
- The Airport does not have a sustainability plan, but rather a list of initiatives. Most sustainability efforts occur when the opportunity for improvement arises.
 - The main goal is to save money
- Return on Investment
 - The ROI and analysis is left to the consultant or engineer; only for part of the overall project
- Sustainability comes from senior management as well as everyday employees top-to-bottom
 - Geo-thermal idea came from on the ground employees
- Implementing recycling facilities in airport to show public that the airport is sustainable
 - Recycling is an overall cost but done for public relations
 - Program did reduce solid waste amount
 - Implementing recycling and waste removal is difficult
 - Stakeholders
 - Airlines have asked for facilities to accommodate the recycling of on-board waste
 - The Airport wants to put recycling bins inside the terminal area for passengers
- Public Relations
 - Outreach plans in place for tenants
 - No outreach plan for the general public
 - External reporters typically develop stories about the facility
 - Green business member designation is seen as a benefit
- SRQ looking at long term strategic and business planning

- Sustainability efforts/initiatives are always included in projects presented to the Board and are not sold as separate initiatives
- A plan is currently being pursued due to higher management retiring. Mid-level employees are being asked to provide their opinions for the Strategic Plan.
- They do not implement GIS/Asset management system
- Helpful content for inclusion in the Guidebook
 - Descriptions of economic benefit (comparative analysis)
 - What is out there
 - New/growing technology (geothermal, chillers)
 - Benefits from implementation
 - Open communication between organizations
 - Finance, Development, Operations, Engineering
 - Include ideas/efforts from other airports (case studies) and new technology used
 - What worked/what didn't? A "stay away from" list is viewed as important as a BMP list.
 - Solar and alternative fuels
 - Solar is being explored for the Airport
 - Lakeland may be a good case study
 - Alternative fuels not economically feasible, as conditions change, this will be monitored
 - Electric vehicles
 - Providing charging stations for public in parking areas

TAMPA INTERNATIONAL AIRPORT

Thursday | September 17, 2015

Interviewed:

Melissa Solberg, *Tampa International Airport, Sustainability Manager*

<http://www.tampaairport.com/sustainability>

- Lessons learned from the implementation process
 - During the implementation process, we narrowed the focus from 36 initiatives to the top 10-11 initiatives to have in place by September 30, 2015
 - From this, specific goals were developed to guide implementation
 - Tools developed have a lot of information and may not be able to be filled in
 - All departments met to discuss sustainable initiatives/management plans
 - Focus on reporting the benefits/successes of sustainability initiatives
 - The Airport used a series of Microsoft Excel files as a tool, however they seem to be very detailed and the Airport does not have enough information to fill out all areas yet
 - Great support from across the airport organization
 - Reporting is a big component for next year. Gathering data is important to demonstrate the Airport's sustainability efforts.
 - Not sure what method of reporting will be used
 - Tool used for implementation will help with reporting
 - Annual Report Card
 - M. Solberg has found that there are efforts currently on-going that need to be put into a category but isn't sure where to put them yet
 - Initiative Implementation plan:
 - Description, tactic, goals, implementation considerations, funding (capital, return on investment, annual operations and maintenance, primary funding sources), approvals/stakeholder coordination (not as detailed as what tool asks for), performance monitoring
 - A report card template is used
- Everyone is very supportive
 - No roadblocks encountered
- Melissa Solberg has explored some of the ACRP reports
- TPA is interested in a sustainability rating system
 - No specific meetings with department heads
 - People throughout the airport are taking initiative and enjoy having a dedicated person to come to with ideas and concerns
- The airport has created a Legacy of Environmental Actions for our Future "LEAF" Team from different departments. The team is comprised of 24 people in rotation that meet quarterly to discuss what is going on in each area of the Airport.

- Sustainability efforts GA airports
 - Not an official use at the GA airports. The ideas have been discussed at Safety and Security Meetings with Marilyn Gauthier.
 - The airport has also been able to put a story into the Authority's E-newsletter about sustainability
 - Tampa Jet Center and Black Diamond (FBOs at GA Airports) are interested in solar
- Public relations efforts
 - Currently working on ways to reach out, but no formalized plan as of yet. Only small efforts have been made.
 - Some community involvement activities include: Friday Flights, 5K on the runway; Clean Air Fair; and more
 - Utilize Communications department to promote the airport
 - Social media campaign
 - Promotional material
 - Clean Air fair
- Outreach to tenants (waste management/ recycling)
 - The airport has 65 new concessionaires. Sustainability was a part of the request for proposals and the selection process. Their contract requires that they use the Airport Authority's Sustainability Criteria Manual.
 - Sustainable Design Criteria Manual (SDCM) could also be applied to non-aeronautical development
 - TPA design criteria
 - Applicable to all projects, runways, roads, concessions etc.
- New development can be beacon of sustainability
 - Metrics are used to ensure project directors are completing projects consistent with goals for LEED Design criteria manuals are separated by all project types
- Do GA airports use the design criteria manual?
 - It is not required, but could be eventually
 - GA airports are not required to get employees/divisions to promote sustainability
- Incentive programs for employees or tenants, etc.
 - No, not yet, but it is being considered
- Employee engagement – recognition

GREATER ORLANDO AVIATION AUTHORITY

Monday | September 21, 2015

Interviewed:

Judith-Ann Jarrett, *Orlando International Airport, Manager of Sustainability and Noise Abatement*

Jeff Daniels, *Orlando International Airport, Assistant Manager, Maintenance Department*

Alexa Stone, *Consultant, ecoPreserve*

GOAA has recently updated its Sustainability Management Plan, which focuses on waste management, sustainable development (LEED certification of existing buildings and new construction), energy use, commuting/alternative transportation, and water use.

- Original interest came when city/county officials came on board
- Human resources – most of the work to implement sustainability has been done by volunteer groups (Green Team, etc.) at the Airport
- Green Team (100 People)
 - Includes concessionaires, tenants, airlines, WM, and the City
 - Education and outreach
 - Tradeshow, community events, etc.
 - Earth day, America recycles day
 - Volunteer task force
 - Conducting waste audits
 - Constant effort to keep things going
 - Momentum is key
 - Buy in at all levels is very important
- Greenworks program started at city level
 - Large airline company initiated
- Waste management providers can't provide the level of reporting outputs that can feed into United States Green Building Council LEED reporting guidelines
- All new development/construction is LEED
- Sustainable initiatives
 - Developed off using other BMPS
 - Used Greenworks guidelines
 - Limited coordination
 - Goals include the entire airport community
- New procedures for maintenance
- Contract out to develop design guidelines
- Implementing sustainability into capital project will increase sustainability
- Pervious surfaces

- Sustainable purchasing
 - No major successes
 - Recommend a “how to” on proper implementation
- Use of a logo to brand the sustainability effort
- New signage with educational information
- Quarterly “The Diet” disseminates information
- Speaking series on sustainable efforts
 - Whole foods
 - Solar energy loan fund
 - Office Depot
- Individual sustainability a byproduct of overall effort
- No partnership with University of Central Florida
- Executive is currently not included in the Sustainability Management Plan initiatives
 - Have a totally different set of goals
 - Fragments audience
- Add sustainability components to request for proposals
 - Sustainability guidelines
- GOAA Human Resource department has a number of healthy workplace initiatives
 - Gym membership
 - Bus pass
- Mobile app to promote livability
- Waste services cannot provide reports that are standard for LEED certification
 - Reporting as requirement for RFPs
- There are so many options for things to do and not enough staff or hours
 - Incorporate into reviews
- Funding for staff
 - Create a team to implement initiatives
 - Most employees are currently contracted out
 - Lack direct control
- Helpful content for inclusion in the Guidebook
 - Case studies of other airport’s success stories
 - Boilerplate policy or contract language to incorporate sustainability
 - Metrics or key performance indicators (KPIs) most applicable to an airport environment
 - Recommendations for appropriate pervious pavement design standards/products for airports
 - Lists and ideas on “low hanging fruit”
 - Award program
 - When possible, include step by step instructions
 - Provide stumbling blocks
 - Boilerplate language for bids/RFOs/etc.
 - Green Team a huge driving force behind efforts
 - Emphasize the benefits of groups like this
 - Incentivize employees to carpool
 - LEED is a good vehicle for promoting sustainability

BROWARD COUNTY AVIATION DEPARTMENT

Tuesday | September 22, 2015

Interviewed:

Scarlett Hammons, *Broward County Aviation Department, Principal Planner*

- Broward County is forward thinking in regards to sustainability
 - Climate compact (multi-county region)
 - Top down approach
 - Comprehensive plan has a climate change element
- County has a group that meets on environmental issues
- Ft. Lauderdale-Hollywood International Airport missed pilot program funding
- Sustainability will be incorporated as a standalone chapter in the Master Plan
 - Develop tools for monitoring various components
- Much of the county's sustainability efforts have not been related to airports
- No sustainability design guidelines
 - When feasible, designed to LEED standards
 - Not a county standard
- Limited tracking is conducted
 - Mitigation is monitored
- No sustainability champion or team
 - Former champion is no longer involved
 - No sustainability teams are currently formed
- The county supports sustainability but does not push it
- No inclusion of GA airport into sustainability efforts
- State implementing policy on requiring sustainability?
 - Deferring to FAA; obligated airports must have some of FAA's components
- General issues with implementation
 - Staff, time, and funding
 - Further information can be found at:

<http://www.broward.org/Airport/FLLair/Environmental/Pages/Sustainability.aspx>

<http://www.broward.org/Airport/Community/Documents/Sustainabilityvisionjune2012.pdf>

<http://www.broward.org/Airport/FLLair/Environmental/Pages/GreenActivities.aspx>

VERO BEACH REGIONAL AIRPORT

Wednesday | September 23, 2015

Interviewed:

Eric Menger, *Vero Beach Regional Airport, Director*

Danielle Gernert, *Vero Beach Regional Airport, Grant Administrator*

- Vero Beach Regional Airport is nearing the completion of their Sustainable Master Plan – <http://verobeachairport.org/masterplan.html>; the Airport emailed a presentation of the Master Plan to the Authority Board after the interview
- Impetus of the Sustainability Plan?
 - The FAA asked the airport if they would like to implement a Sustainability Master Plan (SMP) as part of FAA's Pilot Program
 - The Airport wanted to conduct a master plan that was different than a typical one
 - The Airport wanted to have a proactive connection with the community and incorporate them into the planning process
 - The Airport wanted to define what sustainability means to them
 - This was suggested as the first step for airports to do: define what sustainability means to their airport
 - The Airport focused the project around the economic and environmental benefits, which allowed the other components to fall into place
 - It was noted that the Return on Investment (ROI) is critical to move forward with sustainability initiatives
- Community input regarding sustainability
 - The Airport received a broad range of input from the community, while most of the comments were positive. The Airport already has support from the community, which may have helped in the community's perception of the project.
 - Some expressed interest in lead pollution
 - Received a large amount of support for the solar initiative
 - The Airport sent out an internet survey and received over 200 responses, which is relatively large for a small airport. Incentive was provided by giving away a Kindle e-reader.
 - Commission was able to understand the cost savings
- Sustainability Goal
 - The Airport created a matrix and set up an advisory panel to create goals
 - The advisory panel was very interactive and provided input into the goals matrix
 - The Airport started with nearly 24 goals and finalized with eight goals
 - Desire to be economically sustainable for the duration of the Master Plan
- Sustainability is included throughout the master plan document
- Coordination with the FAA Airports District Office (ADO)
 - Coordination with the scope of work at the ADO level was very positive

- Made edits to tasks and dollar amounts
- Public input is very important
 - Best if done early in the process
- Solar feasibility was not part of the Sustainability grant
 - It is being completed by a private firm that is interested in installing the solar facility
- No tools were created to track the success or monitoring of the sustainability initiatives
- Creation of sustainable design guidelines
 - The Airport is looking at implementing guidelines for different parts of the airport
- Coordination with the tenants
 - A Piper and Flight Safety representative were on the advisory panel
 - The Airport included non-aviation tenants, but did not have the same amount of representation
- No specific sustainability efforts in city/county
 - Did coordinate with them
 - Using city utilities not Florida Power and Light
 - County going through branding process
 - Using this to market commercial service
- Benefits of the sustainable initiatives
 - Only time will tell
 - The Airport had previously implemented some sustainable initiatives, including LED lighting
 - The best part of including the community is educating about sustainability and the Airport
 - Money was well spent
- A general sustainability screening process was used
- Must provide guidance to consultants in the guidebook as well
 - Create guidelines for consultants to follow
- Does not think that benefits will be seen at smaller airports
 - Concern over how much funding is needed to be cost effective

TALLAHASSEE INTERNATIONAL AIRPORT

Friday | October 2, 2015

Interviewed:

Erik Treudt, *Tallahassee International Airport*
David Pollard, *Tallahassee International Airport*

- Currently finalizing scope for a sustainable master plan
 - Initially thought to update management plan
 - Highlights the relationship between NEPA process and sustainability
- Would like FDOT guidance and procedures on integrating sustainability at airports
- Solar will be looked at highly in the next session
 - Decrease costs for little-to-no investment
- Pay stormwater permitting costs
 - Reduction of impact fees
 - Reductions of permits
- City of Tallahassee design standards
 - Environmental Policy and Energy Resources Department
- Installing electric charging stations
- Strive for “zero maintenance”
 - Streamline entryway
 - Turn planters into sitting areas
 - Be conscious of where trees and plants are being placed to minimize future maintenance
- Education of the applicable Commission/Board will be key to being successful
- Standardization of elements used on the airport
- Incorporate sustainability into request for proposals when projects are being completed at the airport
- Break old habits in order to pursue sustainability
- Put information on websites to promote what the airport is doing
- Involve the staff
- Coordinate with the implementing staffs

JACKSONVILLE AVIATION AUTHORITY

Tuesday | October 13, 2015

Interviewed:

Davey Jones, *Jacksonville Aviation Authority*
David Dunkley, *Jacksonville Aviation Authority*

- Trying to sell sustainability
 - Get the process started
 - How to keep the process going
- Develop - Implement - Track (Process)
- Needs due to lack of direction from FAA
 - Why?
 - How?
 - Results?
- How do you view sustainability?
 - Years ago, performed a greenhouse gas (ERM) inventory – began the journey
 - Last three years began sustainability planning
 - All related to waste/recycling
 - Have plan that tracks metrics
 - Large effort to track sustainability efforts
 - Next steps: what should be done with the data?
 - Only internal planning; have not rolled it to the board yet
- Previously, no recycling bins at the airport
- How can sustainability affect the bottom line?
 - How can costs be reduced?
 - Involve all staff
 - Quick on and off taxiway lights
 - Efforts have been received very well (cost savings/money making)
 - Starts with bottom line
 - Environmental benefits just a bonus
 - City Environmental Symposium
 - Facilities maintenance group included in the efforts
 - What can you do? – learning and location of information
 - EECDG program (Energy Efficient and Conservation Block Grant Program)
 - Funding source to reduce local spending
- Point in process when they decided to do a greenhouse gas inventory
 - Higher-ups were skeptical, and needed a big push
 - Had a lot of ideas originally
 - Kiosk in lobby
 - Champion group

- Were able to settle on a tracking project
 - Would rather do a complete sustainability study
- Sustainability is about all people making a small difference together
 - Project established benchmarking items and tracked them
- Unless people can feel/touch the project they will not be interested
- Limited coordination between all departments; was discussed but not a huge part of the study
- Energy analysis at term
- All airports in authority were included in the study
- Next step is to involve corporate groups
- Never had a follow-up from major airlines
- Some local airlines already voluntarily participating
- Knowing what you know now
 - Work with local authority (power authority)
 - Replace chillers – get rebates
 - FedEx replaced lights; JAA helped them get rebates
 - How can they get money to develop a plan
 - Streamlining funding process
 - Easy fixes
 - If you do this.... This will happen
 - Return on Investment, payback period, savings
 - Life cycle cost analysis
 - 75% of cost is maintenance
- Are people more receptive now than before?
 - Yes, Europe has been in front of this and the US is now getting there
 - People are beginning to support sustainability
 - The data will be used to support the plans
- Limitations to moving forward with the Plan?
 - Finance is always a problem
 - It's all money
 - \$900K to replace lights
 - Multiple projects going at the same time; funding gets thin
- When looking at projects, always look at ways to save money
 - Look at keeping material on-site during construction
- A management plan should be done prior to a master plan to set the mindset of the organization
 - Incorporate sustainable thinking into the Master Plan process
 - A lot is applied during design and construction
- Local requirements for LEED or design guidelines
 - No
 - Executive director did not support it
- One struggle is certifying existing buildings as LEED certified

- Development of performance Measures
 - Previous plan had goals; but not much came of them because it was so new
 - Have to be aware of what is occurring at the airport (new tenants, may increase costs)
 - Must understand what the discrepancies mean
- For templates – ACRP has developed a lot
- Template to qualify for grant funding
 - Minimum requirements to receive grant funding
 - Could be tiered for different funding levels
 - Realized difference between airports
 - Scalability of deliverables
 - Education on what is out there
 - Sustainability training

APPENDIX 6

COORDINATION WITH NON-AIRPORT PLANS AND POLICIES

Understanding the importance of non-airport plans and policies as they apply to sustainability planning is vital to the successful development of an airport sustainability plan. The airport is recommended to evaluate relevant government agencies that should be consulted throughout the sustainability planning process. Florida has a unique system of government involvement with the airport industry, therefore it is beneficial for airports to stay up-to-date with government policies, legislation, and guidance.

This guidebook provides current information pertaining to non-airport plans and policies that should be considered during the sustainability planning process. Depending on an airport's size, role, and ownership, the plans and policies mentioned in this chapter may or may not be relevant to individual airports. It is up to the individual airport to evaluate and decide which plans and policies are relevant to their respective sustainability plan.

Sustainability at airports is most effective when the airport makes an effort to ensure that planning documents outside of the most common airport planning documents are consulted as explained in this document. Priority should be given to meeting with representatives from the local government, regional planning organizations, or any other large entities that develop plans that may impact an airport (Ex: Universities).

There are two primary types of documents that affect airports: state/federal guidance and local/regional planning documents. Each of these documents may include elements that will benefit a sustainability plan and may even provide an airport with alternative partnership and funding opportunities.

It is recommended that the project team review and understand the following plans and documents as they relate to their airport:

1. Local Government Comprehensive Plans
2. Rule 14-60 Florida Administrative Code (F.A.C.)
3. Title XXV, Florida Statutes, relating to Aviation
 - a. Chapter 333 Florida Statutes
4. Long-Range Transportation Plans
5. Other
 - a. Hospital Plans
 - b. Local School Board Plans
 - c. Military Plans

LOCAL GOVERNMENT COMPREHENSIVE PLANS

In accordance with Ch. 163, Florida Statutes (F.S.), all counties and municipalities in Florida are required to adopt a local government comprehensive plan. The local government comprehensive plan (LGCP) is a policy document based on local needs and values that defines a long-term vision for each community or local government entity. The LGCP also establishes specific goals, objectives, and policies needed to meet statutory requirements. The LGCP helps

manage growth, while at the same time protecting the environment and the health and welfare of the community.

As development or redevelopment is proposed in a community, including airport development, those actions must be consistent with the goals, objectives, and policies contained in the LGCP. The LGCP helps identify infrastructure improvements needed to support growth, including those needs related to transportation. However, at this time, it is not a requirement for the LGCP's five-year capital plan component to include projects needed to serve anticipated aviation demand, such as increased capacity on roadways around the airport and related infrastructure improvements. Airports are most frequently included and addressed in one or more of the following elements of an LGCP:

- Transportation
- Future land use
- Intergovernmental coordination
- Capital improvements

It should be noted that airport staff do not necessarily need to write portions of the LGCP related to the airport. Some communities have instead chosen to incorporate their airport master plan directly into the LGCP. At a minimum, airport staff should be included in the overall review of the LGCP, similar to other local departments.

The following summarizes the regulatory requirements that exist relative to the integration of an airport into the LGCP:

- Inclusion of aviation facilities into a comprehensive plan
- Relationship between the comprehensive plan and airport master plan
- Future land use compatibility of land surrounding airports
- Intergovernmental coordination
- Capital improvements schedule

LOCAL GOVERNMENT COMPREHENSIVE PLAN'S RELATIONSHIP TO SUSTAINABILITY PLANNING

Although the development of an airport sustainability plan is neither required nor regulated by Federal or state law, implementation of the airport sustainability plan will need to be consistent with local, state, and Federal regulations. When developing a sustainability plan, the project team should work to understand how recommendations in the sustainability plan relate to the LGCP and the airport master plan. Recommendations and proposed developments that are incompatible with the LGCP; airport master plan; or local, state, and Federal regulations may cause the sustainability plan to lose credibility and ultimately be ineffective.

Rule 14-60, Florida Administrative Code (F.A.C.)

Rule 14-60 of the Florida Administrative Code (F.A.C.) was created to promote safe civil aviation by eliminating hazards; providing airfield standards for airports; providing standards for airport marking and lighting; licensing and register airports pursuant to the licensing and registration requirements of Ch. 330, F.S.; and promoting flight safety by providing for airspace protection pursuant to the requirements of Ch. 333, F.S.

When developing an airport sustainability plan, special consideration must be given to ensure that the development recommendations are in accordance with Rule 14-60, F.A.C. It is recommended that the project team understand the allowed development limits for variances or permits so that resources are not spent developing recommendations that are infeasible. Coordination with local and state representatives related to Rule 14-60, F.A.C. is recommended before any development plans are made.

Rule 14-60, F.A.C. could relate to the implementation of recommendations in an airport sustainability plan in the following sections:

- Section 14-60.005, F.A.C. – Governs the approval of sites for new airport development
- Section 14-60.007, F.A.C. – Provides airfield standards for licensed airports
- Section 14-60.009, F.A.C. – Provides airspace protection

RELATIONSHIP BETWEEN RULE 14-60 F.A.C. AND SUSTAINABILITY PLANNING

Although most physical development at an airport will be depicted in the airport master plan and ALP, airports developing a sustainability plan will need to review Chapters 14-60.007 and 14-60.009, F.A.C. to ensure that proposed developments are in compliance with the prescribed standards.

THE 2015 FLORIDA STATUTES, TITLE XXV - AVIATION

Title XXV *Aviation* of the Florida Statutes outlines the Florida-specific rules and regulations pertaining to pilots, aircraft, and airports operating in the state of Florida. The five chapters of Title XXV should be taken into account during all phases of sustainability plan development, particularly the chapters pertaining specifically to airports. Upon selecting sustainability initiatives for implementation at the airport, it is recommended that airports investigate potential outcomes effecting the airport's compliance with Title XXV.

Chapter 330 of Title XXV *Aviation* titled, "Regulation of Aircraft, Pilots, and Airports" provides detail on Florida-specific regulation pertaining to the approval of airport sites (including registration and licensure of airports) as well as airport zoning protection. This chapter outlines the requirements for an airport to achieve site approval and licensure as well as situations resulting in license revocation. It is suggested that airports determine if chosen sustainability initiatives could potentially effect licensing standards so as to not qualify for license revocation.

Chapter 331 of Title XXV *Aviation* titled, "Aviation and Aerospace Facilities and Commerce" is divided into three parts differentiating airports and air commerce from space flight and spaceports. Specifically, part one titled, "Airports and Air Commerce" details the Florida-specific regulations regarding: eminent domain granted those engaged in air commerce, auto transportation between county airports, publicizing, advertising, and promoting airports and related facilities, and independent authorities.

Chapter 332 of Title XXV *Aviation* titled, "Airports and Other Air Navigation Facilities" details many aspects of airport legislation in Florida. Among the many aspects detailed, prominent ones potentially relating to sustainability include: 332.001 – Aviation; powers and duties of the Department of Transportation, 332.003 – Florida Airport Development and Assistance Act,

332.006 – Duties and responsibilities of the Department of Transportation, 332.007 – Administration and financing of aviation and airport programs and projects, 332.01 - Airport law, and 332.02 – Acquisition of real property for airports.

All aspects of **Chapter 332** should be considered and studied during sustainability planning to ensure compliance; however, this chapter can be utilized by an airport to better understand outside organizations' roles in a sustainability plan. For example, Section 332.007 – Administration and financing of aviation and airport programs and projects, provides an in-depth look at potential project-related funding from the state of Florida, and how an airport's project would apply.

Chapter 333 of Title XXV *Aviation* titled, "Airport Zoning" outlines the requirements, permitting process, and overall regulations of airport zoning. This chapter should be utilized by airports in their sustainability plans when a selected initiative effects the airport zoning and land use. More information on this Chapter is provided in the next section.

RELATIONSHIP BETWEEN TITLE XXV AVIATION AND SUSTAINABILITY PLANNING

By adhering to regulations set forth in this Florida Statute, the airport can enhance their sustainability plan's efficiency and productiveness. Not every aspect of Title XXV will apply to an airport's chosen sustainability initiatives; however, some sustainability initiatives could have unknown effects to an airport's Title XXV compliance. Therefore, as previously mentioned, Title XXV Aviation should be utilized and monitored to ensure airport compliance during the sustainability planning process. Further, questions pertaining to Title XXV and its relationship to a sustainability plan should be directed towards the airport's FDOT District for further assistance.

CHAPTER 333 FLORIDA STATUTES

All local governments and political subdivisions, in accordance with Ch. 333, F.S., are required to adopt, administer, and enforce airport zoning regulations for airport hazard areas. The purpose of Ch. 333, F.S. is to protect the health, safety, and welfare of the public on the ground and in the air by preventing the creation or establishment of hazards around airports. Additionally, the chapter aims to protect public investment in aviation facilities and to promote the sustainability of airports as transportation resources.

Hazards to airports, according to Ch. 333, F.S., may be in the form of any existing or proposed object, terrain, or structure construction or alteration that exceeds the federal obstruction standards contained in 14 C.F.R. part 77, subpart C. When incompatible land uses exist in the airport environment, such uses may result in negative impacts for both aeronautical activities and for the activities associated with the incompatible use. Incompatibilities can also affect the airport's operations and future development.

Chapter 333, F.S. includes the protection of navigable airspace from the encroachment of structures that are hazardous to air navigation. Such structures can endanger users of airports and those on the ground in the vicinity of airports. Structures that have a negative impact on an airport's navigable airspace can also limit the utility of an airport and compromise public investment.

Related to sustainability plans and initiatives, airports must ensure that the recommended initiatives of their sustainability plan are in accordance with Ch. 333, F.S. Inconsistencies between recommendations in an airport sustainability plan and Ch. 333, F.S. would be counterproductive and conflict with the intended purpose of the sustainability plan. For example, if an airport were to propose siting a regional retention pond to help with regional stormwater flow and flooding, which would likely be inconsistent with the provisions of Ch. 333, F.S.

RELATIONSHIP BETWEEN CHAPTER 333, F.S. AND SUSTAINABILITY PLANNING

During the development of an airport sustainability plan, the restrictions specified in Ch. 333, F.S. need to be reviewed to ensure that proposed development is in accordance with the statute. If proposed development is found to be in violation of Ch. 333, F.S., then the proposed development must be modified so that it is compliant. An additional resource related to Ch. 333, F.S. is the FDOT *Airport Compatible Land Use Guidebook* available at: www.dot.state.fl.us/aviation/flpub.shtm. This document, along with the accompanying primer, provides assistance during the sustainability planning process by identifying land uses that are compatible and incompatible with development around airports.

LONG RANGE TRANSPORTATION PLANS

A long range transportation plan (L RTP) is a document developed by a Metropolitan Planning Organization (MPO) or other entity to encourage and promote the safe and efficient management, operation, and development of a cost feasible intermodal transportation system that will serve the mobility needs of people and freight within and through urbanized areas, while minimizing transportation-related fuel consumption and air pollution.

The L RTP must meet certain established state and federal requirements to maintain each MPO's transportation funding eligibility. In addition to the federal requirements, there are also 11 requirements for L RTPs in Florida, as defined in the Florida Statutes that include elements such as infrastructure improvements and capital investments. Not all of the requirements will relate to projects at airports; however, the following requirements specifically address airports:

1. Identify transportation facilities that should function as an integrated metropolitan transportation system, giving emphasis to facilities that serve important national, state, and regional transportation functions. Those facilities include the facilities on the Strategic Intermodal System (SIS) designated under Section 339.63 and facilities for which projects have been identified pursuant to Section 339.2819 (Transportation Regional Incentive Program). [339.175(1), F.S.]
2. Address the prevailing principles to be considered in the long range transportation plan: preserving the existing transportation infrastructure; developing surface transportation systems that will foster economic growth and development while minimizing and improving travel choices to ensure mobility needs of people and freight. The L RTP must be consistent, to the maximum extent feasible, with future land use elements and the goals, objectives, and policies in the approved local government comprehensive plans of the units of local government located within the jurisdiction of the MPO [339.175(1), (7), F.S.]

3. Identify transportation facilities including, but not limited to, major roadways, airports, seaports, spaceports, commuter rail systems, pedestrian walkways, bicycle transportation facilities, and intermodal or multimodal terminals that will function as an integrated metropolitan transportation system [339.175(7) (a), F.S.]
4. Make the most efficient use of existing transportation facilities to relieve congestion and maximize the mobility of people and goods. [339.175(7) (c), F.S.]

RELATIONSHIP BETWEEN A LONG RANGE TRANSPORTATION PLAN AND SUSTAINABILITY PLANNING

When developing an airport sustainability plan, the project team should coordinate with their MPO where applicable, and ensure that the sustainability plan supports the LRTP. Since the LRTP provides information regarding specific projects that may impact an airport (i.e., construction of a new road, interstate interchange, identification of a freight route, etc.), coordination with the MPO regarding the sustainability planning process is vital. Planned, needed improvements as identified by an airport, may be addressed as part of the LRTP and vice versa, including the identification of alternative funding sources.

OTHER PLANS

The documents and policies described previously are important for all airports to understand when completing any planning effort at their airport. In some instances, additional coordination may be needed based on local factors. For instance, the presence of a large university or hospital may require additional coordination based on their development plans. The list below introduces some of the plans and documents that may need to be reviewed and understood while developing a sustainability plan.

Hospital Plans

Hospitals play a vital role to the functionality of society. Major hospitals regularly have heliports available for emergency helicopter operations. Airports within close proximity to hospitals, especially those with heliports, should reach out to the hospitals to see what, if any, development plans they have identified could potentially have an effect on the hospitals and/or hospital plans and policies. In most cases, development will not interfere with the operational sustainability of an airport, but understanding future plans may help to mitigate issue in the future. As airports are recommended to consult local hospital plans and policies throughout multiple planning programs such as capital improvement programs, this step of sustainability planning should be relatively consistent with airport protocol.

Local School Board Plans

The Florida Department of Education (FLDOE) serves nearly 2.7 million students, 4,200 public schools, 28 colleges, 192,000 teachers, 47,000 college professors and administrators, and 321,000 full-time staff throughout the state. Upon drafting a sustainability plan, airports should consult with local school boards and/or the FLDOE depending on if sustainability initiatives are determined to potentially impact the local school board or FLDOE. Additionally, local university plans can play a major role in land-development in several cities in Florida. Airports within cities that have universities should contact the university and discuss the sustainability initiatives

determined to have a potential effect of the university and the university's plans. School development plans should be consulted with by the airport to mitigate possible interference with airport plans. Generally school board and university plans will not interfere with airport sustainability operations, however, an understanding of the plans and policies is recommended.

Military Plans

The state of Florida is home to numerous military installations. Airports should consult military installations that are within close proximity if the chosen sustainability initiatives are anticipated to have a potential impact on said military installation. Availability of military installation information such as plans and policies may be limited, therefore it is recommended that airports aim to simply inform the military installations of the sustainability initiatives.

APPENDIX 7

TOOL INVENTORY

INTRODUCTION

This inventory was created to analyze existing tools available for airports to utilize when developing and implementing a sustainability plan or sustainability initiatives. These tools were derived from numerous sources including Airport Cooperative Research Program (ACRP) Reports, National Cooperative Highway Research Program (NCHRP) Reports, and outside agencies. For organization and enhanced understanding, the identified tools have been sorted into three categories:

- Baseline Assessment
- Initiative Selection
- Other

These categories are meant to help airports identify useful tools for different phases of a sustainability planning project and also corresponds to the content and flow of the Airport Sustainability Guidebook. The Baseline Assessment tools can help airports analyze the current state of sustainability-related characteristics. The Initiative Selection tools can help airports determine which sustainability initiatives will fit best at their airport to help achieve specific goals and objectives. The tools in the Other category can help airports in different ways related to sustainability such as performance monitoring and facility improvements/upgrades. This tool inventory should be utilized by airports during the planning process to ensure a more accurate and efficient sustainability plan.

BASELINE ASSESSMENT

1. AIRPORT PERFORMANCE INDICATORS

ACRP Report 19: Developing an Airport Performance Measurement System

Website: <http://www.trb.org/Main/Blurbs/164175.aspx>

and ACRP Report 19A: Resource Guide to Airport Performance Indicators

Website: http://onlinepubs.trb.org/onlinepubs/acrp/acrp_rpt_019A.pdf

ACRP Report 19 details the steps to assist airports in identifying performance measures suitable for their organization and in crafting and implementing a performance measurement program. The Report breaks down the individual steps in developing a performance measurement system, including preparing, planning, developing the structure, implementation and monitoring, management of the program, and technological considerations. Additionally, a CD-ROM with various tools is provided to assist airports with additional guidance and resources when developing a performance measurement system.

The airport performance indicators outlined in ACRP Report 19A present airports with a multitude of sustainability indicators to allow airports to assess numerous metrics based on industry accepted measures. The indicators are broken down into 23 categories including Air

Service, Human Resources, Planning/Construction, and Maintenance. Within each of these categories there are multiple indicators that provide useful information related to that category. As such, each indicator has a devoted page for airports to learn more about the measurement techniques involved with the airports. ACRP Report 19A is used as the foundation for the baseline assessment component of this Guidebook.

Tool Application to Sustainability

These tools can be used by airports to identify key sustainability performance indicators, metrics, and performance targets. Specifically, the performance indicators should be utilized in the baseline assessment stage of a sustainability project.

2. Tool for Evaluating Emissions and Costs of Auxiliary Power Units and Alternative Systems (TEECAAS)

ACRP Report 64: Handbook for Evaluating Emissions and Costs of APUs and Alternative Systems

Website: <http://www.trb.org/main/blurbs/167070.aspx>

TEECAAS Tool CD Download: http://onlinepubs.trb.org/onlinepubs/acrp/acrp_rpt_064.iso

The Tool for Evaluating Emissions and Costs of Auxiliary Power Units (APUs) and Alternative Systems (TEECAAS) gives airports the ability to evaluate the environmental and economic impact of APU systems at the airport. TEECAAS also provides data related to air conditioning and heating units regarding emissions and power consumption. This tool is useful for airports when evaluating the current costs and environmental impacts of APUs and alternative systems at an airport. The overall goal in the creation of TEECAS was to provide airports a standardized method to quantify APU emissions, especially as a sustainability initiative.

The tabular format of this software allows for airports to follow a standardized progression when calculating APU emissions. Though there are ten interactive tabs for airports to manually enter data, TEECAAS expresses that most of the expected user-supplied data is contained in the first three tabs:

- Study setup
- Airport specific input
- Operations

The TEECAAS provides baseline data for airports to implement into their respective study as needed; however, airports with more data to input into the TEECAAS software will receive more accurate and tailored results. Further, the TEECAAS provides links for airports to obtain specific information depending on the time of the report and the airport's location. For example, under the airport specific input tab, the two primary data entries include annual temperature percentages as well as jet fuel prices, electricity costs, and natural gas costs. The TEECAAS provides two links at the bottom of the page for airports to access local annual temperature data and jet fuel price data online.

Tool Application to Sustainability

The TEECAAS helps airports collect the data needed to focus on the quantification of emissions and associated costs during the daily operations of APUs and alternative systems. Although this tool is specific to aircraft-related emissions quantification, this tool can be useful to airports during the baseline assessment portion of the sustainability planning process.

3. Departure Optimization Tool (DOIT)

ACRP Report 86: Environmental Optimization of Aircraft Departures: Fuel Burn, Emissions, and Noise

Website: <http://www.trb.org/main/blurbs/169059.aspx>

DOIT Download: http://onlinepubs.trb.org/onlinepubs/acrp/acrp_rpt_086.iso

The Departure Optimization Investigation Tool (DOIT) is an interactive Excel-based file that allows airports to model the environmental impacts of air traffic, including categories such as fuel burn, emissions, and noise. Further, this tool provides mitigation strategies in an interactive spreadsheet format that gives airports the ability to determine the feasibility of implementing various strategies based on the unique conditions at their airport.

The DOIT is most effective when airports are able to input specific information regarding aircraft departures, fleet mix, and other airport-specific information. Inputting this detailed information allows the DOIT to produce the most accurate and tailored information for the airport. This system is based on multiple baseline scenarios and behind-the-scenes calculations that, when combined with airport specific information, provide airports with an in-depth overview of the current status of air traffic environmental impacts. ACRP Report 86 provides detailed instructions on using the tool and the system driving the data output.

Tool Application to Sustainability

The DOIT is beneficial to airports in calculating the environmental footprint of aircraft on departure. In sustainability planning, this tool can be utilized by airports during the baseline assessment process to aid in developing a standardized assessment of the environmental impacts. The results produced by DOIT will help airports compare the current environmental impact from aircraft departures to other airports with similar scenarios.

4. Airport Construction Emissions Inventory Tool (ACEIT)

ACRP Report 102: Guidance for Estimating Airport Construction Emissions

Website: <http://www.trb.org/main/blurbs/170234.aspx>

Airport Construction Emissions Inventory Tool CD Download:
http://onlinepubs.trb.org/onlinepubs/acrp/acrp_rpt_102.iso

The Airport Construction Emissions Inventory Tool (ACEIT) is a construction emissions data generator developed for airports to analyze the environmental impact, particularly on air quality, of ongoing and past airport construction projects. This tool outputs a summary Excel file with annual totals of Non-Greenhouse Gas and Greenhouse Gas (GHG) emissions including carbon dioxide, methane, nitrous oxide, etc.

The ACEIT tool has multiple tabs for manual data entry to provide the most airport-specific data possible. Basic construction project information is required; however, in-depth data assumptions are provided if the airport is unable to acquire the data. This tool provides information selection boxes for airports to easily find and select information relevant to the characteristics of specific construction projects. For example, the two activity tabs (on road and non-road) provide a drop down menu for airports to select different types of equipment that are being used, such as an asphalt dump truck or a passenger car. Further, drop down menus are provided next to each selection to pick between the fuel type being used, the activity being performed, as well as others. The depth and specificity of the data entry portion of the ACEIT ensures the most accurate and effective emissions calculations possible. Using the data assumptions in lieu of particular airport-specific data will require less effort, but may result in a less accurate output from the ACEIT. Following data entry, the ACEIT uses the information and data to produce the final Excel-based emissions inventory summary.

Tool Application to Sustainability

The ACEIT is a beneficial tool for airports to utilize during the baseline assessment stage of a sustainability project. Based on construction project frequency, airports should decide on a case-by-case basis if the ACEIT would be applicable to use in their respective baseline assessments.

5. General Aviation Airport Preventative Maintenance Checklists

ACRP Report 138: Preventative Maintenance at General Aviation Airports Volume 2: Guidebook

Website: <http://www.trb.org/Main/Blurbs/172853.aspx>

Checklists Download: http://onlinepubs.trb.org/onlinepubs/acrp/acrp_rpt_138.iso

This series of 48 Excel-based checklists provides general aviation (GA) airports a tool for evaluating the current status and condition of the airfield and airport. Each checklist is specific to a certain facet of the airport that requires recurring inspection. These checklists give GA airports characteristics to look at and inspect, as well as a column to note remarks and a column to note action taken. Examples of checklists within the series include:

- Irrigation system monthly inspection
- Hangar monthly inspection
- Turf and safety area monthly inspection
- Solar panel inspection

Most GA airports are not required to fulfill a Part 139 daily airfield inspection; thus, these checklists can provide information to those GA airports without required routine airfield inspections. Further, the checklists may provide additional information and areas of interest to airports already performing routine airfield inspections.

Tool Application to Sustainability

These checklists provide GA airports with information on multiple airfield and airport facilities/properties that may need to be inspected and evaluated. These checklists should be utilized by GA airports during the baseline assessment portion of the sustainability planning process. Although the checklists are not tailored specifically to sustainability, they could provide GA airports with an understanding of areas to inspect for potential deficiencies that may not be included in the daily airfield inspections.

6. Airport Terminal Building Energy Use Intensity (ATB-EUI) Benchmarking Tool

ACRP CD-ROM 178: Airport Terminal Building Energy Use Intensity (ATB-EUI) Benchmarking Tool

Website: <http://www.trb.org/Energy/Blurbs/173795.aspx>

The ATB-EUI provides airports with a streamlined process for evaluating terminal energy usage as well as other facility energy usage at an airport. Airports begin this process by downloading the PDF “input form” which asks for specific data relevant to the airport. The categories for data entry on the input form include:

- General information
- Floor Space Information
- Mechanical Systems
- Airport Ground Support Equipment (GSE) Electricity Use
- Alternative Systems (Ground Power & PCA Power)
- External Lighting/Parking Lighting
- Performance and Utilities Information

Based on these inputs, the ATB-EUI presents the energy-usage information in a graphical format for enhanced display and easy interpretation of data. In addition to providing the airport-in-study’s breakdown of energy usage, the ATB-EUI provides a comparison of results to ten other airports of varying roles and sizes who originally participated in the study. By providing a comparison of energy usage, an assessment can be made as to the relative performance of one airport to another.

Tool Application to Sustainability

The ATB-EUI should be utilized by airports during the baseline assessment stage of sustainability program development. The results can be evaluated and compared to other airports to provide a general understanding of potential energy waste at the airport. The ATB-EUI can also be used during the monitoring phase of an airport’s sustainability program to provide an opportunity to continually evaluate energy-usage and provide continued comparisons to the case study airports.

INITIATIVE SELECTION

7. Airport Greenhouse Gas Emission Assessment and Reduction (GEAR) Tool

ACRP Report 56: Handbook for Considering Practical Greenhouse Gas Emission Reduction Strategies for Airports

Website: <http://www.trb.org/main/blurbs/166519.aspx>

AirportGEAR Tool CD Download: http://onlinepubs.trb.org/onlinepubs/acrp/acrp_rpt_056.iso

This tool provides airports with numerous Greenhouse Gas (GHG) emission reduction strategies that provide support to airports when measuring and analyzing their GHG “footprint.” Specifically, AirportGEAR describes 125 strategies across 12 categories that aid airports in GHG identification, measurement, and reduction. AirportGEAR is interactive so airports can filter between the emission reduction strategies based on criteria deemed important to the airport. There are also numerous criteria that airports can filter between allowing for the most effective and relevant results based on an airport’s specific goals in terms of GHG reduction strategies.

The AirportGEAR tool also allows airports to prioritize and plan emission reduction strategies based on factors that are relevant to an individual airport. The tool provides an evaluation matrix for each emission reduction strategy that is based on the airport’s specific characteristics and can be adjusted to better represent the airport. This functionality provides airports with the ability to draft an emission strategy implementation plan to begin the installment of the chosen GHG reduction strategy at the airport.

Tool Application to Sustainability

The AirportGEAR tool can be utilized by airports during the initiative selection portion of sustainability program development. If the airport identifies the environmental portion (specifically GHG emissions) of the baseline assessment as deficient, the AirportGEAR tool can help by providing reduction emission strategies for consideration during the initiative selection process.

8. Airport Sustainability Assessment Tool (ASAT)

ACRP Report 80: Guidebook for Incorporating Sustainability into Traditional Airport Projects

Website: http://onlinepubs.trb.org/onlinepubs/acrp/acrp_rpt_080.pdf

Excel tool: www.trb.org/Publications/Blurbs/168044.aspx

The Airport Sustainability Assessment Tool (ASAT) is an airport-directed sustainability decision-making enhancement tool that aids airports in evaluating the applicability and feasibility of numerous sustainability practices. The practices provided in the ASAT were derived from case studies of over 15 airports and airport authorities including the Chicago Department of Aviation (CDA), Los Angeles International Airport (LAX), and many more.

The ASAT streamlines and guides airports through the selection process in regard to implementing sustainability initiatives into common airport projects. To accomplish this, the ASAT provides two main components to guide airports through the decision-making process:

- Specific technology or procedures
- Exploring technology or procedures to consider

Together, these two components guide airports through a basic decision-making process that will allow them to determine the most appropriate sustainability practices.

Tool Application to Sustainability

By filtering through sustainability initiatives derived from the numerous case studies within the ASAT, airports can learn how initiatives fit in and operate at airports around the world. Thus, this tool can be implemented in the initial phases of the sustainability planning process, as well as the initiative selection phase. This tool can serve as a launching point for airports to select initiatives at their respective airports based on how well they've performed at others.

9. Airport Facility Optimization Ranking Tool

ACRP Report 139: Optimizing Airport Building Operations and Maintenance through Retrocommissioning: A Whole-Systems Approach (Appendix G)

Website: <http://www.trb.org/main/blurbs/172739.aspx>

Airport Facility Optimization Ranking Tool CD Download:

http://onlinepubs.trb.org/Onlinepubs/acrp/acrp_rpt_139.iso

This web-based software provides airports with an Excel-based spreadsheet tool that allows airports to filter between sustainability initiatives based on criteria deemed important to the airport. Two sets of sustainability initiatives are provided; a SIMPLE list and an ADVANCED tool. The SIMPLE list is a basic filterable sheet that lists numerous initiatives broken into 28 categories and further divided into goals. The ADVANCED tool provides the same list, but in a much more customizable interface. Within the spreadsheet, each initiative is scored based on the following criteria:

- | | |
|--------------------------|--------------------------------|
| ○ Implementation Cost | ○ Visibility |
| ○ Potential Cost Savings | ○ Greenhouse Gas (GHG) Savings |
| ○ Estimated Difficulty | |

The listed sustainability initiatives are ranked 1-5 on the above criteria, which are calculated as part of the overall weighted score. The weighted score is also derived from the percentage of identified importance of each criterion to the individual airport. For example, an airport that highly values low implementation costs, but doesn't value GHG savings as much could rank implementation costs 30 percent and GHG savings five percent. Upon doing so, initiatives with a five in the implementation cost criteria column would increase in weighted score. This way, the airport could identify initiatives that are more relevant to fulfilling the airport's goals and objectives.

Tool Application to Sustainability

This tool should be utilized by airports during the initiative selection stage of sustainability program development. Using the Facility Optimization tool can help airports identify initiatives that are most relevant to them based on the priorities identified by the sustainability project team/champion.

10. Airport Climate Risk Operational Screening (ACROS)

ACRP Report 147: Climate Change Adaptation Planning: Risk Assessment for Airports

Website: <http://www.trb.org/main/blurbs/173554.aspx>

ACROS Tool CD Download: http://onlinepubs.trb.org/onlinepubs/acrp/acrp_rpt_147.iso

The Airport Climate Risk Operational Screening (ACROS) tool was designed to help airports evaluate climate change and the relevant/potential impacts it could have on the built airport environment. Many Florida airports are located on the coast of the Atlantic Ocean and the Gulf of Mexico. Therefore, the ACROS tool should be considered when evaluating the potential risks of climate change and sea level rise. Further, the ACROS tool presents airports with potential strategies and real-world experiences to help adapt with the changing climate. Using the ACROS tool is as simple as selecting the airport within the database, evaluating current climate hazard data, and inputting details about the airport and its characteristics. The data backing the ACROS tool was derived from the Intergovernmental Panel on Climate Change's AR5 report as well as the 2012 Global Sea Level Rise Scenarios for the United States National Climate Assessment.

Tool Application to Sustainability

Climate change is a topic that has been deemed critically important by many countries and organizations around the world. In coming years, airports may be tasked with adapting to a changing climate and rising sea levels. Airports can use the ACROS tool as a sustainability initiative within the environmental portion of the sustainability plan to begin strategizing and developing preparations for anticipated climate change.

11. Renewable Energy Project Evaluation Criteria Template

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

Website: <http://www.trb.org/main/blurbs/173554.aspx>

Template: http://onlinepubs.trb.org/onlinepubs/acrp/acrp_rpt_147.iso

The renewable energy project evaluation tool provides an Excel-based system for analyzing potential renewable energy projects to determine the feasibility and benefits of their implementation. The template is based on four categories which are further broken down into specific factors, or "criteria," for consideration. The four primary categories include:

- Economic
- Investment in Long Term Business
- Environmental/Social
- Other

Each of these categories is worth 25 percent of the renewable energy project's total score. Further, the template provides four columns to note potential alternatives to the renewable energy project under study. These alternatives can then be run through the same criteria and scored accordingly to compare to the project of study.

Tool Application to Sustainability

This tool can be highly beneficial for airports in pursuing renewable energy projects. This tool should be utilized during the initiative selection stage of the sustainability planning process if the airport determines renewable energy to be an objective. This tool can play a beneficial role to airports when selecting a renewable energy project to pursue.

OTHER

12. Sustainable Facilities Tool

Website: <https://sftool.gov/>

This website is an interactive sustainability database created by the General Services Administration to "put our nation's public servants into efficient, healthy buildings and buy goods and services that provide maximum value to the tax payer."

Though not airport specific, this website provides guidance and information on numerous facets of sustainability planning. The website provides access to information in four primary tabs:

- **Learn** – provides case studies, best practices, legal requirements, as well as various sustainability topics to explore
- **Plan** – provides guidance on life cycle assessments, various project types, and climate adaptation resources
- **Procure** – provides a comprehensive list of sustainable products and services that can be utilized by an airport
- **Share** – provides example case studies that highlight the value of implementing various sustainability initiatives

Through these sections, the Sustainable Facilities (SF) website provides a step-by-step process for organizations to follow to maintain a sustainable environment and implement a sustainability plan. Specifically, the website provides guidance, tools, interactive games, case studies, resources, and many more beneficial aspects to organizations implementing sustainability.

Tool Application to Sustainability

It is highly recommended that airports visit the SF website at the beginning of the sustainability planning process. This website can provide airports with an abundance of useful information that will aid airports throughout a sustainability planning project. Airport sustainability project teams can familiarize themselves with the SF website to understand many efficient tools and concepts involving effective sustainability planning.

13. Energy Star® Portfolio Manager®

Website: <http://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/use-portfolio-manager>

The Environmental Protection Agency (EPA) created this online tool to measure and track energy usage, water consumption, and greenhouse gas emissions. Though this tool was not developed specifically for airports, it provides a simple user interface that would allow for simple measurement of energy outputs. The STAR portfolio manager provides one access point for organizations to evaluate the environmental sustainability of the building or buildings. To get started in the STAR program, all that is needed are energy bills and some basic information about the building. Further, the Energy STAR website provides a benchmarking starter kit to efficiently help organizations integrate into the STAR program. Although this tool was not created specifically for airports, it can be utilized as an organization method and initiative tracking system for airports.

Tool Application to Sustainability

Airports can use the Energy STAR program to organize and track the progress of selected sustainability initiatives. This program could be most beneficial to airports during the initiative tracking stage of sustainability program development.

14. Evaluation Process (EP) and Cost Benefit Tool (CBT)

ACRP Report 110: Evaluating Impacts of Sustainability Practices on Airport Operations and Maintenance (O&M)

User Guide/More Information: http://onlinepubs.trb.org/onlinepubs/acrp/acrp_rpt_110.pdf

Website: www.trb.org/Publications/Blurbs/170580.aspx

The Evaluation Process and Cost Benefit Tool (EP&CBT) was developed to aid airports in determining the financial impacts that implementing sustainability initiatives might have on operations and maintenance (O&M) departments. The tool is broken into two parts: the evaluation process and the cost benefit tool. The evaluation process is designed to help airports collect all relevant economic information pertaining to O&M and related sustainability tools. The cost benefit tool uses the information collected during the evaluation process to develop total cost and individual costs, related to O&M, of implementing specific sustainability initiatives.

Utilization of this tool is designed to help airports determine which sustainability initiatives would be feasible to implement based on conditions at their airport. The results of the EP&CBT are presented in two ways: Budget Output and Graphical Output. The Budget Output shows the annual monetary impact of the sustainability initiative broken into categories, such as personnel, materials and supplies, and contractual services. The Graphical Output presents O&M cost-benefit data in a visually appealing format. The graphical format is an excellent source of information to present to outside parties involved in the sustainability planning process such as local government agencies, airport tenants, and agency stakeholders.

Tool Application to Sustainability

The EP&CBT should be utilized by airports in the cost-benefit analysis portion of the sustainability planning process. A number of sustainability initiatives require O&M departments to devote labor to ensure successful initiative implementation. This tool will help airports determine the extent to which the O&M department could be affected if chosen initiatives were implemented. Further, this tool can be beneficial in reporting the analysis of sustainability initiatives to outside entities interested in the airport's sustainability project, especially the local community.

15. Performance Measures Compendium

NCHRP Report 708: A Guidebook for Sustainability Performance Measurement for Transportation Agencies (Appendix B)

Website: http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_708.pdf

Excel Tool: www.trb.org/Main/Blurbs/166313.aspx

Though not aviation specific, this compendium details 11 goals specifically designed to help transportation agencies with performance measures of sustainability initiatives. Each goal is broken into six focus areas which are further broken into numerous sustainability objectives. Measures are detailed for each sustainability objective to provide ideas for objective achievement. More specifically, the measures can be utilized as options for airports to implement and track as part of achieving the sustainability objective. This compendium is designed to support transportation agencies in identifying appropriate objectives and measures for a successful performance measurement system, consistent with the goals set by the agency.

This tool was developed as an Excel spreadsheet to allow users to sort, organize, and filter sustainability measures that are important to the specific organization. This tool is not specifically geared towards aviation; however, it offers insight on sustainability performance measures for all modes of transportation. The eleven goals outlined in the performance compendium are:

- Safety
- Basic Accessibility
- Equity/Equal Mobility
- System Efficiency
- Security
- Prosperity
- Economic Viability
- Ecosystems
- Waste Generation
- Resource Consumption
- Emissions and Air Quality

Tool Application to Sustainability

The performance measuring compendium can be utilized by airports in the sustainability initiative selection stage as well as the performance monitoring stage of the airport sustainability planning project. Although not specific to airports, this tool can be used to implement sustainability ideas spanning several categories and track those ideas as they develop within the airport system.

16. Sustainable Airport Construction Filterable Spreadsheet

ACRP Report 42: Sustainable Airport Construction Practices

Website: <http://www.trb.org/Publications/Blurbs/164240.aspx>

Sustainable Airport Construction Filterable Spreadsheet Tool CD Download:

http://onlinepubs.trb.org/onlinepubs/acrp/acrp_rpt_042.iso

The sustainable airport construction spreadsheet is a list of sustainability initiatives/practices that airports can implement during construction projects. The list is provided a filterable sheet divided into three primary categories of airport construction projects – Pre-construction, Construction, and Commissioning – to aid airports in a specific component of a construction project. Further, each sustainability initiative describes things to be considered for that initiative regarding the four primary categories of sustainability: economic, environmental, operational, and social. This spreadsheet also provides names of airports that have implemented the initiative and whether or not the initiative is recognized by LEED. The primary objective of this spreadsheet is to provide airports with sustainable initiative ideas to pursue during construction projects.

Tool Application to Sustainability

This spreadsheet can be utilized by airports with ongoing or planned construction during the initiative selection stage of a sustainability project. By analyzing presented initiatives and selecting those deemed applicable, airports can ensure a more sustainable construction project at the airport.

17. Airport Sustainability Practices Matrix

ACRP Synthesis 10: Airport Sustainability Practices (Appendix D)

Website: http://onlinepubs.trb.org/onlinepubs/acrp/acrp_syn_010.pdf

This list of sustainability practices was created from a survey of 25 domestic and international commercial service airports. The survey contained five sections of questions including:

- General Information
- Organizational Governance
- Existing Sustainability Initiatives
 - Environmental
 - Economic
 - Social
- Other Initiatives and Barriers
- Future Sustainability Priorities

Based on the responses of the 25 airports that participated in the survey, the sustainability practices matrix was developed. The matrix is divided into numerous sustainability subtopics (water quality, air quality, etc.) that display the airport responses to the category based on airport size and category. The airport responses are aggregated into columns based international/domestic and further by hub size. The 18 pages of sustainability initiatives collected from the surveyed airports provide specific and helpful insight to sustainability implementation at airports.

Tool Application to Sustainability

This matrix can be utilized by airports in the sustainability initiative selection, the baseline assessment, and the organizational readiness assessment phase of sustainability program development. This matrix can provide airports with ideas for sustainability initiative selection as well as provide insight to how other airports are handling sustainability considerations across the globe.

18. End Use Water Audit Tool

ACRP Report 154: Water Efficiency Management Strategies for Airports

Website: <http://www.trb.org/ACRP/Blurbs/174444.aspx>

End Use Water Audit Tool Download:

http://onlinepubs.trb.org/Onlinepubs/acrp/acrp_rpt_154.xlsx

The End Use Water Audit tool was designed to help airports monitor and track water usage and efficiency at the airport. This tool was developed in an interactive Excel-based platform that gives airports the ability to manually edit initial input data based on the specific characteristics of the airport. The end use water audit tool helps break down the areas on an airport that could use water efficiency reform and benefit from sustainability initiative implementation.

By entering in detailed information regarding the airport, its water usage, and its activity/passenger flow, the tool can present an accurate and descriptive information sheet in Excel. This sheet can be very beneficial to airports when analyzing the water “footprint” of the airport.

Tool Application to Sustainability

This tool should be utilized by airports during the baseline assessment portion of the sustainability planning process. Analyzing water usage and efficiency can be included in all four aspects of sustainability, but is generally regarded as an environmental or economic measurement.

19. The Sustainable Airport Manual

Chicago Department of Aviation

Website: <http://www.airportsgoinggreen.org/sustainable-airport-manual.aspx>

The Chicago Department of Aviation developed a Sustainable Airport Manual (SAM) that incorporates multiple guidebook sections and corresponding checklists to aid in implementation and evaluation of sustainability initiatives at airports. The SAM is broken into five major sections:

- Administrative Procedures
- Planning
- Design and Construction
- Operations and Maintenance
- Concessions and Tenants

Within these categories, the SAM provides ample information for airports to use in developing a sustainability plan. The Appendices of the SAM include several checklists that provide sustainability initiatives and a corresponding numerical rating system. These checklists were designed with the intent enhance organization of airport sustainability initiatives and tracking. The following is a breakdown of the checklists provided with the SAM. Table X details the checklists provided in the SAM.

Tool Application to Sustainability

The SAM can be used by airports in all phases of sustainability program development, from initiative selection and benchmarking to monitoring and tracking and continuous plan refinement.

Chicago Department of Aviation - Sustainable Airport Manual (SAM)			
Location	Name	Description	Application to Sustainability
Appendix PL-A	Planning Checklist	<p>Designed to aid airports in spurring sustainability and beginning the planning process.</p> <p>Provides attainable goals for airport administration to strive to obtain</p> <p>Includes five corresponding deliverables for airports as part of the procedures</p>	<p>This checklist can be utilized by airports in the early stages of the sustainability planning process.</p> <p>This tool can be used to incorporate basic sustainability ideas into the airport environment early in the planning process</p>
Appendix DC-B	Design & Construction (DC) Checklists	<p>A large Excel-based spreadsheet that details numerous sustainability initiatives for implementation regarding design & construction.</p> <p>The initiatives are divided into eight categories for enhanced organization and understanding.</p> <p>Correlating points column to track the initiatives as they develop</p>	<p>It is recommended that airports consult this checklist during the initiative selection stage of the sustainability planning process.</p> <p>Although this tool is intended for DC use in sustainability progression, it can be utilized across all airport departments for sustainability initiative ideas and as a template for a basic tracking system.</p>

Chicago Department of Aviation - Sustainable Airport Manual (SAM): *Cont.*

Appendix OM-B	Operation & Maintenance (O&M) Checklist	<p>A large Excel-based spreadsheet that details numerous sustainability initiatives for implementation by and for airport operations and maintenance.</p> <p>The initiatives are divided into nine categories for enhanced organization and understanding.</p> <p>The focus of this checklist is to enhance airport operations and maintenance in sustainability activities and collaboration.</p>	<p>It is recommended that airports consult this checklist during the initiative selection stage of the sustainability planning process.</p> <p>Although this tool is intended for O&M department use in sustainability progression, it can be utilized across all airport departments for sustainability initiative ideas and as a template for a basic tracking system.</p>
Appendix CT-B	Concessions & Tenants Checklists	<p>Provides a detailed layout of potential sustainability initiatives regarding concessions and tenants at an airport.</p> <p>The initiatives are broken into two major tabs:</p> <ul style="list-style-type: none"> - Design & Construction - Operations & Maintenance <p>These tabs contain multiple categories containing initiatives that airports can pursue regarding concessions & tenants</p>	<p>It is recommended that airports consult this checklist during the initiative selection stage of the sustainability planning process.</p> <p>Although this tool is intended for Concessions & Tenants use in sustainability progression, it can be utilized across all airport departments for sustainability initiative ideas and as a template for a basic tracking system.</p>

Source: Chicago Department of Aviation <http://www.airportsgoinggreen.org/sustainable-airport-manual.aspx>

20. Environmental Stewardship Practices at Small Airports

ACRP Report 43: Guidebook of Practices for Improving Environmental Performance at Small Airports

Website:

http://www.trb.org/Publications/Blurbs/Guidebook_of_Practices_for_Improving_Environmental_164885.aspx

Chart Download: http://onlinepubs.trb.org/onlinepubs/acrp/acrp_rpt_043.iso

This Excel-based database that provides small airports with over 200 environmental-related sustainability initiatives. The initiatives outlined in the database are directly related to the chapters within ACRP Report 43. Some of the chapters include: air quality, waste minimization practices, energy efficiency, etc. Further, the initiatives are evaluated on four criteria:

- Compliance
- Implementation Feasibility
- Staffing
- Costs

By analyzing the criterion results for each sustainability initiative, small airports can decide which environmental sustainability initiatives would be most appropriate to the specific airport. Although this database was developed to benefit particularly small airports, large airports could also benefit from evaluating proposed sustainability practices.

Tool Application to Sustainability

It is recommended that all small airports consult this database when selecting environmental practices to implement. This database provides useful information about numerous practices that can be filtered based on an airport's identified goals and objectives of sustainability.

Airport Sustainability Guidebook

Technical Appendices

Source	Tools	Preliminary Study	Baseline Assessment	Initiative Selection	Performance Monitoring	Cost Benefit Analysis
https://sftool.gov/	Sustainable Facilities Tool	→				
ACRP Synthesis 10	Airport Sustainability Practices Matrix	→	→	→		
ACRP Report 19	Airport Performance Indicators		→			
ACRP Report 64	Tool for Evaluating Emissions and Costs of Auxiliary Power Units and Alternative Systems (TEECAAS)		→			
ACRP Report 86	Departure Optimization Tool (DOIT)		→			
ACRP Report 102	Airport Construction Emissions Inventory Tool (ACEIT)		→			
ACRP Report 138	General Aviation Airport Preventative Maintenance Checklists		→			
ACRP Report 154	End Use Water Audit Tool		→			
ACRP Report 178	Airport Terminal Building Energy Use Intensity (ATB-EUI) Benchmarking Tool		→			
Chicago Department of Aviation	The Sustainable Airport Manual		→	→	→	
ACRP Report 42	Sustainable Airport Construction Filterable Spreadsheet			→		
ACRP Report 43	Environmental Stewardship Practices at Small Airport			→		
ACRP Report 56	Airport Greenhouse Gas Emission Assessment and Reduction (GEAR) Tool			→		
ACRP Report 80	Airport Sustainability Assessment Tool (ASAT)			→		
ACRP Report 139	Airport Facility Optimization Ranking Tool			→		
ACRP Report 147	Airport Climate Risk Operational Screening (ACROS)			→		
ACRP Report 151	Renewable Energy Project Evaluation Criteria Template			→		
NCHRP Report 708	Performance Measures Compendium			→	→	
ACRP Report 110	Evaluation Process (EP) and Cost Benefit Tool (CBT)			→		→
http://www.energystar.gov	Energy Star® Portfolio Manager®				→	

APPENDIX 8

REFERENCE MATERIALS AND LITERATURE REVIEW

INTRODUCTION

This list of reference materials was compiled to analyze useful resources for sustainability project teams and airports to reference for further information regarding sustainability. This list was derived from previous literature review efforts as well as sustainability tool inventory collection. While this list provides a foundation of information for airports to reference, it is important to note that new publications and guidance relating to sustainability are continuously in development.

TRANSPORTATION RESEARCH BOARD RESOURCES

1. ACRP Report 141: Renewable Energy as an Airport Revenue Source

Prepared by: Transportation Research Board, 2015

http://onlinepubs.trb.org/Onlinepubs/acrp/acrp_rpt_141.pdf

Report 141 contains information on using renewable energy sources at airports through case studies and feasibility assessments of multiple renewable energy options. Key components of *Report 141* include:

- Evaluation of the airport factors that influence what forms of energy are feasible at an airport
- Guidance on conducting financial assessments of chosen renewable energy sources
- Guidance on renewable energy implementation
- A Renewable Energy Funding Matrix
- Sample Request for Proposals are referenced within and are available at:
http://onlinepubs.trb.org/Onlinepubs/acrp/acrp_rpt_141_AppendixF.pdf

2. ACRP Synthesis 66: Lessons learned from Airport Sustainability Plans

Prepared by: Transportation Research Board, 2015

<http://www.trb.org/Main/Blurbs/172887.aspx>

Synthesis 66 provides a summary of the lessons learned from a sustainability implementation survey sent to airports around the nation. This report organized information from 31 medium and small general aviation and commercial service airports from 20 states. Based on the survey results, *Synthesis 66* provides the following:

- Advice on the development of sustainability plans
- Typical drivers, aids, and barriers to implementation
- Sustainability implementation lessons learned
- Airport sustainability case studies

ACRP Report 110: Evaluating Impacts of Sustainability Practices on Airport Operations and Maintenance

Prepared by: Transportation Research Board, 2014

http://onlinepubs.trb.org/onlinepubs/acrp/acrp_rpt_110.pdf

Report 110 provides guidance on the proper function and use of two tools developed to monitor the impact of sustainability on airports' operations and maintenance; these tools are:

- **Evaluation Process (EP)**: Guides users to scope the analysis and collect relevant data as it relates to sustainability practices for use in the Cost Benefit Tool
- **Cost Benefit Tool (CBT)**: Helps users categorize the data collected in the EP to support the assessment of potential impacts resulting from the implementation of sustainability initiatives on maintenance budgets and resources

http://onlinepubs.trb.org/onlinepubs/acrp/acrp_rpt_110.iso¹⁹

Video tutorial on how to use the CBT: <http://vimeo.com/116156429>

3. **ACRP Report 119: Prototype Airport Sustainability Rating System – Characteristics, Viability, and Implementation Options**

Prepared by: Transportation Research Board, 2014

http://onlinepubs.trb.org/onlinepubs/acrp/acrp_rpt_119.pdf

Report 119 contains an exploration and explanation of the Prototype Rating System (Prototype) and how it can be used by airports. The primary components of *Report 119* include:

- The methods used to create the Prototype
- A user's guide for the Prototype
- A list of sustainability best practices
- Sustainability activity definitions and performance metrics

4. **ACRP Report 80: Guidebook for Incorporating Sustainability into Traditional Airport Projects**

Prepared by: Transportation Research Board, 2012

http://onlinepubs.trb.org/onlinepubs/acrp/acrp_rpt_080.pdf

Report 80 provides guidance on incorporating sustainability into airport projects using the Airport Sustainability Assessment Tool (ASAT) developed as part of this report. To accomplish this, *Report 80* provides the ASAT which allows users to evaluate which sustainability practices would be most applicable based on the conditions at the airport and includes a comprehensive list of suggestions for incorporating sustainable initiatives with traditional airport projects. The ASAT can be found at:

http://onlinepubs.trb.org/onlinepubs/acrp/acrp_rpt_080.xls

5. **ACRP Report 19A: Resource Guide to Airport Performance Indicators**

Prepared by: Transportation Research Board, 2011

¹⁹ To enhance ACRP Report 110, a downloadable file is available that contains editable Excel files as well as an informational video. This file can be found at: [CD-149: Evaluation Process and Cost-Benefit Tool](#) and instructions for accessing it can be found at: <http://onlinepubs.trb.org/Onlinepubs/create-and-burn-iso.pdf>

http://onlinepubs.trb.org/onlinepubs/acrp/acrp_rpt_019A.pdf

Report 19A provides users with a list of Airport Performance Indicators (APIs) that can be used to accurately measure an airport's performance across multiple functional areas including general aviation, human resources, and operations. APIs are provided in the following categories:

- **Core APIs:** Important for overall operation or otherwise important to the airport executive level and/or the airport governing board
- **Key APIs:** Important for the operations of key airport departments or functions
- **Other APIs:** Not considered as useful for airport overall operation, to the executive level, or to key airport departmental functions

6. ACRP Synthesis 77: Airport Sustainability Practices

Prepared by: Transportation Research Board, 2016

<http://www.trb.org/ACRP/Blurbs/174993.aspx>

This synthesis was developed to analyze 10 sustainability initiatives that have not been included in the Sustainable Aviation Guidance Alliance (SAGA). Through TRB research, it has been identified on multiple fronts that the SAGA database is in need of re-evaluation and consistent updating. *Synthesis 77* strives to provide 10 primary sustainability initiatives that were generated from researching:

- Seven airport operators
- Two airlines
- One concessionaire

While this synthesis is not an all-inclusive list of sustainability initiatives, it focuses on the continuing evolution of sustainability and how airports can begin to adapt.

7. ACRP Synthesis 69: Airport Sustainability Practices – Drivers and Outcomes for Small Commercial and General Aviation Airports

Provided by: Transportation Research Board, 2016

<http://www.trb.org/main/blurbs/174223.aspx>

For this synthesis, a total of 303 airports were surveyed and studied to determine sustainability initiatives that have been pursued and are currently being pursued by small airports. Sustainability initiatives were categorized into the EONS categories of:

- Economic Viability
- Operational Efficiency
- Natural Resource Conservation
- Social Responsibility

Out of all the airports surveyed, the majority were currently pursuing sustainability initiatives in the realm of energy conservation and renewable energy. Overall, this synthesis presents the

collection of gathered sustainability data from airports who participated in the surveying efforts.

8. ACRP Synthesis 42: Sustainable Airport Construction Practices

Prepared by: Transportation Research Board, 2011

http://onlinepubs.trb.org/onlinepubs/acrp/acrp_rpt_042.pdf

Synthesis 42 organizes 480 sustainable construction practices into three categories: Pre-Construction, During Construction, and Commissioning/Post Construction. Additionally, *Synthesis 42* contains a thorough list of sustainable construction case studies, and includes the following informational matrices that sort sustainable construction practices in a variety of ways:

- Categorized by practice category (Policies and regulations, construction methods, logistics, etc.)
- Categorized by construction implementation stage categories (Pre, during, and post construction)

9. ACRP Report 20: Strategic Planning in the Airport Industry

Prepared by: Transportation Research Board, 2009

http://onlinepubs.trb.org/onlinepubs/acrp/acrp_rpt_020.pdf

Report 20 contains information and guidance on strategic planning and how to properly implement the strategic planning process. The Report provides airports with the tools necessary to appropriately incorporate their sustainability goals into their overall strategic plan. Within *Report 20*, the following tools and information are provided to assist airports in the strategic planning process:

- A step-by-step framework that allows an airport to efficiently navigate the strategic planning process http://onlinepubs.trb.org/onlinepubs/acrp/acrp_rpt_020workbook.pdf
- Information and guidance to aid in the understanding or implementation of strategic planning at airports
- Case studies outlining the strategic planning efforts of airports and airport systems around the country

10. ACRP Synthesis 10: Airport Sustainability Practices

Prepared by: Transportation Research Board, 2008

http://onlinepubs.trb.org/onlinepubs/acrp/acrp_syn_010.pdf

Synthesis 10 was developed to inform interested users on a range of airport sustainability initiatives collected from a comprehensive literature review and online survey. *Synthesis 10* provides the following tools to assist airports when developing and implementing sustainability plans and initiatives:

- **Management Performance Scale:** Helps assess the extent to which sustainability management practices are integrated into the business process at airports (Appendix B of ACRP *Synthesis 10*)

- **Airport Sustainability Practices Matrix:** Catalogues sustainable airport practices by commercial hub size, location (domestic or international), and type of sustainable practices (land use, waste, noise, etc.)(Appendix D of ACRP Synthesis Report 10)

11. NCHRP Report 708: A Guidebook for Sustainability Performance Measurement for Transportation Agencies

Prepared by: Transportation Research Board, 2011

http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_708.pdf

NCHRP Report 708 was developed to provide transportation agencies with tools to apply concepts of sustainability in core activities through performance measurement. To assist in this, *Report 708* includes the following:

- Sustainability definitions and issues background
- Theories on the application of sustainability
- A sustainability performance measurement framework
- Methods to evaluate sustainability initiatives and determine effectiveness

12. ACRP Report 154: Water Efficiency Management Strategies for Airports

Prepared by: Transportation Research Board, 2016

<http://www.trb.org/ACRP/Blurbs/174444.aspx>

ACRP Report 154 was developed to walk airports through developing and implementing a water efficiency program. Through numerous real-world examples and tools being utilized, this report offers an abundance of knowledge for airport sustainability teams to inquire about decreasing water usage and increasing water efficiency. Chapter 5 “How to Design a Program” has noticeable parallels to the Florida Airport Sustainability Guidebook that can help airport sustainability teams coordinate integration of the two program types. Further, the report is complemented by a toolbox containing 34 tools “to design and implement airport water efficiency programs”.

13. ACRP Report 159: Pavement Maintenance Guidelines for General Aviation Airport Management

Prepared by: Transportation Research Board, 2016

<http://www.trb.org/main/blurbs/175058.aspx>

ACRP Report 159 was created to help general aviation airports extend the life time of airfield pavement through more efficient maintenance methods. Although specifically intended for general aviation audiences, this report can be utilized by maintenance departments from airports of all sizes and uses. This report identifies itself as a “starting point” and recommends supplementation with the following documents:

- Airport Pavement Recommendation Tool: <http://acrp-pavement-tool.tti.tamu.edu>
- Field Guide: <https://acrp-pavement-tool.tti.tamu.edu/docs/ACRP-09-11-Field-Guide.pdf>

14. TRB Webinar: Renewable Energy Use and Sustainability Practices at Airports²⁰

<http://www.trb.org/main/blurbs/174865.aspx>

This webinar highlights the benefits of pursuing renewable energy practices at airports. The major benefits discussed were categorized as financial and public. This information can be beneficial to airports determining if renewable energy initiatives should be incorporated into their sustainability plans. Further, this webinar discussed initiatives that could aid in enhancing the SAGA database.

15. TRB Webinar: Resources for Evaluating Airport Sustainability Practices²

<http://www.trb.org/main/blurbs/172533.aspx>

This webinar provides an overview of the SAGA database and how airports can utilize the database to its maximum potential. This webinar stresses the multi-functionality of the SAGA website and how airports could take advantage of it with their sustainability plans. Further, this webinar discusses ACRP Report 119: Prototype Airport Sustainability Rating System – Characteristics, Viability, and Implementation Options.

16. TRB Webinar: Evaluating and Improving Airport Environmental Sustainability Practices²

<http://www.trb.org/main/blurbs/170140.aspx>

This webinar highlights two major sustainability-related ACRP Reports:

- ACRP Report 110: Evaluating Impacts of Sustainability Practices on Airport Operations and Maintenance
- ACRP Synthesis 42: Integrating Environmental Sustainability into Airport Contracts

The two primary takeaways from this webinar include the ability “to better evaluate the day-to-day impacts of sustainability practices and to summarize how to increase the use of contracts as an efficient mechanism for delivering environmental sustainability improvements.”

17. TRB Webinar: Airport Sustainability Practices and Strategies²

<http://www.trb.org/main/blurbs/169268.aspx>

²⁰ Note: All of the webinars have occurred in the past but a recording of each individual webinar can be viewed at the link provided.

This webinar discusses many strategies for airports to pursue sustainability, particularly in green initiatives such as recycling strategies and green technology implementation. This webinar can be beneficial to airport sustainability teams who are in need of sustainable strategy concepts as well as potential tools and technology for implementation. Two ACRP documents are discussed in this webinar:

- ACRP Report 80: Guidebook for Incorporating Sustainability into Traditional Airport Projects
- ACRP Research Project 02-15: Recycling Strategies for the Airport Industry

Within these ACRP documents, there are numerous strategies for airports to analyze and implement where they see fit best.

FEDERAL AVIATION ADMINISTRATION RESOURCES

1. Report to Congress: National Plan of Integrated Airport Systems

Prepared by: The FAA, September 30, 2016

https://www.faa.gov/airports/planning_capacity/npias/reports/media/NPIAS-Report-2017-2021-Narrative.pdf

The *National Plan of Integrated Airport Systems (NPIAS)* provides an overview and evaluation of the public-use airports that are important to national air transportation and eligible for AIP funding. Within this document, the following are included:

- An overview of the composition of the national airport system
- Overall objectives of the NPIAS and an evaluation of the system's performance
- Aviation forecasts and how this information will affect airports
- The overall development requirements and estimates for future costs

2. General Aviation ASSET Documents:

General Aviation Airports: A National Asset (ASSET 1)

Prepared by: The FAA, May, 2012

ASSET 2: In-Depth Review of the 497 Unclassified Airports (ASSET 2)

Prepared by: The FAA, March 2014

Both available at http://www.faa.gov/airports/planning_capacity/ga_study/

ASSET 1 was completed by the FAA to explore and better communicate the role that general aviation airports included in the NPIAS play in the National Air Transportation System. *ASSET 1* provides readers with an overview of the types of services general aviation (GA) airports provide within the national airport system and categorizes the GA airports that facilitate this activity. *ASSET 1* outlines the following information:

- The societal importance of GA airports

- Four new ASSET categories to organize GA airports based on various characteristics (such as based aircraft, IFR interstate flights, cargo landed weight, and location): National, Regional, Local, and Basic
- The identification of 497 GA airports that did not fit within the four categories (Unclassified) and the plan to address these airports within another study

ASSET 2 documents the review of the 497 facilities that could not be categorized in 2012 as part of *Asset 1*. Key information from this report includes:

- 212 of the previously unclassified airports were classified within one of the four ASSET categories
- 281 of the unclassified airports will remain unclassified within the NPIAS (4 facilities closed before *ASSET 2* was completed and have been removed from the NPIAS)
- A matrix showing the breakdown of the categories of the NPIAS airports organized by state

3. Airport Improvement Program Handbook

Prepared by: The FAA, September 30, 2014

http://www.faa.gov/airports/aip/aip_handbook/media/AIP-Handbook-Order-5100-38D.pdf

The *Airport Improvement Program Handbook (AIP Handbook)* provides guidance on the types, eligibility, and steps necessary to receive funding through the AIP. The *AIP Handbook* outlines the following:

- Types of sponsors and entities eligible for grant funding
- Type of projects eligible for funding
- Types of AIP funding available
- Guidance on the grant process

4. FAA AC 150/5070-6B: Airport Master Plans, Change 2

Prepared and updated by: The FAA, January 27, 2015

http://www.faa.gov/documentLibrary/media/Advisory_Circular/150-5070-6B-Change-2-Consolidated.pdf

Advisory Circular 150/5070-6B outlines the features and content necessary for an airport to complete the master planning process. The following are included within this document:

- Guidance on the necessary steps and elements of an airport master plan
- Guidance on the development of individual components of an airport master plan
- A listing of potential stakeholders to include in the master planning process
- Guidance on the specific requirements of an airport layout plan set

5. Sustainable Master Plan Pilot Program (including Lessons Learned)

Prepared by: The FAA, December 17, 2012

Interim Guidance for FAA's Sustainable Master Plan Pilot Program (Interim Guidance):

http://www.faa.gov/airports/environmental/sustainability/media/interim_guidance_sustainable_master_plan_pilot.pdf

Lessons Learned from the Sustainable Master Plan Pilot Program (Lessons Learned):

<http://www.faa.gov/airports/environmental/sustainability/media/SustainableMasterPlanPilotProgramLessonsLearned.pdf>

The *Interim Guidance* and *Lessons Learned* contain a summary of the FAA's Sustainable Master Plan Pilot Program and information collected from the participants. Within the report, the following are included:

- An introduction of the Sustainable Master Plan Pilot Program
- Lessons learned from the participants of the Sustainable Master Plan Pilot Program
- A list of notable sustainability goals, targets, and initiatives found from the Sustainable Master Plan Pilot Program
- Links to documents completed during the Sustainable Master Plan Pilot Program

6. Recycling, Reuse, and Waste Reduction at Airports: A Synthesis Document (Recycling Synthesis)

Prepared by: The FAA, April 24, 2013

<http://www.faa.gov/airports/resources/publications/reports/environmental/media/RecyclingSynthesis2013.pdf>

Recycling Synthesis provides guidance on the implementation of recycling and waste management programs at airports. The document contains three major sections for consideration:

- The establishment of municipal solid waste recycling programs
- The establishment of a construction and demolition waste management programs
- A listing of airports that have implemented recycling programs and their lessons learned

FLORIDA DEPARTMENT OF TRANSPORTATION RESOURCES

7. Florida Transportation Plan

Prepared by: Florida Department of Transportation, 2015

<http://www.fdot.gov/planning/ftp/>

The *Florida Transportation Plan (FTP)* defines the overall transportation goals of Florida and was developed to make it more economically competitive, livable, and environmentally sustainable for future generations. The FTP is updated every five years to accommodate and respond to new trends and challenges to meet future mobility needs. The current version of the report provides the following vision for the future of Florida transportation:

- Safety and security for residents, visitors, and businesses
- Agile, Resilient, and Quality transportation infrastructure
- Efficient and reliable mobility for people and freight
- More transportation choices for people and freight
- Transportation solutions that support Florida's economic competitiveness
- Transportation solutions that support quality places to live, learn, work, and play
- Transportation solutions that support Florida's environment and conserve energy

8. Florida's Strategic Intermodal System Policy Plan

Prepared by: Florida Department of Transportation, 2015

<http://www.fdot.gov/planning/ftp/SIS-PolicyPlan.pdf>

The Strategic Intermodal System (SIS) is comprised of Florida's largest and most strategic air, space, water, rail, and highway transportation facilities. There are currently 20 airports that are included in the SIS. Of these 20 airports, seven are Commercial Service SIS Airports, and two are SIS General Aviation Reliever Airports. The remaining 11 are Commercial Service Emerging SIS Airports. Airport eligibility into the SIS and categorization must meet the identified criteria as updated. More information on the SIS criteria can be found on the SIS website: <http://www.fdot.gov/planning/sis/>. SIS funds can be used for airport facilities in need of additional capacity. The SIS Strategic Plan creates the policies used to designate SIS facilities, where funding should be allocated, and how to establish priorities among these investments. The SIS has identified three objectives within the strategic plan:

1. **Interregional Connectivity** - Ensure efficiency and reliability of multimodal transportation connectivity between Florida's economic regions and between Florida and other states and nations
2. **Intermodal Connectivity** - Expand transportation choices and integrate modes for interregional trips
3. **Economic Development** - Provide transportation systems to support Florida as a global hub for trade, tourism, talent, innovation, business, and investment

In addition to these overarching objectives, a set of emphasis areas were also developed to support the objectives as well as support the overall update and implementation of the SIS Plan. In total, there are seven emphasis areas that the SIS Update identified, two were continued from the previous SIS plan and five are new to the current SIS Update. The two existing emphasis areas as provided by the SIS are:

- Reaffirm statutory intent for interregional, interstate, and international travel
- Continue emphasis on largest and most strategic facilities

The five new emphasis areas are:

- Statewide/regional economic development opportunities
- Freight mobility and trade development

- Innovation and technology
- Modal and system connectivity
- Coordinated planning for SIS, regional, and local facilities

9. Florida Aviation System Plan 2025²¹

Prepared by: Florida Department of Transportation, 2012

http://www.fdot.gov/aviation/FASP_details.shtm

The Florida Aviation System Plan (FASP) was developed through the coordination of the FDOT, the FAA, and Florida's public airports through the Continuing Florida Aviation System Planning Process (CFASPP). The FASP involves standard aviation system planning elements provided within most state aviation system plans, and assists in updating and maintaining the Florida Aviation Database (FAD), a comprehensive statewide aviation database. The FASP 2025 includes an analysis of the intermodal aspects of the state transportation system and a strategic aviation planning element that identifies seven strategic goals and the measurements, approaches, and recommendations to achieve these goals:

- Support new technologies and innovation in aviation
- Contribute to sustainable growth while remaining sensitive to the environment
- Provide efficient, safe, convenient, and secure airports
- Enhance Florida's leadership and prominence in the aviation industry
- Protect airspace and promote compatible land use planning around Florida airports
- Promote aviation to business, government, and the public
- Foster Florida's reputation as a military-friendly state

10. FDOT Guidebook for Airport Master Planning

Prepared by: Florida Department of Transportation, 2016

www.fdot.gov/aviation/flpub.shtm

The *FDOT Guidebook for Airport Master Planning* was developed for use by airport owners/sponsors, operators, and consultants when developing Florida airport master plans to assist in effective and appropriate master plan studies. All master plans developed for Florida airports must be developed in accordance with the [FDOT Guidebook for Airport Master Planning](#) which was updated in May of 2016.

Airport master plans are used to define and implement the long-term development plans of an airport. This includes projecting future aviation demand and developing facilities that can accommodate the projected growth at an airport. The elements of a master plan vary in complexity and level of detail depending on the size, function, issues, opportunities, and conditions of the individual airport but generally include the following:

- Public involvement program
- Existing conditions (inventory)

²¹ The FASP 2035, a comprehensive update, is currently underway.

Airport Sustainability Guidebook

Technical Appendices

- Environmental considerations
- Aviation demand forecasts
- Facility requirements
- Alternatives analysis
- Airport Layout Plans (ALPs)
- Facilities implementation plan, including a Capital Improvement Plan
- Financial feasibility analysis

It is of the highest importance to FDOT that the Guidebook for Airport Master Planning be utilized to help the state meet its airport improvement needs in a logical and cohesive manner. To accomplish this, the Guidebook for Airport Master Planning provides the following:

- Guidance on the necessary steps of an airport master plan
- Guidance on the development of individual components of an airport master plan

11. FDOT General Aviation Airport Business Plan Guidebook

Prepared by: Florida Department of Transportation, 2014

www.dot.state.fl.us/aviation/flpub.shtm

The *FDOT General Aviation (GA) Business Plan Guidebook* was developed as a resource to assist GA airports to develop financial strategies geared at a broad range of topics affecting an airport and its fiscal success. In an effort to remain financially self-sufficient, airports have focused on improving their financial health by diversifying their business models to include more non-aeronautical revenue. To accomplish this, the Guidebook provides the following key elements:

- Case studies on airports that completed business plans
- Step-by-step instructions on the business planning process
- Best management practices for airports completing a business plan

12. Airport Compatible Land Use Guidebook

Prepared by: Florida Department of Transportation, 2012

www.dot.state.fl.us/aviation/flpub.shtm

The *Airport Compatible Land Use Guidebook* highlights important information and factors that must be considered when evaluating various land use and development decisions that have the potential to impact public-use airports or military airfields in Florida. Information in the *Airport Compatible Land Use Guidebook* is applicable to individuals, airport sponsors, land developers, professional aviation consultants, state agencies and planners, and local government officials and planners. To accomplish this, the *Airport Compatible Land Use Guidebook* is divided into four distinct sections:

- **Section One:** Provides detail on the specific areas around airports and airfields that need to be protected from tall structures that may interfere with navigable airspace and/or land uses that may jeopardize compatibility
- **Section Two:** Provides detail on state laws, federal regulations, and various processes in place to prevent incompatible development around airports/airfields
- **Section Three:** Provides an overview of the process that all local governments in Florida should follow when they review a development application in order to be compliant with existing state statutes and federal regulations
- **Section Four:** Discusses strategies to prevent or correct land use incompatibilities around airports/airfields and responsibilities related to compatible land use

ADDITIONAL RESOURCES

13. Florida Airports Council Sustainability Initiatives

www.floridaairports.org/sustainability.cfm

In 2010, the Florida Airports Council (FAC) initiated a program to document the sustainability plans, programs, and initiatives that had been completed at Florida airports. To accomplish this goal, a survey was developed by the FAC Sustainability Task Force and was distributed to all FAC member airports to gather information on sustainability policies, initiatives, energy/waste reduction goals, beneficial information, and local “green” or sustainability initiatives/policies. Of all airports, responses were received from 27 airports in Florida. From this survey, a list of airports with various sustainability programs was developed. These sustainability programs include:

- Sustainability or “green” policies
- Sustainable planning/design/construction guidelines or sustainability plans
- Airport and/or airline waste recycling programs
- Local procurement process
- Alternative energy production
- LED lighting (roadways or airfield)

14. Sustainable Aviation Guidance Alliance Database

www.airportsustainability.org

The Sustainable Aviation Guidance Alliance (SAGA) was formed in 2008 to create consistent and consensus-based sustainability resources available for all airports. A web-based system was developed by SAGA members to provide users with an extensive list of sustainability actions and initiatives that can be implemented at airports. The SAGA website was developed to be interactive and allow users to learn about sustainability, share ideas and experiences, search sustainable practices based on custom information, and efficiently plan, implement, and monitor sustainability activities. To accomplish this, the website is divided into five modules:

- **Share:** This module allows users to add sustainable initiatives/practices to a library of sustainable initiatives as well as allows users to share case studies, documents, links, and comments on the initiatives/practices
- **Learn:** This module allows users to learn about the definition of sustainability, practical applications of sustainability principles at airports, and methods for integrating sustainability into existing business processes and an organization's culture
- **Search:** This module allows users to search for sustainability initiatives/practices that are meaningful to their organization as well as identify, evaluate, prioritize, and select initiatives/practices that help the airport
- **Plan:** This module provides a scalable framework, based on an individual airport's culture and business model, to assist users in starting, implementing, improving, and maintaining sustainability initiatives/practices. The framework is a systematic approach to set goals, prioritize actions and monitor progress
- **Measure:** This module provides information and guidance on how to measure progress in sustainability, including steps to help airports identify key performance indicators (KPIs) and associated metrics for sustainability goals and practices

15. TRB AV030 Aviation Sustainability Subcommittee Materials

www.trb.org/AV030/AV030.aspx.

To provide airports with specific information and resources related to specific aviation topics, the Transportation Research Board (TRB) developed an Information Resource Series to highlight information on particular topic areas from a broad range of sources that are referenced throughout all TRB resources. Related to sustainability, the Committee on the Environmental Impacts of Aviation (AV030) focuses on environmental issues central to airport planning, design, construction, and operation as well as aviation system and aviation technology development issues. Within this Resource Series, TRB provides numerous resources, publications, and news sources on the environmental impacts of aviation. Reports and resources included in the Environmental Impacts of Aviation Information Resource Series include:

- TRB Publications (from all TRB programs)
- Transportation Research Record Series (peer-reviewed papers published in the journal of TRB)
- National Academies Publications (from other units of the National Academies)
- Other Publications (from outside TRB and the National Academies)

APPENDIX 9

SAMPLES AND TEMPLATES

INTRODUCTION

Initiating sustainability at an airport is typically driven through a planning effort, whether it is a standalone airport sustainability plan or a sustainability component of a master plan or other airport planning study. While each airport and situation is unique, there is a basic framework to help ensure a successful plan is developed or improved upon if there is already a sustainability plan in place. The overall process and the individual elements can be tailored for the size of the airport, the operating characteristics, the region, the available resources, and many other factors.

To assist airports in the development of sustainability plans or sustainability related projects, this section was developed to provide overall guidance and sample language and suggestions on the following:

- Requests for Proposals and Scopes of Work
 - Provides samples and examples that can be utilized by airports developing either an airport sustainability plan or a sustainable airport master plan
- Design Guidelines
 - Used to establish an organizational framework for implementing sustainable initiatives in future projects as well as guidance on how it can be implemented airport-wide
- Leases, Minimum Standards, and Rules and Regulations
 - Provides sample language that can be used when developing contract and governing documents for the airport

When an airport decides to develop a sustainability plan, it is ideal for the airport to know what level of effort is desired and whether it will be a standalone document or incorporated within another planning study. The level of effort may be specified by the funding amount and allow consultants or staff to tailor the product based on that budget. The FAA's 2010 Interim Guidance for FAA's Sustainable Master Plan Pilot Program²² requires specific content to be addressed as part of a federally funded sustainability plan. This includes a sustainability policy or mission (vision) statement, sustainability categories, baseline assessment, measurable goals, initiatives, and public participation and community outreach. In general, a sustainability plan should contain the following sections:

- I. Setting the Stage
 - a. Develop the strategy
 - b. Define sustainability for the organization
 - c. Identify and convene stakeholders (organization wide for plan; targeted airport group for project or focused effort)
 - d. Develop and identify vision, priorities, and guiding principles

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www.faa.gov/airports/environmental/sustainability/media/interim_guidance_sustainable_master_plan_pilot.pdf

- e. Define focus areas, goals, objectives, performance measures, and performance indicators
- f. Obtain stakeholder buy-in
- g. Identify and allocate resources
- II. Baseline Assessment
 - a. Based on goals, objectives, performance measures, and performance indicators, collect relevant data for a baseline assessment
- III. Plan/Program development
 - a. Identify initiatives, prioritize them based on results of Steps I and II (show case studies)
 - b. If necessary, refine goals, objectives, performance measures, and performance indicators
 - c. Select action items (who, what, when, where, why, how)
 - d. Set performance targets
 - e. Develop an action plan and a monitoring plan
 - f. Complete the plan/program (obtain approval, buy-in, communicate the plan and the roles and responsibilities to relevant parties)
- IV. Implementation and Monitoring
 - a. Implement the plan
 - b. Monitor performance and evaluate the program
 - c. Communicate progress and achievements
 - d. Refine the program/plan

REQUEST FOR QUALIFICATIONS

If the airport is not utilizing internal resources to complete the sustainability plan, an on-call services consultant can be utilized or an outside consultant can be hired through the standard procurement process. For an existing on-call services consultant, sustainability planning must be defined in the original Request for Qualifications (RFQ) or Request for Proposals (RFP) per FAA procurement regulations. For the new selection of a consultant to conduct a plan or study outside of an on-call contracting arrangement, the airport may release a RFQ/RFP that outlines the airport's needs and desires and how it will evaluate the consultant for selection. The RFQ/RFP process should follow the municipality's standard process and legal language and documentation requirements with certain sections such as the scope of work (SOW) and evaluation criteria tailored to the specific project.

The RFQ/RFP does not require a detailed SOW as the airport may request that the consultant develop the SOW. The RFQ/RFP may state the specific topics the airport would like to review such as administration and planning policies, design and construction practices, maintenance and operations practices, or tenant and user leases or agreements and any additional assessments that need to be completed such as an energy audit and/or waste management and recycling audit. The RFQ/RFP may also identify the end users of the document so that final deliverables are presented in an appropriate manner. An example of a detailed project purpose and description for an RFQ/RFP for an airport sustainability plan:

"The [Airport or Agency] is seeking a qualified firm to develop an [airport sustainability plan (the Plan)] for the Airport, which will provide a framework to integrate sustainable practices into planning, design, construction, maintenance, and operation of the airport.

The Plan will guide the [Airport or Agency] in integrating airport sustainability as a core objective in future planning, operational, and business strategies. The plan will promote design, project implementation, and financial decisions that will help the [Airport or Agency] identify ways to reduce natural resource consumption, vulnerability to the changing climate, environmental impacts and carbon footprint. In addition, the plan will identify ways to promote resiliency and adaptive capacity, and increase local value proposition.²³

"The [Airport or Agency] is seeking proposals for a qualified vendor to provide Sustainability Consulting Services at [Airport or Agency]. The Consultant will provide in-house support for a wide variety of sustainability, planning, and implementation activities, and to support the [Airport or Agency] in advancing its Airport Sustainability Advancement Program ("ASAP") for [Airport or Agency]. In some cases, the selected Consultant maybe directed to serve in a program and/or project management role to other Consultants already hired under existing contracts. For the purposes of this solicitation, the services are being classified within the categories listed within the scope. This list is intended to provide each Respondent with a general idea of services needed, and does not necessarily represent a comprehensive list of sustainability consulting services the Consultant maybe directed to perform during the duration of the Agreement.²⁴

Examples of the final deliverable requirements for an RFQ/RFP:

"The final product will include guidance and templates to be used by [Airport or Agency] that will allow airport staff to incorporate sustainability initiatives that meet the local circumstances and needs.²⁵

"Consultant shall provide a handbook that explains the mission, vision, and guiding principles of the organization and how sustainable use of site, water, energy, materials, environment, and other resources supports the [Airport or Agency]'s strategic theme of efficient resource management."

"An update to the Plan is needed to evaluate current conditions and forecast future aviation needs for the [Airport or Agency] and surrounding region, provide vision for the next 20 years of development, and estimate the timing of major airfield projects and other airfield and non-airfield development. The updated Plan will guide comprehensive development to maximize the economic viability, operational efficiency, and social responsibility of the Airport."

²³ City of Flagstaff Request for Statement of Qualifications for Planning of Airport Sustainability Master Plan Project, January 2014

²⁴ City of Chicago, Request for Proposal for Sustainability Consulting Services, 2013

²⁵ Colorado Department of Transportation RFQ Airport Sustainability Plan for Colorado General Aviation Airports.

SCOPE OF WORK – SUSTAINABILITY MANAGEMENT PLANS

Typically, after a consultant is selected, a detailed SOW is developed between the airport and the consultant. The SOW outlines each step in the plan's development process and should clearly define the topics to be reviewed and the final documentation to be delivered, as well as the public outreach effort to discuss and present the findings. The SOW is used as part of the contractual obligation between the two parties for what will be completed and delivered. In addition to the example SOW text displayed below for each section of the Plan, a full template SOW is provided in **Appendix X**.

DEFINITION AND STAKEHOLDER ENGAGEMENT

The first steps of developing an airport sustainability plan are defining sustainability for that airport and determining the key stakeholders. As there are several definitions of sustainability within the industry, the airport must determine what sustainability means to their organization. SOW language for defining sustainability might look like this:

"The purpose and meaning of sustainability will be defined early in the planning process. A draft definition will be prepared during the initial project coordination meeting and refined during the advisory committee meeting."

This definition process may be done by a team within the airport, with key stakeholders, or elected officials. Just as every plan is different, the public involvement effort must be tailored to the individual airport and community. In most cases, the airport must, at a minimum, provide notice to the public regarding the plan and allow for comment on the plan's recommendations. Identifying the appropriate stakeholder involvement needs, level of effort, and time constraints is essential to a successful plan. A comprehensive stakeholder involvement process helps build support for the plan and further assists in implementation and support for identified initiatives. These components would be addressed in the SOW by outlining the definition or steps to assist with defining sustainability, identifying the appropriate stakeholders, and defining the stakeholder and public engagement program. As a standalone plan, it may also be useful at this stage to define how the plan will integrate with other planning projects such as the Airport's Master Plan to ensure compatibility. Example SOW language for developing a stakeholder involvement plan could include:

"The Consultant shall work with the [Airport or Agency] to identify and contact the appropriate federal, state, and local agencies and stakeholders that should be involved in this study. Representatives may include [agency]."

"The Consultant shall oversee a program of public outreach efforts for this project. This program will be structured to obtain key public input at critical points within the study, so that the public concerns and ideas can be fully considered as part of the Plan. Outreach will include Mailing Lists, Public Information Meetings, Newsletters, and a Plan website."

VISION STATEMENT AND GUIDING PRINCIPLES

Establishing the vision statement and guiding principles is important to provide the foundation of the goals and initiatives. A new statement may be developed or the local municipalities may be adopted. The scope should also describe how the vision statement will be communicated to the airport employees, tenants, and community. An example SOW for the definition of a vision:

"This effort will revalidate the [Airport or Agency]'s vision and mission for the future of the Airport. The vision will set the framework by which the Study and any development and alternatives will be crafted, evaluated, and refined. This visioning revalidation effort will reflect input from both internal and external stakeholders as determined by the [Airport or Agency]."

GOALS AND OBJECTIVES

Once the vision is set, the focus areas, goals, and objectives can be outlined. The focus areas would be related to the airport's chosen definition of sustainability, such as Economic Vitality, Operational Efficiency, Natural Resource Conservation, and Social Responsibility, or the location or process within the airport such as the terminal, ground transportation, community relations, procurement, or stormwater. Goals for each focus area can be developed and refined based on the airport's intent. The scope of work should describe the methodology, schedule, and stakeholder involvement to develop the goals and objectives. This task should also include a review of the feasibility of the goals based on the airport's available budget and manpower. An example SOW for the development of goals:

"The Consultant will work with the [Airport or Agency] to identify specific strategic goals that the [Airport or Agency] would like to achieve for the Airport over the planning horizon. The strategic goals will be focused on operational, development, and market-related objectives. These goals will then be used to assist the Airport in revalidating or refining the vision statement and/or mission statement in a manner that reflects the [Airport or Agency]'s current desires for the future direction of the Airport."

"The Consultant will work with the [Airport or Agency] to define goals for the Airport towards sustainability within the identified target elements. Specific methods for measuring and monitoring success in meeting these goals will be drafted at this time and further refined once initiatives are identified."

BASELINE ASSESSMENT

Based on the focus areas discussed and how the goals will be measured, a baseline assessment should be conducted. This may include a formal Greenhouse Gas (GHG) emissions assessment, energy audit, waste management and recycling audit, ground access study, or other assessments. An RFQ/RFP may list the types of assessments desired or may request the consultant to suggest assessments to be completed. For the purposes of this Guidebook, ACRP Report 19A, *Resource Guide to Airport Performance Indicators*, was used to determine categories or subject areas that airports can use to collect data. When possible, the source of the baseline assessment categories should be stated in the SOW. The SOW should detail the specific types of analysis that will be performed, if known. If the assessments are not determined at the start of the sustainability study, then additional scope and fee may be added to the project, the

assessments may be completed separately, or a placeholder fee may be held within the project's budget until it is decided. An example SOW for a baseline assessment:

"The objective is for the Consultant to develop an understanding of the type and level of sustainable planning, design and construction, energy and water conservation upgrades, or other methods to improve performance that have occurred at the [Airport or Agency]. Part of the information gathering will include identifying the locations and approximate sizes of the existing waste refuse facilities serving the [Airport or Agency]. The Consultant will document the number of haulers, tipping fees, and approximate schedule for removing waste from the [Airport or Agency]. Data will be used to review additional efforts proposed in later tasks."

If the project is an update to the airport sustainability plan or is utilizing the sustainability plan's information in another planning study, the SOW should reflect that.

"The Consultant will work with the [Airport or Agency] to assess progress on sustainability across each of the areas: air emissions, energy, water conservation, water quality, noise, landscape management, solid waste and recycling, indoor environmental quality, hazardous materials, surface transportation management, socioeconomics and outreach, and sustainable sites and land use compatibility. We will summarize progress made in each category and lessons learned. We will then use the information to update action plans in the context of the overall Master Plan Update and current local conditions and initiatives."

The FAA Modernization and Reform Act of 2012 required an analysis of existing solid waste recycling programs, which is reflected in Change 2 of FAA AC 150/5070-6, *Airport Master Plans*. Sample SOW language to address this is:

"As required by the FAA Modernization and Reform Act of 2012 (Public Law 112-95), an analysis of existing solid waste recycling programs and the identification of methods to minimize the generation of airport solid waste at the Airport, consistent with applicable State and local recycling laws, will be conducted. The analysis will be performed per the FAA's "Guidance on Airport Recycling, Reuse and Waste Reduction Plans" (September 2014, APP-400). This analysis [will/will not] include a waste audit²⁶ and does not address hazardous wastes, but will address the following issues related to municipal solid waste and construction and demolition solid waste recycling at the airport:

- *Minimizing the generation of solid waste at the Airport;*
- *Operation and maintenance requirements associated with waste recycling;*
- *Review of waste management contracts; and*
- *Potential cost savings or revenue generation."*

²⁶ It should be noted that while master plans may not include a waste audit, stand-alone sustainability plans typically do.

INITIATIVES

Once the airport has set goals and conducted the baseline assessment, a series of initiatives will be established to achieve the goals. A rating system can be developed to evaluate and prioritize the initiatives. ACRP's Airport Sustainability Assessment Tool²⁷ may provide additional data to assist in the decision making and implementation process for specific initiatives such as reducing water usage or construction waste management. The Sustainable Aviation Guidance Alliance (SAGA)²⁸ also provides a sort feature for over 900 initiatives with several filters that allow the user to sort by location on the airport, airport characteristics, and practice details. Based on industry information, such as costs, staffing requirements, energy reduction, social benefits, reporting ability, and more, a ranking of each initiative is provided. SAGA also provides information on improving a sustainability program and its measurements. An example SOW of identifying and prioritizing sustainability initiatives:

"Identify a range of specific sustainability initiatives to assist with achieving the goals outlined in the previous tasks. It is anticipated that up to [number] initiatives will be identified for each goal. This may include refinement of initiatives already in place. A rating system will be developed with advisory committee guidance to evaluate and prioritize each initiative. Initiatives will be reviewed to ensure they are feasible within the airport's budget and manpower availability and are measurable to demonstrate future progress."

ACTION AND MONITORING PLAN

Based on the final initiatives, the goals, objectives, and measures should be refined and finalized. A sustainability plan may be considered complete at this stage depending upon the SOW. Public outreach would be provided at this time to present the plan and inform staff, tenants, and users of the goals and desired outcomes. The plan may also include an Action and Monitoring Plan, which would outline specific action items for each initiative, their priority and schedule, who is responsible, what is to be delivered, and the resources needed to complete the action. The Action and Monitoring Plan may streamline the process of determining the status of the sustainability initiatives and also sets accountability. Monitoring of initiatives is typically handled by the airport and is outside of the SOW for a sustainability plan, however consultant teams can assist airports in setting up a tracking process to be utilized when the project is complete. Example SOWs for an Action and Monitoring Plan:

"The Consultant, with assistance from the [Airport or Agency], will develop an Action and Monitoring Plan that outlines the responsibility, timeline, resource requirements such as labor and funding, and baseline data for each initiative."

"Consultant shall incorporate the findings of the sustainability assessment into a long-term sustainability strategic plan. Consultant shall outline the plan goals as a strategy framework for implementation of the plan. The plan will provide opinions of cost for each recommendation and prioritize the projects by feasibility (low, medium, high) and other potential parameters identified by the client. The plan will include the development of

²⁷ www.trb.org/Publications/Blurbs/168044.aspx

²⁸ www.airportsustainability.org/

key performance indicators to monitor the progress of the plan and metrics to measure progress against the goals."

SCOPE OF WORK – SUSTAINABLE AIRPORT MASTER PLANS

If sustainability is to be completed as part of a Master Plan, the above scope items should be included in addition to the standard Master Plan components. Sustainability may be discussed as a standalone chapter within the master plan that outlines goals, the assessments completed, and initiatives. While the SOW may list sustainability as a single task as shown in the example below, it is commonly integrated into each step of the Master Plan. Baseline assessments are typically completed as part of the inventory effort and the vision statement and goals outline prior to the alternatives development to ensure the recommended plan incorporates the airport's vision. The facility requirements section of the Master Plan can be expanded beyond the traditional analysis of infrastructure to review the deficits between the sustainability goals and baseline assessment, which leads to a series of initiatives that are evaluated for feasibility and applicability as development alternatives are. Below are examples of sustainability initiatives being included within a Master Plan SOW. Full generic SOW are available in **Appendix X** that may be used as samples, including a basic SOW for a GA airport and a much more expansive SOW for a commercial airport.

"This analysis will assess the potential opportunities to enhance sustainable practices at the airport to minimize the environmental impact footprint of the airport. The analysis will include developing a sustainability framework defining the opportunities available to the [Airport or Agency]. A baseline will be developed for each option that is identified. An action and monitoring plan will be developed for each of the options selected for implementation. The analysis will include a review of existing recycling programs within the community and how they may be leveraged, coordinated with, or implemented at the airport."

"The Consultant will prepare a working paper summarizing the results of the facility requirements and sustainability analysis. This will be focused on the airport facilities needed to meet projected activity levels, FAA design standards, and the [Airport or Agency] strategic goals. The information in this working paper will be used in subsequent elements of the MPU and will ultimately become a chapter of the final MPU document."

"Our Consultant will work closely with the [Airport or Agency], the Florida Department of Transportation, and the Federal Aviation Administration (FAA) to achieve results that meet their respective requirements and to create a plan that enhances the operational sustainability of the Airport."

"The recommendations of the alternatives developments will be reviewed against the baseline sustainability considerations identified for the study such as energy use or environmental impacts."

IMPLEMENTATION GUIDELINES FOR SUSTAINABILITY PROJECTS

No matter the size or activity level of an airport, sustainability can be implemented with a tailored approach. To implement a sustainability plan, an airport must look at:

- Budget, scope, and time required to develop and implement the sustainability plan
- Organization and structure of the project team and airport staff
- How to monitor and improve performance over time

Engaging stakeholders is an important element of a successful sustainability plan as it allows for buy-in by the end users of the vision, goals, and metrics to be implemented. Continued support from different levels of the community will help provide an organizational culture that desires a successful outcome of the plan.

An evaluation and prioritization of the goals and measures prior to implementation should include a review of the time and budget it will take to implement the initiatives across the airport, including passengers, tenants, and other users. This can also be utilized to help determine the size and organization of the implementation team. Some initiatives may be simple and low cost such as promoting a recycling program through signs and flyers or installing occupancy sensors to reduce power usage. Other initiatives may be complex with the need for significant funding, planning, and coordination such as converting shuttles to natural gas or installing LED airfield lighting. Being aware of state and federal funding programs will help when determining what projects are eligible for funding and the steps needed to obtain that funding. More information on potential funding sources is provided in this Guidebook. Projects that may require substantial funding should be documented and input into the airport capital improvement plan as early in the process as possible.

An airport must prioritize the goals and initiatives with the knowledge that there is typically a limited budget and available time. Prioritization should also include a review of the urgency and steps necessary to implement. If a goal will allow the airport to obtain certain funding, is tied to other requirements or goals, or is highly supported by stakeholders, more emphasis may be placed on its achievement than that of others. ACRP's Airport Sustainability Assessment Tool²⁹ may provide additional data to assist in the decision making and implementation process for specific initiatives such as reducing water usage or construction waste management.

Determining the organization of the team is an important step within the implementation process. Depending on the airport's staffing ability this may be an additional role for an existing staff member, a single dedicated staff member, or a team. Stakeholders in the initial planning may be involved as team members or as an advisory committee that continues to provide input and support to the goals and initiatives. Team members would be responsible for directing the initiatives, providing feedback to the committees and external stakeholders, ensuring future planning and projects include sustainability, and encouraging support of the overall goals. All team members need to be familiar with the airport's sustainability vision, goals, initiatives, and measures.

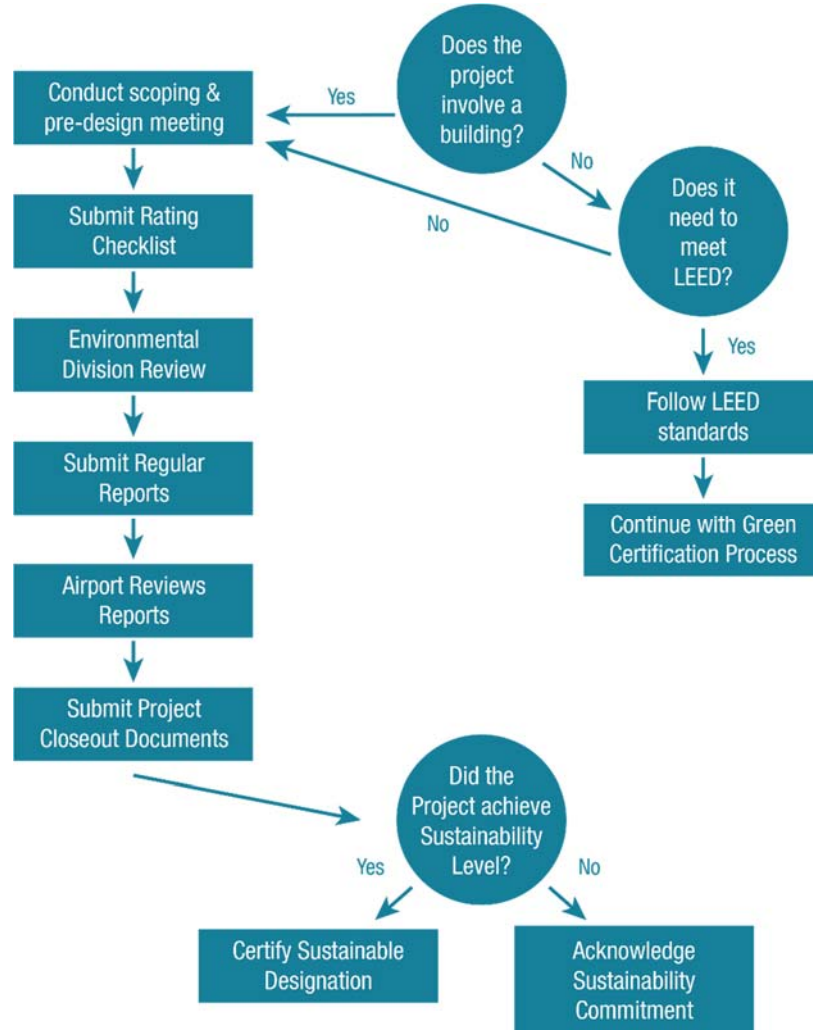
Based on the sustainability plan, which outlines the goals, initiatives, and measures, an Action and Monitoring Plan should be developed. The Action and Monitoring plan shows how the goals

²⁹ www.trb.org/Publications/Blurbs/168044.aspx

will be achieved within the allotted timeframe and how they will be measured and reported. Depending on the airport, the plan may be complex, detailing the team and vision, specific steps to achieve the goals, financial and stakeholder requirements, reporting and monitoring techniques, and published reports. It may also be simple enough to be included as a section in the master plan. An airport will need to balance its resources to provide the level of service it can provide with fulfilling stakeholder expectations. The Action and Monitoring plan may also provide the process for determining how sustainability may apply to the project or initiative.

Figure 1, provides an example of a flow chart that details what steps and documentation are necessary depending on the projects' scope and requirements.

Figure 1. Sample Flowchart of Project – Chart will be updated during final development



An initial or baseline assessment is conducted as part of the initial sustainability plan (See Section XXX). This assessment provides quantifiable values or procedures for specific elements based on the current status of the airport. This assessment should be conducted periodically to determine how the airport has improved compared to the initial baseline assessment. The frequency and type of assessments should be documented in the Action and Monitoring Plan. Findings from these assessments are typically documented in a report to demonstrate the effectiveness of the sustainability plan.

Findings should be reviewed when published to determine the successes and note where the initiatives may have fallen short. Specific questions may include:

- Were the initiatives implemented? If not, what prohibited its implementation?
- What other initiatives may be useful to implement based on the current progress?
- Are the expected benefits being realized?
- Are there other ways to track the goals?

This review and feedback can allow the airport to determine the methods that work best so it may improve in other areas. Improvement may include different methods of monitoring or reporting information, additional training, or refinement of the goals and initiatives.

Additional information and specific action plans for Administrative Procedures, Planning, Design and Construction, Operations and Maintenance, and Concessions and Tenants are available through Airports Going Green³⁰.

SAMPLE LEASE, MINIMUM STANDARDS, AND RULES AND REGULATIONS LANGUAGE

Sustainability can be integrated into more than just the airport's plans, projects, and action items. Airport tenants reach numerous passengers and users of the airport through their day to day activities whether they are providing line services to corporate aircraft, concessions to passengers, storing aircraft, advertising local businesses, or renting cars.

Airports can include language on sustainability initiatives in leases, minimum standards, and rules and regulations to further drive their sustainable goals and performance. Certain language within these contracts can increase awareness, improve compliance, minimize impacts, and drive innovation of sustainability. Airports should, at the same time, review the potential impacts with the tenants and users before inclusion into contracts to ensure they are realistic and feasible.

These efforts have been found to be more successful when the airport has a set of sustainable policies, goals, and measures, a record of contract renewal and negotiation dates, a database of impacts by activity and stakeholder, education activities, and a committee that reviews contract language. The airport's legal advisors should be consulted to ensure local regulations are being properly followed. An airport must also remember that any measures implemented within these contracts must be monitored for compliance which in some cases may require additional man-hours to manage.

Utilizing their established goals and measures, the airport should focus on the types of sustainable topics they wish to have tenants assist with or improve upon as well as the enforcement of them.

³⁰ www.airportsgoinggreen.org/sustainable-airport-manual.aspx

For example, minimum standards may include energy efficiency, recycling, using compostable packaging, handling of hazardous materials, or operational efficiency. Some initiatives may be enforceable while others may be incentivized or voluntary. Another consideration is whether or not an initiative is directed at a service or action or a physical product. Encouraging language is stated in the form of “the tenant shall seek to...” while required language is “the tenant is required to...” One example of incentivizing is reducing cost of municipal services such as recycling or garbage pickup if the initiative is achieved.

The airport must then determine if they wish to provide technical criteria on how to meet the initiative or simply provide a goal to be met. An example of this would be “*Tenants are required to provide to the airport a recycling plan that specifies the methods they will enact to increase recycling to at least 35%*” compared to “*Tenants must achieve a 35% recycling rate.*” Typically, by listing performance based initiatives, tenants and users are given flexibility on how to achieve the goal in a manner that works best for them or in a manner that the airport may not have been aware of and, in some cases, this flexibility leads to innovation.

Examples of other contract language related to various sustainability topics include:

ECONOMIC VITALITY

“Complete preventive and regular maintenance on all infrastructure to reduce deferred maintenance costs.”

“Regularly conduct a market analysis to ensure providing competitive pricing on goods and services.”

When the airport is unsure of specific initiatives at the time of the agreement, a more general set of conditions may be included that allows the municipality to place future sustainability initiatives upon the tenant.

“[Tenant] operating at the Airport may also pursue various sustainability measures. City encourages such initiatives and from time to time may call upon [Tenant] to cooperate with City where practicable in implementing sustainability measures that impact [Tenant] operations such as tenant improvements to LEED Silver or better standards, energy and water conservation, solid waste reduction and recycling, electrification of ground services equipment, maximizing the use of preconditioned air, or single engine taxiing, provided that such sustainability measures are lawful. [Tenant] shall agree to implement sustainability measures as required to meet City, State and federal regulations.”³¹

OPERATIONAL EFFICIENCY

“Provide incentives to employees for carpooling or utilizing public transportation.”

“Sustainability goals should be reviewed as part of the annual Capital Improvement Program.”

“Prohibit idling of vehicles.”

³¹ San Francisco International Airport airline use and lease agreement.

NATURAL RESOURCES

"All supplies and materials used in cleaning must be in compliance with 'Green Cleaning' requirements and continue to achieve the [Airport or Agency] environmental strategic goals³²."

"Tenants are required to report wildlife sightings to airport staff."

"The natural landscape of the site shall be preserved to the extent possible. Landscaping must consist of at least 75% native vegetation and 100% of nuisance and invasive vegetation from the site must be removed.³³"

"Build on previously developed sites to the extent possible to reduce new disturbance."

"Tenants are required to utilize Sustainability and Environmental Best Management Practices (BMP) for all improvement projects."

"It is encouraged for correspondences and notices to be transmitted electronically."

SOCIAL RESPONSIBILITY

"Tenants must promote healthy eating and environmental stewardship through their food displays and offerings."

"All tenants must comply with the Federal, State, and Local Laws and Ordinances with regard to equal opportunity practices that all programs, services, employment opportunities, and volunteer positions and contracts are open to all persons without regard to race, religion, color, national origin, sex, age, marital status, handicap, or political affiliation."

"Tenants are encouraged to participate in the annual [airport event] to show support and help promote the benefits of the airport and strengthen community relations. Tenants are offered free entry and meal with their participation."

"Tenants are required to participate in the following required training courses."

More general language may also be used in contracts to promote sustainability and relate it back to the sustainability plan or goals. Example language includes:

"The [Airport or Agency] promotes the use of environmentally friendly products or processes and encourages suppliers, organizations, and contractors to become ISO 14001 registered. The [sustainability plan] is an integral part of the [Airport or Agency's] infrastructure and operational procedures. All airport users and tenants are requested to follow initiatives to the extent possible through all stages of use, business, and projects. [Airport or Agency] encourages the use of the [Plan] for all aspects of its projects and day to day activities."

Similar to a zoning overlay, contract language can specify new requirements that come into effect when new buildings are constructed or existing structures are improved under the lease or minimum standards. This may include a reference to Leadership in Energy & Environmental

³² Portland International Airport janitorial contract

³³ Florida Native Plant Society's Model Native Plant Landscape Ordinance Handbook

Design (LEED) standards or a Green Building Code as shown below. The American Institute of Architectures publishes a series of sample forms³⁴, including some between owners and contractors, on Sustainable Projects.

"Within [days] days after execution of this Agreement, Architect [Contractor] shall provide, for Owner's review and approval, a Green Building Plan for the design [construction] of the Project which is consistent with the Silver Certification level of the U.S. Green Building Council's LEED for New Construction Rating System. Owner does not anticipate that LEED Certification will be sought for the Project. However, Architect [Contractor] shall track LEED points informally, and provide Owner with such information on a periodic basis. Upon its approval by Owner, Architect's [Contractor's] Green Building Plan shall be deemed to be attached to this Agreement as an Exhibit and incorporated herein by reference. Thereafter, Architect shall perform its Services [Contractor shall perform the Work] in a manner consistent with the approved Green Building Plan."³⁵

ACRP Synthesis 42, *Integrating Environmental Sustainability into Airport Contracts*, provides further information and examples on integrating sustainability language into contracts and agreements. The Airports Going Green's Sustainable Airport Manual – Concessions and Tenants³⁶ provides additional examples of how to implement goals through design and construction and operations and maintenance for concessionaires and tenants as well as current baseline standards within the industry.

³⁴ <http://www.aia.org/contractdocs/aiab093903>

³⁵ Project Owners Strategies for "Greening" Design and Construction Contracts, PLI Green Real Estate Summit 2009

³⁶ www.airportsgoinggreen.org/documents/5ConcessionsandTenants.pdf