



Carbon Management Plan Houston Airport System

April 2024



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1. ORGANIZATIONAL COMMITMENT AND GOVERNANCE STRUCTURE

In April 2020, the City of Houston and its Office of Sustainability committed to the *Houston Climate Action Plan*. The plan contains a science-based, community-driven strategy for the City to reduce greenhouse gas (GHG) emissions and meet the Paris Climate Agreement goal of carbon neutrality by 2050.¹ In the Plan's 2014 baseline year, transportation fuel sources accounted for 47 percent of the City's total greenhouse gas emissions, while energy generated to power homes, businesses, and industry represented 49 percent of the City's greenhouse gas emissions. The remaining 4 percent of emissions were associated with landfill waste and wastewater treatment. The City committed to interim goals of 40-percent reduction in total GHG emissions by 2030 and 75 percent reduction by 2040. In the transportation focus area, targets include converting nonemergency, light-duty municipal fleet to 100 percent electric vehicles by the year 2030, and reducing vehicle miles travelled (VMT) per capita by 20 percent by 2050.²

The Houston Airport System (HAS) is owned by the City and operates three airports: George Bush Intercontinental Airport (IAH), William P. Hobby Airport (HOU) and Ellington Airport (EFD)/Houston Spaceport. IAH and HOU both have commercial service, while EFD serves general aviation tenants as well as NASA and military operations. HAS functions as a self-sufficient enterprise fund of the City and supports the City's sustainability initiatives. HAS is committed to improving energy efficiency and reducing carbon emissions, aiming to become carbon neutral by 2030.

In 2022, the City passed the *Municipal Building Decarbonization and Benchmarking Policy*, which called for HAS to participate in the Airport Carbon Accreditation (ACA) program, a global program that aims in reducing airport carbon emissions through seven levels of certification. In October 2023, all three HAS airports achieved Level 1 of the ACA program. In line with ACA requirements, HAS leadership published an *Emissions Reduction Policy* in March 2023 and committed to conducting annual GHG inventories for all three airports.








HAS's commitment to sustainability was initially outlined in HAS's *Sustainable Management Plan (SMP)*, which was published in August 2018. The SMP defines functional, resource-based sustainability categories to organize sustainable projects and initiatives. Sustainability initiatives consist of recommended short- and mid-term actions designed to enhance sustainability performance and achieve sustainability goals. Table 1 outlines the seven sustainability categories of the SMP and their corresponding goals.

HAS has successfully implemented several sustainability measures mentioned in the SMP, including energy efficiency upgrades and developing sustainable design guidelines for construction projects. Additionally, HAS is working to replace diesel and gasoline-powered fleet vehicles with electric vehicles.

¹ City of Houston. City Launches Houston's First-Ever Climate Action Plan on 50th Anniversary of Earth Day. April 22, 2020. <http://greenhoustontx.gov/pressrelease20200422.html>

² City of Houston. Houston Climate Action Plan. April 2020. <http://greenhoustontx.gov/climateactionplan/CAP-April2020.pdf>

Table 1. HAS Sustainability Categories and Goals

Category	Goal
 Solid Waste/Recycling	<p>Track and increase the landfill diversion rate at IAH and HOU.</p> <p>For new construction/renovation at IAH and HOU, design and build waste/recycling infrastructure.</p>
 Energy	<p>Reduce energy use at IAH and HOU by 5 percent per year on a per square foot basis.</p> <p>For new construction/renovation at IAH and HOU, design and build to achieve at least 20 percent energy performance over the current local energy code.</p>
 Water	<p>Reduce potable water use by 5 percent by fiscal year 2024.</p>
 Greenhouse Gas Emissions	<p>Quantify and track GHG emissions as a performance indicator of energy and solid waste performance.</p>
 Sustainable Design	<p>Incorporate SMP goals into HAS guidance by end of fiscal year 2018.</p>
 Sustainable Assets and Infrastructure	<p>Track reliability and condition of infrastructure assets to inform business decisions.</p>
 Sustainable Procurement	<p>Develop guidelines for contractors to demonstrate a commitment to sustainability and embed Sustainability Management Plan elements into HAS projects.</p>

2. RESOURCE ALLOCATION

2.1 Roles and Responsibilities

A Carbon Management Plan (CMP) contains carbon-focused initiatives that require planning and resources to execute, including staff time, expertise, and financial resources. HAS is responsible for ensuring compliance with environmental laws, including noise management and sustainability planning, through education, training, inspection, analysis, design, implementation, and enforcement. In order to achieve this objectives, HAS recognizes that no one department can undertake the endeavor.

As a result HAS has taken a multi-pronged approach on on the internal roles and responsibilities necessary to execute the CMP. Implementation of the CMP is a multi-disciplinary responsibility among three key teams; partnership among personnel in HAS Planning & Development Division's Environmental Section and Sustainability Section, the Infrastructure Division's Energy Management Section and Resiliency Section and the Maintenance Division; collectively responsible for collaborating on energy and carbon management across the organization to identify challenges and opportunities in carrying out the CMP.

Additionally these teams coordinate with the City Of Houston Office of Resilience and Sustainability to collaborate on sustainability and energy goals.

2.2 Capital Improvement Plan Funding

As an enterprise fund of the City, HAS obtains funding through the City's Capital Improvement Plan (CIP) for aviation facility infrastructure improvements. The CIP is a five-year plan that is updated annually and approved by the City Council.³ Funding for aviation facilities within the CIP comes from the Airports Improvement Fund, Federal Aviation Administration (FAA) Airports Improvement Program (AIP), Department of Homeland Security, Commercial Paper/ General Airport Revenue Bonds, and Passenger Facility Charges.⁴ Carbon management, and sustainability projects more generally, must be included in the CIP to secure funding. In terms of financial resource allocation, as of 2023, aviation sustainability projects do not have a set annual budget within the CIP, but since sustainability is cross-functional, the projects may be funded through various other planning, design, and construction projects. HAS intends to consider the future emissions impact of investments and capital improvement projects as a basis for prioritizing sustainability projects.

³ City of Houston. 2023. Capital Improvement Projects. <https://www.houstontx.gov/cip/>

⁴ City of Houston. Fiscal Year 2024-2025 Capital Improvement Plan. Aviation Facilities. https://www.houstontx.gov/cip/24cipadopt/e_has.pdf

2.3 External Funding

HAS also leverages external funding for carbon management and sustainability projects that align with priorities established in the SMP. HAS has been successful in securing grants and utility rebates to fund projects; for example, HAS pursues incentives from the Centerpoint Energy City Smart Rebate Program⁵ to fund energy efficiency projects. See Section 4 for additional information on rebate value and projects.

Based on the project type, HAS also pursues federal grant funding, including but not limited to the FAA's Voluntary Airport Low Emissions (VALE) Program and Zero Emissions Vehicle (ZEV) Program, along with AIP Supplemental Discretionary Grants funding. HAS has received funding for a variety of sustainability projects through the VALE and ZEV programs, as identified in Section 3. In September 2023, HAS secured a VALE grant and is currently pursuing multiple ZEV grants that are further described in Section 4. HAS secured Fiscal Year 2022 AIP Supplemental Discretionary Grants funding to complete two projects that are described in Section 3.

⁵ CenterPoint Energy. 2023. SCORE and CitySmart Program. <https://www.centerpointenergy.com/en-us/SaveEnergyandMoney/Pages/score-city-smart-programs.aspx?sa=ho&au=bus>

3. CARBON MANAGEMENT INITIATIVES

HAS employs numerous strategies to address carbon emissions at all levels of operations, such as strategies to reduce Scope 1 and 2 emissions by addressing fleet, buildings, and other infrastructure. Additionally, HAS employs strategies to address Scope 3 emissions through highlighting partnerships with airlines and engaging in other city-wide efforts. The emission-reduction strategies are organized into the following categories, and each has a corresponding subsection to further describe the initiatives:

- Renewable or low carbon energy sources (Section 3.1)
- Alternative fuel use (Section 3.2)
- Green electricity (Section 3.3)
- Resilient design and energy efficient buildings (Section 3.4)
- Energy efficiency measures (Section 3.5)
- Vehicle fleet modernization and electrification (Section 3.6)
- Solid waste management (Section 3.7)
- Public transportation (Section 3.8)
- Educational campaigns (Section 3.9)
- Stakeholder partnerships and tenant initiatives (Section 3.10)

Table 2 summarizes the categories of measures and their implementation status at the three HAS-owned airports.

Table 2. Summary Table of Measures

Category	IAH	HOU	EFD
Renewable or low carbon energy	x	x	x
Alternative fuel use	x	x	x
Green electricity	x	x	x
Resilient design and energy efficient buildings	x	x	x
Energy efficiency measures	x	x	x
Vehicle fleet modernization and electrification	x	x	x
Solid waste management	x	x	x
Public transportation	x	x	
Educational campaigns	upcoming	upcoming	upcoming
Stakeholder partnerships and tenant initiatives	x	x	x

3.1 Renewable or Low Carbon Energy Sources

HAS currently owns two solar arrays that provide renewable energy. At HOU, a solar panel array generates 964 kilowatts (KW) of power. This array will avoid approximately 7,000 pounds of carbon emissions every month. Due to its location on the HOU Red Garage, the array provides a co-benefit of providing shade to passengers' vehicles. At IAH, a 82 KW, 269-panel solar array outside the Central Utility Plant facility powers the LEED platinum certified control building.

HAS continues to explore the feasibility of installing a large no- or low-carbon energy production system on the IAH airport campus. In May 2023, HAS released a Request For Information seeking entities interested in designing, building, financing, operating, and maintaining a 50 MW, scalable to 100 MW, energy production system that may consist of solar, wind, cogeneration, or other technology. This system will also provide for energy and business continuity for IAH. The system will be implemented in coordination with energy service provider and ERCOT taking advantage of load shedding/grid balancing technology/controls platform. As well, there may be opportunities for on-site (interpretive/practical use) hydrolization of hydrogen in alignment with HyVelocity Hydrogen Hub scope and grant funding. Based on its potential size, the energy production system is forecast to be capable of producing more energy than the airport's current electricity demands.⁶ Additionally, the *2023 HAS Design Standards Manual* identifies that newly designed facilities should be "solar ready" with space available on the roof for photovoltaic arrays and within the electrical rooms for associated equipment in order to accommodate potential future solar installations.⁷



Solar array on the HOU Red parking garage



Solar panels near the IAH Central Utility Plant

3.2 Alternative Fuel Use

In October 2023, the Houston region was selected by the Biden-Harris administration as one of seven clean hydrogen hubs nationwide. The hydrogen hubs are intended to help accelerate the domestic market for low-cost alternative energy. Based on this designation, the region will receive up to \$1.2 billion dollars in federal funding

⁶ <https://www.fly2houston.com/newsroom/articles/itrp-advances-environmental-commitment-evident-throughout-program>

⁷ Houston Airports System. Design Standards Manual. 2023 Edition. <https://cdn.fly2houston.com/cdn/ff/G6U2PqRvpvAliVM1MX3swYlx1-5UJE0rrSKDiCKmBm8/1674825074/public/2023-01/HAS%20Design%20Manual.pdf>

through the Bipartisan Infrastructure Law to support infrastructure and job creation. The Administration estimates that the investment will support 35,000 jobs during construction and 10,000 permanent jobs.⁸

HAS seeks to procure 10 hydrogen fuel cell electric buses to replace 10 existing diesel buses that operate at IAH. These buses will transport passengers between three of the IAH terminals and the consolidated Rental Car Center. In 2023, HAS applied for FAA Fiscal Year 2025 ZEV grant funding to cover a portion of the cost of procuring the buses. HAS estimates that the project will result in an estimated 1.3939 ton reduction in emissions over the useful life of the buses (10 years). This equates to approximately 0.13939 tons, or 278.78 pounds, of emissions reductions per year.⁹ Currently, HAS uses LNG vehicles for shuttling passengers to and from the EcoPark lots at IAH and electric vehicles for the EcoPark lot at HOU.

3.3 Green Electricity

In April 2020, the City committed to purchasing 100 percent renewable energy through a renewed contract with electric provider, NRG Energy. The renewable energy will be sourced from a new solar facility that was built to power City operations. Procurement of renewable energy for municipal operations will equate to an estimated \$65 million in savings over the seven-year contract. The City will purchase approximately 1,034,399 megawatt-hour (MWh) of renewable electricity annually.¹⁰

Through this partnership, the City purchases Renewable Energy Certificates from Reliant Energy, a NRG company, to cover the electricity usage for the entire city, including HAS. As defined by the U.S. Environmental Protection Agency, “A renewable energy certificate, or REC, is a market-based instrument that represents the property rights to the environmental, social, and other non-power attributes of renewable electricity generation. RECs are issued when one MWh of electricity is generated and delivered to the electricity grid from a renewable energy resource.”¹¹ Since the City purchases RECs for 100 percent of their electricity usage, the City would not have Scope 2 emissions associated with purchased electricity.

3.4 Resilient Design and Energy Efficient Buildings

Both IAH and HOU are susceptible to flooding and hurricanes due to the low-lying geography of Houston and location along the Gulf Coast. HAS secured Fiscal Year 2022 AIP Supplemental Discretionary Grants funding to complete the HAS’ first *Resiliency Master Plan* to identify vulnerabilities and risks associated with climate change and severe weather impacts at both IAH and HOU. The *Resiliency Master Plan* will identify resiliency opportunities and potential solutions to address anticipated future risks, and will help determine priorities for funding, maintenance, and supporting operations for the HAS CIP.

⁸ The White House. Biden-Harris Administration Announces Regional Clean Hydrogen Hubs to Drive Clean Manufacturing and Jobs. October 13, 2023. <https://www.whitehouse.gov/briefing-room/statements-releases/2023/10/13/biden-harris-administration-announces-regional-clean-hydrogen-hubs-to-drive-clean-manufacturing-and-jobs/>

⁹ City of Houston Airport Zero Emissions Vehicle and Infrastructure Pilot Program – Pre- Application for Ten (10) Hydrogen Fuel Cell Electric Buses

¹⁰ Mayor’s Office Press Release, April 30, 2020. <https://www.houstontx.gov/mayor/press/2020/100-percent-renewable-energy.html>

¹¹ US Environmental Protection Agency. Renewable Energy Certificates (RECs). February 5, 2023. <https://www.epa.gov/green-power-markets/renewable-energy-certificates-recs>

The master plan effort will include a thorough assessment of the current state of the Houston Airport System as to the Four Pillars or capacity gradation of resiliency; 1. threshold, 2. coping, 3. recovery, and 4. adaptive. The assessment will identify vulnerabilities and risks associated with climate change and severe weather, cyber – security and man – made disruption, with potential solutions to address these challenges.

The plan will also include an evaluation of the financial implications of implementing proposed solutions and a cost-benefit analysis to determine the most cost-effective and efficient options. The plan will inventory, categorize, benchmark and prioritize resiliency programming specific to CIP and maintenance infrastructure, personnel, and operations. Additionally, the plan will include a community engagement and education component to ensure that the community and airport stakeholders are informed and involved in the planning process.

The outcome of the HAS master resiliency planning effort will be a comprehensive and actionable plan that addresses the challenges of climate change and severe weather, cyber security and man – made disruptions, while also considering the financial and community impacts. This while incorporating sustainability into each opportunity.

The *2023 HAS Design Standards Manual* identifies HAS core values related to sustainable design, planning for sustainable assets and infrastructure, sustainable procurement, and enhanced commissioning of building systems. The Architectural Standards in the manual cover terminal area development projects and include several sustainable design requirements, including guidelines to adhere to the principles of the SMP and to design new buildings and renovations to LEED standards when applicable. The standards also identify sustainable construction practices and refer to the Sustainable Design Guidelines Matrix for tracking compliance. The Resiliency Master Plan will also review the Design Standards Manual and HAS Master Specifications documents for updated alignment with infrastructure resilience standards and 21st Century BMPs.

The IAH Terminal Redevelopment Program (ITRP), anticipated to be completed in 2024, implements sustainable design measures throughout construction of the new terminal, concourses, parking, and associated facilities. The redeveloped ITRP spaces are designed to LEED Silver standards, including 100 percent LED lighting within the terminal, sustainable material selection, and advanced energy metering. The new Mickey Leland International Terminal D at IAH is designed to be 20 percent better than the energy code, IECC 2015.

Additionally, HAS's IDO earned an Energy Star certification, meeting energy standards set by the U.S. Environmental Protection Agency and Department of Energy.¹²

3.5 Energy Efficiency Measures

HAS secured Fiscal Year 2022 AIP Supplemental Discretionary Grants funding to complete energy audits at IAH and HOU. The energy audits will identify opportunities to reduce energy consumption at IAH and HOU, including IAH Terminals A and D, along with support buildings at both airports. The audits will help to determine how to

¹² Houston Airport System Newsroom, December 28, 2022, <https://www.fly2houston.com/newsroom/articles/itrp-advances-environmental-commitment-evident-throughout-program>

optimize energy performance and identify maintenance or capital improvements needed to improve efficiencies within existing building systems.

As of 2022, the A/B parking garages at IAH and the Red Garage at HOU have been converted to all LED lighting, with transition planned at IAH’s C Garage and the terminals in the near future. Airfield lighting conversions to LED are also an energy efficiency strategy deployed by HAS. These lighting retrofits tend to be rolled up into larger airfield projects such as runway or taxiway rehabilitations.

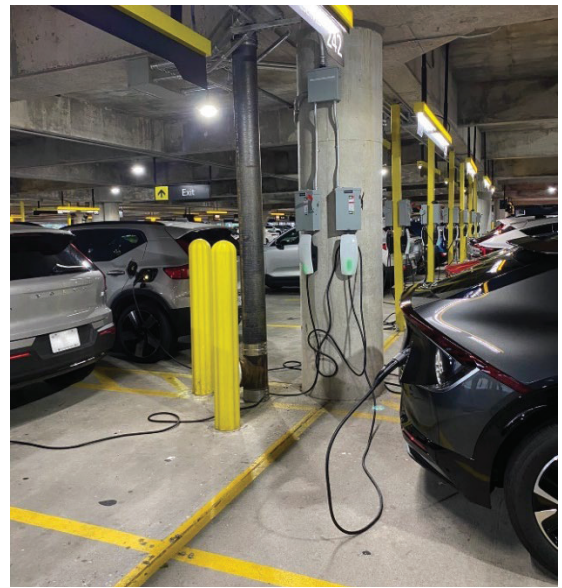
HAS also partners with its airlines in promoting energy efficiency and emissions reduction measures at its airports. Aircraft parked at passenger gates require power to run onboard systems and to condition the onboard air for passenger comfort while deplaning and boarding. While parked at a gate, an aircraft’s onboard auxiliary power unit (APU) is typically used to power these systems. APUs are gas turbine engines that require jet fuel to run, which contributes to GHG emissions and poor air quality on the ramp where workers are present. Gate electrification systems offer an alternative method to provide power to the aircraft while at the gate and typically include electric preconditioned air units (PCAs) and ground power units (GPUs). PCA units connect to the aircraft via a hose from the passenger boarding bridge to condition and ventilate the aircraft while it is parked at the gate. GPUs provide electricity to aircraft via a connection to the terminal’s electricity supply. Optimizing the use of gate electrification systems reduces the need to run the APU and therefore reduces jet fuel emissions.

HAS has obtained funding through multiple rounds of the FAA’s VALE grant program to install gate electrification systems at both IAH and HOU.

3.6 Vehicle Fleet Modernization and Electrification

HAS seeks to reduce mobile source emissions, such as those associated with ground operations and support vehicles, by transitioning to electric vehicles. HAS aims to have a full fleet of 285 light-duty, non-emergency electric vehicles by 2030. HAS will implement a conventional fuel vehicle replacement plan as vehicles reach the end of their service life to identify funding sources and procurement options for electric vehicles and related charging infrastructure. The transition to all electric fleet is not possible for vehicles without an electric vehicle equivalent, such as sweepers, tractors, and heavy-duty trucks. The transition to electric vehicle fleets also requires associated charging infrastructure and electrical capacity necessary to recharge the vehicles. HAS continues to analyze the feasibility of installing various types of charging infrastructure based on the use cases, charging time, and electric vehicle type.

HAS will replace 10 information technology and electrical support service vans with Ford E-transit electric vans. While most of these vans will be deployed at IAH, one of them will be in use at HOU. Additionally, HAS is replacing 25 light-duty pickup trucks with Ford F-150 Lightning electric trucks to reduce emissions and enhance sustainability efforts. The deployment of these trucks will be carried out across all three airports, with 19 of them planned for IAH, five for HOU, and one for EFD.



Electric vehicles charging at the Hertz parking area in the consolidated IAH Rental Car Center

In summer 2023, HAS Maintenance Services began the installation of 11 Level 2 charging stations needed to support the vehicle fleet across six airport locations. HAS maintains 43 publicly accessible electric vehicle charging stations throughout public parking facilities, with 28 available at IAH and 15 at HOU. Tenants of HAS, such as rental car companies Hertz and Enterprise, also offer a variety of all-electric vehicles and charging stations at IAH and HOU.

HAS has a long history of utilizing federal funding as a resource to modernize their fleet with hybrid and electric vehicles. Since 2005, HAS has received multiple rounds of FAA VALE grant funding for electric hybrid vehicles and electric ground support equipment (eGSE) at HOU and IAH.

3.7 Solid Waste Management

In accordance with the SMP, HAS designated a waste management champion committed to increasing the landfill diversion rate at IAH and HOU. The HAS waste management champion has future goals to implement training on waste collection and disposal, as well as updating concessionaire and tenant contracts to include recycling requirements. HAS is currently participating in City negotiations for future solid waste contracts.

HAS also plans to develop standard operating procedures for waste collection and disposal at IAH, HOU, and EFD, including updating waste and recycling signage on public waste bins. Waste assessments will be included in the operating procedures. HAS currently offers recycling options to customers and tenants. HAS also mandates recycling with construction and demolition (C&D) projects. Over 99 percent of the C&D waste was recycled on the recent Federal Inspection Station (FIS) project.

The *2023 HAS Design Standards Manual* requires that heightened concentrations of waste and recycling containers be provided within circulation areas of food and beverage zones when designing new or renovated terminals. The manual also dictates that HAS will govern the design and construction of projects on Airport properties, including the recycling of the materials removed from construction sites and buildings. HAS recycled 53,000 tons of concrete and 2,000 tons of metal from the removal of the IAH Terminal D/E parking garage.

3.8 Public Transportation

The Houston Metropolitan Transit Authority (METRO) provides public transit options in Houston. Passengers are currently able to connect from IAH to downtown Houston utilizing METRO Bus Route 102. This route serves the airport vicinity and costs \$1.25 to ride. The METRO bus stop is located at the Baggage Claim Level at Terminal C. Passengers can also connect from IAH to HOU (and HOU to IAH) utilizing METRO Bus Route 102 and transferring to METRO Bus 40 downtown at the intersection of Milam Street and McKinney Street. The two-stop route costs \$2.50. Additional daily bus and shuttle services exist at IAH and HOU to connect to Jack Brooks Regional Airport (BPT), Easterwood Airport (CLL), and Galveston, Texas. There are also plans to extend the METRO light rail to HOU, and to extend Bus Rapid Transit to IAH.

As identified in the SMP, HAS may consider establishing employee incentives for energy efficient behavior, such as utilizing public transportation or ridesharing.

3.9 Educational Campaigns

As of 2023, HAS is developing training materials in carbon management and sustainability initiatives for their staff. Training curriculum is being developed by HAS' Workforce Innovation & Development. HAS identifies that additional training and socialization of carbon management and sustainability concepts with staff represents an opportunity for integrating these concepts into the organizational culture and fostering support for implementation of the SMP and CMP. Leadership support for these initiatives also helps to garner staff support and illustrate the importance of these efforts to the organization as a whole to meet their goals.

3.10 Stakeholder Partnerships and Tenant Initiatives

HAS has engaged with its airline partners for over two decades on emissions reduction projects, such as integration of electric ground support equipment (GSE) and installation of GPUs intended to minimize aircraft engine run time while taxiing and at the gate. At IAH, United Airlines had over 74 percent of the airport's total passenger traffic in 2022 and 86 percent of United Airlines' GSE fleet is electric. At HOU, Southwest handled almost 94 percent of the airport's total passenger traffic in 2022 and over 80 percent of Southwest Airlines' GSE fleet is electric. The airlines also focus on turning off equipment when not in use to reduce emissions and energy consumption.



Southwest Electric GSE charging at HOU

4. REPORTING EMISSIONS REDUCTION PERFORMANCE

In its inaugural ACA application in 2023, HAS decided that absolute emissions would be the metric for evaluating reduction performance at all three airports. GHG emissions are tracked on an annual basis, and many of the emissions reductions that HAS experiences come from energy efficiency projects. HAS has received over \$1 million in rebate incentives from the CenterPoint Energy City Smart Program from 2019 to 2022. This program was utilized to install LED lighting and controls upgrades at IAH and HOU. CenterPoint Energy estimates the energy savings from the lighting upgrades as over 1,500 kilowatts (kW) per year or over 10 million kilowatt-hours (kWh) per year. CenterPoint Energy projects financial savings of \$15 million over a period of 15 years related to the lighting upgrades. HAS has also received \$108,032 in incentives for the HOU Red Garage Solar Photovoltaic (PV) System and \$145,687 in incentives for the HOU Central Utility Plant Upgrades, with significant energy savings, as shown in Table 3. At HOU, the use of four electric chillers for indoor climate control also saves 1.8 kWh electricity annually.¹³ As of early 2024, an ongoing project at the IAH central plant will remove the two large gas boilers and steam driven chillers and replace with electric chillers.

Table 3. HAS Project Incentives Awards

Project Incentives Awards	Year	kW Savings	kWh Savings	Incentive Amount
Current Project Incentives Awards				
HOU- Hobby Central Utility Plant	FY22	14.7800	1,565,383.00	\$145,687.97
HOU- Hobby Airport Red Garage Solar PV	FY22	393.2064	1,469,537.00	\$108,030.74
Previous Project Incentives Awards				
IAH- LED Retrofits Train Tunnel	FY19			\$42,136.85
IAH- New Construction	FY19			\$8,815.90
IAH-Lighting Controls	FY19			\$1,476.90
IAH-HVAC-DX Heat Pumps	FY19			\$8,656.74
IAH – A/B Garage Lighting	FY20			\$224,700.86
HOU- Hobby Terminal Lighting	FY20			\$91,002.39
IAH Terminal A LED Lighting	FY20			\$43,337.62
Hobby Red Garage Lighting	FY20			\$66,262.48
IAH Terminal C Garage LED Lighting	FY21			\$304,810.15

¹³ HAS. Soaring Towards Sustainability. 2023. <https://www.fly2houston.com/biz/resources/sustainable-management-plan>

HAS submitted a VALE application in July 2023 for the purchase and installation of five PCA and five GPU units at HOU. Emissions reductions are estimated to be 118.32 tons of ozone precursors [nitric oxide (NOx) and volatile organic compounds (VOCs)] over the useful life of the project.

HAS submitted three ZEV pre-applications in November 2023 and estimated the following emissions reductions associated with those projects, should they be completed in the future:

- Procuring 25 Ford F-150 Lightning electric trucks would result in an emissions reduction of approximately 0.4115 tons over the useful life of the project.
- Procuring 10 Ford E-Transit electric vans would result in an emissions reduction of approximately 0.1419 tons over the useful life of the project.
- Procuring 10 hydrogen fuel cell electric buses would result in an emissions reduction of approximately 1.3939 tons over the useful life of the project.

In total, these ZEV projects could result in emissions reduction of approximately 1.95 tons. For both VALE and ZEV grants, the federal government has reporting requirements associated with these funding opportunities.

5. IMPLEMENTATION

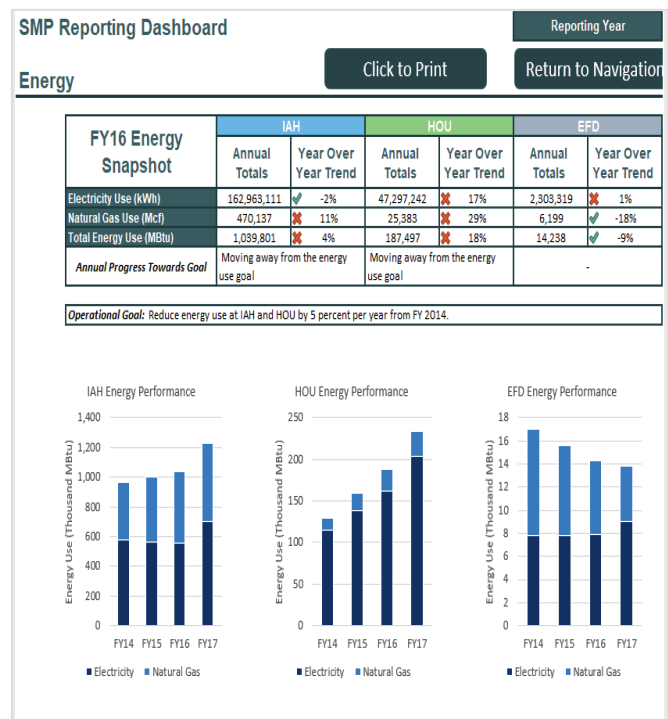
Successful implementation of a CMP will always require cross-organizational support with clearly established roles and serious commitments and accountability from all levels of the organization. The City of Houston issued the *Municipal Building Decarbonization and Benchmarking Policy* in 2022, which applies GHG reduction efforts to all applicable City buildings and requires compliance from the operating departments of each building.¹⁴ HAS, as a division of the City, falls under this policy. Therefore, several departments at HAS have primary responsibilities related to the implementation of the CMP.

From the Planning & Development Team, the Environmental Senior Project Managers & Sustainability Senior Project Managers are responsible for leading the ACI Accreditation process as well as overarching Environmental & Sustainability initiatives of the organization leading regulatory coordination of capital projects through implementation. Some of these programs as describe through NEPA Reviews, Recycling Programs, Noise Monitoring Programs, etc. . This role also develops plans and policies, promotes initiatives, and ensures that facility Design Criteria are followed.

From the Infrastructure Division, the HAS Energy Manager works closely with the Senior Project Manager for Sustainability. The Energy Manager is responsible for verifying electricity and natural gas invoices. This role also works on promoting energy efficiency measures and projects for the CIP, and acquiring utility rebates. HAS created the Sustainable Management Tool, a spreadsheet-based tool for tracking energy in the forms of electricity and natural gas, waste, water, and GHGs. An example dashboard of this tool is shown to the right. Electricity and natural gas utility data is entered into this tool to track usage, discover anomalies, and build long-term trends to compare over time. The dashboard is also used to report progress to leadership.

Also from the Infrastructure Division, the Director of Resiliency coordinates with all divisions within the organization especially Asset Management, to ensure seamless continuity of efficient facility operations and proposes facility modification and improvements as needed to meet carbon neutrality goals.

From Maintenance Division, the Fleet Manager works with the Senior Project Manager for Sustainability on fleet electrification projects. Together, these roles have an open channel of communication with



¹⁴ Municipal Building Decarbonization and Benchmarking Policy. May 2022. <https://www.houstontx.gov/adminpolicies/3-40.pdf>

HAS leadership, who ultimately decide what carbon management initiatives get funded in the CIP and what outside funding sources to pursue. Additionally, Maintenance Division inevitably provide crucial asset data which is foundational for the decision making and implementation of facility modifications.

6. COMMUNICATION, AWARENESS, AND TRAINING

The HAS Public Relations Department updates the HAS public-facing websites and provides information to the traveling public. The Public Relations Department leads external communications and outreach and regularly releases articles, newsletters, and press releases to share information with the public through various channels. HAS sustainability and carbon management commitments, initiatives, and progress are often documented and shared with the public through the HAS website. This communication helps to raise awareness of the various programs that HAS is implementing and shows how stakeholders can contribute to the success of the initiatives. In the context of the CMP, the Public Relations Department plays a role in communication of emissions performance to relevant external stakeholders.

Internally, the HAS SMP identifies that the Chief Development Officer and the Senior Project Manager for Sustainability are responsible for internal and external communications on implementation of the SMP, which includes developing messaging and communicating relevant information to stakeholders. The SMP identifies that SMP Champions are responsible for implementation of initiatives and tracking data. HAS plans to implement a similar structure to communicate internally related to CMP implementation. HAS plans to establish regular communications channels with stakeholders, tenants, and business partners related to carbon management initiatives and partnerships.

Upon adoption of the CMP, HAS intends to identify job-specific knowledge and skills needed to execute decarbonization initiatives. The organization will need to develop staff training on the topics of GHGs and carbon emissions in order to ensure consistency across the organization. One concept for a training opportunity is to collaborate with Ford on training for maintenance staff to support electric vehicles.

7. SELF-ASSESSMENT, ACCOUNTABILITY, AND AUDITING

HAS collects and analyzes utility data on a monthly basis in the Sustainable Management Tool to identify any discrepancies and reconcile them with the utility. HAS uses the utility information, generator metered hours, and fueling information from the Fuel Force Fuel Management System to conduct an annual GHG inventory for all three airports that HAS operates. This inventory is the primary way of monitoring carbon emissions reductions and performance towards HAS goals of carbon neutrality by 2030. All units are converted to metric tons of carbon dioxide equivalents using recognized GHG Protocol consistent emission factors. This report is produced by an external consultant to ensure accuracy and robustness of data. HAS contracts with a third-party auditor to verify the records and data for the purpose of certification in the ACA program.



Prepared by:



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