



HOUSTON METRO CLIMATE ACTION PLAN

METRO Going Green: Pathway to Sustainability

January 2022

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METRO Going Green: Pathway to Sustainability

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Message from Former Board Chair Carrin F. Patman

(April 7, 2010 – December 2013; April 7, 2016 – February 24, 2022)



In 2019, Houston voters overwhelmingly approved METRO's long-range plan, known as METRONext. Over the coming years METRO will enhance existing service while adding new mobility options such as bus rapid transit, METRO curb2curb service and extension of light rail. As we look ahead, we seek to future proof these significant capital investments.

METRO is paying close attention to the climate assessments showing Houston will grapple with rising temperatures and more frequent weather events. It is more critical than ever that METRO map out a plan to not only prepare for these events but to mitigate the impact they have on our community as much as we can. I'm proud that the METRO Board has developed and approved the agency's first Sustainability Vision Statement. These guiding principles consist of:

1. METRO will shift to procuring only zero-emission buses by FY2030.
2. METRO will manage its operations to avoid or minimize environmental impacts on the health and safety of our customers and employees.
3. METRO will apply green principles to the design and management of its facilities. METRO will foster sustainable use of natural resources by promoting energy management, energy creation / generation, recycling, re-use, and re-purposing of materials and waste reduction management opportunities.
4. METRO will collaborate with educational institutions and community organizations to achieve shared environmental goals.
5. METRO will develop an agency wide Climate Action Plan to achieve the objectives of this Sustainability Vision Statement.

Due to the importance of this initiative, I have designated Board Members Chris Hollins and Terry Morales to lead this critical effort. Both Terry and Chris are exemplary leaders who will help guide the agency as it implements the goals of the Sustainability Vision Statement. These goals will move us toward a more sustainable and resilient transit system and be of benefit to the entire region.

Sincerely,



CARRIN F. PATMAN

Message from Board Member Terry Morales



Climate change threatens our livelihood and continues to impose an increased financial burden on our community. The Federal Emergency Management Agency (FEMA) has declared a disaster in the Greater Houston area 26 times since 1980, with eight of those declarations made since 2015. Most recently, Winter Storm Uri in 2021, and most notoriously Hurricane Harvey in 2017. From flooding to freezing, our community has suffered and recovered together.

I am proud of METRO's reputation as an environmentally conscious public transportation provider and community partner. The Board's recent adoption of a Sustainability Vision Statement provided further context to METRO's approach to addressing climate related issues. This Climate Action Plan is the next step in progressing this commitment. The Plan is aligned with our community partners and includes several measurable actions.

The activities included in the Climate Action Plan align with the METRONext Moving Forward Plan to ensure delivery with sustainability, resiliency, and equity at the forefront. METRONext and other mobility improvements occurring in the coming years will include a commitment to environmentally sound practices as we choose and implement new technologies, improve business processes, and advance transportation for our region.

Most notably, the Plan will be implemented with a focus on equity. METRO recognizes that climate change disproportionately affects underserved communities. The initial electric vehicles joining our fleet will serve one or more of the City of Houston's Complete Communities neighborhoods and soon will provide service as part of our curb2curb and METROLift services.

I celebrate the opportunity to influence this directive and look forward to working with Co-Chair Hollins, supporting METRO staff, and coordinating with the community to deliver the commitments contained in METRO's first Climate Action Plan.

Sincerely,

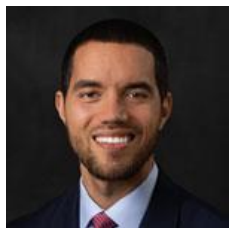
A handwritten signature in black ink, appearing to read 'Terry Morales', with a long horizontal flourish extending to the right.

Terry Morales

Co-Chair, METRO Sustainability & Climate Action Plan

Terry Morales, Member, Board of Directors, Metropolitan Transit Authority of Harris County, Texas

Message from Board Member Christopher G. Hollins



I appreciate Chair Patman asking me to co-lead the task force dedicated to creating and implementing METRO's first Sustainability Vision Statement and Climate Action Plan. The impact of climate change is a significant threat to the health and safety of our community. METRO can and will be a leader in helping the region respond to this challenge.

METRO's sustainability is vital to maintaining mobility options for the more than 4 million residents we serve. We are prepared to meet the challenge. As we advance our long-range plan, METRONext, we are committed to implementing industry best practices in sustainability and transitioning to a zero-emissions fleet by 2030.

Beginning with the deployment of clean fleet technology, METRO will lead the way in green transit. METRO is taking a holistic approach - transforming not just our buses, but also our business practices - to increase sustainability, resiliency, and carbon emissions reduction. To achieve this, we need to ensure that METRO is well-positioned to receive federal funding related to the newly passed infrastructure bill(s).

Success will require a collaborative approach. I look forward to working with Co-Chair Morales, fellow board members, METRO staff, and the broader community to meet the goals of our Sustainability Vision Statement. We will work with key partners like CenterPoint Energy, EVolve Houston, LINK Houston, and our city and county stakeholders to realize our shared goal of carbon emissions reduction in our community.

Sincerely,



Christopher G. Hollins
Co-Chair, METRO Sustainability & Climate Action Plan

Christopher G. Hollins, Member, Board of Directors, Metropolitan Transit Authority of Harris County, Texas

Message from President/CEO Thomas C. Lambert



Climate change is one of the biggest challenges facing the region. Whether it's the flooding and damage caused by a hurricane, or a major power outage as caused by Winter Storm Uri, the effects cannot be ignored. METRO is taking proactive steps to become a more resilient and sustainable agency.

The METRO Board has given us a pathway to sustainability with adoption of the agency's first Sustainability Vision Statement. The five goals of the Sustainability Vision Statement will guide our efforts over the coming years.

METRO is already one of the greenest travel options according to the City of Houston Climate Action Plan. We've incorporated an increasing number of low emissions CNG buses and implemented internal green business practices. You can learn more about METRO Going Green on our website <https://www.ridemetro.org/Pages/CommunityGoingGreen.aspx>. We seek to further reduce greenhouse emissions as METRONext brings new service to encourage people to use public transit instead of cars.

Implementation of the goals under METRO's Sustainability Vision Statement has already begun. METRO will soon welcome its first battery electric buses and begin testing of Fuel Cell Electric Buses (Hydrogen), another carbon neutral transit solution. Efforts toward greater sustainability and resiliency will be on-going over the coming years.

This Climate Action Plan is another key step into how METRO will move toward enhanced sustainability. We appreciate the leadership of Chair Patman and Board Members Terry Morales and Chris Hollins as we move this Plan forward. METRO will continue to develop our approach and partner with key stakeholders throughout the region, locally and nationally.

Sincerely,

A stylized, handwritten signature in black ink, consisting of a large loop followed by several sharp, overlapping strokes.

Thomas C. Lambert
President/Chief Executive Officer

Executive Summary

Climate change in our service area has had a tangible impact on service affecting our ability to be resilient and sustainable. To combat this growing threat, the METRO Board of Directors, President/CEO and staff are taking concrete steps to enhance the safety and health of the people in our community. These steps include:

- Address climate change's impact to create resiliency and sustainability in METRO's services.
- Bring METRO into alignment with local, regional, state, and national climate change and sustainability goals and plans.
- Protect the environmental safety and health of METRO employees, customers, and contractors.

METRO's Sustainability Vision Statement, adopted by the METRO Board of Directors, serves as our pathway to sustainability.

METRO's Sustainability Vision Statement



METRO will shift to procuring only zero-emission buses by FY2030.



METRO will manage its operations to avoid or minimize environmental impacts on the health and safety of our customers and employees.



METRO will apply green principles to the design and management of its facilities. METRO will foster sustainable use of natural resources by promoting energy management, energy creation / generation, recycling, re-use, and re-purposing of materials and waste reduction management opportunities.



METRO will collaborate with educational institutions and community organizations to achieve shared environmental goals.



METRO will develop an agency wide Climate Action Plan to achieve the objectives of this Sustainability Vision Statement.

METRO's Climate Action Plan describes the steps METRO will take to reach the agency's sustainability goals. The Plan is designed as a roadmap to guide our on-going business decisions to reduce or eliminate our carbon footprint. This Plan has been developed based on the Federal Transit Administration's (FTA) climate change guidance. The Plan also aligns with the City of Houston's Climate Action and Resilient Houston Plans.

This Plan inventories METRO’s existing efforts and focuses on new and potential opportunities. METRO does have existing extensive sustainability efforts and those initiatives can be found at <https://www.ridemetro.org/Pages/CommunityGoingGreen.aspx>

METRO will use a plan-do-check-act methodology to monitor and track the success of our efforts under these goals.



The Plan is a living document. It is to be reviewed regularly and, if needed, amended to reflect the agency’s current plans, goals, budget, and available resources. The activities documented in this plan cover METRO’s fiscal years 2022 – 2024. Prior to the conclusion of this time period, the plan will be reviewed and amended to continue to be supportive of the agency’s sustainability goals.

1. Introduction

The destruction wrought by Hurricane Harvey in 2017 was a wakeup call for many that severe weather events were no longer an anomaly, but increasingly becoming a regular occurrence. The region had experienced numerous “100-year” events in the preceding years and Harvey exceeded all previous rainfall totals setting continental US rainfall records. Last year, Winter Storm Uri further showed how climate change impacts the welfare of our region and specifically how vital governmental services are impaired during these events. Houston METRO joins our federal, regional, state, and local communities in establishing a plan to combat this growing threat to our collective welfare.

Houston, as the 4th largest city in the United States, is also the largest city in the State of Texas. It is a large metropolitan area with a majority minority population of varying social economic levels. Today, Houston has one of the highest per capita greenhouse gas emissions in the country. The Houston-Galveston region is designated as a non-attainment area under the Clean Air Act (CAA) for exceeding the National Ambient Air Quality Standard for its levels of ozone pollution. A climate assessment commissioned by the City of Houston reflected that climate change in the form of higher temperatures and more frequent rain/storm events will continue to increase, unless mitigating actions are taken.

Some efforts to respond to climate change are already underway.

- The Houston Galveston Area Council, our regional metropolitan planning organization, has been a long-standing member of the Clean Cities Coalition. The Houston Galveston Clean Cities Coalition promotes use of advanced transportation solutions to reduce carbon emissions in the region.
- The City of Houston developed a Climate Action Plan in 2020 identifying goals and strategies toward reducing carbon emissions. The City’s first area of focus was on transportation and specifically on vehicle fleets in the region.
- The City of Houston established Resilient Houston as a framework to proactively address critical issues affecting our community. This strategy identifies actions necessary to prepare Houston for the challenges that lie ahead and better ensure more equitable and resilient neighborhoods.
- METRO’s Going Green initiatives reflect the Agency’s commitment to implementing clean technologies in pursuit of the mission to provide safe, clean, reliable, accessible, and friendly public transportation services to our region.

The purpose of METRO’s Climate Action Plan is to adopt approaches to address climate change and to develop ways to ensure METRO’s resiliency against the related challenges. METRO seeks to align to its federal, state, regional, and city partners to leverage resources and capabilities to develop a comprehensive approach to minimizing the impacts of climate change on vital government services, particularly regional public transportation.

The public transportation industry is addressing climate change by providing information and resources to assist industries in the transition to zero-emissions fleets. The Federal Transit Administration recently launched the Sustainable Transit for a Healthy Planet Challenge. The Challenge seeks “to encourage transit agencies to build on progress already made and to further reduce [Greenhouse Gas] (GHG) emissions from public transportation to support President Biden’s GHG reduction goal.” President Biden’s goal is to “achieve a 50-percent reduction from 2005 [GHG] levels in economy-wide net greenhouse gas (GHG) pollution in 2030.” Houston METRO has joined the challenge and will submit this Climate Action Plan in response. METRO will use a plan-do-check-

act methodology to monitor and track the success of our efforts under these goals.



METRO's Climate Action Plan is a roadmap to guide our on-going business decisions to become a more sustainable agency and to reduce or eliminate our carbon footprint. This plan is a living document to be reviewed and, if needed, amended annually to reflect agency plans, goals, budget, and available resources for the upcoming budget year.

2. Agency Overview

The Metropolitan Transit Authority of Harris County (METRO or Houston METRO) is the public transportation agency for the Houston metropolitan area. METRO operates local and commuter bus service, Park & Rides, vanpools, paratransit, light rail, and over 100 miles of HOV/HOT lanes across its 1,300 square mile service area. Houston continues to be one of the fastest growing cities in the U.S. and regional forecasts expect the METRO service area to experience a 50% increase in population by 2040.

Once viewed as simply a necessary municipal service, mass transit is now considered an essential service without which no major city can compete or prosper. Mass transit connects our communities. It connects employees to jobs, students to education, families to health care, residents to museums and theaters, and sports fans to stadiums. And, as we learned during Hurricane Harvey and during the COVID-19 pandemic, METRO is also critical to the first-response network with vehicles, drivers, police, and call centers capable of rapid deployment during an emergency and providing transit service to essential workers.

Transit services are provided over approximately 1,300 square miles utilizing 1,293 vehicles. The make-up of these vehicles includes diesel electric hybrid (clean diesel) buses, electric light rail, vanpools, METRO curbside vehicles, and compressed natural gas (CNG) buses. In addition to the operating fleet, METRO utilizes vehicles for service and support roles within the agency. As public transit adjusts to the post pandemic new normal, METRO continues to operate 7-day a week service to the region and in-particular to and for essential workers.

Harris County, home to METRO and over 4.7 million residents, is the third most populous county in the U.S. Our region's population is expected to grow to more than 10 million people in the next 20 years.



The METRO Vision

METRO has taken several steps and initiatives to prepare for the future. New light-rail corridors started operations in 2013 and 2014 and the METRO Reimagining campaign was initiated to move the agency to a high frequency / high-capacity transit network. The result was Houston, prior to the pandemic, being one of the few cities to experience a ridership increase.

METRO built on this success as it developed its long-range plan, known as METRONext. METRONext was overwhelmingly approved by voters in 2019. The program provides 500 miles of travel improvements and facilities around the region. METRONext will build on Houston's existing transit system and improve the environmental and health benefits delivered. To put into perspective

- METRO keeps thousands of cars out of downtown Houston each day, eliminating demand for 65,000 parking spots downtown.
- METRO cuts 235,000 auto trips each day and reduces greenhouse gas emissions by 300,000 metric tons per year.
- A 2019 study found that the Red Line light rail service has led to significant reductions in harmful carbon monoxide and toluene air pollution in neighboring communities.

With METRONext, by 2040, the METRO system will eliminate 500,000 auto trips a day and reduce greenhouse gas emissions by 680,000 metric tons each year. Houston's electric light-rail trains emit no ground-level pollution. METRO currently uses diesel-electric hybrid and CNG buses that cut smog-forming pollution by as much as 50 percent compared to conventional buses and METRO will soon deploy a fleet of fully battery electric buses. Sustainability will be a key focus as we design and deploy the transit improvements of METRONext.

METRO's Going Green initiatives

METRO is not new to sustainability efforts. In METRO's Going Green initiatives, METRO began shifting to low emissions buses such as diesel-electric hybrid buses and CNG. Replacing our older buses with new, fuel-efficient, environmentally friendly vehicles was merely the first step. Other efforts include:

Water Conservation

METRO recycles the water it uses to clean its fleet of buses.

Recycling

METRO regularly recycles all scrap metal, tires, batteries, wood pallets, and motor oil. Older buses are also being "scrapped," as opposed to reselling.

Green Energy

METRO uses green-tipped fluorescent lamps, which contain lower levels of mercury, to light its facilities.

Limited Idle Time

METRO buses have been designed to automatically shut down when sitting idle for approximately 15 to 20 minutes.

Bikes on Buses and Better Bike Access

When two wheels just aren't enough, METRO's bikes-on-buses program affords cyclists the convenience of mounting their bike on the front of our local buses (limit two per bus) or storing it in the luggage compartment of our commuter buses. Cyclists may also bring their bike aboard METRORail. METRO coordinates closely with Houston BCycle, Houston's bike share nonprofit, to ensure bike share stations are at or near major transit infrastructure. METRO is also a key partner in the implementation of the City of Houston's [Bike Plan](#).

Commute Alternatives

When buses or trains aren't an option, METRO helps commuters "go green" by forming vanpools through the STAR vanpool program. STAR vanpools offer a "ride-share" option for those commuters that live/work in the eight-county region (Harris, Galveston, Brazoria, Fort Bend, Waller, Montgomery, Liberty and Chambers) but are without convenient bus service.



Annually, the vanpool program is responsible for helping to eliminate more than 25,000 tons of carbon dioxide, 500 tons of carbon monoxide, 65 tons of hydrocarbons and 45 tons of nitrous oxides that might otherwise be emitted by the vehicles they displace.

From the road to rail and all our facilities in between, METRO is making a conscious effort to efficiently minimize its impact on the environment. METRO will continue these efforts and build on them through new initiatives based on best practices and evolving sustainability efforts and initiatives. For more details, please visit our METRO Going Green page at <https://www.ridemetro.org/Pages/CommunityGoingGreen.aspx>

3. Local and Federal Initiatives

LOCAL

In April 2020, the City of Houston (COH) released its [Climate Action Plan](#) focused on four key areas:

- Transportation.
- Energy Transition.
- Building Optimization.
- Materials Management.

The COH plan aligns with the [Paris Climate Agreement](#) which adopted the goal of being carbon neutral by 2050. Houston is seeing increased rainfall from hurricanes and extreme flooding events that cause extensive damage and disruption. Houston has experienced five federally declared flooding disasters during the past five years, which produced 100-year and 500-year floods— Memorial Day, 2015; Halloween, 2015; Tax Day, 2016; Hurricane Harvey, 2017; and Tropical Depression Imelda, 2019. Hurricane Harvey remains the largest rain event in North American history and served as a catalyst for an aggressive response to climate change. A climate assessment commissioned by the City of Houston reflected that climate change in the form of higher temperatures and more frequent rain/storm events will continue to increase unless mitigating actions are taken.

The Intergovernmental Panel on Climate Change (IPCC) has recommended that efforts be made to prevent the global temperature from increasing above 1.5 degree Celsius in order to avoid continued and worsening conditions. Global temperatures exceeded 1.0 degree Celsius in 2017. To that end, many international, national, states, cities, and transit agencies are implementing plans to reduce the presence of greenhouse gas (GHG) emissions. Without any action to reduce global GHG emissions,

we are likely to see increased heat waves, floods, and droughts.

The City's Climate Action Plan's first goal under the Transportation focus area is to shift the region's fleets to electric and low emissions vehicles. This is followed by a second goal of reducing vehicle miles traveled. The plan targets 2030 for the conversion of the COH light duty, non-emergency vehicles to electric vehicles. This goal is also focused on motivating regional fleets to convert to low emissions.

The City of Houston Climate Action Plan is part of the City's overall strategy to obtain sustainability and resilience as outlined in the Resilient Houston Plan, also issued in 2020. Resilient Houston lays out five key visions for the city:

- A healthy place to live
- An equitable, inclusive, and affordable city
- A leader in climate adaptation
- A city that grows up, not out
- A transformative economy that builds forward.

Supporting these five vision themes are several activities and goals. METRO's Climate Action Plan aligns to the Resilient Houston themes. METRO's current and future activities outlined below demonstrates METRO's contribution to city efforts toward establishing a more equitable, sustainable, and resilient community.

REGIONAL

The Houston Galveston Area Council (HGAC) has been a member of the U.S. Department of Energy's Clean Cities Coalition Network since September 1997. The Houston Galveston Clean Cities Coalition seeks to reduce carbon emissions in the region by promoting and facilitating the usage of alternative fuels, advanced vehicle technologies, and fuel conservation strategies.

FEDERAL

Nationally, the Biden Administration has announced several initiatives toward reducing GHG emissions and moving the United States to carbon neutrality. It is anticipated that the administration's infrastructure bill will provide additional support for clean energy initiatives.

Sustainable Transit for a Healthy Planet Challenge

On June 15, 2021, the Federal Transit Administration (FTA) announced the *Sustainable Transit for a Healthy Planet Challenge* to encourage transit agencies to take bold actions and investments to support President Biden's goal of achieving a 50 percent reduction in GHG emissions from 2005 levels by 2030.

Participating transit agencies would develop climate action or sustainability plans that detail strategies such as:

- Converting fleets to electric buses.
- Making facilities more energy efficient.
- Applying other technologies.

METRO joined the FTA challenge, and this plan will be submitted to FTA to satisfy the requirement to submit an agency climate action plan. Final plans must be submitted by April 2022.

4. METRO'S Pathway to Sustainability

Houston has one of the largest rates of per capita GHG emissions in the U.S., counting 14.9 metric tons of carbon dioxide equivalent (CO₂e) per capita per year. In its first Climate Action Plan, the City of Houston has identified transportation fleets as a key focus to help mitigate current conditions.

METRO, as the regional transportation provider, operates a fleet of 1,293 buses and 376 additional vehicles. The make-up of these vehicles includes conventional gas/diesel, hybrid electric diesel and compressed natural gas (CNG). Currently, according to the Houston Climate Action Plan, public transit buses make up approximately 1% of greenhouse gases in the region.

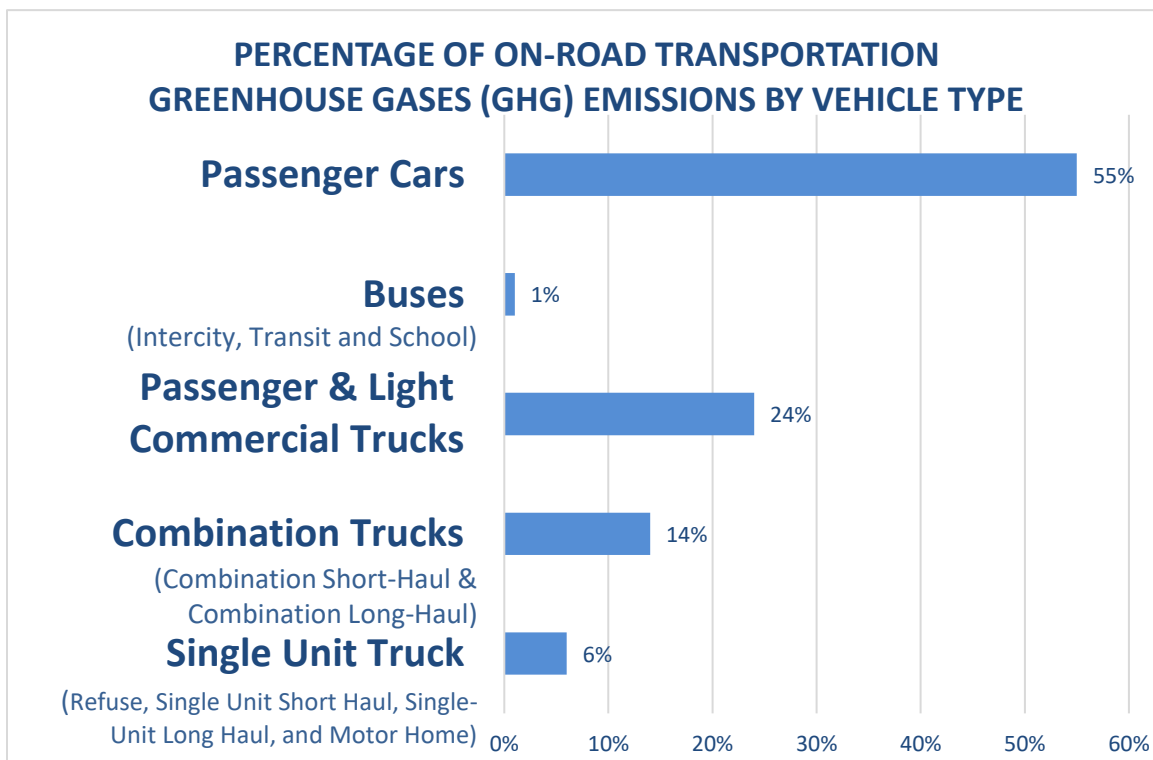
METRO has historically operated buses for their useful life of approximately 12 years. As of FY2021, the average fleet vehicle is 6 years old, and most of the fleet is even younger. If the oldest vehicles in the current fleet are utilized for their useful life of 12 years that brings the oldest fleet vehicle scheduled for replacement to FY2030. This makes FY2030 a logical year to target a zero-emissions fleet goal with a rolling transition until the entire fleet consists of low or zero emissions vehicles.

This target year of on or before 2030 gives METRO up to eight years to prepare for the transition to a zero emissions fleet. The transition involves addressing the related infrastructure needs at METRO facilities, to work with our local utility providers to ensure we have the necessary capacity and doing the necessary budget planning needed to accommodate the costs to integrate a zero-emissions fleet, from facilities to workforce training.

SUSTAINABILITY VISION STATEMENT 1

METRO will shift to procuring only zero-emissions buses by FY2030.

Use of METRO's fleet of diesel, hybrid electric diesel, electric light rail and compressed natural gas (CNG) vehicles results in one of the cleanest transit options in the region. METRO seeks to maintain its role as a leader in clean transportation by moving from low emissions to zero emissions vehicles. Improvements in the availability, quality, and operations of zero emissions vehicles make this the time to move toward incorporating more zero emissions options. With the overwhelming approval of the METRONext Moving Forward program of increased transit services throughout the region, it is even more critical that METRO implement the most state of the art fleet available.



Source: H-GAC & Houston Climate Change Plan

Alternative & Conventional Fuel Fleet



METRO Experience with Electric Vehicles

In 2015, METRO deployed an electric bus pilot to better understand the operational, infrastructure and workforce issues of electric bus service. The pilot operated for 90 days along the Fondren route. The

reviews from customers were largely positive. However, the pilot concluded that improvements were needed in the following areas for the vehicle to provide comparable level of service:

1. Reliability.
2. Battery Life/Range.
3. HVAC System.
4. Price.

It was also determined that to integrate an electric vehicle into its fleet, METRO would need to:

1. Invest in operator and mechanic training.
2. Upgrade existing bus operating facilities to accommodate electric vehicle charging infrastructure.
3. Install electric vehicle charging infrastructure at facilities and along routes operating electric vehicles.
4. Plan for future financial investments in upfront vehicle costs and infrastructure.

Fast forward five years from our electric bus pilot, there has been tremendous growth in the industry. There has been improvement in each of the areas noted from our pilot and new vehicle options. As METRO looks to establish a more sustainable fleet and shift to procurement of only zero emissions fleet by FY2030, we will undertake the following initiatives:

METRO Fiscal Years 2022 – 2023 Activities

20 Battery Electric Bus Deployment

METRO will deploy 20 battery electric buses across two facilities, to be operated on two routes. Ten battery electric buses each will be assigned to the West and Polk Bus Operating Facilities. The two operational routes are the 402 Bellaire Express (Quickline) and 28 OST/Wayside.

Equity & Access

These two routes were specifically selected as they serve a number of socially and economically underserved communities, as identified in the City of Houston's Complete Community program and based on METRO's ridership data.

Fuel Cell Electric Bus (FCEB) (Hydrogen)

METRO intends to test between 3-5 Fuel Cell Electric Buses (FCEB) in operational service. The goal is to collect data and compare the service delivery of this low/no emissions technology. METRO will take the following steps and analysis:

- Purchase of 3 - 5 FCEBs.
- Repurpose at least 1 METRO bus operating facility for the storage and fueling of hydrogen.
- Install necessary equipment to create a revenue sharing opportunity.
- Train on fuel cell technology, maintenance, storage, and safety for METRO staff, operators, and area first responders.
- Install Emissions Detection Sensors.

Electric Vehicles/Vans/Shuttles

METRO has already begun the purchasing of electric vans and shuttles. These vehicles can be used as part of METRO's non-revenue/supervisor fleet. Operational opportunities include using electric vans and shuttles in METRO's curbside and METROLift paratransit service.

METRO Fiscal Years 2022 – 2024 Activities

University District Project Phase II/Houston METRO Shuttle of the Future

With support from the FTA's Accelerating Innovative Mobility Grant, METRO will continue work on its Autonomous Vehicle Proving Ground project, the University District Project. Phase II of the University District Project will utilize an electric shuttle with Level 4 autonomous self-driving. The shuttle will provide first and last mile service between Texas Southern University and the University of Houston. Patrons using the AV shuttle also have the opportunity of transferring to the TSU-UH Athletics Light Rail Station.

Automated Bus Consortium

METRO will continue its involvement in the Automated Bus Consortium, a national collection of transit agencies and departments of transportation to facilitate development of a full-size electric automated bus.

The above activities will allow METRO to fully understand how to integrate various zero emissions options into its fleet operations to prepare for only zero emissions bus purchases by FY2030.

The activities in this plan cover METRO's fiscal year 2022 – 2024.

Below is METRO's approach to achieve the Sustainability Vision Statement #1.

- Plan:** Shift to procuring only zero-emissions buses by FY2030.
- Do:** Begin implementation of Battery Electric Bus program.
Begin testing of Fuel Cell Electric Buses.
Continue work on METRO's AV Electric Bus Program (University District Project Phase II and Automated Bus Consortium).
Perform capability assessment of bus operating facilities, park and rides, and transit centers for battery electric and/or fuel cell electric bus fleet.
Implement Workforce Development Program for Operators & Mechanics.
Pursue funding to support the conversion to a zero emissions fleet.
- Check:** After 15 months of operation, assess preliminary performance under:
- Operations.
 - Infrastructure.
 - Workforce.
 - Customer Service.
- Act:** Make adjustments based on preliminary assessment at 15 months of operations, recommendations as financially feasible.
Develop financing and budget plan for future adjustments not available in budget.

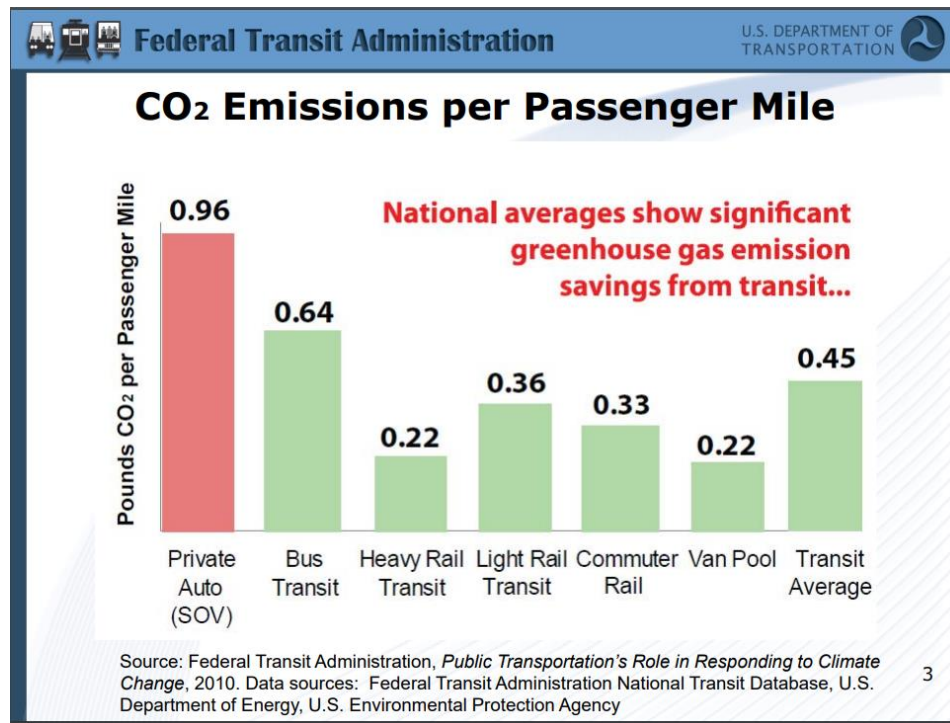
SUSTAINABILITY VISION STATEMENT 2: METRO will manage its operations to avoid or minimize environmental impacts on the health and safety of our customers and employees.

METRO currently performs a series of activities to promote environmental sustainability. These activities range from trash pick-ups to landscaping to used cleaning materials. METRO will establish and monitor environmental objectives and implement the best management practices to ensure improved performance. Many of these activities are existing activities under its “Going Green” initiatives.

Identify METRO’s Carbon Footprint

The U.S. Environmental Protection Agency (EPA) defines carbon footprint as “the total amount of greenhouse gases that are emitted into the atmosphere each year by a person, family, building, organization, or company.” For METRO, this includes first identifying the emissions generated from our fleet, then identifying those generated from operations of our facilities and other sources.

With our mission to provide safe, clean, reliable, accessible, and friendly public transportation services to our region, the focus is to encourage people to use public transit instead of cars. As depicted in the image below, this alone results in reduced greenhouse gas emissions for the region. However, as stated, METRO’s Climate Action Plan is designed as a roadmap to guide our on-going business decisions to reduce or eliminate our carbon footprint. A critical first step is to map identify our current carbon footprint. We can then measure impact of improvements identified as result of this plan.



Environmental Management Plan

METRO will develop an Environmental Management Plan that establishes standards to minimize the impact of operations and construction through environmentally sound practices. The environmental benefits of establishing this plan include improving the ability to analyze, control, and reduce environmental impacts. This includes but is not limited to air emissions, general waste reduction, disposal of environmentally sensitive equipment and materials (EV batteries), and ensuring compliance with regulatory standards. Additionally, METRO expects to experience business benefits by establishing this plan, including more efficient and controlled operations, cost savings, and improved relationships with employees, regulators, systems users, and the general public.

The activities in this plan cover METRO's fiscal year 2022 – 2024.

Below is METRO's approach to achieve the Sustainability Vision Statement #2:



- Plan:** METRO will establish and monitor environmental objectives and implement best management practices to ensure improved performance without reducing service standards or high-capacity transit goals.
- Do:** Identify METRO's Carbon Footprint.
Develop an Environmental Management Plan.
Collaborate with EVOlve Houston to identify industry best practices in carbon reduction.
Inventory existing agency practices and initiatives.
- Check:** Benchmark existing practices against current industry best practices.
- Act:** Make adjustments based on bench marked best practices.

SUSTAINABILITY VISION STATEMENT 3: METRO will apply green principles to the design and management of its facilities. METRO will foster sustainable use of natural resources by promoting energy management, energy creation / generation, recycling, re-use, and re-purposing of materials and waste reduction management opportunities.

METRO has taken steps to become more sustainable and resilient. We are currently developing a waste management program operated by our Planning, Engineering and Construction group. Other facilities initiatives include agency wide recycling program and implementation of LED lighting at all facilities. METRO is also implementing urban design guidelines to make future METRO transit facilities more sustainable and resilient.

Develop an Energy Management Plan

METRO will develop an Energy Management Plan that establishes a roadmap for transforming how we operate through reduced energy use and provide greener, safer, and more reliable service. This plan will inventory existing agency practices and initiatives and include how we will implement improved efficiency by modernizing design, construction, and operational practices.

Implement an Energy Conservation Plan

METRO will document an Energy Conservation Plan in an effort to increase awareness and understanding of energy consumption and improve identification of opportunities to reduce energy usage when feasible. This plan may include simple things such as turning off lights, shutting down computers, and taking the stairs, to more complicated initiatives such as educational awareness, equipment replacement, and landscaping design. This plan coupled with the Energy Management Plan will provide specific guidance for improving energy efficiency across the agency.

LED Lighting Conversion

METRO is converting lighting at our facilities to LED lighting. Improved lighting and illumination at our facilities will improve safety and security, reduce energy use for lighting by approximately 60%, and extend the life of the lighting source by three to four times.



Person. "LED vs. Regular Lightbulbs: Do They Really Make a Difference?" Blog, Arcadia, 16 Mar. 2020, <https://blog.arcadia.com/led-vs-regular-lightbulbs-do-they-really-make-a-difference/>.

Shift from 25% to 35% renewable energy sources by 2030.



METRO currently purchases 25% of its energy from renewable sources and staff remains actively engaged with strategic purchasing opportunities to provide cost conscious purchase and increase our use of renewable energy sources.

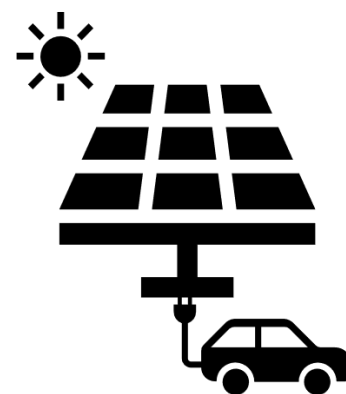
Upgrading chiller plants to more efficient, state-of-the-art technology

In 2022 the chillers at 1900 Main are being upgraded to mag-bearing chillers which are expected to be approximately 35% more efficient. This is part of a multi-year program to upgrade chillers at numerous facilities with efficient, state-of-the-art technology. Installation and use of this new equipment is estimated to reduce energy costs by tens of thousands of dollars annually.

Develop scope for solar pilot project for at least 1 METRO facility

As METRO progresses toward more resilient and sustainable energy use, we are exploring options to use solar power at our facilities and will scope out a pilot project to assist in evaluation of this technology to best serve our mission. This effort will include research into the capabilities to use METRO facilities for energy storage as well.

This initiative is complimented by other activities METRO is engaged in including partnering with the University of Houston on a National Science Foundation grant to explore options at the West Bellfort Park & Ride that will best serve the community and provide equitable access to EVs. The West Bellfort P&R update is a resiliency project as it will mitigate long-standing flooding issues, connect the facility to the adjacent hike & bike trail, and include sustainable features. The project will also serve as a framework for future Park & Ride development.

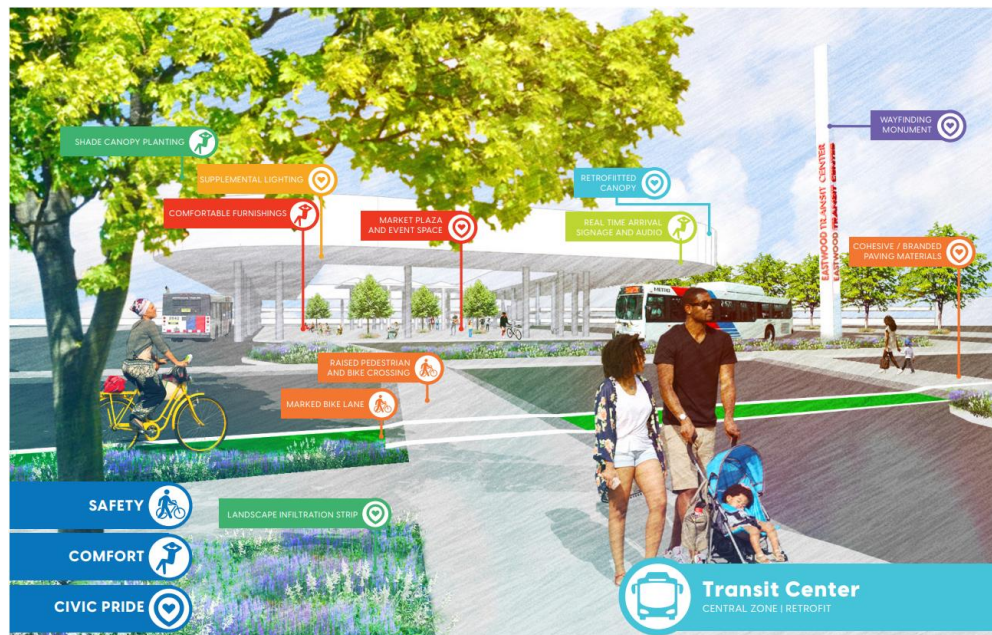


Evaluate feasibility of "Green Bonds" for METRONext related debt issuances

Green bonds are those specifically designated to encourage sustainability and support projects that mitigate climate change. More specifically, projects that improve energy efficiency, pollution prevention, clean transportation, and more sustainable resource management. This funding option is in direct alignment with service enhancements included in the METRONext Program.

Implement Agency Urban Design Guidelines for future project

METRO is developing an Urban Design Manual that provides a long-term strategy for delivering high-quality transit environments with the goal of creating a more livable region. The manual includes five guiding principles, including one focused on sustainability and resilience to better ensure transit related development is designed to have a positive environmental impact. This guiding principle provides direction for such things as minimizing hardscape footprints, incorporating an ecologically based design approach, creating partnerships to support dense building, and encourages mixed uses to support smart, healthy, livable, resilient, walkable places.



Collaborate with regional alternative energy programs

METRO will coordinate with regional programs that promote alternative energy solutions to promote our efforts within the community and better understand opportunities for expanded use of clean, renewable energy.

The activities in this plan only cover METRO's fiscal year 2022 – 2024.

Below is METRO's approach to achieve the Sustainability Vision Statement #3:

- Plan:** METRO will apply green principles to the design and management of its facilities.
- Do:**
- Develop Energy Management Plan.
 - Implement an energy conservation plan.
 - Complete LED Lighting conversion at all facilities.
 - Shift from 25% to 35% renewable energy sources by 2030.
 - Upgrading chiller plants to more efficient, state-of-the-art technology.
 - Develop scope for solar pilot for at least 1 METRO facility.
 - Evaluate feasibility of "Green Bonds" for METRONext related debt issuances.
 - Implement Agency Urban Design Guidelines for future projects.
 - Collaborate with regional alternative energy programs including, but not limited to:
 - Community solar cooperatives.
 - Houston Hydrogen HUB initiatives.
- Check:** Benchmark existing practices against current industry best practices.
- Act:** Make adjustments based on bench marked best practices.

SUSTAINABILITY VISION STATEMENT 4: METRO will collaborate educational institutions and community organizations to achieve shared environmental goals.

With increased interest in reducing carbon emissions and with METRO's current and on-going efforts, relevant organizations and resources will be vital in helping METRO implement its Sustainability Vision Statement and Climate Action Plan. METRO has been active partners with the City of Houston and will continue to support both the City of Houston Climate Action Plan and its Resilient Houston Plan.

METRO has also joined the FTA Sustainable Transit for a Healthy Planet Challenge which supports transit agencies in its transition to zero emissions fleets and carbon footprint reduction. METRO has established informal partnerships with its area utility, CenterPoint Energy, fleet electrification advocates, Evolve Houston, and the City of Houston. Additionally, METRO has had a longstanding relationship with LINK Houston, a non-profit focused on equity and access in transportation.

On the industry side, METRO has joined both American Public Transportation Association's (APTA) Zero Emissions Fleet Committee, and zero emissions fleet non-profit CalSTART.

Previously, METRO entered into a Memorandum of Understanding with the Environmental Defense Fund (EDF) to further study its fleet electrification opportunities. Equity will be a key focus of our Climate Action Plan. With that in mind, we will coordinate with community organizations and non-profits such as LINK Houston.

The activities in this plan only cover METRO's fiscal year 2022 – 2024.

Below is METRO's approach to achieve the Sustainability Vision Statement #4.

- Plan:** Establish relationships with industry, local, state, and national organizations focused on zero emissions fleet transition and operations.
- Do:** Coordinate with CenterPoint Energy.
- Establish Memorandum of Understanding or Membership with EVolve Houston.
- Continue involvement in APTA Zero Emissions Fleet Committee and other relevant industry groups/committees.
- Join Houston Galveston Area Council Clean Cities Coalition.
- Collaborate with regional alternative energy programs including, but not limited to:
- Community solar cooperatives.
 - Houston Hydrogen HUB initiatives.
- Partner with other transit agencies to gather lessons learned on fleet transition, operations, and workforce development.
- Collaborate with community organizations.
- Collaborate with customers and equity focused non-profits such as LINK Houston and explore METRO's potential involvement in EVolve Houston's equity program.
- Check:** Effective relationships with communities and partners.
- Act:** Implement lessons learned and best practices.

SUSTAINABILITY VISION STATEMENT 5: METRO will develop an agency wide Climate Action Plan to achieve the objectives of this Sustainability Vision Statement.

This Climate Action Plan satisfies the goal of Sustainability Vision Statement Goal 5. METRO's Climate Action Plan describes METRO's steps to build on and further develop the pathway to sustainability. The Plan will inform our current and future business practices and service delivery. METRO's Climate Action Plan is designed to be a roadmap to guide our on-going business decisions to become a more sustainable agency and to reduce or eliminate our carbon footprint. The activities in this plan cover METRO's fiscal year 2022 – 2024.

At the July 2021 METRO Board meeting, a Sustainability Vision Statement was presented to serve as the framework for the METRO Climate Action Plan. The METRO Climate Action Plan will serve as a living document. The framework will involve an inventory of existing agency initiatives and activities, review of best practices with target goals and timelines.

Below is METRO's approach to achieve the Sustainability Vision Statement #5.

- Plan:** Develop and implement Climate Action Plan.
- Do:** Track & Monitor activities under the Climate Action Plan.
- Check:** Review analysis at conclusion of FY2024.
- Act:** Review, update and implement updated Climate Action Plan.

5. Conclusion

METRO looks forward to working with its partners and the community to deliver greener service and to support a carbon neutral environment. The Sustainability Vision Statement approved by the METRO Board of Directors will serve as our guide. Following the Plan-Do-Check-Act methodology we will be able to measure the effectiveness of our efforts. This plan is a living document to be reviewed and, if needed, amended annually to reflect agency plans, goals, budget, and available resources in preparation for future budget and planning.

The activities in this initial plan cover METRO's fiscal year 2022 – 2024, with future actions to be determined as the initiatives contained herein are accomplished. We view this as a living document with the flexibility to adapt to the rapidly changing knowledge, research, opportunities, and best practices related to mitigating the effects of climate change. We look forward to working closely with the region and city on our mutual goals of a more environmentally friendly and resilient community.

6. METRO SUSTAINABILITY VISION STATEMENT & CLIMATE ACTION PLAN GOALS CHART

	Goal 1 METRO will shift to procuring only zero-emissions buses by FY2030	Goal 2 METRO will manage its operations to avoid or minimize environmental impacts on the health and safety of our customers and employees	Goal 3 METRO will apply green principles to the design and management of its facilities. METRO will foster sustainable use of natural resources by promoting energy management, energy creation / generation, recycling, re-use, and re-purposing of materials and waste reduction management opportunities	Goal 4 METRO will collaborate with educational institutions and community organizations to achieve shared environmental goals	Goal 5 METRO will develop an agency wide Climate Action Plan to achieve the objectives of this Sustainability Vision Statement
Plan	Shift to procuring only zero-emissions buses by FY2030.	METRO will establish and monitor environmental objectives and implement best management practices to ensure improved performance without reducing service standards or High-Capacity Transit goals.	METRO will apply green principles to the design and management of its facilities.	Establish relationships with industry, local, state, and national organizations focused on zero emissions fleet transition and operations.	Develop and implement Climate Action Plan.
Do	Begin implementation of METRO Battery Electric Bus program.	Identify METRO's Carbon Footprint. Develop an Environmental Management Plan.	Develop Energy Management Plan. Implement an Energy Conservation Plan.	Coordinate with CenterPoint Energy. Establish Memorandum of Understanding or Membership with EVolve Houston.	Track & Monitor activities under the Climate Action Plan.
	Begin testing of Fuel Cell Electric Buses.	Collaborate with EVolve Houston to identify industry best practices in carbon reduction.	Complete LED Lighting Conversion at all facilities.	Continue involvement in APTA Zero Emissions Fleet Committee and other relevant industry groups/committees.	
	Continue work on METRO's AV Electric Bus Program (University District Project Phase II and Automated Bus Consortium).	Inventory existing agency practices and initiatives.	Shift from 25% to 35% renewable energy sources by 2030.	Join Houston Galveston Area Council Clean Cities Coalition.	
	Perform capability assessment of bus operating facilities, park and rides and transit centers for battery electric and/or Fuel Cell Electric Bus fleet.		Upgrading chiller plants to more efficient, state-of-the-art technology.	Collaborate with regional alternative energy programs including, but not limited to: • Community solar cooperatives. • Houston Hydrogen HUB initiatives.	
	Implement Workforce		Develop scope for solar pilot for at	Partner with other transit agencies	

	Goal 1 METRO will shift to procuring only zero-emissions buses by FY2030	Goal 2 METRO will manage its operations to avoid or minimize environmental impacts on the health and safety of our customers and employees	Goal 3 METRO will apply green principles to the design and management of its facilities. METRO will foster sustainable use of natural resources by promoting energy management, energy creation / generation, recycling, re-use, and re-purposing of materials and waste reduction management opportunities	Goal 4 METRO will collaborate with educational institutions and community organizations to achieve shared environmental goals	Goal 5 METRO will develop an agency wide Climate Action Plan to achieve the objectives of this Sustainability Vision Statement
	Development Program for Operators & Mechanics.		least 1 METRO facility.	to gather lessons learned on fleet transition, operations, and workforce development.	
	Pursue funding to support the conversion to a zero-emissions fleet.		Evaluate feasibility of "Green Bonds" for METRONext related debt issuances.	Collaborate with community organizations.	
			Implement Agency Urban Design Guidelines for future projects.	Collaborate with customers and equity focused non-profits such as LINK Houston and explore METRO's potential involvement in EVolve Houston's equity program.	
			Collaborate with regional alternative energy programs including, but not limited to: <ul style="list-style-type: none"> • Community solar cooperatives. • Houston Hydrogen HUB initiatives. 		
Check	After 15 months of operation, assess preliminary performance under: <ul style="list-style-type: none"> ▪ Operations ▪ Infrastructure ▪ Workforce ▪ Customer Service 	Benchmark existing practices against current industry best practices.	Benchmark existing practices against current industry best practices.	Effective relationships with communities and partners.	Review analysis at conclusion of FY2024.
Act	Make adjustments based on preliminary assessment at 15 months of operations, recommendations as financially feasible.	Make adjustments based on bench marked best practices.	Make adjustments based on bench marked best practices.	Implement lessons learned and best practices.	Review, update and implement updated Climate Action Plan.
	Develop financing and budget plan for future adjustments not available in budget.				