

Hillsborough County Aviation Authority

Sustainable Management Plan

2024



TAMPA INTERNATIONAL AIRPORT
**Sustainability
& Resilience**



Sustainable Management Plan

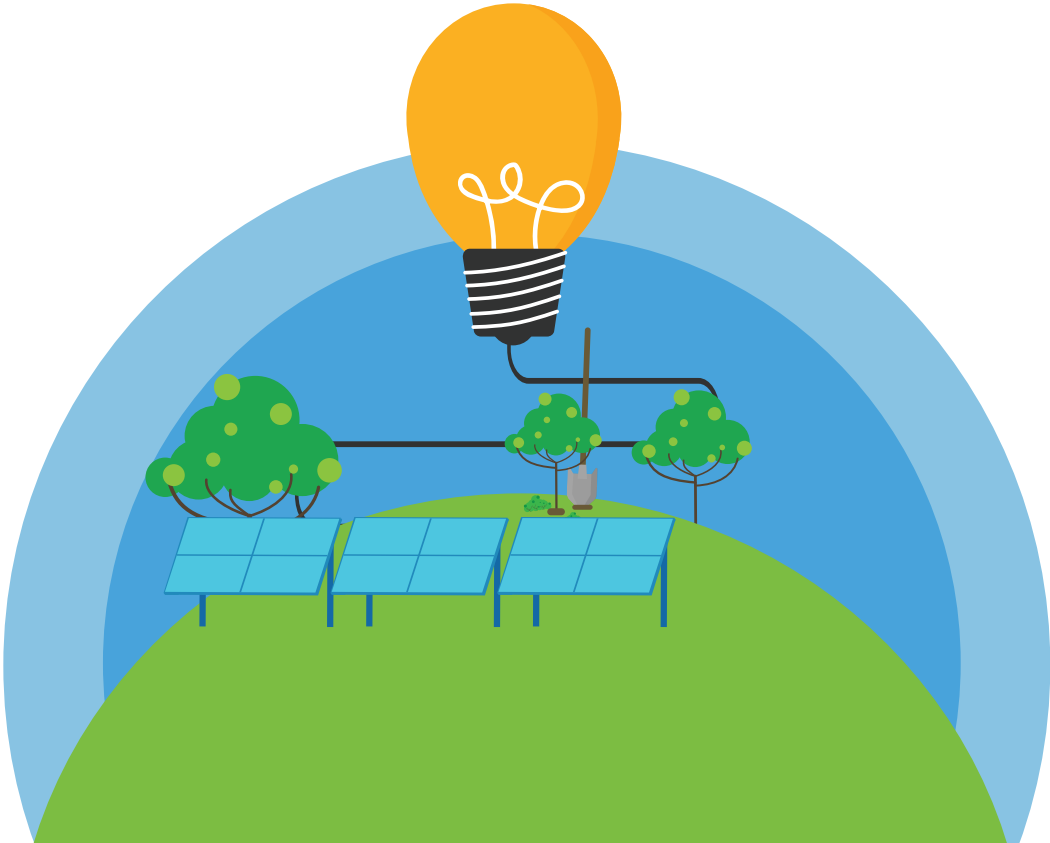
Hillsborough County
Aviation Authority

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SUMMARY

THE SUSTAINABLE MANAGEMENT PLAN (SMP) GUIDES THE HILLSBOROUGH COUNTY AVIATION AUTHORITY’S EFFORTS TO BALANCE ENVIRONMENTAL STEWARDSHIP, QUALITY OF LIFE, AND ECONOMIC PERFORMANCE.

This updated SMP aligns with advancing industry norms. It complements organizational values of teamwork, vision, hospitality, community, and excellence. It supports top-ranked daily operations, as well as the innovation and ambition required to develop the airport of the future.

The SMP is the result of a process of continuous improvement beginning in 2012 with a Sustainable Management Policy for Tampa International Airport (TPA), followed by the Authority’s first Sustainable Management Plan in 2014. This updated SMP was developed over a four-year process, persevering through the disruptive COVID-19 pandemic to comprehensively assess past performance and envision a sustainable future. The process included extensive external benchmarking, deep collaboration with dozens of staff from across the organization, and data-driven analysis of lessons learned and best management practices. The result sets the direction for the next ten years of sustainable and resilient development at Hillsborough County Aviation Authority (HCAA or Authority).

Guided by this new SMP, the mission of the Authority’s sustainability program is to create a sustainable and resilient organization through intentional and responsible leadership, empowerment, and action. Looking forward, HCAA’s vision is to be an innovation leader throughout the aviation industry and inspire action in the Tampa Bay Community.

The SMP advances goals and strategies in each focus area to accelerate the Authority’s sustainability and resilience performance. In total, the SMP includes 17 goals and 55 strategies. Each goal is paired with

a series of implementation strategies designed in collaboration with HCAA staff to achieve the goal within the SMP’s ten-year planning horizon.

Strategies leverage Authority insight to include details on key performance indicators, implementation actions, and potential impacts. A data-driven approach supplements strategies with analysis of potential economic, social, and environmental performance.

These details facilitate rapid transition from planning to action and will guide evaluation of progress. Hillsborough County Aviation Authority has long demonstrated its commitment to sustainability, laying a groundwork through its past SMP that has led to industry and community recognition for responsible development. This new SMP is an opportunity for the Authority to continue its journey towards a sustainable future.



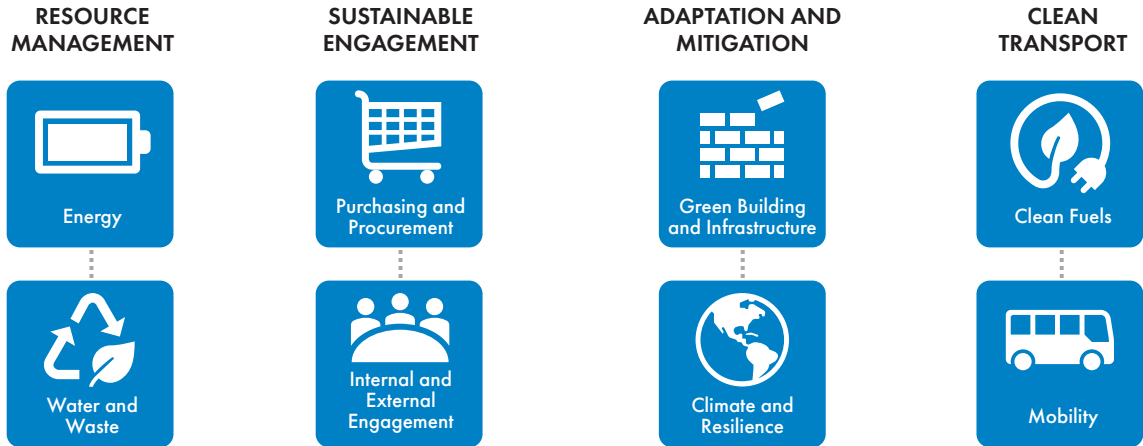
BACKGROUND

The Hillsborough County Aviation Authority (Authority) has long demonstrated its dedication to sustainability. Initial groundwork was laid by instituting the Sustainable Management Policy for Tampa International Airport (TPA) in 2012, followed by an FAA-funded Sustainable Management Plan (SMP) in 2014. Ten years later, it is time for an update.

This updated Sustainability Management Plan aligns with advancing industry norms, mirrors evolution of organizational values, and incorporates significant development and innovation associated with implementing the Authority’s extensive Master Plan.

Beginning in 2019, this effort involved a comprehensive evaluation of the existing sustainability program. This assessment established an updated performance baseline to gauge progress to date, conducted thorough benchmarking with industry peers and stakeholders, and surveyed and conducted focus group discussions with HCAA employees to gather their feedback on the program. The analysis underscored significant sustainability success, while highlighting opportunities for advancement in the next phase.

Staff from across the Authority’s departments participated in four workshops to define the program’s mission and vision, evaluate goals, consider implementation strategies, and identify supporting tools. Progress was interrupted in March 2020 due to the COVID-19 pandemic, with activities resuming in July 2022 in a collaborative effort that engaged 45 HCAA staff from 16 different departments. Staff were organized into four working groups to facilitate collaboration, and eight focus areas were identified to steer sustainability management at the Authority:



These focus areas reflect the triple-bottom-line definition of sustainability—social equity, environmental responsibility, and economic performance—and HCAA’s organizational values of teamwork, vision, hospitality, community, and excellence.

Over the course of over a dozen working group meetings, HCAA staff finalized the Authority’s Sustainability Management Plan update, calibrating new goals and establishing new strategies. The result is a refreshed Sustainability Management Plan to guide the next ten years of sustainability and resilience management at the Authority.

MISSION

Create a sustainable and resilient organization through intentional and responsible leadership, empowerment, and action.

VISION

Be an innovation leader throughout the aviation industry and inspire action in the Tampa Bay community.

GOALS AND STRATEGIES

HCAA’s sustainability mission and vision incorporates eight focus areas: energy, water and waste, purchasing and procurement, internal and external engagement, green buildings and infrastructure, climate and resilience, clean fuels, and mobility. This SMP advances goals and strategies in each focus area to accelerate the Authority’s sustainability performance.

The following table summarizes the goals and strategies guiding sustainability management at HCAA. All goals are set to a 2030 timeframe and measured against a 2018 baseline where available data exists. Where data is limited, the goal does not include a metric, but instead establishes an implementation strategy to quantitatively analyze future efforts.

FOCUS AREA	GOAL	IMPLEMENTATION STRATEGIES
Energy	Procure or install 5% of energy use from sustainable resources	Develop onsite solar energy resources
		Utilize renewable energy credits
		Study feasibility of hydrogen applications
	Reduced natural gas consumption	Implement heat recovery to reduce natural gas used in Airside C restaurants
		Replace natural gas with renewable natural gas (RNG) in stationary combustion applications
		Replace natural gas water heaters with electric or solar thermal systems
	Reduce energy consumption at terminal and airside by 10%	Hire an Energy Manager
		Develop a sustainability metric tracking system and database
		Convert economy garage lighting to LED
		Utilize smart lighting controls in the main terminal and airside
Convert fluorescent lighting to LED		
Upgrade airside A, C, and E chillers		
Implement and continuously commission central utility plant controls		

FOCUS AREA	GOAL	IMPLEMENTATION STRATEGIES
Water and Waste	Reduce potable water consumption at terminals and airside by 15% on a per passenger basis	Water fixture and fittings efficiency
		Car wash recycling
		Irrigation efficiency
		Rainwater harvesting for cooling tower make-up water
		Expand condensate recycling
		Harvest water for toilet flushing
	Divert 30% of solid waste on a per passenger basis	Enhance recycling program for HCAA and Tenants
		Waste characterization study
		Resume food donation program
		Develop pilot composting program
Increase construction and demolition (C&D) waste diversion		
Purchasing and Procurement	Increase internal purchasing of Environmentally Preferable Products and Services	Update existing Sustainable Procurement Program
		Integrate sustainability standards into selection criteria for tenant Requests for Proposals
		Match criteria listed in Achievement of Excellence in Procurement program
	Increase awareness and access to HCAA projects for all businesses	Support employee engagement in industry and regional organizations
External sustainability engagement		
Internal and External Engagement	Enhance internal sustainability awareness and employee support initiatives	Cultural Intelligence 360° Plan implementation
		Employee Experience Councils (EEC)
		Enhance internal sustainability awareness
	Strengthen employee engagement in HCAA programs and outreach opportunities	Increase engagement with BeWELL
		Develop sustainability-related outreach
		Establish engagement tracking tool

FOCUS AREA	GOAL	IMPLEMENTATION STRATEGIES
Green Buildings and Infrastructure	100% of Master Plan (MP) and Capital Improvement Program (CIP) projects with sustainability and resilience criteria	Update the Sustainable Design Criteria Manual (SDCM)
		Regular commissioning or energy audits of major facilities
		Third Party Certification (TPC) Feasibility Study
		Sustainable design training and education program
		Incorporate life-cycle cost analysis of sustainability criteria in CIP projects
Climate and Resilience	Complete 90% of the primary actions listed in the 2019 Resiliency Action Plan	Resiliency Action Plan initiatives implementation
	Reduce greenhouse gas emissions by 10%	Participation in the Airport Carbon Accreditation Program
		Carbon Offset Program participation
		Alternative fuels and technologies used for backup power generation
	Florida-Friendly, non-wildlife attracting species will comprise 75% of new landscape projects	Incorporate Florida-Friendly landscape criteria in updated sustainable design criteria
Allocate funds to support greenhouse rehabilitation		
Clean Fuels	Transition 60% of maintenance fleet to clean fuels	Implement HCAA maintenance fleet electrification program
		Provide electric vehicle support equipment for
		Transition additional maintenance fleet vehicles to clean fuels
	Transition 50% of HCAA bus fleet to clean fuels	Transition HCAA-owned and leased buses to clean fuels
Mobility	Include EV infrastructure at 250 additional public and employee parking spaces	Develop an EVSE Forecast Study
		Develop EV Master Plan
	Enhance efficient mobility opportunities for employees and travelers to TPA	Develop EV Rental Car Plan
		Enhance traffic management
		Expand Ridesharing

The following pages detail the goals and strategies for each focus area.

Goals are paired with a set of implementation strategies designed to achieve the goal within the SMP's ten-year planning horizon. Strategies were developed collaboratively by HCAA staff from across the organization.

Wherever feasible, strategies include details on **Key Performance Indicators, Implementation, and Impacts**.

Additional available data supplement strategies with a **Cost / Benefit Summary**, including analysis of economic performance, contribution to goals, and greenhouse gas reduction potential.

- **Economic performance metrics** include net present value (NPV), a measure of profitability, and return on investment (ROI), a measure of cost-effectiveness. *High NPV or ROI are indicators of sound investments.*
- **Contribution to goals** compares a strategy's projected impact in 2030 to the overall target, expressed in percentage terms. *Strategies with higher percentages are more impactful.*
- **Greenhouse gas reduction potential** (GHGa) is measured by forecasting abatement of metric tons of carbon dioxide equivalents (mtCO₂e) in 2030. This is accompanied by a measure of cost per mtCO₂e abated (\$/GHGa), and indicator of cost-effectiveness. *GHGa is a simple way to understand the environmental benefit of HCAA's sustainability strategies.*

ENERGY

It takes a lot of energy to power an airport. HCAA's facilities run mostly on electricity and natural gas and these utilities are costly. At the same time, they are a principal source of the Authority's greenhouse gas footprint. While power delivered from the grid is getting cleaner due to commitments by providers like TECO to increasingly generate electricity from renewable sources, the Authority can take action to meet its energy needs more sustainably.

The Authority's goals and strategies are focused on increasing the use of renewable energy sources and using energy as efficiently as possible. Renewables limit pollution, while energy efficiency cuts costs. Both tend to stimulate the economy by creating local jobs. HCAA's airports are Tampa Bay's connection to the world. So, producing more of its own energy on-site and using only as much energy as necessary have the added benefit of increasing HCAA's resilience to supply disruptions, helping to keep its doors open.

GOAL	ACTIVITY / PROJECT
Procure or install 5% of energy use from sustainable resources	<ul style="list-style-type: none"> • Develop onsite solar energy resources • Utilize renewable energy credits • Study feasibility of hydrogen applications
Reduced natural gas consumption	<ul style="list-style-type: none"> • Implement heat recovery to reduce natural gas used in Airside C restaurants • Replace natural gas with renewable natural gas (RNG) in stationary combustion applications • Replace natural gas water heaters with electric or solar thermal systems
Reduce energy consumption at terminal and airside by 10%	<ul style="list-style-type: none"> • Convert economy garage lighting to LED • Utilize smart lighting controls in the main terminal and airside • Convert fluorescent lighting to LED • Upgrade airside A, C, and E chillers • Implement and continually commission central utility plant controls • Hire an Energy Manager • Develop a sustainability metric tracking system and database

Goal: Procure or install 5% of energy use from sustainable resources

Purchasing or installing more renewable energy is essential to making the Authority more sustainable and resilient. Currently, HCAA's power supply includes no renewable energy. While TECO owns and operates a 2 megawatt (MW) solar array atop the south Economy Garage at TPA, the electricity it produces goes to the grid. HCAA is proud that its real estate facilitates clean power for Tampa Bay, but the Authority does not directly benefit from the project. This goal is the start of HCAA realizing the social, environmental, and economic benefits of a cleaner power supply.

Strategy: Develop onsite solar energy resources

The 2 MW solar array opened at TPA's south Economy Garage in 2016 proves that producing renewable energy on-campus is viable. Since then, the cost of solar photovoltaics has continued to decrease, while system efficiency has increased, strengthening the business case for solar. While regulatory barriers exist, innovative business models that leverage financial incentives that encourage adoption of solar technologies are making solar power increasingly accessible to public agencies like HCAA. A recent study led by students at the University of South Florida (USF) estimated that rooftop solar alone could meet up to 40% of TPA's needs. This strategy will enable onsite generation of renewable, low-carbon energy by validating the feasibility of solar PV arrays that directly benefit the airport by offsetting grid power use.

Indicators:

- Renewable energy capacity in MW
- Annual renewable energy generation in kilowatt-hours (kWh)

Implementation:

HCAA will evaluate the feasibility of developing solar arrays at a 125-acre parcel west of Runway 19R / 01L ("West Parcel"), Drew Park and facility rooftops to determine the best solar PV sites and configurations for generating power at the least cost, without disrupting airfield operations. Glint and glare studies will be necessary to demonstrate that solar panels will not interfere with air traffic control or distract pilots. Feasibility studies will also evaluate the optimal delivery method, considering the pros and cons of owning/operating/maintaining the solar arrays versus entering into a power purchase agreement (PPA) with TECO, or an agreement with other third-party developers. Whatever the arrangement, HCAA is committed to powering its facilities with and owning the environmental attributes of solar systems on its land, reducing its emissions, and building its resilience. Resilience can be improved by understanding how battery storage and microgrids can leverage solar power in the event grid power is interrupted.

Impacts:

Studying the feasibility of solar arrays at TPA will help the Authority understand the best locations for power production, the appropriate size and configuration of arrays, how to mitigate any glint or glare, the amount of energy that can be produced, and the cost of development. In addition, the study will help TPA identify the most beneficial procurement strategy. It will also clarify how feasible it may be to add battery storage and microgrids to solar projects to contribute to the airport's power resilience.

Strategy: Utilize renewable energy credits

Renewable Energy Credits, or RECs, are certificates representing the clean energy generated by renewable energy sources such as solar or wind energy. A REC is produced when a renewable energy installation generates 1 megawatt-hour (MWh) of clean electricity and delivers it to the grid. Since grid electricity comes from many different sources, some renewable and some not, there is no way to know the exact source of electricity delivered to HCAA or its environmental attributes. By purchasing RECs, HCAA can certify use of renewable energy while sending a market signal that encourages continued development of renewable generation facilities. While RECs are a useful tool, HCAA will prioritize increasing onsite renewable generation at its facilities and reducing energy consumption. Purchasing RECs enables the Authority to offset remaining grid energy usage.

Strategy: Study feasibility of hydrogen applications

Hydrogen fuel can be a clean and efficient source of energy for facilities, processes, and various kinds of transportation, including difficult to decarbonize modes like aviation. Evaluating the potential benefits and costs of using hydrogen fuel at TPA and the GA airports can help determine if investment in hydrogen infrastructure is advantageous for HCAA. Benefits of transitioning to hydrogen fuel include resilience and emissions reduction. The magnitude of the GHG reduction depends on the type of hydrogen source, and how it is generated. This involves evaluating hydrogen production, storage and refueling facilities, working with airlines on their plans for hydrogen-powered aircraft, and understanding infrastructure requirements on the airport campus.

Goal: Reduced natural gas consumption

This goal aims to replace natural gas consumption with cost effective alternatives. Reducing direct greenhouse gas emissions — so-called “Scope 1” emissions – from these processes is a related goal of this SMP (see “Climate & Resilience”). For similar reasons, the Federal Government’s Building Performance Standard also aims to eliminate Scope 1 emissions from standard building operations. HCAA currently uses natural gas for standard building operations like space and water heating and dehumidification. The Authority will seek opportunities to make these processes more energy efficient and/or power them with electricity. It also uses compressed natural gas to fuel vehicles. The Authority has already begun the process of phasing them out. For the purposes of this goal, a 90% reduction relative to 2018 levels is desired. To date, HCAA has achieved an 83% reduction.

Strategy: Implement heat recovery to reduce natural gas used in Airside C restaurants

Integrating domestic hot water (DHW) heat recovery systems in Airside C restaurants at TPA could significantly reduce natural gas consumption and costs. The most common approach is to use excess heat recovered from refrigeration systems (i.e., refrigerators, coolers, and walk-in freezers) to heat water. Capturing the heat rejected from refrigeration and cooling systems to produce hot water can result in substantial energy and cost savings because conventional natural gas water heaters do not need to operate as frequently to maintain setpoints. Reducing TPA’s use of natural gas would also result in GHG emissions savings.

Indicators:

- Annual natural gas consumption in MMBTUs or Therms

Implementation:

Implementing a DHW Heat Recovery System for Airside C concessions will require a feasibility study, a design phase, procurement, and construction. The first step will be to assess the hot water needs of the concessionaires to determine feasibility. This will include evaluating the cooling and refrigeration systems, the hot water demand, and the availability of space for the heat recovery equipment, followed by a design phase led by a qualified mechanical systems designer. HCAA will then procure competitive bids from contractors who can supply and construct the heat recovery system. After construction, the equipment will be tested and commissioned before it is put into service, with protocols put in place to ensure regular operations and maintenance.

Impacts:

This type of heat recovery system is well-suited to facilities with year-round cooling needs like the restaurants in Airside C. DHW energy savings could be as much as 40%. The reduction in heat rejection equipment load could also lead to secondary energy savings as the refrigerant temperatures decrease and the equipment operates more efficiently. Typical costs for a DHW heat recovery system range from \$150 to \$400 per ton of heat recovery capacity. Systems that operate near capacity can return investments costs in as few as two years.

Strategy: Replace natural gas with renewable natural gas (RNG) in stationary combustion applications

Natural gas is used for domestic water heating and dehumidification (i.e., re-heat of conditioned air) in TPA's Central Utility Plant (CUP). HCAA will evaluate use of renewable natural gas (RNG) in these applications. RNG is produced from organic waste and has a lower carbon intensity compared to conventional natural gas, resulting in a decrease in the airport's carbon footprint.

Although it is unlikely to provide cost savings compared to conventional natural gas, RNG may be available at a comparable cost or a small premium. In the near-term, RNG may be limited in availability. RNG production is still in its early stages of development and is dependent on the availability of organic waste from sources like animal feedlots and landfills. HCAA will assess the availability of renewable natural gas from its natural gas supplier.

Strategy: Replace natural gas water heaters with electric or solar thermal systems

Natural gas is currently used for large and small domestic hot water applications at HCAA. As these systems require replacement, they can be substituted with heat pump water heaters (HPWH) or solar thermal systems.

HPWHs use electricity to move heat rather than generate it directly. They can be two to three times more energy efficient than conventional electric resistance water heaters, which are already similarly more efficient than gas water heaters. Solar thermal systems use heat collected from the sun to heat water, typically through a heat exchange fluid. Solar thermal systems can be the sole source of heat or can supplement an electric system. Because the heat source is freely collected, these systems have a significant fuel cost advantage, in addition to clear environmental advantages.

Electric and solar systems must be evaluated versus natural gas systems in terms of lifecycle cost, accounting for upfront costs, as well as ongoing fuel and maintenance costs. Environmental, health and safety benefits should also be considered. Where advantages can be demonstrated, these systems will replace natural gas systems at HCAA.

Goal: Reduce energy consumption at terminal and airside by 10%

A major source of energy use at HCAA is TPA's main terminal and its four airside (A, C, E, and F). With the addition of Airside D in 2027, total energy use is expected to increase. This goal aims to reduce energy use intensity (EUI), or the energy used per square foot, in these spaces by 10% relative to the Authority's 2018 baseline. Recent energy efficiency efforts have reduced EUI by 2%. Focus on energy efficiency is essential for sustainable development at the airport; it is also the most cost-effective method for continued greenhouse gas emissions reductions.

Strategy: Convert economy garage lighting to LED

The TPA economy garage utilizes high-pressure sodium (HPS) lamps. Replacing these with fixtures with light-emitting diode (LED)s could deliver significant energy savings. The initiative would replace 100% of existing HPS lighting fixtures / lamps at TPA's Economy Parking Garage with LEDs and install occupancy sensors (OCs) to dim lighting when portions of the garage are unoccupied.

Indicators:

- Electricity savings in kWh
- Energy use intensity (thousand British thermal units per square foot, kBTU/ft) for the main terminal and airside
- Energy cost intensity (expenditure per kBTU) for the main terminal and airside



Cost / Benefit Summary

- NPV: \$272,000
- ROI: 7%
- Annual GHGa in 2030: 2,666
- GHGa Cost per MTCO_{2e}: \$198

Implementation:

Implementation of this strategy requires design and specification of appropriate replacement of existing lighting with LEDs and associated controls, as well as installation. To maximize energy savings, LEDs should be bi-level, operating at full power when activated by sensors that indicate occupancy and at a reduced power level otherwise. The design should also include a protocol for measuring and verifying energy savings.

Impacts:

LEDs in the economy garage could generate \$117,000 in net benefit (i.e., excess benefit after cost) to the Authority, or a return on investment of 10%. The project is also expected to reduce greenhouse gas emissions by more than 2,500 tons per year (GHGa) at a cost of \$198 per GHGa.

Construction costs could be \$0.74 per square foot based on a case study from ACRP's "Airport Parking Garage Lighting Solutions" report (Table 11, page 36). Design costs are estimated at 15% of construction costs.

A US Dept. of Energy Case Study of a conversion of parking garage HPS to LED with lighting controls project at the University of Minneapolis achieved 90% energy savings with 29% return on investment. For the purposes of analysis, savings of 70% are projected. Savings result from high efficiency LED replacement fixtures, as well as from occupancy sensors which reduce the power output of the LEDs in unoccupied portions of the garage, excluding emergency lighting. HCAA's electricity rate is projected to increase by 2.5% per year on average, based on the CBO's Economic Projections for 2023 - 2030 for the Consumer Price Index. Maintenance cost savings could be significant since LEDs may last two to five times longer than HPS. However, avoided maintenance costs are not included in this analysis, since HCAA can beneficially reallocate

limited maintenance labor and resources. First year savings are estimated at one-half of subsequent years, assuming that project installation is completed within six months. Benefits do not include commercial energy efficiency rebates that may be available from TECO.

Strategy: Utilize smart lighting controls in the main terminal and airside

Implementing a smart lighting control system at TPA's main terminal and airside could significantly reduce energy use. Lighting makes up 10 to 30% of energy consumption in commercial buildings. Smart lighting controls include the ability to tune and change lighting levels based on space needs, occupancy, and available daylighting. They also can provide data-driven feedback to operators to optimize schedules, spot anomalies, and manage load.

Indicators:

- Electricity savings in kWh
- Energy use intensity (thousand British thermal units per square foot, kBTU/ft) for the main terminal and airside
- Energy cost intensity (expenditure per kBTU) for the main terminal and airside



Cost / Benefit Summary

- NPV: \$187,000
- ROI: 14%
- Contribution to 2030 Goal: 50%
- Annual GHGa in 2030: 1,968
- GHGa Cost per MTCO2e: \$176

Implementation:

Implementation of this strategy requires design and specification of appropriate lighting controls, as well as installation. Key considerations are commissioning of the installed systems and extensive maintenance staff training on operations. The design should also include a protocol for measuring and verifying energy savings.

Impacts:

Smart lighting controls can create \$187,000 in net benefit (i.e., excess benefit after cost) to the Authority, or a return on investment of 14%. The project is also expected to reduce greenhouse gas emissions by nearly 2,000 tons per year (GHGa) at a cost of \$176 per GHGa.

A 2021 study by the Northwest Energy Efficiency Alliance estimates that a smart lighting control system, which would include the ability to sense occupancy and daylight, dim, and schedule lighting, and communicate and analyze data, could cost about \$1.16 per square foot. Meanwhile, a Lawrence Berkeley National Laboratory meta-analysis commissioned by the United States Department of Energy found that advanced lighting controls using multiple strategies could reduce lighting-related energy use by up to 38%. For the purposes of analysis, this strategy assumes 30% savings. The strategy is phased in over three years to account for design and construction of the system across the main terminal and all four airside.

Strategy: Convert fluorescent lighting to LED

Improvements in the availability and cost of light-emitting diode (LED) lighting have resulted in the potential to significantly reduce the energy intensity of certain lighting applications. Converting older fluorescent fixtures to LED has the potential to result in significant energy savings at TPA. HCAA has already completed some limited LED conversions at TPA. HCAA previously upgraded about 50% of the lighting in areas of the main terminal with low ceilings to LED. The main terminal baggage claim area will also be upgraded to LED in late 2023.

Students at USF prepared an energy efficiency program report in 2022 that evaluated the benefits of replacing CFL bulbs in the Main Terminal and Airside A, C, E and F at TPA with LED bulbs. The study

found that over a ten-year period, converting existing CFLs to LEDs would reduce annual lighting energy consumption in the terminal and airside by 38.7%, saving about \$400,000 annually. This would result in more than \$5 million in cost savings and more than 27,000 metric tons of GHG emissions reductions over ten years.

The study assumed all existing lighting demand was from 13-Watt CFL lamps that consume 9.3 kWh, lighting is 20% of the energy used in the terminal and airside and did not factor in previous LED lighting conversions at the airport. It modeled the costs/benefits of replacing CFL lamps with LED lamps of equivalent lumens under the assumption that LED lamps could be swapped into existing fixtures without modification at a labor cost of \$0.87 per lamp. The cost of recycling the CFL lamps (\$1.00 per lamp) was also included.

While the USF study illuminates the potential of LED lighting conversions at TPA, further study is required to inventory the types of existing fixtures at TPA, specify suitable lamp and/or refrigerant replacements, and estimate the cost of retrofit. After HCAA completes this comprehensive study, it will implement feasible and cost-effective LED upgrades according to the study findings.

Strategy: Upgrade airside A, C, and E chillers

Cooling and dehumidifying are the single largest energy end use at the main terminal and airside. The essential work of keeping passengers and employees comfortable in these facilities is mostly attributable to “chillers” – mechanical systems that control temperature and humidity by circulating a cooling liquid in a refrigerant cycle. Chillers are significant investments for TPA and require careful design and diligent operations and maintenance. As chillers at airside A, C, and E near the end of their useful lives, it presents a significant opportunity to boost TPA’s energy efficiency.

Strategies that will be considered during chiller replacement include:

- Exceeding ASHRAE 90.1, the industry standard for energy use in commercial buildings.
- Using life cycle cost analysis to optimize specifications.
- Utilizing variable frequency drives (VFDs) to enable precise control over the chiller’s motor and/or pump speeds, allowing the system to tailor its operation to match the actual cooling demand. When cooling needs are lower, the chiller’s compressor and/or pumps can run at reduced speeds, saving a significant amount of energy compared to traditional fixed-speed chillers. VFD-equipped chillers excel in part-load conditions, which are common in real-world applications, reducing wasted energy and operating costs. An additional benefit is extended equipment life. VFD retrofits and new installation can cut a chiller’s annual energy costs by 30%.
- Specifying centrifugal chillers for large loads, and screw chillers for smaller loads.

These strategies can be incorporated into HCAA’s design criteria manual as well as upcoming upgrades to the Sustainable Design Criteria Manual.

The results will improve system performance across all present and future HVAC systems at the Authority.

Strategy: Implement and continuously commission central utility plant controls

HCAA recently invested in an airport-wide upgrade of energy management systems (EMS) at TPA. In addition, TPA's new central utility plan (CUP) features additional machine-learning enabled software referred to as the JCI Energy Management System (JEMS). The sophistication of this system requires continuous commissioning to achieve its full energy savings potential.

JEMS is an overlay to the CUP base controls which oversees Plant operation. JEMS gathers data from the chillers and other HVAC systems at TPA (e.g., airside, main terminal, ConRAC, etc.) and processes it to analyze energy and water consumption trends across the campus. Based on trend data analysis, the JEM system modifies CUP controls settings to optimize efficiency and energy consumption of the plant.

Continuous commissioning is required for the system to operate at its full capacity. Continuous commissioning of this system requires training of HCAA personnel to perform regular data collection and analysis to identify deviations from expected performance. Trained personnel will diagnose JEM inefficiencies or malfunctions based on observed deviations and apply appropriate corrections to optimize system performance. At full operating capacity, the JEM system will reduce operational costs, extend equipment life, and promote increased energy conservation at TPA.

Strategy: Hire an Energy Manager

HCAA recently invested in an airport-wide upgrade of energy management systems (EMS) at TPA. EMS link electrical and mechanical equipment to software, enabling sophisticated controls of processes and schedules. EMS also provides valuable data-driven feedback to operators on performance, including anomalies that may indicate opportunities for preventative maintenance or energy savings. Hiring an energy manager to optimize HCAA's existing and new facilities, its new CUP, and the sophisticated EMS that control them, using a system of continual improvement such as the ISO 50001 Energy Management standard, will help ensure that the Authority gets the most out of its investments in modern terminal and airside buildings and equipment. This position will pay for itself in energy savings, preventative maintenance, and improved passenger comfort.

Indicators:

- Energy savings in kWh
- Energy use intensity (thousand British thermal units per square foot, kBtu/ft) for the main terminal and airside
- Energy cost intensity (expenditure per kBtu) for the main terminal and airside



Cost / Benefit Summary

- NPV: \$266,000
- ROI: 34%
- Contribution to 2030 Goal: 50%
- Annual GHGa in 2030: 1,776
- \$ / GHGa: \$167

Implementation:

Implementing this strategy requires HCAA management to authorize a new position focused, at minimum, on managing energy use in its major facilities. The ISO 50001 management system provides a framework for such a position through its requirements for policy-setting; establishing objectives; collecting and analyzing data to inform decisions; reporting results; and reviewing progress. HCAA will need time to experience. Key to success will be the relationships the energy manager forms with stakeholders, including the Maintenance Department, the Sustainability and Resilience Program Director, and associated HCAA consultants. The energy manager will need to engage daily with HCAA's design standards, energy management policies and procedures, and sustainability and resilience programs. To achieve the benefits of this strategy, HCAA must evaluate the effectiveness through performance reviews, and monitoring energy management practices and outcomes.

Impacts:

An energy manager implementing a process of continuous improvement could generate over \$250,000 in net benefit (i.e., excess benefit after taking cost into account) to the Authority, or a return on investment of 34%. The strategy could also reduce greenhouse gas emissions by about 1,750 tons per year (GHGa) at a cost of \$167 per GHGa.

The energy savings that might be reasonably expected from hiring a qualified energy manager implementing a program like ISO 15001 depends on several factors, including the energy management practices already in place at HCAA and the specific strategies and initiatives implemented by the energy manager. A February 2023 paper from Lawrence Berkely National Laboratory found that institutionalizing ISO 50001 best practices could result in energy savings from 5-20% per year. This strategy assumes an energy manager would be capable of leading initiatives that reduce energy use 0.2% in the first year, increasing to and maintaining 1% annual savings by year 5 and reaching a cumulative level of 5% by 2030 demonstrating how energy savings can justify a position with this focus. For purposes of analysis, annual wages of \$125,000 are assumed, escalated at 2.5% per year based on the current inflation outlook (CBO's Economic Projections for 2023 - 2030 for the Consumer Price Index).

Strategy: Develop a sustainability metric tracking system and database

Sustainability is most successful as a data-driven system, using information to support decision-making, evaluate and report progress, and calibrate investment and engagement. This strategy focuses on developing a comprehensive, centralized data-management solution for TPA's sustainability program that supports a variety of activities. These include evaluation of progress against Sustainability Management Plan goals and support of SMP strategies. Examples of the latter include participation in the Airport Carbon Accreditation Program and implementation of the Sustainable Design Criteria Manual.

Indicators:

- Energy use intensity (thousand British thermal units per square foot, kBTU/ft)
- Energy cost intensity (expenditure per kBTU)
- Water use and cost (thousand gallons, expenditure)
- Fuel consumption in gaseous gallons equivalent
- Waste generation and diversion by commodity in tons
- Refrigerant stocks, replacement, and leakage in pounds

Implementation:

Integrating HCAA sustainability data into a unified, automated, modular database that is systematically paired with key attributes of facilities, infrastructure, and external variables that influence performance (e.g., occupancy, floor area, weather, etc.), can yield insight and simplify implementation of sustainability initiatives. Insight is derived from dashboards that facilitate daily data-driven decision making, and by reporting functions that can support a variety of internal and external stakeholder engagement efforts. Increasingly, such systems are available as hosted, web-based enterprises. This approach offers a balance of accessibility and security, with configurable levels of permissions to interact with data. Systems may be scaled from existing building automation systems allowing direct control of facility systems in addition to utility tracking and benchmarking, procured off-the-shelf from an increasing group of software-as-a-service providers, or a custom solution can be developed that is tailored to HCAA's specific needs. In the latter scenario, this strategy can be developed organically, with incremental enhancements to data management implemented over time.

Currently, HCAA systematically collects and analyzes utility data (e.g., energy, water, and fuel) for TPA infrastructure and vehicles. However, the current system depends on a small number of individuals using relatively limited and inaccessible technology. This inhibits ease of access to and regular update of sustainability program data. Further, other key data such as refrigerants, waste, and implementation of the sustainability design criteria is not systematically collected or controlled by HCAA with high resolution. In addition, the informational capabilities of sophisticated software systems that control TPA's most significant infrastructure are not regularly leveraged for the benefit of the sustainability program.

For HCAA's GA airports similar data is available only through analysis of billing records, which do not always clearly attribute facilities, infrastructure, or end uses, making analysis a repetitively labor-intensive process, the results of which yield limited insights.

Implementation of this strategy involves mapping out the sustainability program's informational needs. Engagement with key stakeholders, including the Authority's information technology experts will be required. The professionals can assist with a survey of market offerings that leads to definition of a scope of work. Service providers can be solicited, and a solution procured. Collaboration between HCAA staff and the service provider will be required to populate the database and train users.

Impacts:

A sustainability data management solution will require upfront costs to configure and typically involves annual software-as-a-service costs. Cost will range widely based on the scope of the solution, with upfront costs ranging from \$50,000 to \$100,000 or more, with annual subscriptions ranging from thousands to tens of thousands per year. Benefits include improving the management and performance of the sustainability program and raising employee awareness of and support for the sustainability program.

Studies have linked increased employee awareness with energy, fuel, and water use of up to one to 10% of expenditures. For organizations like HCAA, with many accounts and high annual expenditure, identification of billing errors alone could generate sufficient return-on-investment.

Funding

Federal incentives are available for renewable energy and efficiency measures. In July 2023, FAA awarded over \$270M in discretionary funds under the Airport Improvement Program (AIP) for conducting energy efficiency assessments, installing solar panels, and developing airport sustainability and resiliency master plans, among many others. More funds may become available via this source soon. Further, until 2032, tax exempt entities like HCAA can receive direct payment of clean energy tax incentives.

TECO offers a suite of incentives for commercial energy efficiency projects, including chiller replacements, VFDs for chillers, energy management systems, and lighting. HCAA has worked with TECO in the past to develop solar arrays at TPA. Since then, the solar industry has innovated alternative delivery methods that may make it possible for HCAA to procure solar arrays at no upfront cost in exchange for a long-term energy services agreement. Similarly, energy service companies continue to innovate delivery methods for energy efficiency investments that shift expenditures from capital to operating budgets. These complex alternative delivery methods require careful consideration of legal and technical details.



The Authority's goals and strategies are focused on increasing the use of renewable energy sources and using energy as efficiently as possible.

WATER & WASTE

Water is a precious resource in Tampa Bay. The region’s supply of ground water, river water, and desalinated sea water reflects a strategic response to a history of shortages and associated conflict among local governments. Rapid regional growth and climate change challenge the region’s delicate water supply balance and highlight the need for large users like HCAA to seek conservation solutions. The Authority’s water goal and strategies focus on using water more efficiently and seeking alternative supplies.

Like water, waste is a challenge extending far beyond HCAA’s boundaries. Statewide, waste generation is increasing both in absolute and per capital terms. Meanwhile, the statewide recycling rate is 25% and falling. Tampa Bay’s solution has been to incinerate most of its garbage, producing energy. It also pursues single stream recycling, although contaminated commodities have resulted in falling prices for mixed recyclables. HCAA’s waste goal and strategies respond to these headwinds through a mix of source reduction, reuse, and recycling.

Conserving water and reducing waste can cut costs and emissions for the Authority, but also enhance airport resilience and contribute to community efforts to solve complex challenges.

GOAL	ACTIVITY / PROJECT
Reduce potable water consumption at terminals and airside by 15% on a per passenger basis	<ul style="list-style-type: none"> • Water fixture and fittings efficiency • Car wash recycling • Irrigation efficiency • Rainwater harvesting for cooling tower makeup water • Expand condensate recycling • Harvest water for toilet flushing
Divert 30% of solid waste on a per passenger basis	<ul style="list-style-type: none"> • Enhance recycling program for HCAA and Tenants • Waste characterization study • Resume food donation program • Develop pilot composting program • Increase construction and demolition (C&D) waste diversion

Goal: Reduce potable water consumption at terminals and airside by 15% on a per passenger basis

Potable water is used in TPA's main terminal and airside primarily by passengers in lavatories and concessions food service. This goal is measured on a "per passenger basis" to reflect this relationship between water use and passenger volume. Seeking out water conservation opportunities in lavatories and in kitchens are key strategies.

Associated with water use in the terminals and airside are water use in rental car operations, landscaping, and in TPA's central utility plant. While not a direct focus of this goal, these end-uses represent significant opportunities for both water efficiency and development of alternative water supply. Alternative water supply, such as harvested rainwater or condensate, has potential to offset use of potable water in the terminal and airside.

Strategy: Water fixture and fittings efficiency

High efficiency plumbing fixtures or fittings can be easily incorporated into existing facilities at TPA and the GA airports. Use of efficient flow fixtures can reduce water use by 20%. While replacement of fixtures is sometimes necessary, in most cases reduced-flow accessories (e.g., flow restrictors, flow regulators, aerators, and laminar flow devices) can be added to existing fixtures, typically at a low cost. For lavatory and kitchen faucets, fixtures or accessories specified with a maximum flow of about 0.5 and 2.2 gallons per minute (gpm), respectively, will save water relative to standard fixtures. For showers, 1.5 gpm fittings should be specified. Lower-flow fixtures and fittings are also available and may be appropriate in certain cases. Reducing flow rates of fixtures that supply hot water will also save energy required for heat.

Indoor water use may also be significantly reduced by utilizing high efficiency toilets and urinals. Replacing 3.5 gallon per flush (gpf) fixtures / bowls and valves with 1.2 – 1.6 gpf models for toilets and 1.0 or less gpf models for urinals can reduce water use by 20%. While retrofits are usually less effective than replacement, retrofits may be made to toilets that allow a "dual flush" mode. Very low-flow or waterless urinals require an assessment of compatibility with the existing plumbing design and its present condition.

Strategy: Car wash recycling

Potable water consumption for rental car company (RAC) car washing operations at TPA could be significantly reduced by utilizing a system that incorporates water filtration and recycling. This could result in decreased operating expenses for the rental car companies, as well as positively impact TPA's overall sustainability performance.

A water recycling system would also lead to a reduction in the volume of wastewater generated from car wash operations. This wastewater typically contains pollutants such as soaps and chemicals that, if not properly treated, can have negative environmental impacts. Reducing wastewater flows would improve sustainability performance by minimizing this source of pollution.

Studying the feasibility of this strategy involves outreach and engagement with the rental car companies, determining system needs, identifying one or more locations for the equipment, and preliminary project design and scoping. Investigation of options to share costs and benefits with RACs would also be required.

Strategy: Irrigation efficiency

Measures aimed at increasing the efficiency of irrigation systems can cut water use by up to half. Potential measures include use of drip irrigation instead of traditional sprinklers, use of more efficient traditional sprinkler heads, and use of weather and/or sensor-based irrigation controls in lieu of manual or timer controls. Proper maintenance also plays a significant role in irrigation water efficiency. The Florida Water Star program provides independent criteria for identifying options and validating water-efficient landscapes. While HCAA tracks irrigation water use and has begun utilizing low-flow fixtures, it lacks a comprehensive program which includes drip systems, efficient sprinkler heads and weather-based controls. Implementing these measures can cut irrigation water use by 20% or more.

Strategy: Rainwater harvesting for cooling tower make-up water

The Authority successfully eliminated potable water use in its cooling towers, which support its campus wide approach to efficiently cooling the main terminal, airside, and other facilities at TPA. The strategy involved replacing potable water with reclaimed water supplied by the TPA's water utility. However, this solution proved unsustainable, as it led to maintenance problems and reduced the useful life of the equipment. As the chillers are returned to potable water, HCAA is investigating water alternatives, including capturing and treating rainwater.

Indicators:

- Potable water use in gallons
- Harvested stormwater use in gallons

Implementation:

At TPA water is used to remove waste heat from its space cooling system primarily through evaporation. This cycle, which occurs in cooling towers, also concentrates mineral impurities, and this water must be "blown down" before it becomes corrosive to equipment. Because of evaporation and blow down, cooling towers require a significant amount of "make up" water to be effective.

Rainwater would be collected from rooftops, softscapes and hardscapes in a below-grade storage cistern. In addition, a rainwater system will require pumps, filtration, backwash processing, sanitation, and controls.

Further analysis is required to validate this concept. Evaluation of storage options, including utilizing existing stormwater detention sources and the amount of water stored, require additional study. Once the concept is further defined, HCAA will evaluate cost and benefits. If deemed an effective solution, the rainwater system will require design, construction, commissioning, operations, and maintenance.

Impact:

Preliminary analysis of cooling tower make up water consumption at TPA cooling towers indicates that 25 to 35% could be cost-effectively supplied by harvesting rainwater, which could avoid more than \$350,000 in present day water and sewer utility costs. Analysis of cost-effectiveness depends on further definition of rainwater harvesting infrastructure requirements and associated up-front costs.

Strategy: Expand condensate recycling

In addition to harvesting rainwater, water may be harvested in lower volumes from cooling equipment condensate. HCAA already captures some condensate for reuse at TPA, but this practice can be expanded and also implemented at the GA airports.

Water vapor condenses when it comes in contact with the cooling coils in heating ventilation and air conditioning (HVAC) equipment. The water is drained from the equipment to prevent corrosion and is typically plumbed to the sewer. Approximately ten gallons per day per 1,000 square feet of conditioned space can be produced by typical HVAC systems. At TPA, as much as a million gallons of condensate water (after filtration and disinfection) may be available for capture annually for irrigation and other appropriate uses. Capturing this water may also reduce sewer flows and costs.

Strategy: Harvest water for toilet flushing

Operational and maintenance improvements are essential for reducing potable water consumption at TPA. A large portion of airport water use comes from passenger use of restrooms while they travel through the concourse. Toilets at TPA currently use potable water. Utilizing recycled greywater, or harvested HVAC condensate or rainwater can reduce use of potable water. Greywater includes any water drained from sinks, water fountains, and other appliances within the building. Harvested rainwater may be collected during rainstorms using storage tanks and then pumped into the building for use in restrooms.

Indicators:

- Potable water use in gallons
- Harvested stormwater use in gallons

Implementation:

To implement a rainwater collection or greywater recycling program, the airport will identify the appropriate water quality specifications for toilet flushing use. Water must be treated under certain specifications before it can be used within buildings to flush toilets. Once this is established a system that takes advantage of TPA existing infrastructure to capture, treat, and pump the recycled or collected water will be designed and constructed. The operations and maintenance implications of such a system would also require consideration when evaluating lifecycle costs and benefits.

Impact:

Reducing on-site potable water use will help enhance water security, sustainability, and resilience at the airport. There will be less of a demand on freshwater systems and the volume of water entering sewer systems will be decreased. Using less water also lowers overall energy demands and greenhouse gas emissions. Studies have estimated that reusing greywater for toilet flushing can reduce potable water use by up to 17% and reduce wastewater by up to 11%. This would correspond to a \$22,800 cost savings in water use charges and \$35,300 savings in sewer charges, using 2022 usage and cost figures. Costs of implementing a system depend on further definition of the project scope.

Goal: Divert 30% of solid waste on a per passenger basis

The Authority's principal solid waste diversion strategy is recycling. Presently, the waste diversion rate stands at 23%, and it has shown limited improvement since the inception of HCAA's sustainability program in 2014. To achieve progress, HCAA must develop a holistic waste management program. By focusing on efficient waste collection and the expansion of waste diversion strategies, including food donation and composting, the Authority can significantly increase its solid waste diversion rates.

Strategy: Enhance recycling program for HCAA and Tenants

Recycling within an airport poses unique challenges due to varying disposal regulations and passenger volume, often leading to contamination of this important waste stream. In response to this challenge, TPA undertook a substantial expansion of its terminal recycling program in March 2009, strategically deploying a total of 132 recycling containers in publicly accessible areas throughout the airport, providing guests with convenient recycling options during their visit. An additional 31 containers were placed in employee breakrooms. The program enables the co-mingled recycling collection of a wide array of materials, including plastics, glass, aluminum, steel cans, newspapers, magazines, and paperboard. Despite these advancements, the recycling rates at TPA (per passenger) remain unchanged from the initial stages of the recycling program's implementation. Further enhancement of HCAA's existing recycling program is necessary to achieve the Authority's 30% waste diversion goal.

Indicators:

- Recycling rate
- Recycling contamination rate
- Trash disposal fee reduction

Implementation:

The following focus areas have been identified to enhance HCAA's recycling program:

- Education and Signage Enhancement:
 - » Ensure consistent and clear recycling signage across all HCAA facilities, using visual aids and pictures to communicate recycling guidelines effectively.
 - » Conduct regular staff outreach and awareness programs to educate employees about recycling protocols, ensuring they can provide accurate information to passengers.
 - » Update the Concessionaire Handbook to include detailed Authority recycling policies and guidelines, emphasizing the participation of concessionaires in Airport-wide sustainability initiatives.
 - » Develop educational training materials for employees and concessionaires, emphasizing proper waste disposal practices, including food donation and recycling procedures.
- Waste Audit Analysis:
 - » Utilize data from waste audits to identify successes and failures of the current recycling program, with a focus on common contamination sources.
 - » Collaborate closely with the janitorial contractor to address and rectify recycling program challenges based on audit findings.
 - » Weigh collected materials to measure diversion rates and track progress over time, using this data to set achievable recycling goals.

- Enhance Recycling Visibility:
 - » Add recycling bins alongside every trash bin throughout the airport, ensuring uniform signage that educates passengers on the City of Tampa’s recycling regulations to prevent contamination.
 - » Enhance the uniformity of recycling receptacles airport-wide, reducing confusion among passengers and staff regarding the need to separate recyclables from other waste.
 - » Develop digital signage campaigns within the airport, employing visual paging to explain waste separation practices and guide passengers on where to dispose of each waste type.
 - » Provide liquid waste collection bins before the TSA checkpoint to eliminate recycling contamination caused by improper liquid disposal.

Impact:

Increased rates of recycling at the Authority will reduce the amount of solid waste sent to landfill, conserving valuable resources and decreasing GHG emissions associated with waste disposal. Recycling initiatives can generate cost savings by reducing waste disposal expenses and enhance the Authority’s public image by demonstrating its commitment to sustainable resource management.

Strategy: Waste characterization study

A waste characterization study at Tampa International Airport will analyze current waste management practices, identify areas for improvement and efficiency enhancements, and inform the development of a sustainable waste management program. The insights gained from this study will guide the Airport’s efforts to minimize waste generation, reduce operational costs, and increase recycling rates. By understanding what materials are ending up in the landfill, targeted strategies for waste diversion may be developed.

Indicators:

- Material composition of TPA waste streams
- Recycling contamination rate and cause identification

Implementation:

The waste characterization study will encompass the following key components:

- Waste Audit: Physically sort and categorize waste from various airport sources to determine its composition and identify the materials that can be diverted from landfills.
- Surveys: Conduct surveys among concessionaires, tenants, and janitorial staff to gather insights into existing waste management practices and gather feedback on potential improvements.
- Enhanced Waste Tracking: Implement a system for tracking waste in detailed categories, enabling precise data collection on waste streams.
- Data Analysis: Analyze the data collected from the waste audit, surveys, and waste tracking to create a comprehensive waste characterization report including an evaluation of potential cost savings from diversion strategies.

Impact:

A waste characterization study at TPA is a crucial step toward achieving sustainable waste management practices. It will provide valuable insights, guide decision-making, and enable the Authority to implement targeted strategies to minimize waste, reduce costs, and enhance recycling efforts.

Strategy: Resume food donation program

The purpose of this strategy is to resume HCAA's food donation program. In the past, HCAA partnered with HMSHost and Feeding Tampa Bay to repurpose large quantities of surplus packaged food and grab-and-go items that would otherwise have been discarded by restaurants and concessions throughout TPA. HMSHost quickly expanded this program to many of the airports it operates at, and by 2018 was donating to local food banks from restaurants at 57 different airports across North America. However, this program was discontinued in 2020 due to safety concerns and restrictions related to the COVID-19 pandemic.

To resume this program, coordination with HMSHost, Feeding Tampa Bay, and TPA concessionaires is required. The TPA concessions redevelopment program completed in 2019 required new concessionaires to include food donation as part of their proposals. Furthermore, the Concessions Handbook mandates compliance with all current and future sustainability initiatives, including food donation programs, ensuring that concessionaires will continue to play an active role in reducing food waste and supporting the local community.

Daily truck shipments of leftover food may be picked-up by Feeding Tampa Bay from the Concessionaires Receiving and Distribution Center (CRDC). The CRDC Manager will provide for the collection and storage of food for repurposing that meets minimum standards for safety and wholesomeness. A formalized tracking system will be implemented to measure the amount of food being donated by TPA and which local non-profits and food banks will receive food via Feeding Tampa Bay. This program will empower TPA and its concessions to divert significant quantities of food from the landfill and is an important step towards a more food secure Tampa Bay.

Strategy: Develop pilot composting program

The objective of the pilot composting program at TPA is to reduce waste, minimize environmental impact, and promote sustainable practices within the Airport's operations. The pilot program will determine the feasibility of composting organic waste at Tampa International Airport, focusing on the diversion of preconsumer food scraps.

Indicators:

- Food waste diverted (lbs.)
- Participation rate
- Education and outreach

Implementation:

Development of the pilot composting program will include:

- Internal stakeholder coordination to discuss lessons learned from the previous composting program. Prior to discontinuing the program in 2014, TPA composted approximately 50 tons of coffee grounds annually in partnership with the USF Botanical Gardens. Assessment of the coffee ground composting program will guide this pilot project.
- Identification of a composting facility or partner with a local composting service capable of processing food waste efficiently. Stakeholder coordination with the City of Tampa, Suncoast Compost, USF Botanical Gardens, and various local farms will help determine the appropriate selection for a composting partner according to handling capacity, collection infrastructure, and cost.
- Selection of TPA food vendor(s) to participate in the pilot project.
- Program on-boarding for selected food vendors, including formal education and training for kitchen staff on food separation strategies and guidelines. Portable collection infrastructure to transport food waste from the kitchen to the CRDC area will be installed. As with the food donation program, the composting

contractor will pick up food waste from the CRDC according to a pre-set schedule. Many composting companies—like Suncoast Compost—provide composting materials such as counter-top and outdoor bins, compostable bags, and appropriate signage, and provide an educational training program for any participating employees.

- Establishment of a formalized tracking system to evaluate the effectiveness of the program. This will include tracking mechanisms to measure the amount of diverted food waste and calculate costs and savings associated with the program. Additionally, regular check-ins with participating vendors will be performed to review program progress. Successes and failures will be discussed, and solutions will be identified.

Impact:

This project is intended to assess the feasibility of composting pre-consumer food waste at TPA. Development of appropriate infrastructure, education programs, and training materials will facilitate the expansion of this program as collection capacity grows to meet food waste availability. The development of a composting program at the Authority will increase the waste diversion rate, divert food waste from landfills and reduce harmful GHG emissions, and demonstrate HCAA's dedication to environmental stewardship to passengers.

Strategy: Increase construction and demolition (C&D) waste diversion

Addressing C&D waste diversion at an airport is crucial for minimizing environmental impact and optimizing cost-efficiency. Airport infrastructure projects often generate substantial amounts of C&D waste, comprising diverse materials like concrete, metals, plastics, and salvaged building components. The handling and disposal of such waste can be costly, both in terms of financial resources and environmental consequences. Therefore, it is imperative for HCAA to establish C&D waste diversion goals for each project, tailored to suit the unique opportunities and constraints of individual projects. Goal development requirements and procedures will be incorporated into the Sustainable Design Criteria Manual (SDCM) update. Implementing a robust tracking tool for contractors, requiring the submission of waste manifests, and establishing a comprehensive construction waste management plan procedure can provide the necessary framework to achieve these diversion objectives effectively. A construction waste management plan should include identification of waste materials within the project that may be recycled, or project needs that may be met using recycled content. By making C&D waste diversion an integral part of airport development, HCAA will lead by example in promoting sustainable construction practices, reduce landfill dependency, and ultimately contribute to a more environmentally responsible aviation industry.

Funding

Federal and local incentives are available for water efficiency measures. In July 2023, FAA awarded over \$270M in discretionary funds under the Airport Improvement Program (AIP) for conducting water and energy efficiency assessments and developing airport sustainability and resiliency master plans, among many others. More funds may become available via this source soon. Tampa Bay Water offers water conservation rebates for initiatives including cooling towers, flow and flush fixtures, as well as custom measures developed in collaboration with the utility. Tampa Bay Water also offers \$1,000 for achieving building-level Florida Water Star certification.

External funding is less common for waste goals and strategies, although the recent AIP Notice of Funding Opportunity could encompass such efforts.

PURCHASING AND PROCUREMENT

Purchasing and procurement is the process of acquiring goods, services, or work from external sources to meet an organization’s needs and objectives. Sustainable purchasing practices encourage the efficient use of resources and ensure sustainability is valued by all individuals involved with the Authority.

In this context, procurement refers not only to the acquisition of material items and airport services, but also to the exchange of knowledge and support between HCAA and its national and regional partnerships, an integral component of HCAA’s core values. The Authority continues to provide leadership in sustainability by sharing lessons learned, participating in innovative technology development, and providing opportunities for employees to transfer their knowledge in global, national and local forums.

GOAL	ACTIVITY / PROJECT
<p>Increase internal purchasing of Environmentally Preferable Products and Services</p>	<ul style="list-style-type: none"> • Update existing Sustainable Procurement Program • Integrate sustainability standards into selection criteria for supplier Requests for Proposals • Match criteria listed in Achievement of Excellence in Procurement program
<p>Increase awareness and access to HCAA projects for all businesses</p>	<ul style="list-style-type: none"> • Support employee engagement in industry and regional organizations • External sustainability engagement

Goal: Increase internal purchasing of Environmentally Preferable Products and Services

Environmentally Preferable Products and Services (EPP) are defined as those with reduced negative impacts or increased positive effects on human health and the environment, compared to alternatives serving the same purpose. The official implementation of an EPP strategy will further waste reduction by enhancing the sustainable procurement program to align with industry best practices in sustainability, and incorporating sustainability considerations into tenant, supplier, and concessionaire programs. Aligning purchasing and procurement standards with the Authority's sustainability program is paramount to realizing sustainability goals and nurturing a culture of sustainability organization wide.

Strategy: Update existing Sustainable Procurement Program

HCAA's Sustainable Procurement Program (SPP) will be updated to improve and align the Authority's procurement practices with updated sustainability goals (e.g., increasing energy and water efficiency, reducing greenhouse gas emissions, utilizing sustainable landscaping, expanding the use of clean fuels, etc.) and evolving best practices. An updated SPP will also support sustainable design and third-party certification initiatives. SPPs have been shown to provide value to agencies, including reduced cost of goods and services, reduced administrative costs, reduced supply chain risk, and increased supply chain resilience.

Indicators:

- Percent of Environmentally Preferable Products and Services procured, by department
- Cost savings through sustainable procurement
- Percent waste generation reduction

Implementation:

The following strategies will be implemented to update the Sustainable Procurement Program:

- Existing procurement policies from various organizations will be benchmarked to evaluate best management practices. Existing programs and standards for sustainable procurement will be assessed to determine applicability to HCAA including an evaluation of potential costs, environmental performance, etc. The results of this preliminary study will be evaluated against existing HCAA procurement policy and standards to solidify program updates and an implementation framework tailored to each department's needs.
- Costs and benefits for procurement updates and standards identified will be evaluated to determine feasibility of implementation at HCAA.
- The existing capacity of the Authority to collect, track, and report sustainable product purchases will be assessed, and new metrics and data management systems, along with the required processes and technology, will be identified. Department-specific policies to steer sustainable purchasing and promote best practices will also be developed.
- Updated policies, standards, metrics, and data management systems will be incorporated into an updated Sustainable Procurement Program document.

Impact:

Updating the SPP is essential to ensure that the Authority remains aligned with sustainability objectives, stays compliant with regulations, minimizes waste production, and reduces environmental and social impacts.

Strategy: Match criteria listed in Achievement of Excellence in Procurement program

The Achievement of Excellence in Procurement (AEP) program is an award and recognition program in the field of procurement and supply chain management. It is typically administered by procurement professional associations or organizations and aims to recognize and celebrate excellence in procurement practices among public and private sector entities. The AEP program serves as a benchmark for organizations seeking to enhance their procurement practices, promote transparency and accountability, and demonstrate their dedication to responsible and efficient procurement processes. It encourages organizations to continuously improve their procurement operations and contribute to the overall success of their entities.

HCAA has been an active participant in this program since 2010, leveraging it to enact substantial enhancements in its procurement endeavors. However, to attain full alignment with the AEP program's benchmarks and bolster the Authority's broader sustainability objectives, the SPP will be aligned with the sustainability criteria articulated within the AEP program.

The AEP sustainability criteria necessitate that organizations develop a formal sustainable procurement program. These programs must possess a broad scope, addressing multiple environmental, social, and economic impacts and opportunities. The criteria underscore the importance of securing executive-level commitment, designating a program lead, and allocating the requisite resources for seamless implementation. Furthermore, organizations must demonstrate their adherence to Sustainable Purchasing Leadership Council best practices, which involve setting relevant priorities, establishing goals and metrics, engaging staff and ensuring accountability, evaluating goods and services transparently, fostering supplier engagement, transparency, and accountability, promoting supplier development and innovation, and prioritizing effective communication and sustainable purchasing transparency.

Goal: Increase awareness and access to HCAA projects for all businesses

The Sustainability and Resilience Program at HCAA plays a pivotal role in advancing the industry's commitment to environmental stewardship, fostering economic growth, and upholding social responsibility standards. Likewise, HCAA places a strong emphasis on assuming leadership roles and driving sustainability initiatives within both the aviation industry and the Tampa Bay Area. This leadership is exemplified through innovative development and the dissemination of knowledge in global, national, and local forums.

Strategy: Support employee engagement in industry and regional organizations

The primary objective of this initiative is to fortify and foster connections between the Airport, the aviation industry, and the Tampa Bay Area. Currently, the Authority maintains a presence in industry organizations such as the Airports Council International (ACI), American Association of Airport Executives (AAAE), and the Florida Airports Council (FAC). It also has affiliations with regional entities like United Way Suncoast (UWS), Tampa Bay Regional Planning Council (TBRPC), Tampa Bay Chamber of Commerce, the Sustany Foundation, and the University of South Florida (USF). Expanding employee engagement in industry and regional events will be achieved through the following actions:

- Encouraging greater employee participation
- Increasing support for community events annually
- Organizing workshops and training sessions to empower employees with the necessary skills to effectively represent the organization
- Maintaining a monthly calendar of events on the Authority's intranet
- Acknowledging and incentivizing employee involvement and accomplishments in these events

Enhanced employee engagement in these organizations will bolster the Authority's reputation within both the industry and the regional community, fostering new partnerships, business opportunities, and investments in employee skill development and job satisfaction through exposure to valuable networking and learning experiences. Moreover, this approach encourages staff to actively contribute to the community and align with HCAA's organizational values, ultimately leading to a more fulfilled and motivated workforce.

Strategy: External sustainability engagement

Facilitating external engagement with the Authority's Sustainability Program is crucial for raising awareness, gaining support, and encouraging active participation. A range of activities and strategies aimed at enhancing the passenger experience, supporting local organizations, and contributing to regional planning efforts will be implemented by HCAA to facilitate engagement.

HCAA will continue to leverage its facilities as innovative spaces to involve passengers in sustainability initiatives, including onsite greenhouse tours and showcasing sustainability program highlights throughout the Main Terminal at TPA. Enhancing support for events that showcase the sustainability efforts of HCAA and its regional and national partners—such as TPA's Earth Day celebration—will educate passengers about the Authority's latest environmental initiatives. Additionally, external engagement extends to the broader community by hosting events like the Susanty Foundation's Sustainable Business Awards, raising charitable donations through 5K on the Runway, and establishing community-oriented programs like clean-ups with Keep Tampa Bay Beautiful. Further outreach strategies may include the development of a customer-facing recycling team to actively engage passengers in sustainability efforts, or the creation of visual displays throughout TPA to highlight sustainability achievements and tips for passengers. To assess the impact of sustainability-related outreach endeavors, key metrics, including annual engagement in events, campaign effectiveness, and participation in industry-specific sustainability initiatives, will be measured and benchmarked.

Funding

External funding resources to further purchasing and procurement goals and initiatives may be limited. In July 2023, FAA awarded over \$270M in discretionary funds under the Airport Improvement Program for developing airport sustainability master plans, which could include sustainability efforts related to this area.



Rapid regional growth and climate change challenge the region's delicate water supply balance and highlight the need for large users like HCAA to seek conservation solutions.

INTERNAL AND EXTERNAL ENGAGEMENT

Social sustainability focuses on the well-being of people and communities, emphasizing inclusion, equity, and fair treatment. It promotes access to healthcare, ensuring fair labor practices, fostering diversity and inclusion, and engaging with and supporting local communities. These priorities help HCAA retain committed and productive staff, attract new talent to its mission and vision, and build community support for its ambitious endeavors.

HCAA practices social sustainability by promoting employee engagement in internal resource programs, and external community events. Wellness programs are powerful tools, promoting better employee health and productivity, while curbing healthcare costs. Social support programs empower employees, granting them a sense of agency, and correlate with greater workplace satisfaction and employee retention. Similarly, active involvement in volunteer services and community events significantly enhances mental and physical well-being. Internal and external engagement strategies further embed sustainability within HCAA's culture, enabling employees to embrace comprehensive sustainable practices and solidifying the Authority's role as a responsible community partner.

GOAL	ACTIVITY / PROJECT
Enhance internal sustainability awareness and employee support initiatives	<ul style="list-style-type: none"> • Cultural Intelligence 360 Plan implementation • Employee Experience Councils (EEC) • Enhance internal sustainability awareness
Strengthen employee engagement in HCAA programs and outreach opportunities	<ul style="list-style-type: none"> • Increase engagement with BeWELL • Develop sustainability-related outreach • Establish engagement tracking tool

Goal: Enhance internal sustainability awareness and employee support initiatives

The Authority is dedicated to creating a diverse and welcoming workplace, which can attract top talent and promote employee satisfaction, leading to improved teamwork, innovation, and overall organizational performance. Enhancing employee support and awareness can lead to innovative solutions and greater commitment to a sustainable HCAA.

Strategy: Cultural Intelligence 360° Plan implementation

The Authority does not view diversity, equity, and inclusion as a separate initiative; instead, it is a cultural philosophy that supports the Authority's mission, vision and strategic objectives, and is embedded in the organizational values. HCAA has completed the Cultural Intelligence 360° Report, an initial study to benchmark and provide knowledge on employee engagement, innovation, and continual improvement, and provide recommendations on areas of potential development. Based on these findings, the Cultural Intelligence 360° Strategic Plan will include resources, stakeholder buy-in, and an implementation plan to support the strategies developed in the Cultural Intelligence 360° Report.

Indicators:

- Annual employee turnover rate
- Annual employee retention
- Internal employee advancement rate
- Percent participation in employee resource groups
- Employee training participation rate

Implementation:

The first phase of the project will collect and analyze qualitative data from focus groups, interviews, and observations to establish a baseline of the current cultural intelligence (CQ) proficiency and development strategies at the Authority, which are detailed in the Cultural Intelligence 360° Report. The second phase will finalize the Cultural Intelligence 360° Strategic Plan, which will be used to guide the Authority from the current to the desired state of cultural philosophy. The plan will address various stakeholder concerns, determine specific, measurable, realistic, and timely (SMART) goals and objectives, recommend specific allocation of resources, and develop expectations and strategies for implementation. The Plan will be accompanied by a high-level communication strategy.

Impact:

The Cultural Intelligence 360° Report will cultivate an open-minded and collaborative workplace by promoting awareness and knowledge of diverse cultural perspectives, development of cross-cultural skills, and a willingness to embrace differences.

CQ development will impact HCAA by attracting, developing, and retaining top talent, building trust and respect, stimulating innovative solutions, enhancing stakeholder experience, supporting diverse business partnerships, and strengthening the bottom line. Successful implementation of the CQ Plan will position HCAA as an employer of choice, attracting the next generation of aviation professionals and guaranteeing the future success of the Authority.

Strategy: Employee Experience Councils (EEC)

To enhance the work environment and employee experience at HCAA, the Authority conducted an Employee Engagement Survey. This endeavor led to the establishment of five distinct Employee Experience Councils, each tasked with evaluating survey outcomes, pinpointing organizational growth areas, and formulating recommendations for enhancement. Based on survey results, five council focus areas were selected:

- Operational Efficiency and Meetings
- Inclusion and Different Points of View
- Interdepartmental Cooperation
- Personal and Professional Development
- Leadership and Employee Connections

Each council is comprised of ten volunteer employees who will work as a unified team to fulfill the council's identified goals. Collectively, these councils aim to delve deeper into employees' perspectives, gaining valuable insights for refining organizational practices. Their employee-driven initiatives seek to foster an enriched workplace culture, stimulate productivity, bolster personal and professional growth, champion diversity and inclusivity, promote meaningful engagement among colleagues, and employ effective tools to enhance work processes. Members will take an evidence-based approach to develop solutions and propose initiatives to HCAA executive leadership. The implementation of these proposed strategies will reinforce the Authority's ability to attract, motivate, and retain top talent.

Strategy: Enhance internal sustainability awareness

Development of internal engagement programs to enhance awareness and understanding of HCAA's sustainability program and its associated initiatives is paramount to the success of the goals outlined in this Plan. This includes trainings on updated program procedures and guidelines, newsletters to share program updates, and collaborative learning sessions to explore synergies between sustainability and other program or department goals. A sustainability recognition program will acknowledge and reward employees and/or departments that consistently demonstrate exceptional commitment to sustainable practices and may expand beyond HCAA staff to recognize efforts made by employees Airport-wide (e.g., concessions or airline staff, TSA, contractors, etc.). Enhancing internal sustainability awareness will empower Authority staff to actively participate in sustainability efforts, fostering a sense of ownership and responsibility toward environmental and social goals.

Goal: Strengthen employee engagement in HCAA programs and outreach opportunities

HCAA supports social sustainability through Authority-wide programs and initiatives such as the BeWell program, understanding that individual wellness equates directly with organizational wellness. Likewise, the Authority strives to make a positive impact on the Tampa Bay community and encourages employees to do the same. Expanding opportunities for involvement and developing tracking mechanisms for engagement will further support employee wellbeing and solidify the Authority's role as a responsible community partner.

Strategy: Increase engagement with BeWELL

The BeWELL program is an individual and organizational health and wellness campaign benefiting all HCAA employees. It encompasses five areas of wellbeing: career, social, financial, physical, and community. Annual wellness reimbursements, group movement events (e.g., yoga, cycling, walking), an employee wellness council, and health fairs are just some of the wide range of initiatives and employee benefit programs included in BeWELL. To enhance employee engagement and promote the widespread use of this valuable employee resource, tracking mechanisms for each of the five categories will be established.

Indicators:



Career

- Employee onboarding costs
- Engagement statistics of BeWELL + News e-newsletter
- Number of internships offered
- Participation in learning and development programs



Community

- Charitable donation to United Way annual giving campaign
- Percent of vendors selling healthy food options
- Number of outreach opportunities
- Employee outreach participation hours



Social

- Number of employee engagement events
- Number of employee resource groups
- Participation rate in employee resource groups



Financial

- Tuition reimbursement costs
- Wellness program reimbursements
- Number of employees participating in matching program



Physical

- Peerfit metrics
- Number of wellness activities offered
- Participation rate in wellness activities offered

Implementation:

This initiative increases the effectiveness of BeWELL by implementing targeted marketing strategies, enhancing accessibility, and closely monitoring employee engagement and participation in wellness events across the entire HCAA staff. Presently, the BeWELL program is disseminated through channels like Gateway, On the Radar lessons, and leadership and staff meetings. However, this communication approach leaves a gap for employees whose job roles may not regularly involve interactions with the intranet. To bridge this awareness and accessibility gap, the Employee Wellness Council—a BeWELL initiative—can be leveraged to establish a direct and effective means of communication with all employees. This council will also establish a baseline of current participation levels, providing valuable insights from HCAA staff regarding the diverse offerings within the BeWELL program. Subsequent annual data collection will be compared against this baseline to track engagement trends, offering opportunities to refine communication strategies and enhance participation rates. Wellness challenges, incentives, and rewards can also be incorporated within the BeWELL program to increase engagement.

Impact:

The BeWELL program seeks to increase employee satisfaction and become a role model for wellness across the Authority and Tampa Bay community. By providing opportunities and resources to enhance employee wellbeing, the Authority fosters organizational resilience and promotes a happy and healthy workplace.

Strategy: Develop sustainability-related outreach

The establishment of a comprehensive authority-wide sustainability outreach program will foster stronger connections among employees, the environment, and the community. This initiative will create diverse opportunities related to sustainability in collaboration with HCAA's Volunteer Services Manager. Numerous organizations in Tampa Bay, such as Keep Tampa Bay Beautiful, Tampa Bay Watch, Tampa Bay Estuary Program, and The Florida Aquarium, share a common goal of involving the community in environmental stewardship, conservation, and education efforts. These activities include clean-up initiatives, habitat restoration projects, and educational programs aimed at safeguarding and revitalizing the natural environment for a resilient Tampa Bay.

A portfolio of outreach initiatives, such as environmental education programs, clean-up events, tree planting drives, and sustainability workshops will be established. The Authority already collaborates with students from the University of South Florida's Patel College of Global Sustainability, providing hands-on experience with sustainable aviation challenges and opportunities. Further collaboration with local environmental organizations, schools, and community groups to co-host events and leverage their expertise can be considered. Such connections serve as powerful demonstrations of collective commitment to environmental stewardship. The creation of a sustainability engagement calendar will effectively communicate these sustainability outreach opportunities. This calendar will serve as a tool to raise awareness, generate enthusiasm within the organization, and enhance the visibility of sustainability efforts. It can be distributed to Authority employees and extended to other airport staff to facilitate wider participation.

Partnerships with local schools to educate students about airport sustainability and aviation-related initiatives will not only strengthen community relations but also nurture the growth and development of aspiring aviation professionals. By implementing a sustainability outreach program, HCAA bolsters community relations, cultivates a workplace committed to sustainability, engages stakeholders effectively, and promotes a positive corporate image.

Strategy: Establish engagement tracking tool

Community and industry engagement is a pivotal aspect of the Authority's commitment to sustainability. The development and implementation of an engagement tracking tool will effectively track and enhance employee involvement in community and industry initiatives. This tool will enable HCAA to measure and manage its contributions, ensuring alignment with community and industry outreach goals. While the Authority has an annual summary of engagement activities related to sustainability (e.g., passengers, agencies, industry), an annual summary of participation in these regional planning efforts is needed.

Indicators:

- Number and types of events sponsored
- Number and type of regional partnerships and/or organizations
- Participation rate by department
- Number of leadership positions held in regional or industry organizations

Implementation:

Development of this tool will require identifying a suitable technological platform for tracking. This could involve leveraging existing software solutions, developing a custom application, or utilizing user-friendly project management tools. Both qualitative and quantitative tracking metrics will be determined. A recognition program to acknowledge and celebrate employee contributions to community and industry engagement can be implemented, considering incentives, such as awards or prizes, to motivate and reward active participants. Consideration of engagement may be included in employee annual reviews to further integrate the tool into the Authority's culture and processes. The engagement tracking tool will be periodically reviewed and updated to maintain alignment with evolving community and industry engagement goals.

Impact:

The implementation of a structured tracking system will enable the Authority to establish a baseline for measuring future engagement initiatives. It will enable employees to engage proactively in community and industry endeavors and reinforce HCAA's dedication to leadership within the aviation industry and its mission to create a beneficial influence on the communities it supports.

Funding

External funding resources for internal and external engagement may be limited or indirect. In July 2023, FAA awarded over \$270M in discretionary funds under the Airport Improvement Program for developing airport sustainability master plans, which could include social sustainability efforts. Beyond commitment of HCAA resources to these efforts, methods for cost effectively advancing internal and external engagement include strategic partnerships with organizations that can amplify HCAA's messages, as well as opportunities to "earn" media from efforts that benefit airport stakeholders and the Tampa Bay Community. Commitment of HCAA staff time to these strategies will be essential.

GREEN BUILDINGS AND INFRASTRUCTURE

Green building at HCAA incorporates sustainable practices into the planning, design, construction, and operation of airport facilities and associated infrastructure. This concept encompasses various strategies, including energy efficiency, water conservation, the use of eco-friendly materials, waste reduction, and considerations for indoor air quality. The purpose is to create infrastructure that not only consumes fewer resources during construction and operation but also provides healthier, more comfortable environments for employees and passengers.

Buildings account for nearly 40% of global energy-related CO2 and play a pivotal role in addressing climate change. Furthermore, building and infrastructure projects are the most substantive way airports can contribute to GHG emissions reductions in the aviation industry. As the Authority grows to meet projected aviation demand, HCAA must incorporate green design practices into upcoming phases of development to mitigate its contribution to climate change and ensure long-term viability.

GOAL	ACTIVITY / PROJECT
100% of Master Plan (MP) and Capital Improvement Program (CIP) projects comply with sustainability and resilience criteria	<ul style="list-style-type: none"> • Update the Sustainability Design Criteria Manual (SDCM) • Regular commissioning or energy audits of major facilities • Third Party Certification (TPC) Feasibility Study • Sustainable design training and education program • Incorporate life-cycle cost analysis of sustainability criteria in CIP projects

Goal: 100% of Master Plan (MP) and Capital Improvement Program (CIP) projects comply with sustainability and resilience criteria

HCAA's Master Plan is in Phase 2 of implementation, with a variety of building and infrastructure projects under construction through 2027. Phase 3, which is focused on the new Airside D, is beginning now. Meanwhile, the next iteration of HCAA's master planning process is underway. Given HCAA's rapid growth and development, the application of sustainable and resilient design criteria is paramount to the Authority's vision for sustainability and the achievement of emissions mitigation and resource reduction goals. Updating sustainable design criteria to reflect the Authority's values and developing procedures to ensure criteria adherence will enable the Authority to meet these goals and guide future development and enhancements across its airports.

Strategy: Update the Sustainable Design Criteria Manual (SDCM)

The Authority's 2014 Sustainable Design Criteria Manual will be updated and expanded to incorporate sustainability into all phases of the project life cycle and integrate it more completely with existing development processes. This will provide a framework for healthy, highly efficient, and cost-saving buildings and infrastructure at HCAA.

Indicators:

- Percent of projects that comply with SDCM criteria

Implementation:

Updating the SDCM involves several key tasks:

- Conduct a thorough review of past projects where the SDCM and associated tools were implemented and coordinate with HCAA employees to gather insights and lessons learned.
- Utilize the lessons learned from the Phase 1 Master Plan Envision verification and incorporate the goals outlined in the updated Sustainability Management Plan. This includes objectives related to energy and water efficiency, renewable energy use, reduction of natural gas consumption and waste generation, greenhouse gas emissions reduction, sustainable landscaping, and clean fuel adoption.
- Compare HCAA's current approach with third-party certification (TPC) standards such as LEED, Envision, Green Globes, WELL, to practices adopted by peer airports to identify best management practices.
- Analyze the existing SDCM and provide recommendations for updates. Decide which aspects to retain, revise, eliminate, or replace. Engage with HCAA staff to reach a consensus on the proposed revisions, which may include changes to both the SDCM document and its associated tools and mechanisms.
- Implement the recommended revisions to the SDCM, including updates to the document itself and the creation of revised SDCM tools or new forms, templates, reports, and other relevant materials.
- Develop a policy framework to support the implementation of the updated SDCM, ensuring that it aligns with HCAA's overall sustainability goals.

Impact:

Projects that comply with green building rating systems demonstrate reduced water and energy consumption, substantial emissions reductions, and long-term cost efficiencies. Additionally, these spaces yield indirect benefits, including enhanced employee productivity and occupant well-being. An SDCM update will play a pivotal role in advancing the Authority's emissions reduction and resource efficiency goals while enhancing operational resilience.

Strategy: Regular commissioning or energy audits of major facilities

Best suited for large, complex buildings with interactive systems and sophisticated controls, such as TPA's main terminal and airside, existing building commissioning (EBCx) is a systematic process to improve the efficiency of an existing building's operations. It typically addresses problems that develop as equipment ages and building usage changes. Often it resolves problems that have persisted since design or construction. In addition to saving energy and water, it can improve the comfort of building occupants.

Examples of problems solved by EBCx include equipment or lighting that is on when it may not need to be; systems that do not adequately dehumidify, cool too much or simultaneously heat and cool more than necessary; setpoints, sensors and thermostats that are out of calibration; air balancing systems that are no longer optimal; controls sequences that are functioning incorrectly, etc. Many small operations and control improvements cost little or nothing to implement, making EBCx particularly cost effective.

For smaller, less complex existing facilities, energy audits would be suitable. TECO offers free, high level, commercial energy audits. More detailed energy audits are typically performed by professional services firms. The recent \$270 Notice of Funding Opportunity under the FAA AIP program includes funding for energy audits at several major US airports.

All major new construction projects should be commissioned.

Indicators:

- Gross square feet commissioned or audited
- Energy savings in kWh
- Energy use intensity (thousand British thermal units per square foot, kBtu/ft) for the main terminal and airside
- Energy cost intensity (expenditure per kBtu) for the main terminal and airside



Cost / Benefit Summary

- NPV: \$266,000
- ROI: 34%
- Contribution to 2030 Goal: 50%
- Annual GHGa in 2030: 1,776
- \$ / GHGa: \$167

Implementation:

Implementation requires commissioning for TPA's main terminal and airside. This strategy assumes that one major EBCx project occurs per year for five years. It involves procuring professional services to provide extensive and detailed EBCx focused on tune ups in the field, or subsequently implemented by airport maintenance staff, HVAC or controls contractors. While commissioning agents should identify capital intensive retrofits, HCAA can determine what retrofits would be the most effective and integrate them into its O&M program.

Based on the results, a schedule for regular commissioning of major facilities (e.g., on a five-year cycle) should be developed. In addition, other facilities at the TPA campus and HCAA's General Aviation airports should be considered for commissioning or energy audits.

Updates to the SDCM will consider integrating the commissioning process into all new design and construction.

Impact:

Commissioning of the main terminal and airside could generate over \$725,000 in net benefit (i.e., excess benefit after taking cost into account) to the Authority, or a return on investment of 89%. The strategy could also reduce greenhouse gas emissions by about 1,523 tons per year (GHGa) at a cost of \$116 per GHGa.

Estimates of the impact of commissioning or energy audits of other facilities are not evaluated here. Savings vary depending on the building size, age and location, and the scope of the commissioning process. A large meta-study of commissioning over three decades and 1500 buildings concluded that EBCx costs \$0.26 on average (this strategy assumes \$0.50) and cuts facility energy use between 5 and 16% (this strategy assumes 5%), while payback ranges from less than one to about 3.5 years. Commissioning of new facilities was estimated to cost about \$0.82 per square foot.

Strategy: Third Party Certification (TPC) Feasibility Study

Third-party sustainability certifications like LEED, Envision, WELL and Green Globes demonstrate HCAA's dedication to environmentally responsible design. In addition to independently validating performance and reinforcing HCAA's sustainable design standards, they are globally recognized symbols of achievement that provide assurance to the Authority's stakeholders. Buildings and infrastructure projects that have achieved these and other TPCs are proven to mitigate GHG emissions, reduce resource consumption, improve health and wellbeing of occupants and users, and provide long-term financial savings. LEED and Envision, especially, are becoming standard practice in the aviation industry. HCAA has already achieved Envision verification for Master Plan Phase 1 and LEED Platinum certification for SkyCenter One, the only LEED Platinum-certified building in Tampa. A feasibility study for third-party certifications will establish the Authority's TPC objectives and provide a consistent framework for selecting projects for TPC.

Indicators:

- Percent of projects screened for TPC suitability
- Percent of projects that submit for TPC
- Percent of projects that achieve TPC

Implementation:

This study will assess the compatibility of various TPC rating systems with HCAA's current and future MP and CIP projects. The study will preliminarily identify and select planning phase projects to be used as case studies, including a review of the MP1 and SkyCenter One TPC processes to identify best management practices and recommendations for future projects. A review of TPCs at select peer airports will be conducted, including programmatic approaches to specific certification criteria.

Local and state regulations, the updated SDCM, and other HCAA sustainability initiatives will be reviewed to determine alignment with TPC criteria. An evaluation of the expected performance of the case study projects will be conducted and the project most likely to achieve success under TPC rating systems given current conditions will be identified. Based on this review, recommendations for next steps, including actions necessary to enhance HCAA's performance relative to these rating systems, will be made. Finally, a pre-assessment checklist will be developed, defining thresholds for project evaluation that incorporate project cost, size, and complexity.

The development of a specific TPC evaluation framework may be considered. This approach streamlines the verification process by developing new project management procedures or templates, forming internal document repositories, and standardizing design choices according to the criteria of a specific TPC.

Impact:

The study's outcomes, including its recommendations, thresholds, and pre-assessment checklists, will form the foundation for a TPC screening and evaluation procedure to be integrated into HCAA's project planning process. The establishment of this procedure for assessing TPC feasibility will not only increase the prospects of achieving certifications but also promote the integration of sustainable design principles into both building and infrastructure projects.

Strategy: Sustainable design training and education program

HCAA employees require comprehensive training and education in sustainable design to support the Authority's emissions reductions, resource efficiency, and green building goals. Education and training will enable HCAA employees to effectively implement the sustainability standards outlined in the SDCM, which include requirements for sustainable design and construction of facilities and infrastructure. By implementing this training initiative, HCAA supports the implementation of the updated SDCM, including requirements of additional third-party certifications (TPCs) that are being pursued. This program will educate HCAA personnel on sustainable planning, design, construction, operations, and maintenance of sustainable and resilient facilities and infrastructure. Additionally, it will facilitate the achievement and/or maintenance of professional credentials by HCAA staff supporting LEED, Envision, Green Globes, etc.

Indicators:

- Percent of employees who undergo training
- Number of departments with staff that receive training
- Percent of employees who receive professional credentials from sustainability related TPCs

Implementation:

Development and execution of a sustainable design training will include the following:

- Critical HCAA representatives—such as those from Planning and Development, Procurement, and other relevant departments—will be identified and aid in selecting the key staff members across the Authority to participate in the training and workshop sessions.
- Clear learning objectives for the training sessions and professional credentialing goals for staff will be established.
- Workshop curriculum will focus on sharing lessons learned and developing best management practices through collaborative review of sustainable and resilient infrastructure projects at HCAA. Training sessions will equip participants with the knowledge needed to effectively implement the
- SDCM and achieve any TPC objectives outlines by the Authority, including relevant exam preparation.
- Based on the results of the sustainable design training sessions, recommendations for future education and training activities for improved SDCM implementation will be developed.

Impact:

Sustainable design training equips HCAA employees to streamline the implementation of updated sustainable planning and development standards. This program will inspire active engagement in the Authority's sustainability program and empower key staff members to effectively apply sustainable design criteria into all Master Plan and Capital Improvement Program projects.

Strategy: Incorporate life-cycle cost analysis of sustainability criteria in CIP projects

While it is common to focus on upfront costs, buildings are long term investments requiring continual expense to operate and maintain. Life-Cycle Cost Analyses (LCCA) assess the expenses associated with infrastructure from cradle to grave. These analyses are a valuable tool for guiding design decisions, facilitating the development of sustainable solutions that minimize operational costs and reduce end of life disposal burdens. Incorporating LCCA into decision-making during the planning and design phase can highlight the superior value of sustainable design, which might otherwise be considered too expensive from an upfront cost perspective.

HCAA already informally utilizes LCCA in analysis of new and upgraded mechanical systems, like chillers. In these analyses, scope and objectives are defined and a range of alternative design options are evaluated. Costs and benefits of each alternative must be explored over a common time frame, usually 20 to 40 years or more, including considerations of future expenses linked to maintenance and end-of-life disposal. Findings are analyzed, accounting for external factors like uncertainty or risk, leading to a final recommendation. LCCA guidelines defining threshold requirements, cost assumptions, and industry standards can supplement the SDCM update to simplify use of this technique and ensure uniform analysis.

Funding

Federal incentives are available for green buildings and infrastructure initiatives. In July 2023, FAA awarded over \$270M in discretionary funds under the Airport Improvement Program for conducting energy efficiency assessments, installing solar panels, and developing airport sustainability and resiliency master plans, among many others. More funds may become available via this source soon.

TECO offers a suite of incentives for commercial energy efficiency projects, including chiller replacements, VFDs for chillers, energy management systems, and lighting TPC providers like the Institute for Sustainable Infrastructure (Envision) offer fee discounts of 10 to 20% to organizations that adopt a bulk or programmatic approach to their rating systems. They also offer discounted training for credentialing to public employees.

CLIMATE AND RESILIENCE

Climate change poses significant challenges to the aviation industry, impacting airport operations, safety, and infrastructure through the intensification of extreme weather events, changes in atmospheric conditions, and rising sea levels. Conversely, the transportation sector and aviation industry are significant contributors to global greenhouse gas emissions and must integrate reduction strategies into their day-to-day operations. Given its low elevation and proximity to Tampa Bay, TPA faces a heightened exposure to the adverse effects of climate change, including flooding due to increased heavy precipitation and storm surge exacerbated by sea level rise.

Simultaneously, the Airport is undergoing substantial growth and requires ongoing infrastructure investments to enhance operations. Bolstering the Authority’s resilience to climate change and further integrating emissions reductions strategies into operations will ensure the long-term sustainability of HCAA’s four airports.

GOAL	ACTIVITY / PROJECT
Complete 90% of the primary actions listed in the 2019 Resiliency Action Plan	<ul style="list-style-type: none"> • Resiliency Action Plan initiatives implementation
Reduce greenhouse gas emissions by 10%	<ul style="list-style-type: none"> • Participation in the Airport Carbon Accreditation Program • Carbon Offset Program participation • Alternative fuels and technologies used for backup power generation
Florida-Friendly, nonwildlife attracting species will comprise 75% of new landscape projects	<ul style="list-style-type: none"> • Incorporate Florida-Friendly landscape criteria in updated sustainable design criteria • Allocate funds to support greenhouse rehabilitation

Goal: Complete 90% of the primary actions listed in the 2019 Resiliency Action Plan

HCAA completed a Climate Change Resiliency and Initial Action Plan in FY19 that focused on potential risks and vulnerabilities due to climate change impacts on TPA infrastructure and operations. The study found that several follow up activities were needed to help the Authority better prepare for the identified climate change effects and start to address more highly vulnerable infrastructure and operations at the Airport. Primary actions include monitoring activities such as equipment failure or operational disruptions due to increased temperatures or storm events, evaluation activities such as updating the Surge Analysis, and planning activities like electrical equipment elevation and other adaptation actions. Implementation of several of these activities has already been completed, such as updating the airport's storm surge model and assessing heat risk to airport works, with more work upcoming.

Strategy: Resiliency Action Plan initiatives implementation

The purpose of Resiliency Action Plan implementation is to inform the Airport of its vulnerabilities to climate change and help prioritize decisions, procurement, and upcoming projects to enhance climate change preparedness across HCAA and its operations.

Indicators:

- Percent of Resiliency Action Plan primary actions completed
- Occurrences of asset failure due to climate change impacts
- Occurrences and duration of operational disruption due to climate change impacts

Implementation:

As of 2023, the following primary actions have been completed:

- Conducted a Staff Heat Assessment to evaluate existing health and safety protocols and outdoor exposure risks for airport and tenant employees. Recommendations were developed to safeguard employee well-being during potential heat stress events resulting from climate change in the Tampa region.
- Completed a Storm Surge Inundation Analysis that included updated Sea, Lake, and Overland Surges from Hurricanes (SLOSH) modeling. This analysis incorporated projected sea level rise (SLR) values for 2022 and applied them to the latest topographic features and drainage systems at TPA, based on the conditions as of 2020. The assessment evaluated the impact of SLR on surge elevation for the years 2020, 2050, and 2100, accounting for hurricane categories 1-5 at high tide.
- Utilized the results from the Category 5 Hurricane projections for 2020 as a basis for a Storm Surge Vulnerability and Adaptation Assessment. This assessment identified the susceptibility of critical assets to potential storm surge flooding exposure.

The following primary actions are in progress:

- Development of adaptation strategies, concepts, and costs resulting from the Storm Surge Vulnerability and Adaptation Assessment.
- A Terminal Area Stormwater Analysis to update a portion of TPA's stormwater model to evaluate rainfall induced flooding, as well as compound flooding, which considers interactions between rainfall, storm surge, and tides, influenced by climate change. 2020, 2050, and 2100, accounting for hurricane categories 1-5 at high tide.

- Utilized the results from the Category 5 Hurricane projections for 2020 as a basis for a Storm Surge Vulnerability and Adaptation Assessment. This assessment identified the susceptibility of critical assets to potential storm surge flooding exposure.
- External entity coordination (e.g., TECO, FAA, Port of Tampa) to coordinate emergency response plans and resilience action.
- Development of a Weather Impact and Change Tracking Tool to monitor occurrences of asset and operations failure and resulting operational costs.
- A Vector-Illness Assessment to evaluate and update the Airport's existing emergency response preparedness plans for contagious diseases to proactively address vector-borne illness going forward.
- An Operational Resilience Assessment to evaluate potential risks and vulnerabilities to airport operations from non-climate emergencies or disruptive events and plan how to mitigate, prepare, respond, and recover from potential events.

Impact:

The Climate Change Resiliency and Initial Action Plan will incorporate climate considerations into policy, planning, and design processes at HCAA. By implementing these actions, the Authority will make significant progress in enhancing its resilience to climate change.

Goal: Reduce greenhouse gas emissions by 10%

Greenhouse gas emissions, primarily carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O), trap heat in the Earth's atmosphere, creating a natural greenhouse effect. Excessive emissions from human activities, such as burning fossil fuels, amplify this effect, leading to global warming, altered weather patterns, rising sea levels, and other disruptive climate change impacts. The aviation industry accounts for 2% of global GHG emissions, but as other sectors actively and rapidly reduce emissions, this share is expected to rise to double digits in the coming years. While airports lack direct control over airline operations emissions, reductions achieved and facilitated through airport activities are crucial in mitigating the aviation industry's impact on climate change and will contribute to a 90% reduction in GHG emissions by 2050. HCAA is currently on track to meet this goal.

Strategy: Participation in the Airport Carbon Accreditation Program

The Airport Carbon Accreditation (ACA) Program is a voluntary certification program that allows airports of any size to demonstrate their commitment to greenhouse gas reduction. ACA has six levels of accreditation including: (1) Mapping, (2) Reduction, (3) Optimization, (3+) Neutrality, (4) Transformation, and (4+) Transition. Of the four HCAA airports, Tampa International Airport (TPA), Tampa Executive Airport (VDF), and Peter O Knight Airport (TPF) have reached the Level 2 standard and Plant City Airport (PCM) is certified under Level 1. Continued participation at Level 2 or higher will ensure HCAA reduces emissions annually at each of its four airports.

Indicators:

- Level 2 accreditation for VDF, TPF, and PCM
- Level 3 accreditation for TPA

Implementation:

To maintain Airport Carbon Accreditation HCAA must comply with the following guidelines:

- The Authority must provide a Carbon Management Plan (CMP), detailing a specific GHG emissions reduction target and action plan for reduction. One CMP may be submitted for all four airports. The CMP must be revised every three years, with implementation status updates provided in the interim years.
- Each airport must submit an annual Carbon Footprint Report (CFR) that includes scope 1 and 2 emissions (directly controlled by the airport as defined in Level 1). Independent verification of these reports is required every other year, or when an airport is increasing its accreditation level.
- Level 2 accreditation requires CFRs to calculate total scope 1 and scope 2 emissions and demonstrate emissions reduction compared to a 3-year rolling average. Reductions may be demonstrated via an absolute metric (total CO₂) or a relative metric (CO₂ per passenger).
- Any major infrastructure changes—such as the addition of Airside D—and its impact on the emissions reduction metric must be outlined.
- Level 3 accreditation requires the inclusion of scope 3 emissions in the CFR, and the development of a Stakeholder Engagement Plan which also requires revision every 3 years.
- Level 3 accreditation upgrades may require enhancements to the Authority's data management and collection processes.

Impact:

HCAA demonstrated 10% scope 1 and 2 GHG emissions reductions across each of its four airports in 2022 relative to a 2018 baseline. Continued accreditation will ensure further emissions reductions across the Authority and promote HCAA's leadership in carbon management through a globally recognized symbol of sustainable achievement.

Strategy: Carbon Offset Program participation

Carbon offset programs allow participants to compensate for their GHG emissions by investing in projects or activities that reduce or remove an equivalent amount of GHG emissions elsewhere. Offset programs are best utilized after a carbon emissions reduction program has reached a mature state, supplementing emissions reductions where additional achievement is not feasible.

Indicators:

- MTCO₂ avoided through the purchase of offsets
- MTCO₂ avoided through passenger purchases

Implementation:

To participate in a carbon offset program, HCAA must initially determine whether it intends to collaborate with a carbon offset provider or simply procure offsets independently. It's crucial to note that the carbon offset industry lacks a standardized legal framework for defining offsets and exclusive ownership, which can lead to inconsistency and unreliability if a reputable supplier is not carefully chosen. It is essential that carbon offsets are properly registered, independently verified, and demonstrate additionality, indicating that the emission reduction project would not have taken place under a typical business-as-usual scenario.

As airports lack direct control over tenant operations, including airlines, and passenger vehicular travel to and from the airport, these emissions are often excluded from initial GHG inventories and are not typically offset by the airports themselves. However, airports can offer passengers the opportunity to offset their own emissions through voluntary passenger programs, such as the Good Traveler program. The Good Traveler, founded by San Diego International Airport as the first aviation-focused carbon offset program, enables travelers to offset the GHG emissions linked to their flights by purchasing carbon offsets alongside their tickets. With the participation of over 20 Aviation Partners, this program empowers travelers to proactively reduce the carbon footprint associated with their air travel.

Impact:

Carbon offsets allow organizations to account for unavoidable emissions and are typically available for a variety of projects such as community development, ecosystem protection, and technological solutions that reduce GHG emissions. The purchase of additional carbon credits to offset emissions across HCAA operations will ensure the Authority reaches more ambitious GHG emissions reduction targets over time.

Strategy: Alternative fuels and technologies used for backup power generation

Airports are critical infrastructure that require continual operation, regardless of external factors such as power outages. They often serve as hubs for emergency response operations during natural disasters or other crises. Backup generators enable the airport to power emergency services, ensuring essential systems continue to function even during power failures.

HCAA currently relies on diesel generators for backup power that supports evacuation of the terminal and airside only. To reduce GHG emissions while enhancing the resilience of its backup power systems, alternative fuels like renewable diesel, biodiesel, renewable natural gas, propane, along with technologies such as microgrids and battery storage should be considered.

Diesel fuel produces higher amounts of GHG emissions per unit of energy compared to alternative fuels. By considering alternative fuel options, HCAA retains backup power generation capacity while also decreasing GHG emissions. Alternative backup power technologies such as on-site microgrids can be considered to expand the airport's resilience to power disruption. Paired with generators, and/or battery storage systems charged by solar panels, a microgrid allows the Authority to operate independently of the main power grid, providing backup power to the system during grid failures and allowing critical infrastructure and essential services to continue.

In addition to emissions and resilience benefits, the cost of alternative fuels can be more stable and cost-effective than diesel, depending on factors like local availability and government incentives. For example, biodiesel is often cheaper than diesel fuel. Additionally, tax rebates or subsidies are available for using alternative fuels, further reducing operating costs. Furthermore, alternative fuels generally burn cleaner than diesel, leading to reduced engine carbon deposits and longer engine life. This can result in lower maintenance costs and longer intervals between overhauls.

The choice of alternative technology for backup generation depends on various factors, including fuel availability, environmental considerations, energy efficiency, and specific application requirements. HCAA is beginning the process of assessing these factors and conducting a thorough feasibility study to determine the most suitable backup generator technology for a given situation. In some cases, a combination of different technologies may be used to provide a robust backup power solution.

Goal: Florida-Friendly, non-wildlife attracting species will comprise 75% of new landscape projects

With a collection of over 3,500 live plant species and a dedicated team of landscape professionals, HCAA is a steward of biodiversity across its facilities. To further support biodiversity and promote one of the region's most unique assets, the Authority is incorporating Florida-Friendly species into its landscape designs. Plants are chosen for landscaping and gardening because they are adapted to the state's unique combination of heat, humidity, and occasional extreme weather events. The term Florida-friendly encompasses both native and naturalized plant species, meaning those that are adapted to the local environment and support ecosystem health.

Strategy: Incorporate Florida-Friendly landscape criteria in updated sustainable design criteria

The purpose of this initiative is to ensure that Florida-Friendly species are deliberately considered and selected when developing landscape projects. This effort will also support greater collaboration between HCAA's landscape architect contractor, the landscape team, and HCAA's wildlife biologist to determine appropriate plant selections for varying projects.

Indicators:

- Percent of landscape (ft²) comprised of Florida-Friendly landscaping
- Number of project contractors or employees with Florida-Friendly Landscaping professional certification (FFLCP)

Implementation:

The Florida-Friendly Landscaping (FFL) program — developed by the University of Florida Institute for Food and Agricultural Sciences — is a set of nine guiding principles designed to promote environmentally sustainable and resilient landscaping practices in Florida. These principles encourage appropriate plant selection, efficient water and fertilizer use, mulching to conserve soil moisture, integrated pest management, plant waste recycling, stormwater runoff reduction, and protection of waterfronts. An online Florida-Friendly Plant Guide helps landscape professionals and other users to follow these principles. Plants within the guide are organized by type, shape, color, environmental conditions such as light and water, and Florida native status. Incorporation of FFL guidelines and tools into the updated Sustainable Design Criteria Manual and supporting compliance tools will ensure criteria are followed.

The 5th FFL principle "Attract Wildlife" is incompatible with airports, however, and should not be incorporated into HCAA project landscape design. Airports require an environment that is less attractive to wildlife to minimize the potential for wildlife-related incidents, contributing to safer and more efficient airport operations. To mitigate these risks, these FLL principles will be modified to include various wildlife management strategies.

The strategy will result in a documented collaborative process between HCAA's official landscape architect contractor, the internal landscape team, and HCAA's official wildlife biologist to decide appropriate plant selections for each project. All parties will meet to provide input on project landscape design and will grant approval on all final landscape design plans.

Impact:

Incorporating Florida-Friendly plant species into landscaping efforts can play a crucial role in increasing resilience to flooding, promoting water management, and supporting the overall health and sustainability of ecosystems across HCAA's campuses. Native and naturalized landscapes require fewer resources for plant maintenance, reducing costs and improving environmental health through the reduction of nutrient pollution. Complex and deep root systems characteristic of these landscapes increase the soil's capacity to store water, enhancing resilience to surface runoff, erosion, and flooding from storm surge and heavy precipitation events. Furthermore, native and naturalized plant species are proven to sequester greater amounts of carbon than non-native alternatives.

Beyond environmental advantages, the use of Florida-Friendly plants enhances the Airport's aesthetics, providing a welcoming and attractive environment for passengers and visitors.

Strategy: Allocate funds to support w

As a gateway to Florida for travelers, Tampa International Airport places paramount importance on its appearance, and the TPA landscaping team is committed to crafting a vibrant environment while integrating eco-friendly technological upgrades. Most plants across HCAA's properties are grown within a greenhouse located at TPA. This greenhouse plays a pivotal role in nurturing visitors' experience of TPA, with its lush exterior and interior plant displays.

Recent extreme weather events (e.g., Hurricanes Ian, Idalia, etc.) have damaged the greenhouse, and limited resources have hindered its restoration. Increased funding for greenhouse rehabilitation, one of TPA's most distinctive assets, will bolster HCAA's Landscaping Program and elevate the Authority's cultural significance.

Enhancing greenhouse operations will not only boost the visibility of HCAA's landscaping teams but also foster ongoing collaboration with HCAA's Public Art Program and local non-profits to educate passengers about Florida's unique native flora and fauna. TPA's interior landscape design authentically reflects the region's natural resources, enriching the Airport's aesthetic character and reinforcing TPA's role as a gateway to Florida.

Funding

Adaptation grant funding is available under the Resilient Florida Program and may provide funding for additional vulnerability assessments, stormwater infrastructure assessments, and other resilience-related planning activities.

CLEAN FUELS

Clean Fuels are alternatives to petroleum-based fuels such as gasoline, diesel, and Jet A. Clean Fuels encompass vehicle and infrastructure technologies that can help the airport reduce emissions, protect air and water quality, reduce operational costs, and increase resilience. Clean fuels include electricity, biofuels, propane, hydrogen, sustainable aviation fuels, and other renewable fuels, as well as energy efficient vehicle technologies.

Clean fuels goals and strategies initially focus on the Authority’s fleet of vehicles, identifying the right clean fuel vehicles and infrastructure for the task, without compromising operational capability. Accordingly, the Authority is transitioning away from a clean fuel initiative undertaken in the past – use of compressed natural gas – to options that better balance environmental protection, health, and safety with economic performance. Looking forward, having established a proven platform for clean fuels, the Authority can redirect its focus towards supporting aviation stakeholders in their efforts to employ clean fuel technologies.

GOAL	ACTIVITY / PROJECT
Transition 60% of maintenance fleet to clean fuels	<ul style="list-style-type: none"> • Implement HCAA maintenance fleet electrification program • Provide electric vehicle support equipment for electric vehicle fleet • Transition additional maintenance fleet vehicles to clean fuels
Transition 50% of HCAA bus fleet to clean fuels	<ul style="list-style-type: none"> • Transition HCAA-owned and leased buses to clean fuels

Goal: Transition 60% of maintenance fleet to clean fuels

HCAA manages a fleet of over 100 vehicles necessary to operate and maintain its airports. Clean fuels provide an opportunity to meet these requirements with less expense and less exposure to health, safety, and environmental risks. Currently 20% of HCAA's fleet utilize clean fuels. This includes several electric carts. Reaching 60% involves transitioning more than 60 vehicles to clean fuels over the next several years. Transitioning remaining vehicles will be revisited as suitable clean fuels technologies become available.

Strategy: Implement HCAA maintenance fleet electrification program

This strategy aims to transition HCAA's maintenance fleet assets to electric or other clean fuel vehicles to reduce cost, minimize emissions, and enhance users' experience, while maintaining fuel diversity for resilience. The strategy is based on analysis of potential fuel and maintenance savings for vehicles slated for replacement. Currently focused on a transition to electric vehicles, the strategy will remain flexible and utilize other clean fuels where advantageous.

Indicators:

- Number of maintenance fleet vehicles using clean fuels
- Annual maintenance fleet fuel consumption in gaseous gallons equivalent by fuel type
- Annual maintenance fleet vehicle miles traveled by fuel type



Cost / Benefit Summary

- NPV: \$187,000
- ROI: 31%
- Contribution to 2030 Goal: 100%
- Annual GHGa in 2030: 160
- \$ / GHGa: \$528

Implementation:

This project will implement the HCAA Maintenance Fleet Electrification Program as defined by HCAA's October 15, 2022, Project Management Plan (Project # 7180 23). This plan identifies approximately 66 vehicles, or about 62% of the Maintenance fleet for replacement with electric vehicles versus gasoline equivalents. Electric vehicles make / model may include the Chevy Bolt instead of Chevy Cruze, the Ford F-150 Lightning instead of Ford F-150, the Ford eTransit instead of Nissan NV200, and electric all-terrain vehicles (ATV) versus gasoline models, although other makes / models may be procured depending upon availability and applicability to fleet needs. Under this project, transition to hybrid-electric, electric, biofuel, hydrogen, or propane vehicles would also be possible. Natural gas vehicles will not be considered. Implementation of this plan includes selling existing vehicles and procuring new ones.

Impacts:

This strategy could generate \$187,000 in net benefit (i.e., excess benefit after taking cost into account) to the Authority, or a return on investment of 31%. The project is also expected to reduce greenhouse gas emissions by 160 tons per year (GHGa) at a cost of \$528 per GHGa.

Acquisition cost for vehicles identified in the HCAA Fleet Electrification Program exceed \$2M, however, this project focuses on the incremental cost and benefit of the transition, since the alternative is to procure a similar number of gasoline vehicles. Comparing the cost of electric to gasoline vehicles results in an incremental cost of nearly \$600,000 for electric vehicles. Additional recurring costs include potentially higher insurance premiums for the more expensive electric vehicles.

Benefits include an approximate 75% reduction in fuel costs, due to the efficiency of electric motors, and a 25-40% reduction in maintenance costs, due to fewer parts. An additional benefit is revenue generated from selling existing vehicles. Because this benefit is included, revenue from sale of electric vehicles at the end of their useful life is not included in the project's business case. A nominal discount rate of -0.3% (Office of Management and Budget, March 2022) is used to evaluate net present value, including inflation.

Strategy: Provide electric vehicle support equipment for electric vehicle fleet

Transitioning a significant number of fleet vehicles to EVs requires providing infrastructure to charge those vehicles. Currently aiming for an additional 66 EVs, HCAA will need to provide a similar number of Level 2 (L2) EV charge ports, capable of filling batteries from empty in six to nine hours. Fleet vehicles will likely be charged overnight, or when not in service. Accordingly, HCAA may be able to provide less than 66 charge ports depending on an analysis of fleet duty cycles, which could reveal the ability of a single port to charge multiple vehicles successively during the day. EV chargers can be procured to provide two charge ports per unit, at a cost of about \$6K - \$12K installed. This strategy is synergistic with the EV Master Plan included within the Mobility section of this Sustainability Management Plan.

Strategy: Transition additional maintenance fleet vehicles to clean fuels

HCAA's strategy to transition approximately 66 vehicles to clean fuels is based on a near term cost / benefit analysis that considers potential fuel and maintenance savings for vehicles planned for replacement. Moving forward, as additional passenger vehicles near replacement, the Authority will continue to evaluate the cost and benefit of transition to EVs or other suitable clean fuels. Heavier vehicles, as well as specialty vehicles, including Police and Fire vehicles, will require additional analysis to determine if a clean fuel alternative can meet operational needs. Technological and market advances may result in electric and hydrogen vehicles becoming appropriate for heavy-duty or specialty vehicles. Meanwhile, blends of ethanol and biodiesel, which can be "dropped in" to existing vehicles without any modification or significant changes to operations and maintenance, will be considered for nearer-term implementation.

Goal: Transition 50% of HCAA bus fleet to clean fuels

The Authority operates a bus fleet to shuttle employees from parking to work locations. It also utilizes buses to provide redundancy to the electrically powered SkyConnect people-mover. The transition to clean fuel buses is underway, with four battery electric buses (BEBs) coming on-line in 2023. Additional transitions to BEBs or use of biodiesel will be necessary to achieve this goal.

Strategy: Transition HCAA-owned and leased buses to clean fuels

HCAA is transitioning owned and leased buses to electricity and potentially biodiesel to reduce costs, lower emissions, and improve stakeholders' experience. With four BEBs in operation, using biodiesel in existing buses is a quick way to cost-effectively expand use of clean fuels in buses.

Indicators:

- Number of buses using clean fuels
- Annual bus fuel consumption in gaseous gallons equivalent by fuel type
- Annual bus vehicle miles traveled by fuel type



Cost / Benefit Summary

- NPV: \$103,000
- ROI: ∞
- Contribution to 2030 Goal: 162%
- Annual GHGa in 2030: 311
- \$ / GHGa: \$0

Implementation:

HCAA has already procured four 40-foot, 16-ton electric buses built by BYD, which were procured using grant funds from FAA's Zero Emission Vehicle (ZEV) program. Meanwhile, the Authority values fuel diversity in its fleet because it provides resilience in the event of supply disruption. Accordingly, it intends to maintain a fleet of diesel buses. Procuring and utilizing a blend of 20% Biodiesel, 80% Diesel (B20) in the Authority's owned and leased diesel fleet can maintain fuel diversity using a cleaner fuel. B20 is available locally and is used by USF's Parking and Transportation Services and CSX's locomotive fleet. While the Cost / Benefit Summary of this project is focused on biodiesel, HCAA is also considering expanding its electric bus fleet via the FAA ZEV program in the future. Additional electric buses would move the authority towards a 100% clean fuels bus fleet.

Impacts:

Using B20 in HCAA's diesel buses is expected to generate \$103,000 in net benefit (i.e., excess benefit after taking cost into account).

Return on investment is immediate, since B20 is a "drop in" fuel, meaning that no significant alterations in equipment or maintenance are required to utilize it. For the past several years, the national average price of B20 has been less than Diesel. For example, during 2023 B20 has been about 5% cheaper than diesel, according to the US Department of Energy's Alternative Fuel Price Report. No difference is assumed in the cost of diesel exhaust fluid, maintenance and repair, insurance, licensure / registration.

The project is also expected to reduce greenhouse gas emissions by 311 tons per year (GHGa) at a cost of \$0 per GHGa – a particularly cost-effective greenhouse gas reduction strategy.

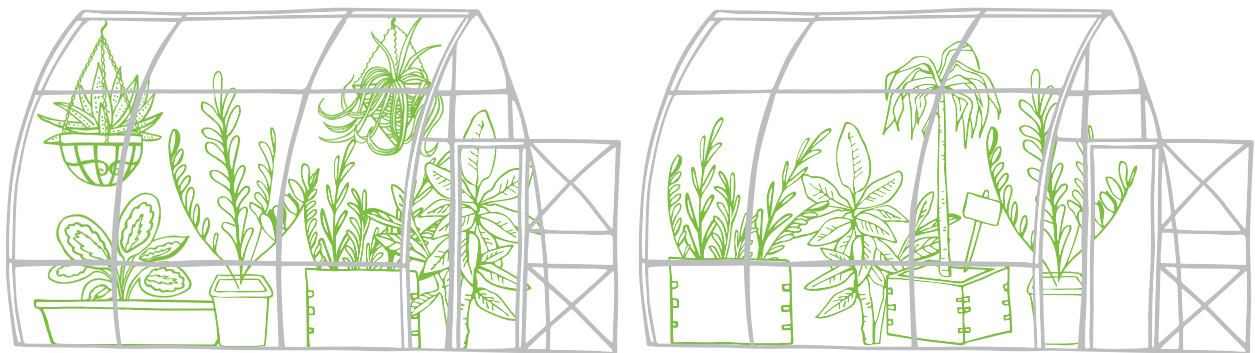
A nominal discount rate of -0.3% (Office of Management and Budget, March 2022) is used to evaluate net present value, including inflation.

Funding

TPA has received FAA Zero Emission Vehicle funding for electric buses. In addition, the Bipartisan Infrastructure Law and Inflation Reduction Act have made funds available for clean fuels projects, accessible via FDOT District 7 and the Hillsborough MPO. Diesel Emission Reduction Act (DERA) funding is another grant source administered by the US EPA and Florida DEP and aimed at replacing diesel vehicles with cleaner models. Los Angeles World Airports recently utilized DERA to replace transit buses with BEBs.



As a gateway to Florida for travelers, Tampa International Airport places paramount importance on its appearance, and the TPA landscaping team is committed to crafting a vibrant environment while integrating eco-friendly technological upgrades.



Greenhouse rehabilitation

MOBILITY

Airport mobility is the movement and transportation of people and goods to and within the airport. It encompasses a wide range of modes of transportation, services, and infrastructure that facilitate efficient and convenient transfer of passengers, employees, cargo, and aircraft. Mobility is a critical component of overall operations and passenger experience.

Initiatives to elevate mobility such as electric vehicle (EV) adoption, public transit, shared mobility services, and efficient parking facilities encourage travelers to choose more sustainable transportation modes, reducing the reliance on private vehicles. These mobility enhancement measures can help reduce congestion and traffic at the airport, leading to less pollution and fewer delays for passengers, employees, airlines, and the wider public. These options foster environmental stewardship and social responsibility, while also increasing the airport’s connectivity, enhancing its role as an economic engine for Tampa Bay.

GOAL	ACTIVITY / PROJECT
Include EV infrastructure at 250 additional public and employee parking spaces	<ul style="list-style-type: none"> • Develop an EVSE Forecast Study • Develop EV Master Plan
Enhance efficient mobility opportunities for employees and travelers to TPA	<ul style="list-style-type: none"> • Develop EV Rental Car Plan • Enhance traffic management • Expand Ridesharing

Goal: Include EV infrastructure at 250 additional public and employee parking spaces

TPA recognizes the importance of facilitating use of EVs by its passengers and employees. Currently, TPA offers 100 Level 2 (L2) chargers across its parking structures. L2 chargers can fill an EV battery from empty in six to nine hours. To align with the increasing use of EVs in the Tampa Bay region, HCAA aims to install Electric Vehicle Support Equipment (EVSE), which includes EV chargers and supporting infrastructure, at 250 parking spaces, constituting 1% of the total parking spaces. Currently, the airport has EVSE at 0.004% of spaces. This strategic expansion allows the Airport to grow its infrastructure without getting ahead of demand.

Strategy: Develop an EVSE Forecast Study

This study assesses the demand for EVSE, providing insights to inform the Authority's infrastructure planning. The study will analyze trends in EV adoption, contrasting the current rate of EV uptake both nationally and locally with anticipated future growth. The study also considers factors causing wider adoption of EVs, including automobile manufacturer strategy, consumer preferences, technology, and public policy.

Indicators:

- Projected EV use and associated EVSE demand growth in the region through 2030
- Projected EVSE quantities by type and year in low, medium, and high scenarios

Implementation:

The Study will baseline the current quantity, type, and distribution of EVSE among TPA's parking services and will estimate requirements through 2030. Stakeholder engagement with peer airports and TECO will also be conducted. Based on an understanding of the Airport's parking supply and demand, the study will develop recommendations for allocating EVSE to different parking services / infrastructure (e.g., Hourly, Daily, Long-term, and Cell Phone lots) for each future EVSE quantity requirement scenario. This will include evaluation of infrastructure of private vehicles separately from rental cars. Based on this allocation, recommendations will be made for the distribution of EVSE by type (e.g., Level 1, 2 and 3). While TPA currently does not require payment for EV charging, fees may be charged in the future to maintain a high-quality level of service. Consequently, the study will include recommendations for rate structures aimed at funding operations and maintenance and service improvements. These rate recommendations will be tailored to the specific EVSE service type and adhere to established airport standards.

Impact:

The results of this study will provide insight into the current and forecasted growth of EV adoption and occupancy patterns in parking facilities at TPA. This data will serve as the foundation for the development of the Authority's comprehensive EV Master Plan.

Strategy: Develop EV Master Plan

Green parking options are a growing concern for passengers and employees at HCAA. A comprehensive EV Master Plan effectively meets these demands, providing adequate EVSE areas airport wide. This EV Plan will be crafted in alignment with HCAA's broader electrification goals spanning its entire range of facilities, including considerations for Transportation Network Companies (TNCs) and taxis, GSE, fleet vehicles, and aircraft.

Indicators:

- EVSE quantities
- Charging infrastructure deployment rate
- Charging infrastructure utilization rate
- EVSE power use and demand

Implementation:

The EV Master Plan will include the following:

- Estimates of infrastructure requirements for electric TNCs, taxis, GSE, fleet vehicles, and aircraft.
- Feasibility study to understand current facility conditions and options for siting EV chargers at specific locations including consideration of existing conduits, conductors, junction boxes, transformers, etc.
- Specific EV charger technologies should be evaluated and specified, including features for networking, data management, and "smart" power use and demand controls.
- Evaluate need for expanded capacity of electrical infrastructure and upgraded electrical panels, transformers, substations, etc.
- Estimates of schedules, costs and available funding sources should be developed to position TPA to participate in unprecedented levels of state and federal support for EVSE.
- Delivery methods and models of ownership and operation will also be important for TPA to consider and should be evaluated as part of capital planning.

Impact:

The EV Master Plan will promote the adoption of electric vehicles among passengers, employees, and other airport stakeholders, reducing emissions and improving air quality. Moreover, the plan will optimize the allocation of EV charging infrastructure, ensuring efficient use of airport real estate and power infrastructure as it develops strategies for expansion of its electrical infrastructure to meet electrification demands. This translates into operational efficiency, cost savings, and a positive impact on environmental footprint. Passengers and other stakeholders will benefit from convenient and reliable charging options. The development of a formalized Plan will aid in the Authority's infrastructure planning efforts and may help qualify the Authority for additional funding.

Goal: Enhance efficient mobility opportunities for employee and travelers to TPA

By optimizing transportation options within and around the airport, TPA can reduce congestion, streamline operations, and promote environmentally responsible travel choices. This goal fosters convenience for travelers, ensuring they can access the airport seamlessly via various modes of transportation, including public transit, bike routes, and car-sharing services. For employees, it supports reduced commute times and a more accessible workplace, boosting job satisfaction and promoting wellness. Ultimately, the endeavor to enhance efficient mobility not only benefits individuals but also contributes to the airport's reputation as an innovative and eco-conscious transportation hub in the region.

Strategy: Develop EV Rental Car Plan

There are 15 on-airport rental car providers at TPA, each with ambitious electrification plans. Several providers have already added EVs to their fleets despite limited EVSE infrastructure to support them. Hertz has invested heavily in its EV offerings, recently installing L2 and Direct Current Fast Chargers (DCFC), capable of filling a battery from empty in one to two hours, in their service area. EV growth across RAC fleets may result in pressure for infrastructure upgrades in the ConRAC. RACs are likely to prefer DCFC chargers at their Quick Turnaround Areas (QTA) in addition to L2 chargers at their Ready-Return areas, resulting in a large power demand. Development of a supplemental EV RAC Plan is critical to support the substantial infrastructure enhancement necessary to harmonize EV demand at the Airport with RAC's business model.

Indicators:

- Present and forecasted RAC EV fleet and percent of RAC EV fleet
- Average forecast power demand in ConRAC
- Percent of EV rental sales per concession

Implementation:

Stakeholder engagement conducted as part of the EV Infrastructure Forecast Study will include a standardized survey or interview for rental car companies serving TPA and involve contact with a specific set of peer airports to benchmark planning for rental car companies' EVSE needs.

Within the Plan, careful consideration will be given to determining the quantity, types, and distribution requirements of EVSE at both Quick Turnaround Areas (QTA) and ready/return stations, catering to rental car providers within the ConRAC facility.

Impact:

Many RAC companies will prioritize offerings to airports with sufficient EVSE to support their electric fleets. The EV Rental Car Plan ensures the Authority's readiness to accommodate growing demand in this sector. By making EV rentals accessible, TPA actively promotes sustainable tourism characterized by zero tailpipe emissions, thereby improving local air quality and reducing scope 2 and 3 emissions. This initiative enhances the overall visitor experience and demonstrates a commitment to environmentally responsible travel throughout the Tampa Bay region.

Strategy: Expand Ridesharing

This initiative encompasses various rideshare options such as vanpooling and carpooling, expanding employees' and contractors' choices for sustainable transportation. By providing staff and contractors with access to rideshare programs, the airport can reduce its environmental footprint, alleviate demand for onsite parking, and reduce transportation costs. Development of a comprehensive rideshare/commute program would include a communication platform for employees to request services. Rideshare assistance strategies, like discounted and/or pre-tax transit pass programs, can also be developed to foster readily accessible sustainable transportation options. The airport is already engaging with service providers like Enterprise, whose Commute program supplements its Rent-a-Car operations at TPA. Collaborative efforts with transit authorities, such as TBARTAs vanpool program and Hillsborough Area Regional Transit Authority (HART) micro-mobility initiatives, enhance mobility with efficient transportation options to and from the airport.

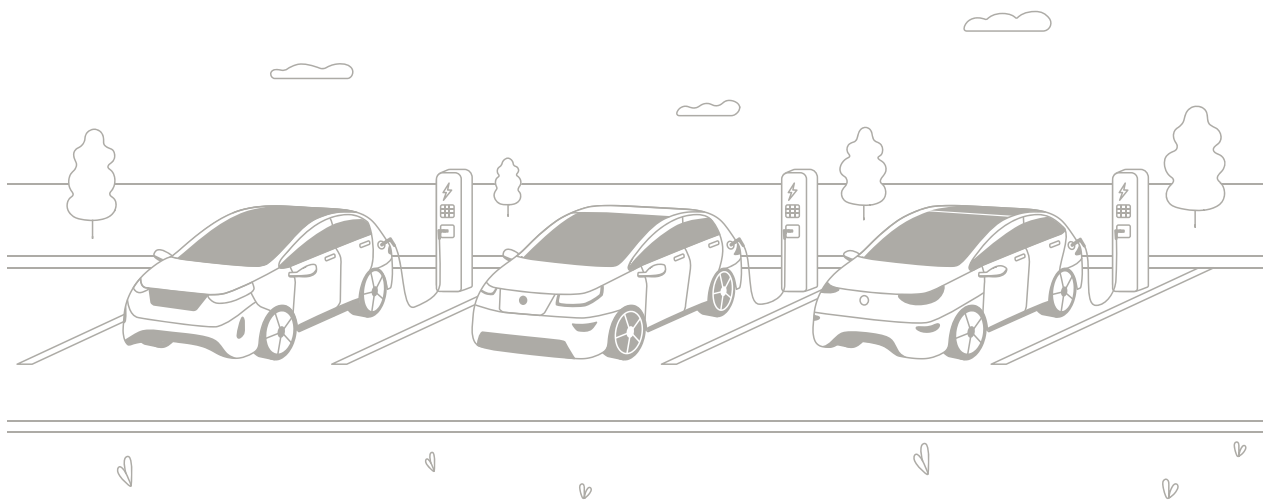
Funding

Funding from FAA, as well as new federal formula and discretionary programs, many of which are managed locally by FDOT and Plan Hillsborough, and revenue generated from competitive usage fees may support the expansion of the EVSE network across the Authority. For example, infrastructure funding may be secured in concert with the Hillsborough Transportation Planning Organization Electric Vehicle Infrastructure Plan (EVIP), which aligns with federal and state funding initiatives such as the Infrastructure Investment and Jobs Act (IIJA), Inflation Reduction Act, Diesel Emissions Reduction Act (DERA), and the Diesel Emissions Mitigation Program (DEMP) resulting from the Volkswagen Settlement, all aimed at enhancing mobility options. Additionally, the RAISE (Rebuilding American Infrastructure with Sustainability and Equity) program offers grants for projects aimed at modernizing transit systems to make them safe, accessible, affordable, and sustainable.

Recently, the airport has tapped the FAA's Zero Emission Vehicles (ZEV) program to support procurement of EVs and EVSE.



Electric vehicle adoption, public transit, shared mobility services, and efficient parking facilities encourage travelers to choose more sustainable transportation modes.



Mobility initiatives

APPENDIX

This appendix collects records of all meetings and workshops conducted to develop the SMP.

Beginning in 2019, this effort involved a comprehensive evaluation of the existing sustainability program. This assessment established an updated performance baseline to gauge progress to date, conducted thorough benchmarking with industry peers and stakeholders, and surveyed and conducted focus group discussions with HCAA employees to gather their feedback on the program. The analysis underscored significant sustainability success, while highlighting opportunities for advancement in the next phase.

Staff from across the Authority's departments participated in four workshops to define the program's mission and vision, evaluate goals, consider implementation strategies, and identify supporting tools. Progress was interrupted in March 2020 due to the COVID-19 pandemic, with activities resuming in July 2022 in a collaborative effort that engaged 45 HCAA staff from 16 different departments. Staff were organized into four working groups to facilitate collaboration and met over a dozen times to steer sustainability management at the Authority within 8 focus areas.



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