

# Chapter 7

## Sustainability

The University Park Airport (Airport) considers sustainability (environmental stewardship, operational efficiency, economic vitality, and social responsibility) an integral part of its operations and development. By incorporating sustainability into its master planning effort, the Airport has committed to a long-term, comprehensive, and integrated approach to sustainable development. This chapter documents baseline sustainability performance and activities, identifies opportunities for improvement, and informs the development of sustainability goals and objectives for each of the following areas: energy efficiency, economic vitality, environmental stewardship, and university/community partnerships.

Sustainability has redefined the values and criteria for measuring organizational success by using a "triple bottom line" approach that considers economic, ecological and social well-being. Applying this approach to decision-making is a practical way to optimize economic, environmental, and social capital. Consistent with the Airports Council International – North America (ACI-NA) definition of airport sustainability,<sup>1</sup> the Airport is focused on a holistic approach to managing its airport to ensure Economic viability, Operational efficiency, Natural resource conservation, and Social responsibility (EONS).

Airport sustainability as part of a business strategy has both immediate and long-term benefits that can be measured and when persistently managed, present rewards. Some benefits of sustainability initiatives that have been demonstrated at airports across the world include:

- Improved passenger experience
- Better use of assets
- Reduced development and/or operations and maintenance costs
- Reduced environmental footprints
- Facilitation of environmental approvals/permitting
- Improved relationships within the community
- Enhancement of regional economy
- Creation of an engaged and enriched place to work
- Creation of new technologies through increased demand and investment in technologies that facilitate sustainable solutions

A key element of the sustainable master planning process focuses on communication and coordination with Airport stakeholders and the public on the needs, benefits, and opportunities of the Airport. Multiple meetings were held throughout the process with the Master Plan Advisory Committee (MPAC), which was

---

<sup>1</sup> Airport Sustainability: A Holistic Approach to Effective Airport Management; accessed July 17, 2013:

comprised of key Airport stakeholders to obtain feedback, brainstorm ideas, and discuss key aspects of the project. The MPAC is described further in Chapter 1 of the master plan update. To further gain input and data for the development of the plan, four surveys were posted on the Airport’s website targeted to multiple audiences (see **Appendix C**). Airline passenger, itinerant user, hangar tenant, and business tenant surveys were posted throughout the plan’s development requesting input and feedback from these key Airport stakeholders.

The Airport has two controlling authorities. The Pennsylvania State University (Penn State) owns most of the Airport property and is responsible for all facilities with the exception of the passenger terminal. The passenger terminal is operated by the Centre County Airport Authority (CCAA). This sustainability planning effort focused on Penn State’s facilities, because Penn State is the sponsor of the master plan update; however, the passenger terminal was included in the sustainability planning efforts and recommendations.

Penn State’s Sustainability Institute developed a *Sustainability Planning Guidebook for Teams*, which included a Sustainability Planning Process that was used to guide the sustainability component of this master plan update. The six steps of the process are detailed below, along with the corresponding section of this chapter.

1. Understand sustainability (see above, Sustainability Introduction).
2. Assess current state (see 7.1 Baseline Assessment).
3. Identify priorities (see 7.2 Sustainability Goals and Objectives and 7.4 Identification and Evaluation of Sustainability Initiatives).
4. Create a vision of sustainability (see 7.2 Sustainability Goals and Objectives and 7.3 Section Alternatives Screening Criteria)
5. Set goals and develop metrics (see 7.2 Sustainability Goals and Objectives and 7.5 Performance Metrics and Targets)
6. Develop an implementation plan (see 7.6 Implementation and Monitoring Plan).

## **7.1 Sustainability Baseline Assessment**

The purpose of the sustainability baseline inventory is to provide an overview of the current performance at the Airport. This provides context for the sustainability goals and objectives that are also included in this chapter. Understanding the Airport’s current sustainability performance also provides the information necessary for Airport staff to measure and evaluate the impact of any sustainability programs and initiatives that the Airport may implement in the future.

The Sustainability Baseline Assessment is organized by the following resource areas:

- Natural resources
- Air Quality and Greenhouse Gas (GHG) emissions
- Energy

- Waste management and recycling
- Noise
- People

Data for this baseline assessment was collected from a variety of resources including, but not limited to: past National Environmental Policy Act (NEPA) documents; the Airport’s prior master plan update; data collection, site visits, and interviews at the Airport; Penn State documents; and other sources.

### **7.1.a Natural Resources**

Natural resources at the Airport include land areas that support local biodiversity. An important element to the Airport’s sustainable growth is to ensure the quality of natural resources is conserved. The Airport is located in a fairly rural area with surrounding land uses consisting of residential, commercial and industrial, agricultural and forested, and some vacant and undeveloped space. This section describes the natural resources at the Airport, and current initiatives to reduce impacts to these resources. It is important to note that many resources described below are subject to federal regulations and requirements, and are described in greater detail in the environmental inventory of this master plan (see Chapter 6).

### **7.1.b Land Area and Biodiversity**

Large-scale land alterations including the development of runways, airport-related buildings, and extensive paved areas have altered the Airport from its prior natural state. Much of the native vegetation has been removed. The Airport covers 1,091 acres of land and is surrounded by a variety of farmland and forests comprised of mountains, hills, and valleys (see Section 2.3.a, Topography). Managed grassland, which is located adjacent to runways, on roadway medians, and on landscaped areas around buildings and parking areas, is the most common land cover. Wetlands, small stands of deciduous trees and shrubs, and landscaping around buildings comprise the remaining vegetation at the Airport. Existing vegetative cover is comprised predominantly of a variety of grasses, clovers, crown vetch, and fescues, which are common for previously developed areas. Vegetated areas with species of weeds include Queen Anne’s lace, raspberry species, and foxtail grass. Areas to the west consist of corn and soybean fields and alfalfa or grass fields. Trees and shrubs are not a common vegetated land cover at the Airport.<sup>2</sup>

Consultation with state and federal agencies such as the Pennsylvania Department of Conservation and Natural Resources’ (PA DCNR) – Bureau of Forestry’s Pennsylvania Natural Diversity Inventory (PNDI) and the United States Fish and Wildlife Service (USFWS) has determined that no threatened, endangered, or species of special concern are known to exist within or adjacent to the Airport.<sup>3</sup> Areas surrounding the Airport may contain various wildlife including, but not limited to: whitetail deer, squirrel (red, gray), groundhog, rabbit, raccoons, fox, opossum, skunk, mice (field, white-footed, etc.), red-tailed hawk, American kestrel, great horned owl, screech owl, eastern turkey, ruffed grouse, doves, robin, sparrow, finch, blue jay, cardinal, blue bird, woodpecker, crow, red-winged black bird, starling, barn swallows, etc.<sup>4</sup>

---

<sup>2</sup> Ibid.

<sup>3</sup> Draft Environmental Assessment for the Proposed Establishment of an Airport Traffic Control Tower (ATCT) and Runway 6 Categorical I Instrument Landing System (ILS)/Medium Intensity Approach Lighting System (MALSR) at University Park Airport. Prepared by Mead & Hunt, Inc. January 2008.

<sup>4</sup> Ibid.

The presence of birds and other wildlife in the vicinity of the Airport can lead to aircraft safety concerns. Wildlife attracting areas of concern at the Airport include:

- Dig outs along perimeter fences. These areas are created by wildlife digging holes under the fence, making it easier for wildlife to gain access to the Airport Operations Area (AOA).
- Standing water/wet areas.
- Nesting areas.
- Off-site attractants such as landfills.

### 7.1.c Wetlands

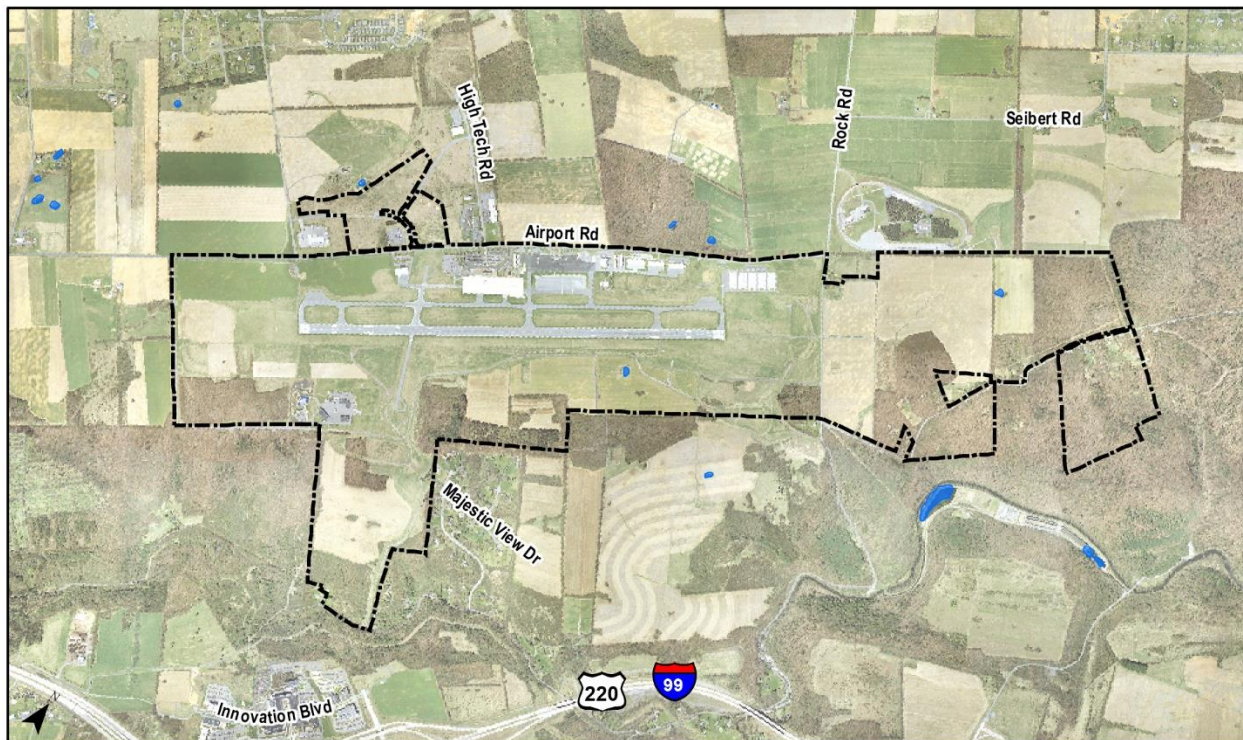
The United States Army Corps of Engineers (USACE), the United States Environmental Protection Agency (U.S. EPA), and the Commonwealth of Pennsylvania define wetlands as follows: *Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted to live in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.*

**Figure 7-1** illustrates the location of wetlands in the vicinity of the Airport. This figure depicts 15 wetlands within close proximity to the Airport, of which only three are on Airport property. Two of the wetlands on Airport property are located to the north: one is south of Fox Hill Road, and the other is northeast beyond the aeronautical developable area of the property. The third wetland on Airport property is located to the south of Runway 6/24 and the Airport perimeter service road. Two wetlands are described by the USFWS as palustrine, scrub-shrub, broad-leaved deciduous, seasonally flooded areas. The third (northernmost) wetland is described as a palustrine, emergent, persistent, seasonally flooded area.<sup>5</sup>

---

<sup>5</sup> US Fish and Wildlife Service, "Wetlands and Deepwater Habitats Classification," February 2011, <http://www.fws.gov/wetlands/Documents/Wetlands-and-Deepwater-Habitats-Classification-chart.pdf>, accessed February 21, 2014.

Figure 7-1: Wetland Locations



Key: --- Airport Property Line    Wetlands

Source: Mead & Hunt, Inc. and VHB, Inc. (2014)

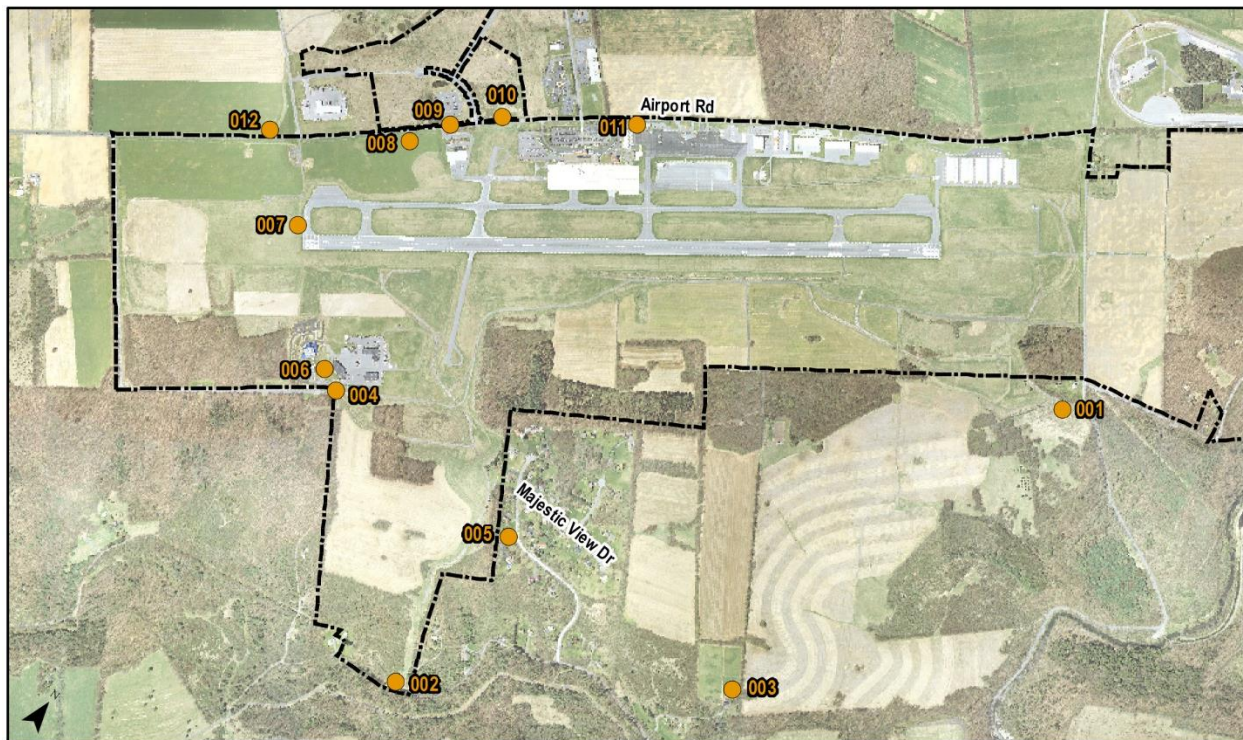
### 7.1.d Water Quality

Protecting local water quality conserves water resources and advances the Airport's role as an environmental steward. This section describes water quality and wastewater at the Airport.

As part of the Environmental Hazards Emergency Response Plan (EHERP), the Airport has a Spill Prevention, Control, and Countermeasure Plan (SPCC) and a Spill Prevention Response Plan (SPRP) to describe how the Airport addresses spills. The Airport also keeps a variety of absorbent materials on hand in the event of a spill.

Stormwater runoff is expected to increase in the future as a result of the creation of additional impervious surfaces on the Airport such as new buildings, roadways, and parking lots. The Pennsylvania Department of Environmental Protection (PA DEP) issued a National Pollutant Discharge Elimination System (NPDES) permit to the Airport in April 2013. The NPDES permit requires sampling and measurements taken for water quality monitoring and reporting (see **Figure 7-2**).

Figure 7-2: Water Quality Monitoring Stations



Key: --- Airport Property Line      ● NPDES Water Quality Monitoring Stations

Source: Final NPDES Permit, April 2013; Mead & Hunt and VHB (2014)

The Federal Aviation Administration (FAA) requires airlines and airports that operate during icy conditions to perform deicing and anti-icing of aircraft and airfield pavement to ensure safe operations. Airlines perform over 80 percent of deicing for commercial airline aircraft operations while the Airport accounts for the remaining 20 percent of de-icing fluid usage for application on runways, taxiways, and aprons. The runoff from deicing operations is collected in compliance with the requirements of the Airport's General Permit for Discharges of Stormwater Associated with Industrial Activities to not adversely affect receiving waters.

Aircraft deicing runoff is currently collected and sent to the Bellefonte Wastewater Treatment Plant.<sup>6</sup> The annual cost to the Airport ranges from \$10,000 to \$20,000. Under this permit, discharge flows to the sanitary sewer are limited. The Airport's permission to discharge was temporarily suspended due to a malfunction of the deicing runoff discharge monitoring system and was recently billed for additional discharge quantities. For these reasons, the Airport explored alternatives for deicing runoff management, but at this time, alternatives are cost-prohibitive.<sup>7</sup>

<sup>6</sup> Wastewater Contribution Permit 006, issued August 10, 2011

<sup>7</sup> Mead & Hunt Draft Technical Memorandum: Analysis of options to collect, treat and dispose of deicing fluids / Impact of Spring Creek Canyon Conservation Overlay District, August 5, 2013.

### 7.1.e Water Use

Water resources include surface water and groundwater features within or adjacent to Airport property, such as lakes, streams, and rivers. Conserving and protecting such resources is crucial to maintaining local and regional water supplies. Reducing potable water use conserves water resources and would advance the Airport's role as an environmental steward. This section describes water resources and water consumption.

**Groundwater Resources** – The bedrock underlying the Airport is comprised of predominantly gray dolomite and sandstone interbeds and has good subsurface drainage and little surface drainage. Water levels often exceed depths of 100 feet in this formation.<sup>8</sup>

Sinkholes are natural depressions in the ground caused by collapses of the ground surface. Under certain conditions, the bedrock formations found in this region provide the conditions for sinkhole development that may result in the direct discharge of surface waters into the groundwater aquifer. Sinkhole conditions typically involve concentrated stormwater runoff, channelized flows, and detention/retention facilities that create temporary concentrations of surface waters that may promote sinkhole development. Bedrock formations found in the vicinity of the Airport provide suitable conditions for the development of additional sinkholes. The Airport has experienced small sinkholes on airport property as seen in **Figure 7-3**.

**Figure 7-3: Sinkhole on Airport Property**



Source: Mead & Hunt, Inc. and VHB, Inc.

**Water Consumption** – The annual cost of potable water at the Airport is approximately \$1,775 a year. The Airport used a total of 373 gallons of water between November 20, 2012, and November 20, 2013. This water usage includes two meters both the passenger and general aviation (GA) terminals, as well as on the fire hydrant, and a sprinkler. Meter 2 saw an increase in usage in Quarter 3 (May-August), which could be the result of summer landscape watering, Penn State/State College summer activities, and/or the start-up of fall Penn State classes with more passengers flying into and out of the Airport.

---

<sup>8</sup> Draft Environmental Assessment for the Proposed Establishment of an Airport Traffic Control Tower (ATCT) and Runway 6 Categorical I Instrument Landing System (ILS)/Medium Intensity Approach Lighting System (MALSR) at University Park Airport. Prepared by Mead & Hunt, Inc. January 2008.

### 7.1.f Existing Natural Resource Sustainability Activities

The Airport completed a Wildlife Hazard Assessment (WHA) in 2010 and a Wildlife Hazard Management Plan (WHMP) in 2012. The Airport also has access to a United States Department of Agriculture (USDA) wildlife biologist who is available to assist with wildlife control and habitat management practices.

At the Airport, drainage ditches were designed and constructed to collect and convey stormwater in a natural way. Vegetation within the drainage ditches primarily consists of grass, teasel, reed canary grass, garlic mustard, and crown vetch. All drainage ditches on airport property are well maintained by Airport staff as part of the Airport's stormwater management system and facilities.

Improvements to the de-icing pad were completed in 2009 by the Airport to correct infiltration issues associated with the glycol holding tank located on Airport property. In 2011, the Airport purchased an aircraft deicing truck, which reduces the quantity of deicing fluid needed (see **Figure 7-4**). The truck utilizes less deicing fluid during the application and also has the ability to use forced air prior to applying fluid. The Airport estimates that use of this truck has reduced deicing fluid needed by at least 30 percent.

**Figure 7-4: Airport Deicing Truck**



Source: Mead & Hunt, Inc. and VHB, Inc.

Historically, sinkholes have developed in areas of the Airport property. Recognizing the need to minimize sinkhole development, the Airport has adopted design standards and requirements for facility construction that serve to minimize the formation of sinkholes, which protects groundwater sources and reduces sinkhole repair costs. These standards are particularly applicable regarding stormwater management facility construction and include special lining materials and design criteria.

### 7.1.g Greenhouse Gas Inventory

A greenhouse gas inventory was conducted to provide a baseline for measuring the effectiveness of future energy efficiency improvement projects (see **Appendix D**). The inventory was conducted based on



recommended procedures from available publications, such as Airport Cooperative Research Program (ACRP) Guidebooks and the FAA/United States (U.S.) Air Force's *Air Quality Procedures for Civilian Airports and Air Force Bases*, as no regulatory guidance currently exists.

The modeling inputs were based on information provided by the Airport, tenants, and FAA databases. When a complete set of data was unavailable, available data was annualized or substitution data was used. If an incomplete set of data was not available, assumptions were made. **Table 7-1** illustrates the baseline GHG inventory in tons per year. This table also indicates the source's equivalent carbon dioxide (CO<sub>2e</sub>) percentage of each group, as well as the CO<sub>2e</sub> percentage of the overall total. The results are separated into three distinct groups:

- Airport-owned/controlled,
- Tenant-owned/controlled, and
- Public responsibility.

Separating the inventory results by ownership enables the Airport to take responsibility for the sources of emissions that they have direct control over, which is less than seven percent of the overall emissions. **Appendix D** provides detailed information about the Airport-owned emission sources, in addition to tenant- and public-owned emission sources.

**Table 7-1: 2014 Baseline Greenhouse Gas Emissions Inventory (Tons/Year)**

Source	CO <sub>2e</sub>	Percent of Category	Percent of Total
<b>Airport-owned/Controlled</b>			
Airport Vehicles	143	17.90%	1.23%
Airport Buildings – Electric	491	61.40%	4.21%
Airport Buildings – Gas	131	16.30%	1.12%
Airport Employees Commute	32	4.00%	0.27%
Airport Generators	2	0.30%	0.02%
Sub-Total	800	100.00%	6.84%
<b>Tenant-owned/Controlled</b>			
Tenant Aircraft – Airline Only	3,891	98.70%	33.31%
Tenant Direct Fuel Consumption	49	1.20%	0.42%
Tenant Buildings – Electric	0	0.00%	0.00%
Tenant Employees Commute	3	0.10%	0.03%
Sub-Total	3,943	100.0%	33.76%
<b>Public</b>			
Transportation to/from Airport – Personal	1,825	26.30%	15.62%
Transportation to/from Airport – Rental Vehicles	370	5.33%	3.16%
General Aviation Aircraft	4,744	68.37%	40.61%
Sub-Total	6,939	100.00%	59.40%
<b>Grand-Total</b>	<b>11,682</b>		<b>100.00%</b>

Source: Mead & Hunt, Inc. (2014)

### 7.1.h Existing Sustainability Activities

The Airport recently received Voluntary Airport Low Emissions (VALE) grants for the purchase and use of zero-emission Airport vehicles (**Figure 7-5**). The VALE program encourages commercial service airports to implement clean technology projects that improve air quality. Multiple project types are eligible under the program including the purchase of alternative fuel vehicles. VALE incentivizes airport sponsors by funding the incremental cost of alternative fuel vehicles instead of conventionally-powered diesel and gasoline vehicles.<sup>9</sup> In 2013, through the FAA VALE grant, the Airport acquired Ground Support Equipment (GSE), including a GEM shuttle vehicle (**Figure 7-5**) and an electric (LEXTRO) aircraft tractor (**Figure 7-6**).

**Figure 7-5: Shuttle Vehicle**



Source: University Park Airport

**Figure 7-6: Electric Aircraft Tractor**



Source: University Park Airport

<sup>9</sup> Federal Aviation Administration. Voluntary Airport Low Emissions (VALE) Program.

### 7.1.i Energy

An energy audit was conducted in October 2013 (see **Appendix E**). The audit included review of existing and historic energy usage, a walk-through assessment, and potential energy conservation measures. The facilities that were included in the audit include:

- Passenger Terminal
- GA Terminal
- Aircraft Maintenance Facility
- Airport Traffic Control Tower (ATCT)
- Snow Removal Equipment Facility
- Exterior Lighting (primarily east hangars)

**Table 7-2** includes the annual average electricity usage (in dollars) and Energy Use Index (EUI) for each facility included in the energy audit. To evaluate the amount of energy used by a building, the EUI is calculated. EUI is estimated by summing the annual use of all energy sources, converting to a common energy unit (thousand British thermal unit or kBtu), and dividing by the applicable conditioned area of the facility. The energy audits provide individual benchmark comparisons of EUI for each audited facility.

**Table 7-2: Energy Usage**

Facility	Building Area (square feet)	Annual Average Energy Cost	Energy Use Index (kBtu/square feet)
Passenger Terminal	34,258	\$69,982 (Electric)	92.4
GA Terminal	5,590	\$10,230 (Electric) \$6,707 (Propane)	160.4
Aircraft Maintenance Facility	16,200	\$19,460 (Fuel Oil) \$17,109 (Electric)	95.5
ATCT	5,588	\$10,227 (Electric) \$1,031 (Propane)	91.8
Snow Removal Equipment Facility	7,600	\$7,634 (Gas) \$1,594 (Electric)	78.8
Exterior Lighting	N/A	Exterior lighting not metered separately	N/A

Source: University Park Airport Energy Audits, Envivity (2014)

### 7.1.j Existing Sustainability Activities

A recent mechanical upgrade project was completed in the passenger terminal in late 2011. A geothermal water loop heat-pump system was installed as part of the upgrade, replacing an existing boiler-tower heat pump system. Additionally, a Building Automation System (BAS) was installed in the passenger terminal, which provides improved control of building systems.

The GA Terminal includes dimming switches and the lobby has an abundance of natural light. Several facilities (aircraft maintenance facility, corporate hangar) have upgraded lighting fixtures to T-8 lamps/ballasts.

The ATCT is a newer facility, with construction completed in late 2010. This facility includes a building environmental system (BES), but it is currently not being utilized to its fullest potential (e.g., unoccupied modes are not in use). Installing occupancy sensors in areas that are used less often would allow the Airport to take advantage of setbacks to adjust temperatures, fans, lighting, and air ventilation when areas of the facilities are unoccupied.

### **7.1.k Recycling, Reuse, and Waste Reduction Plan**

The recently passed FAA reauthorization bill (*FAA Modernization and Reform Act of 2012*) includes a new requirement for Airport Master Plans to address recycling by:

- Evaluating the feasibility of solid waste recycling;
- Minimizing the generation of waste;
- Identifying operations and maintenance requirements;
- Reviewing waste management contracts; and
- Identifying the potential for cost savings or revenue generation from recycling.

Subsequently, FAA issued new guidance<sup>10</sup> on preparing airport recycling, reuse, and waste reduction plans as an element of a master plan or master plan update. The following section is organized, per the FAA's guidance to provide detailed information regarding the Airport's Waste Management Program.

#### **A. Facility Description and Background**

- **Scope of the Existing Recycling Program** – This Recycling, Reuse, and Waste Reduction Plan includes:
  - (a) The GA terminal and associated office space, over which Penn State has direct control
  - (b) The passenger terminal, managed by CCAA, over which Penn State has indirect control

The plan does not include deplaned waste and waste generated by tenants of the passenger terminal because Penn State has no control or influence over these entities, as they contract directly with the CCAA (which uses another disposal service).

- **Existing Waste Management Program** – Recyclable materials at both the GA terminal and the passenger terminal are separated and recycled. Within the municipality of State College all residents and businesses are required to recycle glass, metal cans, newspaper, and other

---

<sup>10</sup> FAA. *Guidance on Airport Recycling, Reuse, and Waste Reduction Plans*. September 30, 2014. <http://www.faa.gov/airports/environmental/media/airport-recycling-reuse-waste-reduction-plans-guidance.pdf>

materials.<sup>11</sup> The GA terminal, owned and operated by Penn State, falls within the university's solid waste management program through the Office of Physical Plant (OPP). Penn State also has a program called Mobius to advance the university's recycling and waste management practices. This program has aggressive goals of reaching 85 percent waste diversion within the university.

Materials recycled at the passenger terminal primarily consist of paper, plastic, glass, and aluminum cans. The GA terminal's waste management program falls within the purview of Penn State's OPP, which recycles plastics (#1-#7), aluminum cans, glass, mixed office paper, and newspaper.

- **Drivers for Implementing/Maintaining a Recycling Program** – The GA terminal implements recycling because it is part of the university's broader Mobius program, which has aggressive recycling goals and accompanying recycling infrastructure. The CCAA's drivers for recycling are more financially-based, deriving from the cost savings that result from reducing waste disposal.
- **Recycling Infrastructure** – At the GA terminal, there are recycling and trash bins located throughout the facility. Trash and recycling are collected from these bins and stored in trash and recycling dumpsters located behind the GA terminal building. Penn State's OPP picks up the GA terminal's recycling and trash two times per week, each week.

CCAA also separates trash and recycling at the source, with recycling and trash bins located throughout the passenger terminal. Trash and recycling is collected and stored outside the passenger terminal. Waste is collected by custodial staff after flights, as necessary. CCAA contracts with an independent waste hauler (Fred Carson Disposal Service), which collects trash and recycling from the passenger terminal dumpsters twice a week.

**Figure 7-7** shows a dual purpose recycling bin located in the commercial airline terminal building while **Figure 7-8** presents recycling bins that are available for general aviation users.

---

<sup>11</sup> State College, PA Refuse and Recycling <http://www.statecollegepa.us/Index.aspx?NID=307>

Figure 7-7: Passenger Terminal Recycling Dual Purpose Bin



Source: VHB, Inc. and Mead & Hunt, Inc. (2014)

Figure 7-8: Recycling Bins for General Aviation Users



Source: VHB, Inc. and Mead & Hunt, Inc. (2014)

- **Current Solid Waste Recycling, Reuse, and Waste Reduction Efforts:**

**(a) Date Recycling was initiated for Various Materials** – Recycling efforts were initiated at both the GA and passenger terminals around 2011.

**(b) Quantities of Recycled or Reused Material** – At both the GA and passenger terminals, data on the volume and weight of trash and materials recycled is not collected because collection of these materials are billed on a per-pick up basis.

Visual inspections of waste bins were conducted at both the GA and passenger terminals in March 2014. At the GA terminal, the large trash bin was approximately 20 percent full and the small trash bin was approximately 80 percent full. The cardboard and mixed paper bins were approximately 20 percent and 25 percent full respectively. The recycling bins are approximately 50 gallons each. Additionally, there was one large bag each of cans, plastic, and Styrofoam. At the passenger

terminal, the trash bin was approximately 50 percent full. Waste at this seven cubic yard dumpster is typically picked up twice a week and the dumpster is usually full. The glass, cans, and cardboard bins, each approximately 50 gallons, were approximately 50 percent, 33 percent, and 33 percent full, respectively. The newspaper/paper and jugs/bottles bins were empty.

**(c) Waste Minimization Efforts** – In an effort to reduce waste, water bottle filling stations were installed pre- and post- security. This measure allows passengers to re-fill their bottles instead of buying plastic water bottles, which ultimately would be disposed of.

- **Program Performance:**

**(a) Recycling, Reuse, and Waste Reduction Goals or Targets** – Currently neither CCAA nor Penn State have concrete waste reduction goals. Penn State does have an aspirational goal of diverting 85 percent of its waste.

**(b) Performance Indicators** – Penn State (the university as a whole, which includes the Airport) reports a diversion rate of 60 percent of its waste. Diversion rates are not calculated for the GA or passenger terminals.

**(c) Community Outreach / Stakeholder Involvement during Recycling Program Development** – During the recycling program development, there was no formal community outreach or stakeholder involvement. The recycling program was informally developed, and the Airport notified the tenants as applicable.

**(d) Methods of Reporting Program Performance** – Performance is not currently tracked or reported. Both CCAA and PSU have flat rate billing, which makes tracking waste and recycling more difficult. Both trash and recycling are picked up twice a week and billing is based on the number of pick-ups as opposed to the quantity of waste generated. Both entities do, however, have initiatives in place to reduce waste generation and increase their recycling rate.

**(e) Program Challenges / Barriers to Implementation** – Challenges to program implementation include the difficulty of understanding quantities of materials recycled because waste and recycling is billed on a per-pickup basis only. Recycling at both the GA and passenger terminals also face behavioral challenges, typical of most airports, that result in contamination of the trash and recycling. Contamination was observed during the waste audit.

## **B. Waste Audit**

Due to the size of the Airport, a waste walk-through was conducted as opposed to a full waste audit. This walk-through was completed in March 2014 and included a review of both terminals, as well as restricted access areas. The GA and commercial airline passenger terminals each have their own trash and recycling bins and collection service.

- **The Annual Quantity and Composition of Generated Municipal Solid Waste (MSW) and construction and demolition (C&D) Debris** – As noted previously, data on the volume and weight of trash and materials recycled is not collected. A visual inspection of waste bins was conducted during the waste walk-through in March 2014. At the GA terminal, the large trash bin was approximately 20 percent full and the small trash bin was approximately 80 percent full. The cardboard and mixed paper bins were approximately 20 percent and 25 percent full respectively. Additionally, there was one large bag each of cans, plastic, and Styrofoam. At the passenger terminal, the trash bin was approximately 50 percent full. The glass, cans, and cardboard bins were approximately 50 percent, 33 percent, and 33 percent full, respectively. The newspaper/paper and jugs/bottles bins were empty. As noted previously, each of the recycling bins at the GA and passenger terminals are approximately 50 gallons.
- **The Sources and Activities that Generate Waste** – Waste at airports is generated by passengers, tenants, and the airport operators. This waste is generally comprised of several types:
  - Municipal solid waste which includes: paper, plastic, bottles, and other waste commonly found in terminals, offices, and other facilities; green waste, such as yard waste from airport landscaping; food waste from concessions; and deplaned waste (waste removed from aircraft).
  - Construction and demolition waste from construction projects.
  - Lavatory waste from aircraft.
  - Spill clean-up and remediation waste, on both the landside and airside.
  - Hazardous waste such as solvents, waste pesticides, and heavy metal paint waste.
  - Universal waste regulated by the U.S. EPA such as batteries, used fluorescent tubes, and electronic devices.<sup>12</sup>
- **The Generators (Owners and Facilities/Areas) of Various Waste Streams** – MSW is generated by passengers, tenants, the airport operators, and any other users of airport facilities. C&D waste is generated from construction projects, which are typically authorized and overseen by the airport operator. Spills, hazardous waste, and universal waste may be generated by tenants (such as the airlines), the airport operator, or a third-party contractor.

### C. Review of Recycling Feasibility

- **Technical and Economic Factors Affecting the Airport's Ability to Recycle** – Penn State's robust Mobius recycling program facilitates recycling of different materials, including organic waste, as markets for these materials currently exist. Penn State has committed to "closing the loop" on its solid waste and in 2012, diverted nearly two-thirds of its solid waste through composting or recycling. This initiative aims to go beyond recycling by reducing, reusing, and composting.

---

<sup>12</sup> The U.S. EPA has less stringent regulations for certain hazardous waste under 40 CFR part 273, the Universal Waste Rule, to streamline regulations and reduce regulatory burden.



- **Federal, State, or Local Guidelines or Policies that Aid or Hinder Recycling Efforts** – As noted, both CCAA and Penn State have flat rate billing, which does not help these entities advance recycling goals. Flat rate billing makes tracking and reporting waste difficult, and bills are based on the number of pick-ups scheduled as opposed to the amount of waste generated. This billing structure does not provide the same financial incentives for improved performance as other billing structures.
- **Other Incentives for Implementing/Maintaining a Recycling Program** – There are a number of ways to incentivize recycling for passengers, tenants, employees, and other Airport users. Formalizing an incentive structure can help the Airport achieve its waste management goals. Potential incentives include:
  - Requiring recycling in all tenant and contractor leases. Highlight the cost savings of recycling.
  - Create a recycling “competition” between tenants and/or employees. Recognize those who have diverted the most waste. This could include a financial bonus.
  - Encourage passenger recycling through clean, universal signage and by co-locating recycling and trash bins.
- **Logistical Constraints** – One logistical constraint is that the Airport has two different waste haulers, which makes the implementation of an airport-wide recycling program more challenging. However, Penn State will be taking over the CCAA waste management (passenger terminal) in the near future.

#### D. Operation and Maintenance (O&M) Requirements

Waste handling at the GA terminal is coordinated by Penn State’s OPP. The recycling and trash is picked up from the GA terminal twice per week. At the passenger terminal, CCAA contracts with Fred Carson Disposal Service. Trash and recycling at the passenger terminal is also picked up twice per week. At both terminals, custodial staff collects waste from bins and transfers it to the dumpsters outside of the terminals.

Diversion rates are not currently tracked or reported at either terminal. Both CCAA and Penn State have flat rate billing, which makes tracking and understanding quantities of materials disposed of challenging.

#### E. Review of Waste Management Contracts

The following section identifies existing contract mechanisms relating to waste management at the Airport.

- **Waste Management Contracting at the Airport** – Airport waste is managed by two separate entities: Waste generated within the GA terminal is managed by Penn State, whereas waste generated within the passenger terminal is managed by CCAA.

- **GA Terminal Waste** – Compostable materials are processed at Penn State’s compost facility. Compostable materials currently include food waste (including fruit, dairy, meat, and bones); pizza boxes and other soiled paper food containers; compostable ware, such as plates, cups, and utensils; coffee filters, grounds, and tea bags; paper towels and tissues; and wooden picks and stirrers. The Airport’s fixed-base operator (FBO) repair facility currently recycles metal products, batteries, and car batteries.

The Penn State OPP collects waste and recycling from the GA terminal and transports the waste to the Centre County Recycling and Refuse Authority (CCRRA). Trash and recycling disposal is direct billed from OPP. As discussed previously, Penn State is billed at a flat rate based on the number of pick-ups; currently recycling and trash are picked up twice a week. As shown in **Table 7-3** below, the cost of recycling is less expensive than the cost of trash disposal.

**Table 7-3: Monthly Trash and Recycling Invoice Amounts**

Entity	Area	Recycling	Trash	Total
CCAA	Passenger Terminal	-	-	\$169.42
PSU	GA Terminal	\$152	\$552	\$704

Source: PSU and Centre County Airport Authority records (2014)

- **Passenger Terminal Waste** – The Airport’s passenger terminal has a well-established recycling program, and has taken on definitive measures to improve recycling rates. CCAA manages the disposal of its waste along with the waste generated by concessionaires and airlines. Waste is collected by custodial staff after flights, as necessary. Recycled materials primarily consist of paper, plastic, glass, and aluminum cans.

Fred Carson Disposal Service collects waste and recycling from the passenger terminal twice a week. The monthly fee was reduced in 2013 (approximately \$200 monthly) due to the acquisition of a new, larger dumpster that requires less frequent collection. Since March 2014, the CCAA has typically paid \$169.42 for disposal services each month.

- **Contracts Relating to Purchase of Environmentally-Preferred Products** – Penn State has several contracts relating to the purchase of environmentally preferred products. For example, a sustainable purchasing policy was developed aimed at reducing packing and increasing resource efficiency of products.
- **Tenant Leases** – Recycling is not currently required in tenant lease agreements. However, tenants are encouraged to participate in the Airport’s recycling program.
- **Funding of Waste Handling and Recycling** – Waste and recycling services are currently paid for by Penn State and CCAA operating budgets.

## F. Potential for Cost Savings or Revenue Generation

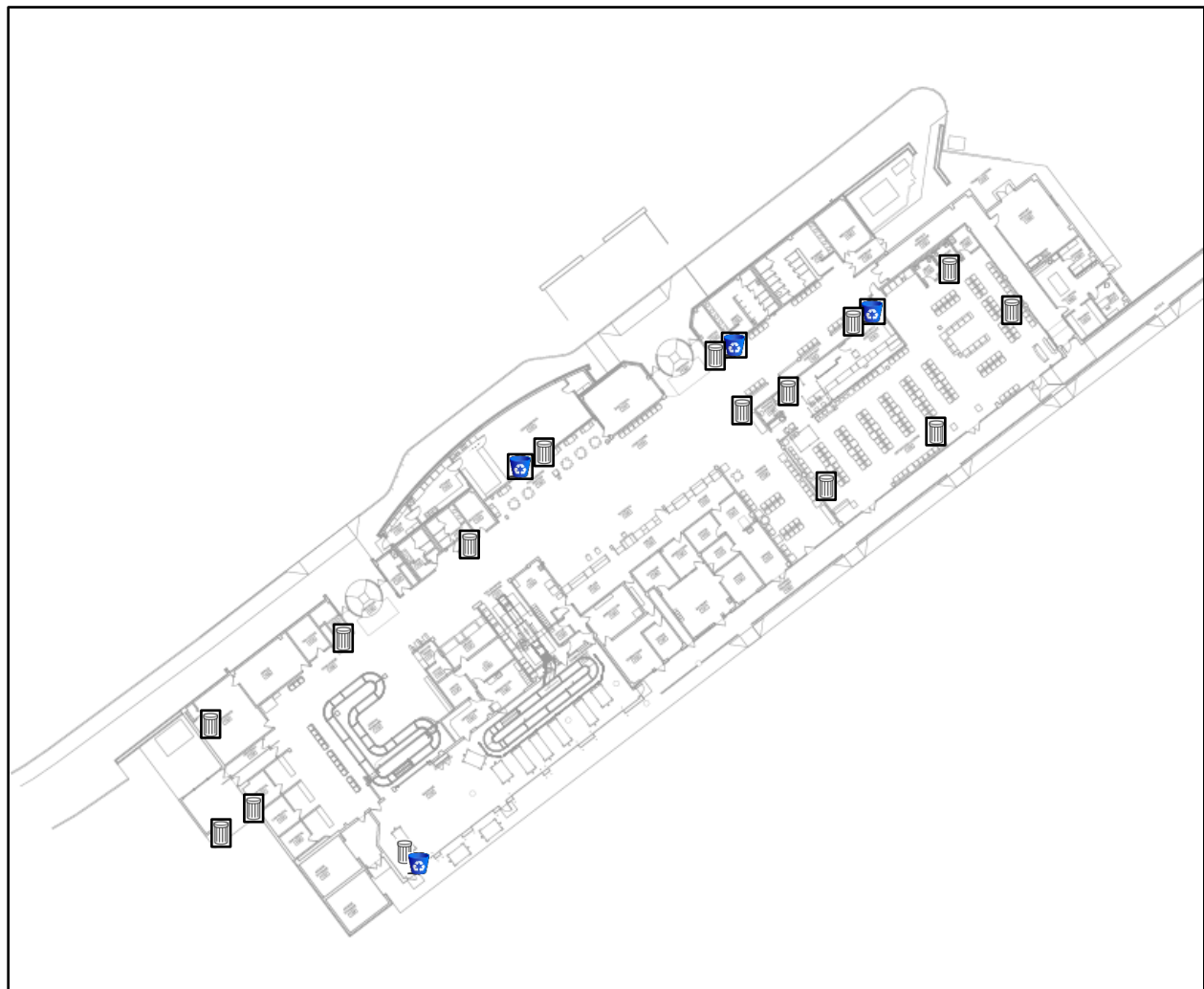
Penn State is responsible for determining opportunities for revenue generation through recycling and will be taking over the CCAA waste management in the near future. Switching the waste management contract from flat rate billing to a contract based on weight of trash and recycling could see potential cost savings and would incentivize recycling. Potential cost savings are discussed further in the next section.

## G. Plan to Minimize Solid Waste Generation

Penn State and CCAA have identified numerous ways to minimize waste generation and increase recycling. This section outlines several sustainability initiatives to advance recycling efforts. Initiatives were identified based on discussions with airport personnel, an analysis of the current recycling program, and a waste walk-through.

- **Recycling Program** – There are trash/recycling bins located throughout the terminals, offices, and in tenant areas. These joint trash/recycling bins have a slot for glass/plastic, paper, trash, and trash/organics. Although the recycled materials are ultimately comingled, this source separation makes a more visible impression of the Airport’s commitment to recycling. There are also separate bins dedicated to trash collection, located in the terminal area. The ratio of trash bins to recycling bins is 10 to 3 in the GA terminal and 15 to 4 in the passenger terminal (see **Figure 7-9** and **Figure 7-10**). The Airport should strive for a 1:1 ratio of trash to recycling bins in both the GA and passenger terminals. Having more trash bins than recycling bins makes recycling more challenging for Airport users.

Figure 7-9: Passenger Terminal Recycling and Trash Bin Locations



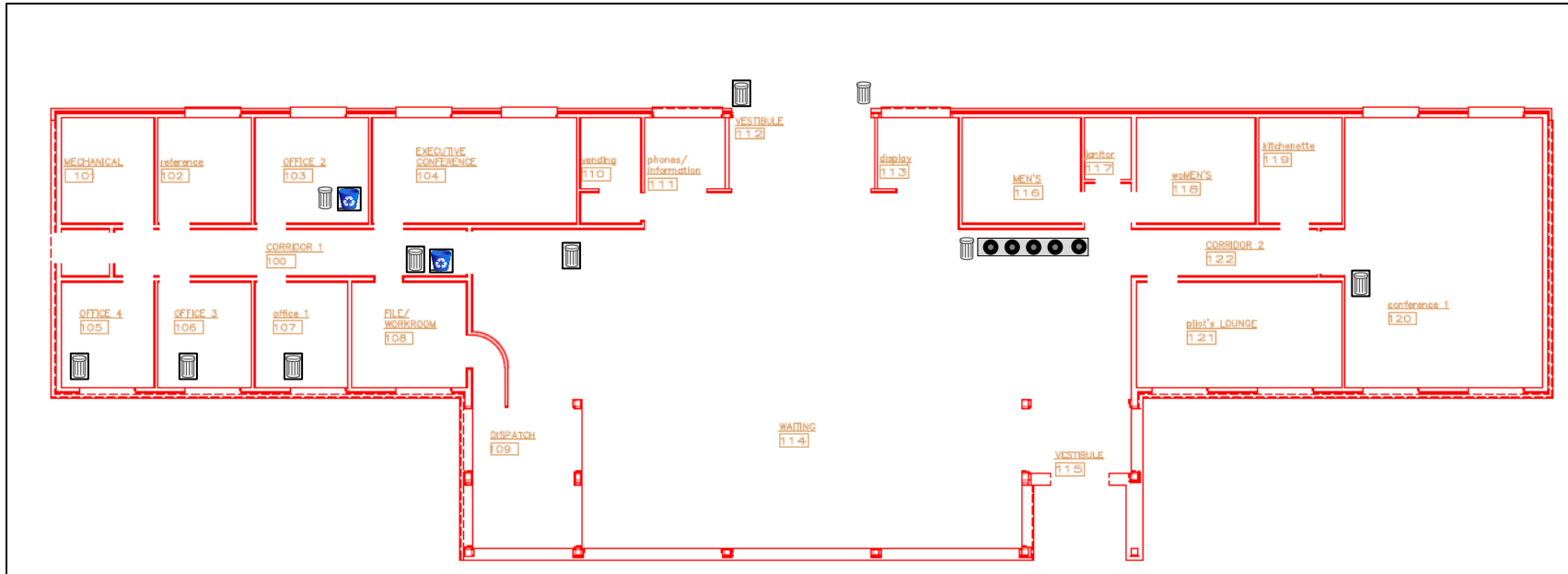
 = Trash Bins




 = Recycling Bins

Note: Restroom receptacles not shown, each restroom has one waste bin

Source: VHB, Inc. and University Park Airport (2014)

Figure 7-10: General Aviation Terminal Recycling and Trash Bin Locations



-  = Trash Bins
-  = Recycling Bins
-  = Combination Bin (newspaper, mixed office paper, glass, cans, and plastics [#1 - #7])

Note: Restroom receptacles not shown, each restroom has one waste bin.

Source: VHB, Inc. (2014)

- **Future Waste Reduction Plans** – The Airport has identified a number of sustainability initiatives to advance its recycling efforts. Implementation will require coordination with both CCAA and Penn State. These initiatives include:
  - **Develop airport-specific environmentally preferable purchasing procedures (Penn State)** – The Airport will develop environmentally preferable purchasing procedures for recycled/bio-based content, materials with low toxicity, and other environmentally-friendly products. The procedures will be developed based on Penn State’s sustainable purchasing policy.
  - **Increase the rate of recycling by incorporating Penn State’s Mobius program (Penn State)** – Increase recycling and partnering with Penn State to implement the Mobius waste management program at the Airport. The Mobius program will assist with reducing the amount of landfill waste that the Airport disposes of daily, which will also reduce greenhouse gas emissions.
  - **Integrate sustainability language into new and renewing contracts (Penn State)** – While drafting or renewing tenant contracts, include sustainability language and initiatives that tenants must practice. This could include requiring recycling and composting.
  - **Communicate waste management practices to tenants (CCAA)** – To maximize tenant recycling, regularly communicate (preferably in written form) to tenants what is being recycled in the passenger terminal, and report on the volume of waste being recycled.
  - **Place additional recycling bins in the GA terminal offices and conference room (Penn State)** – Convenience plays a large role in promoting recycling behavior. To promote recycling in the GA terminal, co-locate recycling bins with trash bins.
  - **Display additional signage to encourage recycling in the GA terminal (Penn State)** – Additional signage explaining recycling options within the GA terminal will promote better recycling amongst users of the GA terminal.
  - **Place additional recycling bins in the passenger terminal (CCAA)** – Purchase and place additional recycling bins in the terminal and co-locate with trash bins (wherever there is a trash bin, there is also a recycling bin).
  - **Improve recycling signage in the passenger terminal (CCAA)** – This signage would explain what products can be recycled, and encourages recycling by educating passengers on the benefits recycling.
  - **Acquire waste disposal compactors for restrooms in the passenger terminal (CCAA)** – The majority of waste generated in restrooms is paper towels. By reducing the proportional volume of paper towels in CCAA's waste stream, the Airport could save on waste disposal costs.
  - **Install high efficiency hand dryers and reduce paper towel dispensers in the passenger terminal (CCAA)** – To reduce the generation of paper towels in CCAA's waste stream, purchase and install high efficiency hand dryers (such as Dyson Air Blades) in the airport restrooms.
  - **Expand waste disposal to include composting (Penn State)** – Coordinate with Penn State's Mobius program to participate in its composting program, which includes food waste and other organics.

- **Include language about Penn State’s construction and demolition policy within all contractor documents (Penn State)** – To promote good recycling practices of construction and demolition waste, include contract language to require contractors to follow Penn State’s waste management practices.
- **Coordinate with airlines to encourage recycling of deplaned waste (CCAA)** – Coordinate with airlines to encourage recycling of deplaned waste and understand what improvements could be made by CCAA to facilitate recycling.

### **7.1.l Noise**

Aircraft noise can be an area of concern in most communities; however, the Airport receives very few complaints from the community regarding aircraft noise. Land surrounding the Airport is primarily agricultural, forest, and commercial; however, there are some residential and public service lands in the vicinity of the Airport. The Airport has also mitigated aircraft noise by completing a Part 150 study and implementing several noise abatement measures.

Day-night average sound level (DNL) is the 24-hour average sound level, in decibels (dB), with an addition of ten dB to aircraft sound levels during the periods between 10:00 p.m. and 7:00 a.m., when people are generally more sensitive to noise. The DNL 65 dB noise contour is within the Airport’s boundaries; therefore, no incompatible land uses are in the vicinity of the Airport based on FAA standards.<sup>13</sup> Even though there are no non-compatible land uses, neighbors can express concerns when an aircraft operation is bothersome. The Airport rarely receives noise complaints; however, the Airport keeps a log at the front desk to document aircraft noise complaints. There were no noise complaints between January 2013 and February 2014.

### **7.1.m Existing Sustainability Activities**

The Airport recommends a voluntary Visual Flight Rules (VFR) departure procedure to avoid over-flight of populated areas. The Townships of Patton and Benner implement zoning restrictions to limit non-compatible land use development.

The Township of Patton has land use zoning restrictions in the Airport District.<sup>14</sup> Benner Township has zoning ordinance restrictions for the Airport Industrial Zone.

### **7.1.n People**

The Airport works toward promoting positive relationships with its neighbors and enhancing passenger and employee well-being. The Airport has an economic impact of more than \$200 million per year and 2,860 jobs in the community.<sup>15</sup> The Airport is active in supporting a variety of activities including stakeholder outreach.

---

<sup>13</sup> Residential land uses within the DNL 65 dB noise contour are considered incompatible.

<sup>14</sup> Township of Patton Zoning Regulations, <http://ecode360.com/6632035>

<sup>15</sup> Pennsylvania Department of Transportation, Bureau of Aviation; *The Economic Impact of Aviation in Pennsylvania*.

The Airport also strives to provide a positive passenger experience by providing the following services and amenities to its passengers:

- Food concession service in the terminal
- Vending machines offering beverages and snacks
- Free Wi-Fi inside the terminal

Public bus service in the vicinity of the Airport is provided by the Centre Area Transportation Authority (CATA); however, there is no bus stop located at the Airport. The closest bus route and stop is the HP Route located approximately one mile southwest of the Airport, on Cricklewood Drive. A variety of taxi and limousine services are offered within the area that directly serve the Airport including Golden Taxi, Handy Delivery Taxi, AA Transit, and Diamond Limousine, among others.

### **7.1.o Existing Sustainability Activities**

The Airport had two summer interns in 2014. One was a Penn State student, and the other was from Kent State University (KSU), which has a student chapter of the American Association of Airport Executives (AAAE). This inspired the Penn State intern to work with the Airport to establish a student chapter of AAAE at Penn State.<sup>16</sup> The chapter was founded in the fall of 2014, and the advisors are the director and associate director of the Airport.

A passenger user survey was conducted as part of this master plan update. The results of this survey are included in **Appendix C**.

The Airport continues to attract new service, which includes non-stop flights to Chicago O'Hare International Airport commenced in January 2014 and weekly non-stop service to Atlanta Hartsfield-Jackson International Airport starting in June 2014.

## **7.2 Sustainability Goals and Objectives**

Based on the Airport's Sustainability Baseline Assessment and coordination meetings with Airport management staff, goals and objectives were developed in support of Penn State's vision for sustainability, to increase overall Airport sustainability. The intent of these goals and objectives was to define the Airport's commitment to financial, social, and environmental sustainability. High level goals were developed for each area of sustainability, supported by objectives that are specifically designed to help the Airport achieve each goal. As the Airport continues to measure its sustainability performance over time to gauge the effect certain initiatives will have, goals and objectives will be adjusted to reflect more quantitative targets. The following are the Airport's initial sustainability goals and objectives, developed as part of this master plan update:

---

<sup>16</sup> *Airport Interns Establish Student Chapter of AAAE*, obtained January 19, 2015 from <http://abservices.psu.edu/news/airport-interns-establish-student-chapter-aaae>



**Energy Efficiency**

- Goal: The Airport will work to leverage the latest technologies to reduce the Airport's rate of energy consumption.
  - Objective: Manage energy use through new lighting technologies, renewable energy production, and improving building efficiency techniques.
  - Objective: Improve vehicle efficiency through use of alternative fuels.
  - Objective: Encourage the use of low emission vehicles, equipment, and supplies.

**Economic Vitality**

- Goal: Enhance the Airport's role as an economic engine to the community by ensuring long-term financial stability and independence.
  - Objective: Educate the community about how the Airport generates revenue, and the economic benefits to the region.
  - Objective: Provide facilities to promote growth in general aviation and commercial air service.

**Environmental Stewardship**

- Goal: The Airport will continue to serve as an environmental steward of its natural resources.
  - Objective: Continue water quality enhancement practices.
  - Objective: Maximize water conservation efforts.
  - Objective: Minimize unavoidable impacts to natural areas.

**Partnerships**

- Goal: Strengthen existing and broaden relationships with Penn State, and other local organizations.
  - Objective: Collaborate with the Penn State Sustainability Institute during implementation of the sustainable master plan.
  - Objective: Develop aviation-related business and educational opportunities for Penn State at the Airport.

## **7.3 Alternatives Screening Criteria**

Master plan alternatives take into consideration the long-term development needs of the Airport, including sustainability goals and objectives, while also planning for the near-term implementation of projects. One of the key goals in completing a sustainable master plan update is to review and identify opportunities to implement a sustainable practice or introduce a sustainable design into a project. By considering screening criteria that are consistent with the Airport's sustainability goals and objectives and Penn State's Sustainability Planning Process,<sup>17</sup> the Airport will maximize the benefits of integrating sustainability into its master plan update process.

---

<sup>17</sup> PSU Sustainability Institute, *Sustainability Planning Guidebook for Teams*.

Based on the components evaluated in the alternatives analysis, and the sustainability goals and objectives detailed in Section 7.2, the following sustainability-related alternatives screening criteria were considered in the master plan update alternatives screening:

- Energy Efficiency
  - Does the alternative incorporate energy-saving measures or renewable/alternative energy components?
- Economic Vitality
  - Does the alternative facilitate growth of aviation activity and revenue generation?
- Environmental Stewardship
  - Does the alternative protect and/or conserve water and other natural resources?
- Partnerships
  - Does the alternative provide opportunities to increase collaboration with Penn State?

The alternatives were quantitatively and qualitatively ranked, according to their performance against sustainability, operational, economic, environmental, and implementation feasibility criteria. Results of the alternatives screening and evaluation process are provided in Chapter 5.

## **7.4 Identification and Evaluation of Sustainability Initiatives**

In addition to incorporating sustainability into the master plan preferred development alternative, a number of discrete sustainability initiatives were considered for the Airport to meet its goals and objectives. Opportunities for sustainability improvements at the Airport were identified based on the information collected during the sustainability baseline assessment (see Section 7.1). Enhancement of the Airport's current practices were also considered as potential initiatives.

Sustainability initiatives can range from high-level process changes within the organization (e.g., integrating sustainability considerations into capital improvement projects) to stand-alone strategies directed at a certain area or facility of the Airport (e.g., specific water efficiency measures). Sustainability can be more fully integrated into all aspects of the organization by recommending both high-level initiatives, as well as those that are more specific and detailed. The relatively small size of the Penn State staff operating the Airport was a major consideration when determining if the recommended initiatives would be feasible. Identified initiatives were intended for Penn State control and implementation, but with the idea that the CCAA and other tenants would participate and support the initiatives as much as possible.

Many resources were used to identify the list of the Airport's potential initiatives. These included the project team's experience with other similar airports and the following resources:

- Industry publications such as the Transportation Research Board's (TRB) ACRP Reports and Synthesis Projects:
  - ACRP Report 28: Marketing Guidebook for Small Airports

- ACRP Report 43: Guidebook of Practices for Improving Environmental Performance at Small Airports
- ARCP Report 44: A Guidebook for the Preservation of Public Use Airports
- ACRP Report 80: Guidebook for Incorporating Sustainability into Traditional Airport Projects
- ACRP Synthesis 10: Airport Sustainability Practices
- ACRP Synthesis 18: Aviation Workforce Development Practices
- ACRP Synthesis 25: Strategies for Reuse of Underutilized or Vacant Airport Facilities
- ACRP Synthesis 42: Integrating Environmental Sustainability into Airport Contracts
- Baseline Assessment – existing sustainability initiatives were identified and opportunities for improvement were recognized.
- Research of other similarly sized airports' sustainability initiatives as well as other airports that are partnered with universities, such as Kent State University Airport.

Initiatives were identified and are detailed in **Table 7-4** (also see **Appendix F** for additional initiative information). The recommended initiatives are provided by goal category and include a description.

**Table 7-4: Recommended Sustainability Initiatives**

Initiative ID	Initiative	Description
<b>Energy Efficiency</b>		
EE-1	Install programmable thermostat in the Maintenance Building.  Lifetime Savings: \$8,291	Replace the existing thermostat in the Maintenance Building with a simple weekday/weekend (also known as 5 day/2 day) programmable thermostat to automatically set the office temperature, reducing the amount of time the heating and cooling system operates. During the heating season, set back the thermostat to 60°-62°F after 5:00 p.m. In the cooling season, set the thermostat up to 80°-82°F after 5:00 p.m.
EE-2	Replace incandescent, halogen, and metal halide lamps with LED or high efficiency equivalent lighting in the Maintenance Building.  Lifetime Savings: \$25,944	The following lighting changes are recommended in the Maintenance Building: <ol style="list-style-type: none"> <li>1) Replace incandescent and halogen lamps with LED equivalent lamps</li> <li>2) Replace exterior metal halide with LED floodlight</li> <li>3) Retrofit all 2-lamp T12's with 4-lamp electronic ballasts</li> <li>4) Replace metal halide high bay fixtures with 6 lamp T5 fixtures</li> </ol>
EE-3	Install propane infrared heaters for the hangar in the Maintenance Building.  Lifetime Savings: \$193,578	Install propane infrared heaters at 30 feet above the work floor to provide primary heat to the maintenance building. Install programmable thermostats and take maximum advantage of potential setback temperatures during unoccupied periods. In a large open building, such as the hangar with large infiltration amounts, a great deal of energy is lost heating the building when it is not being used. Consider setting the temperature back to 55°F at nights and on weekends with an override if occupied.
EE-4	Improvements to the building envelope in the maintenance building.  Lifetime Savings: \$62,248	The following envelope improvements are recommended in the maintenance building to increase energy savings: <ol style="list-style-type: none"> <li>1) Remove the hangar ridge vent and replace with a continuous roof cap.</li> <li>2) Install brush seals to the hangar doors.</li> <li>3) Install gaskets on the man doors.</li> </ol>

Initiative ID	Initiative	Description
EE-5	<p>Improve insulation of the office walls in the maintenance building.</p> <p>Lifetime Savings: \$17,409</p>	<p>The following improvements are recommended in the maintenance building to reduce energy use and increase savings:</p> <ol style="list-style-type: none"> <li>1) Insulate and air seal parapet walls.</li> <li>2) Install 3.5-inch foil faced foam board or fiberglass board insulation as approved by local building jurisdiction for a minimum R-value or R-14.</li> <li>3) Air seal at the parapet cap with closed-cell foam or caulking as allowed by code.</li> </ol>
EE-6	<p>Replace all incandescent and metal halide lighting with LED equivalent in the General Aviation terminal.</p> <p>Lifetime Savings: \$21,102</p>	<p>The following lighting updates are recommended in the GA terminal to increase energy savings:</p> <ol style="list-style-type: none"> <li>1) Replace all 19W CFL, 50W incandescent and 75W incandescent with 8W A19 LED.</li> <li>2) Replace 70W metal halide accent lighting with 20W RAB LED wall packs.</li> <li>3) Replace 120W incandescent spot lights with 15W PAR30 LED.</li> <li>4) Replace all pole mounted exterior lighting with 78W RAB LED wall pack.</li> </ol>
EE-7	<p>Install residential class refrigerator in place of commercial refrigerator in the General Aviation terminal.</p> <p>Lifetime Savings: \$2,864</p>	<p>The GA terminal has an industrial-grade refrigerator for intermittent use by caterers. Evaluate the use of the refrigerator and determine if a large residential unit can accommodate refrigeration demands as an industrial unit uses considerably more energy per unit volume than a residential Energy Star certified unit.</p>
EE-8	<p>Replace faucet aerators to 1 gallons per minute (gpm) in the General Aviation terminal.</p> <p>Lifetime Savings: \$2,592</p>	<p>Existing sink aerators are 2.5 gpm in the GA terminal. Install 1 gpm sink aerators to save on water and electricity for water heating.</p>
EE-9	<p>Install vending miser in the GA terminal.</p> <p>Lifetime Savings: \$1,154</p>	<p>Installing a control device such as the vending miser will power down the vending machine whenever there is no foot traffic in front of it for a determined amount of time. It does this through the use of a motion sensor. The vending miser will periodically power up the refrigeration system to maintain product temperature and senses machine operation so that the vending machine is only powered down when the compressor is not operating (to preserve compressor life).</p>
EE-10	<p>Repair fiberglass insulation and install vapor barrier in the GA terminal.</p> <p>Lifetime Savings: \$42,883</p>	<p>The following improvements are recommended to reduce energy use in the GA terminal:</p> <ol style="list-style-type: none"> <li>1) Repair holes and missing batts of fiberglass insulation.</li> <li>2) Install a new foil skim craft or similar pressure and vapor barrier.</li> <li>3) Tape seams with heavy-duty seaming tape.</li> <li>4) Spray foam may be used to seal seams and utility penetrations if the product selected meets smoke and fire code requirements.</li> </ol>
EE-11	<p>Update heating, ventilation, and air conditioning (HVAC) controls to restore zoning in the General Aviation terminal.</p> <p>Lifetime Savings: \$94,883</p>	<p>The existing GA terminal system's efficiency can be improved based on new controls. New controls that are recommended include:</p> <ol style="list-style-type: none"> <li>1) Install non-proprietary controls to tie each of the boxes together for optimization of operation and increased comfort.</li> <li>2) Configure controls to allow zone set point limits, have unoccupied setback temperatures, and optimize duct supply air temperature and pressure for energy savings.</li> <li>3) Confirm economizer is enabled at favorable outdoor temperatures.</li> <li>4) Install exhaust fan on occupancy sensor to run for 15 minutes from last motion in either restroom.</li> </ol>

Initiative ID	Initiative	Description
EE-12	Upgrade rooftop units (RTUs) to heat pump RTUs in the GA terminal.  Lifetime Savings: \$64,493	The GA terminal rooftop units should be scheduled for replacement in the next 5 to 7 years based on standard equipment life. Install high efficiency units with heat pump option and backup propane heat. During 90% of heating load hours (the hours above 30°F) the heat pump will carry the heating requirements more cost effectively than propane.
EE-13	Installing occupancy sensing thermostats and infrared (IR) tube heating units in the snow removal equipment (SRE) facility.  Lifetime Savings: \$18,516	Install occupancy-based thermostats to control the propane heaters based on occupancy of the SRE Facility. Set the unoccupied temperature set point to a minimum tolerance of equipment and materials stored in the space. Occupied set point should be a minimum that allows a comfortable work environment. Consider combining occupancy based thermostats with a lighting control solution to maximize the benefit of the installation. Once per year, have one or two employees perform recommended maintenance procedures such as cleaning and inspection on the IR tube heading units.
EE-14	Install waste oil furnace in the Snow Removal Equipment facility.  Lifetime Savings: \$45,738	Install a waste oil heater in the SRE facility to provide base heat load for the building when unoccupied. The success of this measure is dependent on the ability to collect enough waste oil.
EE-15	Upgrade the lighting in the Snow Removal Equipment facility.  Lifetime Savings: \$3,588	The following lighting improvements will reduce energy usage in the SRE facility: <ol style="list-style-type: none"> <li>1) Replace 200W HPS high bay fixtures with 4-lamp, 4-foot T8 High Output fixtures with electronic ballasts; this will provide the needed light at just under half of the energy. The light provided by the proposed fixtures will have much better quality than the yellow light provided by the HPS fixtures.</li> <li>2) Replace 310W HPS high bay fixtures with 4-lamp, 4-foot T5 high output fixtures with electronic ballasts. This replacement will provide an increase in quality of light. The T5 fixtures will use 65% of the energy the existing system consumes.</li> </ol>
EE-16	Update lighting to LED equivalent in certain outdoor areas.  Annual Savings: \$12,196	The following lighting upgrades are recommended for exterior lighting: <ol style="list-style-type: none"> <li>1) Replace existing 175W metal halide wall packs located on bay doors with 25W RAB LED wall packs.</li> <li>2) Replace existing 250W metal halide wall packs located at end of hangars with 78W RAB LED wall pack; 78W RAB LED wall packs will operate for up to 100,000 hours compared to the 15,000 operating hours of the existing 250W metal halide.</li> <li>3) Replace existing 400W metal halides along entrance road with 78W LED.</li> <li>4) Replace existing 400W high pressure sodium floodlights and wall packs along tarmac and de-icing pad with 78W LED.</li> <li>5) Replace existing select 400W high pressure sodium floodlights at de-icing pad with T5 high-bay.</li> </ol>
EE-17	Install occupancy sensors at the ends of each hangar outside the east hangars.  Annual Savings: \$389	Install occupancy sensors at the beginning of every row, in between each hangar. These sensors will turn on both rows of wall packs when tripped by a car or pedestrian. The installation of these sensors will provide further energy savings by lighting occupied space only.

Initiative ID	Initiative	Description
EE-18	Optimize the building environmental systems in the ATCT.	<p>Take advantage of Building Environmental Systems unoccupied setbacks and consider occupancy sensors. The ATCT is occupied for 16 hours per day and during this time it is usually lightly occupied. The existing BES provides opportunity to significantly reduce energy consumption by taking advantage of unoccupied setbacks to adjust the temperature set points, the fan operation, and ventilation air. In addition, in the spaces that are lightly used such as bathrooms, conference rooms, break rooms, and offices, occupancy sensors could be installed to allow the spaces to go into unoccupied mode when no one is present. Recommendations include:</p> <ol style="list-style-type: none"> <li>1) Provide for unoccupied modes in all spaces except ATCT equipment room during the 8 hours when the building is unoccupied.</li> <li>2) Set unoccupied heating set point to 65F, with fans allowed to cycle.</li> <li>3) Set unoccupied cooling set point to 85F, with fans allowed to cycle.</li> <li>4) Close outdoor air dampers.</li> <li>5) Turn off exhaust fans.</li> <li>6) Zones where no occupancy scheduling was observed.</li> <li>7) Allow fan to cycle and close OA damper at night for ATCT equipment room.</li> <li>8) Install and utilize occupancy sensors in zones with intermittent occupancy to put zones in unoccupied mode: conference room, break room, office/workspace.</li> </ol>
EE-19	Balance the outdoor air flow in the ATCT.	<p>Outdoor air for ventilation is provided individually to each zone water-source heat pump. Outdoor air heating and cooling is a significant energy cost. Outdoor air control dampers in the ATCT were observed to be fully open, indicating that the system may never have been properly balanced to design outdoor air minimums. Outdoor air minimums indicated on design documents should be referenced for a system-wide outdoor air rebalancing effort.</p>
EE-20	Add a ground loop to the existing water source heat pump system in the ATCT.	<p>The water-source heat pump system combined with a cooling tower in the ATCT can be a relatively efficient arrangement during the cooling season. However, during the heating season, the heat pumps are effectively getting all of their heat from the propane boiler. By adding a geothermal loop to the arrangement the heat pumps would be able to source heat from the ground for most of the year. To reduce costs, the propane boiler could be kept online to supplement a smaller well field during the coldest days. A geothermal loop would also reduce costs on the cooling side by increasing cooling efficiency with lower water temperatures and limiting the amount of time that the fan tower is running.</p>
EE-21	Update the system to allow setback of temperatures during unoccupied times (such as when concessions are closed) in the passenger terminal.	<p>Though the passenger terminal is occupied 24/7 there are several spaces that are unoccupied for part of the day. The BAS system has the capability to allow set point temperatures to be setback during unoccupied times. In addition, outdoor air supplied to zones can be closed or reduced if unoccupied and supply fans can be set to cycle to meet space set points instead of being on constantly.</p>
EE-22	Implement demand controlled ventilation to reduce ventilation rates when the occupation is low in the passenger terminal.	<p>Demand Controlled Ventilation (DCV) systems only ventilate where needed. Sensors in each room of the passenger terminal measuring CO<sub>2</sub> and temperature regulate the indoor climate and make the ventilation system dynamic and intelligent, saving from 33% to 80% of energy for ventilation, cooling, and heating.</p>

Initiative ID	Initiative	Description
EE-23	Switch to a water-to-water heat pump (linking into existing geothermal system) to provide hot water to restrooms, janitorial, and kitchens in the passenger terminal.	Hot water for restrooms, janitorial, and kitchens is provided by electric storage heaters in the passenger terminal. Direct electric resistance is an expensive heat source. In a building that already has a geothermal water loop, a water-to-water heat pump may be used to instead provide hot water. During the cooling season the heat pump will actually be pulling heat from the water loop; operating at higher efficiency and boosting the performance of all other heat pumps in the system.
EE-24	Install high-efficiency equipment and controls as replacement becomes necessary.	Examples of controls which can be used in the passenger terminal include: heating, ventilation, and air-conditioning equipment, food service, equipment, appliances, commercial and industrial equipment, stand-by power equipment, office equipment, and plumbing equipment.
EE-25	Develop project-specific LEED credits for new developments, consistent with Penn State's design & construction standards.	Establish policy designating which LEED credits should be pursued, at a minimum, for every development project.
EE-26	Partner with Penn State and/or students to consider renewable energy projects on residual lands to increase use of renewable energy sources.	Work with Penn State faculty and students and/or renewable energy experts to identify renewable energy projects that can be implemented at the Airport.
EE-27	Install pre-conditioned air and gate electrification to new jet bridges in the passenger terminal.	Outfit new jet bridges with preconditioned air and ground power. This would reduce aircraft auxiliary power unit (APU) usage, which would reduce air and GHG emissions.
EE-28	Post no-idling signs.	Post no idling signs in prominent locations to reduce idling and associated emissions. Provide exceptions to idling limits based on temperature (e.g., lengthen or remove idling limits for temperatures below 32° or above 100°).
EE-29	Install solar energy-powered roadway signs.	Solar lighting is energy-efficient and a reliable source for powering roadway signs. When combined with LED lighting, there are significant savings in energy and maintenance costs. Using solar energy instead of conventional electricity also decreases emissions.
EE-30	Continue to replace airfield and taxiway lighting with new LED lighting.	Install LED airfield and taxiway lighting for new lights and as replacement is required.
EE-31	Install solar window reflectors.	Solar inflectors (i.e., solar window reflectors or insulators) installed in windows can be reversed seasonally to either absorb or reflect solar energy.
EE-32	Install solar panels when conducting new construction or roof repair, also consider adding solar panels to covered buildings off airport.	The installation of solar panels will reduce the amount of electricity consumed by the Airport. The use of solar panels is an environmentally friendly way of producing energy that is needed to operate the Airport. There are many state and federal government incentive programs available.
<b>Economic Vitality</b>		
EV-1	Advertise the socioeconomic benefits of the Airport to the surrounding community.	Develop an awareness campaign to show the benefits of the Airport, such as the Airport acts as an economic engine for the community. Billboards, banners, signs, etc. can be placed in strategic places close the Airport, on or near Penn State, and in the center of town.
EV-2	Obtain economic development grants and offer to match the cost of construction of new facilities to encourage new development on airport property.	Partner with the Chamber of Business and Industry of Centre County (CBICC) to secure economic development grants. Grants could be used to help new airport tenants which will provide jobs and increase economic activity in State College.

Initiative ID	Initiative	Description
EV-3	Increase advertisements of space available for rent.	Advertisements of available space (e.g., terminal, hangar, or airport buildings) can lead to increased revenue and income for the Airport. Advertisements may include providing the real estate sale sheets on the Airport's website, or advertising on billboards, newspapers, radio, etc. To increase the incentive and/or offer promotions/reduced rates to attract new tenants to sign long-term leases.
EV-4	Conduct monthly press releases to increase visibility.	Small airports use press releases to attract media attention; airport managers stated that this is a particularly effective and inexpensive way to market the airport. Press releases prompt local newspapers, magazines, and radio and television stations to provide coverage both through their primary medium and on the internet. The additional coverage could lead to additional business and growth of the general aviation and commercial air services offered by the Airport.
EV-5	Continue to educate the community by conducting annual open houses, air shows, and/ or educational programs such as the Airport's Aviation Awareness Day.	These events provide an opportunity for the airport to showcase its facilities and services to draw in more business and promote growth in general aviation and commercial air service. These events also allow the opportunity for the airport to educate the community on how they generate revenue and what kind of economic engine they are for the region.  Educational opportunities could include programs such as working with the Young Eagles, educational programs (tours, activities, career information) for students through the State College Area School District.
EV-7	Encourage aeronautical and non-aeronautical development projects.	Encourage non-aeronautical development projects such as the development of an industrial park to bring in tenants and ultimately added income to the Airport.
<b>Environmental Stewardship</b>		
ES-1	Incorporate native/low maintenance vegetation in landscaping plans.	Native vegetation is well adapted to the local environment, resulting in less maintenance and water needs once established. Consider such plantings in future and refurbished landscaping plans. Landscape plans should be reviewed by a wildlife biologist for their potential to attract hazardous wildlife.
ES-2	Collect rainwater for use in landscaping and other non-potable uses.	Cisterns can be used to collect rainfall to use for landscaping, wash-down, and other non-potable uses. Water reuse refers to the process of using treated wastewater (reclaimed water) for a beneficial purpose with degree of treatment depending on the proposed use for the water. The initiative is to look for opportunities to implement such systems in future facilities where feasible and when replacement of current systems are needed.
ES-3	Develop Airport-specific environmentally preferable purchasing procedures.	Penn State has environmentally preferable purchasing procedures for recycled/bio-based content, materials with low toxicity, and other environmentally-friendly products. Develop similar guidelines for Airport-specific purchases, such as purchasing a bio-based deicing agent.
ES-4	Increase the rate of recycling by incorporating Penn State's Mobius program.	Increase recycling and partnering with Penn State to implement the Mobius waste management program at the Airport. The Mobius program will assist with reducing the amount of landfill waste that the Airport disposes of daily, which will also reduce greenhouse gas emissions. Penn State conducted a study and determined 600 to 800 tons of food waste and 30% of recyclables were going to the landfill. The Mobius program was developed to renew the Penn State recycling/composting program, which includes aesthetic signage that should be used at the Airport. The Mobius program is implemented through the Penn State Office of Physical Plant.



Initiative ID	Initiative	Description
ES-5	Continue to enhance innovative stormwater BMPs implemented at the Airport and evaluate which will be used to improve water quality for new projects.	BMPs could include natural treatment systems or treatment trains (BMPs in series), including baffling on inlet structures, sumps on storm sewer structures, sand filtration devices, and grassland swales. Specify requirements in design contract documents.
ES-6	Install water efficient fixtures in new and retrofit projects.	This initiative would ensure that new or replacement water fixtures are highly efficient, which would conserve water use.
ES-7	Continue to incrementally switch airport-owned vehicles to alternative fuel vehicles (AFVs).	Continue to convert to electric vehicles used on the airfield. Identify those vehicles that use the most fuel or are in the most need of replacement or repair and begin the conversion with these vehicles. Work with the rental car companies to offer fuel efficient vehicles. In addition, limit idling of all vehicles (see EE-28).
ES-8	Continue to proactively evaluate environmental resource conditions during the planning process of proposed projects.	Performing a pre-NEPA analysis of environmental resources during the planning process could help identify potential environmental impacts early on in the process. Identifying environmental issues early on gives planners an opportunity to tailor development to minimize environmental impacts. Identifying environmental issues early on can also result in reduced time and costs to complete the development project.
ES-9	Use electric lawn mowers versus gas-powered ones.	Use electric lawn mowers to reduce noise and air pollution that would be generated from a gas-powered mower. Use one with a replaceable, rechargeable battery to avoid the need for extension cords.
ES-10	Institute a voluntary Fly Green, Fly Clean, Fly Quiet program.	This program would seek to minimize noise impacts and also greenhouse gas emissions. Hold meetings periodically (quarterly) to give interested community members a chance to participate in an open-forum discussion concerning noise levels in and around their community. Work with the FAA and airlines to determine the most efficient flight paths while using continuous descent approaches.
ES-11	Integrate sustainability language into new and renewing contracts.	While drafting new contracts, or renewing contracts, include sustainability language and initiatives that tenants must practice.
ES-12	Continue to comply with the Spring Creek Canyon Conservation Overlay Ordinance, as able, unless FAA or Airport requirements conflict.	The Spring Creek Canyon Conservation Overlay sets out specific land use and land use development goals within the Spring Creek Canyon Overlay. It identifies sensitive and ecologically diverse natural and cultural resources and recommendations to help safeguard these resources. The goals outlined in the ordinance would be met to the extent feasible and practicable within the context of existing airport and FAA requirements.
ES-13	Place additional recycling bins in the GA terminal offices and conference room.	Convenience plays a large role in promoting recycling behavior. Often times, recyclable materials will be disposed in the closest bin available, which often is a trash bin. To promote recycling in the GA terminal, place paper and bottle recycling bins in each of the offices. In the conference room, place recycling bins for plastics, bottles, and cans adjacent to the trash bin so that containers from lunches are recycled appropriately. Bins are provided by Penn State for free.
ES-14	Expand waste disposal to include composting.	Coordinate with Penn State's Mobius program to participate in its composting program. Food scraps and other organics are currently recycled on Penn State's campus as part of the Mobius Program (see ES-4).
ES-15	Display additional signage to encourage recycling in the GA terminal.	Currently, the GA terminal contains little signage to inform users of what to recycle. Research has shown that when there is uncertainty over what to recycle, people often resort to disposing the recyclable materials in a trash bin. Additional signage explaining recycling options within the GA terminal will promote better recycling amongst users of the GA terminal. Penn State's Mobius program may provide signage for free (see ES-4).

Initiative ID	Initiative	Description
ES-16	Acquire waste disposal compactors for restrooms in the passenger terminal.	The majority of waste generated in restrooms is paper towels. Without compaction, paper towels constitute a large portion of the trash volume. By reducing the proportional volume of paper towels in CCAA's waste stream, the Airport could save on waste disposal costs.
ES-17	Install high efficiency hand dryers and reduce paper towel dispensers in the passenger terminal.	To reduce the generation of paper towels in CCAA's waste stream, purchase and install high efficiency hand dryers (such as Dyson Air Blades) in the airport restrooms. With additional hand dryers, only one paper towel dispenser is necessary for those passengers with a preference for using paper towels.
ES-18	Place additional recycling bins in the passenger terminal.	Purchase and place additional recycling bins in the terminal, such that wherever there is a trash bin, there is also a recycling bin. Increased numbers of recycling bins would help to encourage passengers to recycle, as convenience is an important factor in encouraging recycling behaviors.
ES-19	Improve recycling signage in the passenger terminal.	To encourage passenger recycling, improve recycling signage throughout the terminal. This signage would explain what products can be recycled, and encourages recycling by educating passengers on the benefits of recycling.
ES-20	Coordinate with airlines to encourage recycling of deplaned waste.	Few airlines at the Airport currently recycle deplaned waste. Coordinate with airlines to encourage recycling of deplaned waste and understand what improvements could be made on the CCAA end to facilitate recycling.
ES-21	Communicate waste management practices to tenants.	To maximize tenant recycling, regularly communicate (preferably in written form) to tenants what is being recycled in the commercial terminal, and report on the volume of waste being recycled. Informing tenants of recycling performance may encourage increased diligence to recycle.
<b>Partnership</b>		
P-1	Coordinate with the Office of Physical Plant and College of Agriculture to Utilize Anaerobic Digesters to manage/divert organic waste from landfills; consider storing deicing fluid to assist the digestion process.	The Airport is coordinating with Penn State, which is considering the purchase of an anaerobic digester. The digester diverts a portion of organic waste from landfills which can provide a significant contribution toward achieving EPA, state, and local mandated solid waste diversion goals. Anaerobic digestion has been successfully used for many years to stabilize municipal organic solid waste, and to provide beneficial end products, i.e., methane gas and fertilizer. The Airport could consider using the fertilizer as a bird deterrent and deicing fluid could be considered to speed up the anaerobic process.
P-2	Create and develop airport sustainability internships, co-ops, stewardships, and/or educational programs for Penn State students.	Provide internship opportunities for Penn State students each semester. Internships come at a low cost, as interns are inexpensive and in some cases unpaid, which provides low-cost labor to assist staff at the Airport. Frequently, companies hire previous interns as part- or full-time employees, which also reduces expenses associated with training new employees.
P-3	Organize a Green Team with representatives from all functional areas of the Airport to participate in the Green Paws sustainability program at Penn State.	Currently the Airport participates in the Auxiliary Business Services Green Paws team. Consider creating an Airport team with stakeholders from all functional areas at the Airport (management, maintenance, operations, administration, etc.) and continue to participate in the Green Paws program. Strive for Level 4 Certification in the Green Paws program.
P-4	Partner with the Penn State Sustainability Institute to use the Airport as a laboratory for studying the potential for new sustainability initiatives.	Invite students and professors to research different sustainability practices that could be used at the Airport. Using the Airport as a place to try new sustainability ideas allows for the opportunity of these initiatives being implemented at low or no cost. Provide a space (an office or cubicle) for students and faculty to work/research and provide any information needed as well as any oversight to help them determine if an initiative is feasible based on the Airport's budget and available resources.

Initiative ID	Initiative	Description
P-5	Encourage vendors to participate in the Airport's Sustainability Program.	Communicate airport sustainability goals and objectives to tenants and vendors as well as require participation by new vendors. Encourage existing vendors to participate in meeting the Airport's goals and objectives. Conduct regular meetings to encourage participation in the Sustainability Program.
P-6	Encourage the use of local vendors/suppliers.	Encourage tenants to procure and purchase goods (e.g., paper products, food) from local vendors/suppliers, to benefit the community and reduce emissions. When developing new or renewed contracts, consider requiring tenants to use local vendors and suppliers to keep the local economy thriving.
P-7	Engage with Penn State student organizations to develop and implement sustainability initiatives to increase collaboration between the Airport and Penn State.	Work with aviation, community service, and/or sustainability student organizations at Penn State to identify and implement new sustainability initiatives and other improvements at the Airport. If Penn State pays for the materials and students are willing to donate their time, the cost to implement initiatives significantly decreases. Partner with student organizations to implement suggested initiatives.
P-8	When passenger demand increases, work with the Centre Area Transportation Authority and other transit agencies to develop a route with a stop directly at the Airport.	The Airport should communicate with the Centre Area Transportation Authority (CATA) to advance transit connection opportunities at the Airport. Coordinate with the CATA to develop a route that stops at the Airport, which can reduce the number of vehicle miles driven and ultimately reduce emissions. Also, work with local planners and transit agencies to coordinate long term regional and local transportation plans. These entities should be aware of future growth scenarios and redevelopment plans at the airport so they can anticipate the transportation needs of employees and customers.
P-9	Partner with Penn State's student body and other local universities and community colleges and offer programs at the airport geared towards developing aviation-related careers.	Offer programs to students, current employees, or others seeking employment at an airport or employer at an airport that illustrate and teach the students about aviation related careers. For example the program can cover types of aviation careers available, education and experience requirements to start their career, etc. This program can also offer mentorship assistance to students such as reviewing and writing resumes, interview prep, and mock interviews. The partnership with the local universities and communities colleges will encourage students to pursue aviation careers and assist with career development and advancement; such as with Penn College Larson Institute Airport Management Degree Program. Partner with local businesses that operate at the airport to expand the knowledge offered in the program.
P-10	Employ Penn State students at the airport as part of a work study program.	Train work study students in professional areas, such as line service, customer service, engineering, planning and administration. Work study students are valuable in that they are only part-time employees and are constantly engaging and learning new ideas. Utilizing students with Work Study financial aid funds will significantly reduce cost of regular labor, as they are only allowed to work part-time in the fall and spring semesters, plus typically a student who receives work study money their first year at Penn State will receive it their second year, which will cut back on the amount of training required from year to year.
P-11	Work with the Penn State industry advisory board.	This board should include representatives from Penn State, airport senior staff, local businesses, and aviation department heads. The primary mission of a board is to guide the colleges in developing and maintaining the aviation curricula for meeting the needs of the aviation industry. This board would assist in developing more relationships with industry representatives in the Centre County Area. The Industry Advisory Board should meet several months before each new semester (fall, spring, and summer) to discuss any potential changes to the industry that could affect and ultimately change the curriculum.

Initiative ID	Initiative	Description
P-12	Continue to partner with Penn State Engineering Departments to assist with implementation of sustainability initiatives for senior design projects.	Senior engineering students are required to complete a senior design project to graduate. The Airport should work with Penn State to present their problem/task to the engineering students to generate interest as a potential senior design project. Project assignments could include designing lighting systems for facilities, parking lots, runways, and roadways; designing electrical powered systems (e.g., HVAC) to reduce energy consumption; and designing renewable energy options.
P-13	Partner with the Penn State Agricultural Department to consider agricultural development such as creating an apiary at the Airport and using Penn State's cows and other animals for an environmentally conscious way of clearing/mowing land in non-AOA areas.	Partner with the Penn State Department of Agricultural Sciences to establish an apiary. This initiative connects the airport with the local community and provides important benefits to the region's biodiversity and local bee population. In addition, consider vegetation management techniques such as using cows, goats, and other animals to manage grass height, turf grass, and other brush in non-AOA areas that are difficult to reach or have invasive species. Penn State runs a dairy farm and during the summer it could be economical to use the cows to 'mow/eat the grass at the Airport. Cows will keep the grass trim and goats will eat anything from brush to sticks to bark.
P-14	Encourage Airport staff to volunteer their personal time for local charities and organizations.	Encourage staff members to volunteer personal time to local organizations, not limited to those sponsored by Penn State, such as primary schools, charitable organizations, and community organizations. Ask each employee to join one organization of their choosing and when that organization has an event, show support through sponsorship or participation. Encouraging participation in volunteer activities illustrates the Airport's commitment towards community good-will.
P-15	Encourage a partnership between the CCAA and Penn State College of Health and Human Development and College of Educational Psychology; TSA; and airline(s) to hold an annual event for families with autistic children to prepare them for flying.	<p>This program would help families with autistic children adapt to new surroundings and the stress of flying. This would likely include taking the group of children and parents through security, waiting at a gate, boarding the aircraft, aircraft taxiing, and deplaning the aircraft.</p> <p>The Airport could partner with the Penn State Department of Educational Psychology, Counseling, and Special Education which runs the CEDAR Clinic. The Clinic is used to provide services to children, adolescent, and young adult from the surrounding community.</p>

Source: VHB (2014)

## 7.5 Performance Metrics and Targets

Monitoring and reporting performance is vital to the successful implementation of sustainability initiatives. Performance targets and metrics are used to assist the Airport in tracking the effectiveness of implemented initiatives. The results from performance tracking can be communicated to the public online or throughout the Airport to showcase the Airport's commitment to sustainability (see Section 7.6.b).

Performance metrics were identified during the baseline assessment effort, from industry resources such as ACRP Report 19A, *Resource Guide to Airport Performance Indicators*,<sup>18</sup> and the professional experience of the project team. **Table 7-5** details recommended performance metrics. Review of these metrics is

<sup>18</sup> Transportation Research Board. ACRP Report 19A: Resource Guide to Airport Performance Indicators (2011). Retrieved from <http://www.trb.org/main/blurbs/165238.aspx>.

based on the frequency of monitoring recommended; some metrics are reviewed more frequently than others (as often as monthly) to assist with identifying performance trends.

Performance targets are identified for metrics that are quantifiable. This will allow the Airport to gauge their performance based on thresholds that match the sustainability goals. In many cases, initial monitoring and data collection will need to occur first to establish a performance baseline. Quantifiable targets will be set for these categories once the baseline is established.

Table 7-5: Performance Metrics and Targets

Goal	Objective	Performance Metric	Performance Target	Tracking Frequency	Data Source	Reference	
<b>Energy Efficiency</b>							
The Airport will work to leverage the latest technologies to reduce the Airport’s rate of energy consumption.	Manage energy use through new lighting technologies, renewable energy production, and improving building efficiency techniques.	Energy use (kWh) – increase or decrease	-	Annually	Monthly utility bills	ACRP Report 19A	
		Energy Use Index (KBtu/sq. ft.)	See Energy Audits for benchmarks	Monthly and annually	Monthly utility bills and calculation		
		Energy cost per square foot	-	Monthly and annually	Monthly utility bills and calculation	ACRP Report 19A	
		GA terminal energy cost per GA aircraft operation	-	Monthly and annually	Monthly utility bills, GA aircraft operations, and calculation	ACRP Report 19A	
		Percentage of energy consumed from renewable sources	-	Monthly and annually	Monthly utility bills, meters from geothermal system, and calculations	ACRP Report 19A	
		Amount of renewable energy generated by the airport	-	Annually	Monthly utility bills and meters from geothermal systems	ACRP Report 19A	
	Improve vehicle efficiency through use of alternative fuels.		Fuel by source (delivered)	-	Annually		NFRA Sustainability Management Plan
			Percentage of electric or alternative-fuel airport vehicles and GSE	-	Annually	Vehicle fleet inventory and GSE fleet inventory	ACRP Report 19A
			Total fuel consumption (once procedures are established)	-	Annually	Vehicle fuel use and GSE fuel use	ACRP Report 19A

Goal	Objective	Performance Metric	Performance Target	Tracking Frequency	Data Source	Reference
	Encourage the use of low emission vehicles, equipment, and supplies.	Percentage of alternative-fuel or electric tenant vehicles and GSEs	-	Annually	Tenant vehicle fleet inventory and tenant GSE fleet inventory	ACRP Report 19A
<b>Economic Vitality</b>						
		Number of community events at the Airport	1/year	Annually		
		Number of press releases about the Airport	1/month	Annually		
	Educate the community about how the Airport generates revenue, and the economic benefits to the region.	Operating cost per enplanement	-	Annually	Financial reports and enplanements	ACRP Report 19A
Enhance the Airport's role as an economic engine to the community by ensuring long-term financial stability and independence.		Percentage of total non-aeronautical operating revenue	-	Monthly and annually	Financial reports	ACRP Report 19A
		Revenue from landing fees (GA and airline)		Monthly and annually	Financial reports	
		Revenue from fuel sales		Monthly and annually	Financial reports	
		Number of based tenants		Annually		
		Percentage of total non-aeronautical operating revenue (same metric in the previous objective)	-	Monthly and annually	Financial reports	ACRP Report 19A
		Percentage of revenue from hangar rentals and ground leases	-	Monthly and annually	Financial reports	ACRP Report 19A
	Provide facilities to promote growth in general aviation and commercial air service.					

Goal	Objective	Performance Metric	Performance Target	Tracking Frequency	Data Source	Reference
<b>Environmental Stewardship</b>						
The Airport will continue to serve as an environmental steward of its natural resources.	Continue water quality enhancement practices.	Percent of aircraft deicing fluid (ADF) that is captured/recovered	Maintain an ADF applied collection ratio of 70%	Annually (Winter season)	ADF discharges and collection reports	ACRP Report 19A
		Number of reportable discharges (based on sampling and monitoring)	-	Monthly (Winter season)	Discharges report	ACRP Report 19A
	Maximize water conservation efforts.	Percentage of landscaping that is native/low maintenance vegetation (requires minimal irrigation)	-	Annually		
		Water consumption (total potable water use)	-	Monthly and annually	Water bills	ACRP Report 19A
		Minimize unavoidable impacts to natural areas.	Percentages of developed land, undeveloped land, and wetlands	-	Annually	Land use survey
<b>Partnership</b>						
Strengthen existing and broaden relationships with Penn State, and other local organizations.	Collaborate with the Penn State Sustainability Institute during implementation of the Sustainable Master Plan.	Number of meetings with Penn State Sustainability Institute	-	Annually		
		Penn State Sustainability Institute contribution (in dollars) towards	-	Annually		



Goal	Objective	Performance Metric	Performance Target	Tracking Frequency	Data Source	Reference
		implementation of Airport initiatives				
	Develop aviation-related business and educational opportunities for Penn State at the Airport.	Number of internships/co-ops	1-2/year	Annually		
		Number of student organizations and Penn State departments collaborating with the Airport	-	Annually		
		Number of educational meetings/initiatives	-	Annually		

Source: VHB and University Park Airport (2015)

## 7.6 Implementation and Monitoring Plan

Implementation and monitoring includes a continuous cycle of Plan-Do-Check-Act. The Airport should refer to initiatives identified in Section 7.4 to plan for implementation. After implementing an initiative, the Airport can refer to the performance metrics and targets identified in Section 7.5, which are intended to provide information on the success of the sustainability program as a whole, and not individual initiatives.

The Airport should implement corrective actions or necessary changes as needed. This cycle should be repeated, and the Airport should continually revisit the list of possible initiatives.

### 7.6.a Implementation

Implementation of initiatives is highly dependent on variables such as budget/funding and labor hours. The initiatives detailed in Section 7.4 were ranked based on priority (factors included cost, ease of implementation, and staffing requirements) and are categorized as short- and long-term initiatives. When prioritizing initiatives, additional consideration was given to the potential impact of the strategy, ease of implementation, and/or whether it can be implemented in conjunction with another initiative or Capital Improvement Program (CIP) project.

**Table 7-6** and **Table 7-7** list the initiatives in order of priority based on schedule (short- and long-term) and include general staffing and funding requirements. Initiatives are organized into two defined time-frames:

- Short-Term: High priority initiatives that the Airport wishes to implement within the next 5 years, and
- Long-Term: Initiatives that the Airport would like to implement at a later date due to budgetary or feasibility constraints.

**Table 7-6: Recommended Short-Term Sustainability Initiatives**

Initiative ID	Initiative	Implementation Costs <sup>1</sup>	Staffing Requirements <sup>2</sup>
<b>Energy Efficiency</b>			
EE-1	Install programmable thermostat in the maintenance building.	Low	Low
EE-2	Replace incandescent, halogen and metal halide lamps with LED or high-efficiency equivalent lighting in the maintenance building.	Medium	Low
EE-3	Install propane infrared heaters for the hangar in the maintenance building.	Medium	Low
EE-4	Improve the building envelope in the maintenance building.	Medium	Low
EE-5	Improve insulation of the office walls in the maintenance building.	Low	Low
EE-6	Replace all incandescent and metal halide lighting with LED equivalent in the General Aviation terminal.	Medium	Low
EE-8	Replace faucet aerators to 1 gpm in the General Aviation terminal.	Low	Low

Initiative ID	Initiative	Implementation Costs <sup>1</sup>	Staffing Requirements <sup>2</sup>
EE-9	Install vending miser in the General Aviation terminal.	Low	Low
EE-10	Repair fiberglass insulation and install vapor barrier in the General Aviation terminal.	Low	Low
EE-11	Update HVAC controls to restore zoning in the General Aviation terminal.	Medium	Low
EE-13	Installing occupancy sensing thermostats and IR tube heating units in the Snow Removal Equipment facility.	Low	Low
EE-14	Install waste oil furnace in the Snow Removal Equipment facility.	Medium	Low
EE-16	Update lighting to LED equivalent in certain outdoor areas.	Medium	Low
EE-17	Install occupancy sensors at the ends of each hangar outside the east hangars.	Low	Low
EE-18	Optimize the building environmental systems in the ATCT.	Low	Low
EE-19	Balance the outdoor air flow in the ATCT.	Low	Low
EE-21	Update the system to allow setback of temperatures during unoccupied times (such as when concessions are closed) in the passenger terminal.	Low	Low
EE-22	Implement demand controlled ventilation to reduce ventilation rates when the occupation is low in the passenger terminal.	Low	Low
EE-25	Develop Project-Specific LEED Credits for New Developments, consistent with Penn State's design & construction Standards.	Low	Low
EE-26	Partner with Penn State and/or students to consider renewable energy projects on residual lands to increase use of renewable energy sources.	Low	Low
EE-28	Post no-idling signs.	Low	Low
EE-30	Continue to replace airfield and taxiway lighting with new LED lighting.	Medium	Low
EE-31	Install solar window reflectors.	Medium/High	Low
<b>Economic Vitality</b>			
EV-1	Advertise the socioeconomic benefits of the Airport to the surrounding community.	Low	Low
EV-3	Increase advertisements of space available for rent.	Low	Low
EV-4	Conduct monthly press releases to increase visibility.	Low	Low
EV-5	Continue to educate the community by conducting annual open houses, air shows, and/ or educational programs such as the Airport's Aviation Awareness Day.	Low/Medium	Low
<b>Environmental Stewardship</b>			
EV-1	Incorporate native/low maintenance vegetation in landscaping plans.	Low	Low
EV-3	Develop Airport-specific environmentally preferable purchasing procedures.	Low	Low
EV-4	Increase the rate of recycling by incorporating Penn State's Mobius program.	Low	Low

Initiative ID	Initiative	Implementation Costs <sup>1</sup>	Staffing Requirements <sup>2</sup>
EV-5	Continue to enhance innovative stormwater BMPs implemented at the Airport and evaluate which will be used to improve water quality for new projects.	Low	Low
EV-8	Continue to proactively evaluate environmental resource conditions during the planning process of proposed projects.	Low/Medium	Medium
EV-11	Integrate sustainability language into new and renewing contracts.	Low	Low
EV-12	Continue to comply with the Spring Creek Canyon Conservation Overlay Ordinance, as able, unless FAA or Airport requirements conflict.	Low	Low
EV-13	Place additional recycling bins in the GA terminal offices and conference room.	Low	Low
EV-14	Expand waste disposal to include composting.	Low	Low
EV-15	Display additional signage to encourage recycling in the GA terminal.	Low	Low
EV-17	Install high-efficiency hand dryers and reduce paper towel dispensers in the passenger terminal.	Low	Low
EV-18	Place additional recycling bins in the passenger terminal.	Low	Low
EV-19	Improve recycling signage in the passenger terminal.	Low	Low
EV-20	Coordinate with airlines to encourage recycling of deplaned waste.	Low	Low
EV-21	Communicate waste management practices to tenants.	Low	Low
<b>Partnership</b>			
P-1	Coordinate with the Office of Physical Plant and College of Agriculture to utilize anaerobic digesters to manage/divert organic waste from landfills; consider storing deicing fluid to assist the digestion process.	Medium	Low
P-2	Create and develop airport sustainability internship, co-ops, stewardships, and/or educational programs for Penn State students.	Low	Low
P-3	Organize a Green Team with representatives from all functional areas of the Airport to participate in the Green Paws sustainability program at Penn State.	Low	Medium
P-4	Partner with the Penn State Sustainability Institute to use the Airport as a laboratory for studying the potential for new sustainability initiatives.	Low/Medium	Low
P-5	Encourage vendors to participate in the Airport's Sustainability Program.	Low	Medium
P-7	Engage with Penn State student organizations to develop and implement sustainability initiatives to increase collaboration between the Airport and Penn State.	Low	Low
P-10	Employ Penn State students at the airport as part of a work study program.	Low	Low
P-11	Work with the Penn State industry advisory board.	Low	Low
P-12	Continue to partner with Penn State Engineering Departments to assist with implementation of sustainability initiatives for senior design projects.	Low	Low

Initiative ID	Initiative	Implementation Costs <sup>1</sup>	Staffing Requirements <sup>2</sup>
P-13	Partner with the Penn State Agricultural Department to consider agricultural development such as creating an apiary at the Airport and using Penn State's cows and other animals for an environmentally conscious way of clearing/mowing land in non-AOA areas.	Medium	Low
P-14	Encourage Airport staff to volunteer their personal time for local charities and organizations.	Low	Low
P-15	Encourage a partnership between the CCAA and Penn State College of Health and Human Development and College of Educational Psychology; TSA; and airline(s) to hold an annual event for families with autistic children to prepare them for flying.	Low	Low

Source: VHB, Inc. (2014)

- 1 Implementation costs were broken into three categories: high, medium, and low. Low cost being \$10,000 or less, medium being \$10,000 to \$100,000, and high being greater than \$100,000.
- 2 Staffing requirements were broken into three categories: high, medium, and low. Low being minimal staff effort, medium being one part-time staff member, and high being one full-time staff member.

**Table 7-7: Recommended Long-Term Sustainability Initiatives**

Initiative ID	Initiative	Implementation Costs <sup>1</sup>	Staffing Requirements <sup>2</sup>
<b>Energy Efficiency</b>			
EE-7	Install residential class refrigerator in place of commercial refrigerator in the General Aviation terminal.	Low	Low
EE-12	Upgrade rooftop units to heat pump RTUs in the General Aviation terminal.	Medium	Low
EE-15	Upgrade the lighting in the Snow Removal Equipment facility.	Low	Low
EE-20	Add a ground loop to the existing water source heat pump system in the ATCT.	High	Low
EE-23	Switch to a water-to-water heat pump (linking into existing geothermal system) to provide hot water to restrooms, janitorial, and kitchens in the passenger terminal.	Medium	Low
EE-24	Install high-efficiency equipment and controls as replacement becomes necessary.	Low/Medium	Low
EE-27	Install pre-conditioned air and gate electrification to new jet bridges in the passenger terminal.	Medium	Low
EE-29	Install solar energy-powered roadway signs.	Medium	Low
EE-32	Install solar panels when conducting new construction or roof repair, also consider adding solar panels to covered buildings off airport.	High	Low
<b>Economic Vitality</b>			
EV-2	Obtain economic development grants and offer to match the cost of construction of new facilities to encourage new development on airport property.	Low	Low/Medium

Initiative ID	Initiative	Implementation Costs <sup>1</sup>	Staffing Requirements <sup>2</sup>
EV-6	Continue to consider adaptive reuse strategies for vacant airport facilities.	Low	Low
EV-7	Encourage aeronautical and non-aeronautical development projects.	Medium	Low/Medium
<b>Environmental Stewardship</b>			
EV-2	Collect rainwater for use in landscaping and other non-potable uses.	Low	Low
EV-6	Install water efficient fixtures in new and retrofit projects.	Low	Low
EV-7	Continue to incrementally switch airport-owned vehicles to alternative fuel vehicles (AFVs).	Medium	Low
EV-9	Use electric lawn mowers versus gas-powered ones.	Low	Low
EV-10	Institute a voluntary Fly Green, Fly Clean, Fly Quiet program.	Low	Low
EV-16	Acquire waste disposal compactors for restrooms in the passenger terminal.	Low	Low
<b>Partnerships</b>			
P-6	Encourage the use of local vendors/suppliers.	Low	Low
P-8	When passenger demand increases, work with the Centre Area Transportation Authority and other transit agencies to develop a route with a stop directly at the Airport.	Low	Low
P-9	Partner with Penn State's student body and other local universities and community colleges and offer programs at the airport geared towards developing aviation-related careers.	Low	Low

Source: VHB, Inc. (2014)

Notes:

- 1 Implementation costs were broken into three categories: high, medium, and low. Low cost being \$10,000 or less, medium being \$10,000 to \$100,000, and high being greater than \$100,000.
- 2 Staffing requirements were broken into three categories: high, medium, and low. Low being minimal staff effort, medium being one part-time staff member, and high being one full-time staff member.

In addition to implementing discrete initiatives, the Airport will involve stakeholders on continuous planning and implementation activities. Specifically, the Airport will focus on three stakeholder activities:

- Sustainability Working Group – a group of individuals from the Airport, PSU and local community to meet quarterly and discuss sustainability progress, initiatives and implementation issues.
- University Student Group – a committee of students identified by PSU's Sustainability Institute to meet on an annual basis and discuss activities of common interest (this group would also fulfill initiative P-9 listed in Table 7-7); the Airport will continue to participate in the University's Auxiliary & Business Services Sustainability Team that meets quarterly (Duane Bullock, Committee Chair).
- Annual Sustainability Update – posted online (Airport website) with update of sustainability activities and performance; notices of availability will also be posted in the Airport terminal.

### **7.6.b Monitoring**

Performance monitoring and reporting is vital to the successful implementation of the program. The Airport's monitoring plan includes an annual progress report (**Figure 7-11**). The performance metrics identified in Section 7.5 are intended to provide information on the success of the sustainability program as a whole, and not individual initiatives. The progress report is based on these performance metrics. As the Airport continues to measure its sustainability performance over time to gauge the effect certain initiatives will have, the performance metrics will be refined to reflect more quantitative targets.

The progress report may be kept for internal use only, or could be shared with the public to promote the Airport's commitment to sustainability and the community. An outline and proposed format for the progress report follows this section.

Figure 7-11: Annual Sustainability Report Card

## Annual Sustainability Report Card



### Performance at a Glance

<u>Performance Measure</u>	<u>Baseline Year</u>	<u>Current Year</u>
<b>Energy</b>		
Amount of Renewable Energy Generated by the Airport		
Energy use (kWh)		
Percentage of electric or alternative-fuel airport vehicles/GSE		
<b>Economic Vitality</b>		
Number of Community Events at the Airport		
Revenue from fuel sales		
Operating cost per enplanement		
<b>Environmental Stewardship</b>		
Water consumption (total potable water use)		
Percent of aircraft deicing fluid that is captured/recovered		
<b>Partnerships</b>		
Number of meetings with PSU Sustainability Institute		
Number of internships/co-ops		

Charts & Graphics (provide up to 4 charts/graphics):



## Initiatives Implemented in the Previous Year



### ❖ Energy Efficiency

- Goal: The Airport will work to leverage the latest technologies to reduce the Airport’s rate of energy consumption.
- Objectives:
  - Manage energy use through new lighting technologies, renewable energy production, and improving building efficiency techniques.
  - Improve vehicle efficiency through use of alternative fuels.
  - Encourage the use of low emission vehicles, equipment, and supplies.
- Accomplishments:

---

---

### ❖ Economic Vitality

- Goal: Enhance the Airport’s role as an economic engine to the community by ensuring long-term financial stability and independence.
- Objectives:
  - Educate the community about how the Airport generates revenue, and the economic benefits to the region.
  - Provide facilities to promote growth in general aviation and commercial air service.
- Accomplishments:

---

---

### ❖ Environmental Stewardship

- Goals: The Airport will continue to serve as an environmental steward of its natural resources.
- Objectives:
  - Continue water quality enhancement practices.
  - Maximize water conservation efforts.
  - Minimize unavoidable impacts to natural areas
- Accomplishments:

---

---

### ❖ Partnerships

- Goals: Strengthen existing and broaden relationships with PSU and other local organizations.
- Objectives:
  - Collaborate with the PSU Sustainability Institute during implementation of the Sustainable Master Plan.
  - Develop aviation-related business and educational opportunities for PSU at the Airport.
- Accomplishments:

---

---

**THIS PAGE INTENTIONALLY LEFT BLANK**