



Houston Climate Action Plan
DRAFT Outline of Recommendations
For Public Comment

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Background

The City of Houston has a strong history of implementing effective and practical programs and policies that establish a competitive market advantage. The creation of the first community-wide Climate Action Plan (CAP) builds upon this legacy by solidifying the commitment made by Mayor Turner, co-chair of Climate Mayors, on June 24, 2017, to adopt, honor, and uphold the goals of the Paris Climate Agreement. As of July, 427 Mayors in 48 States have pledged to uphold the Paris Agreement.

A CAP enables Houston to develop strategies and evidence-based measures that will not only help minimize the City's carbon footprint and the negative outcomes of climate change, but also create more resilient communities, reduce harmful pollution, cut energy waste, and boost the local economy. This roadmap for the City, businesses, residents, and communities will analyze current emission sources and evaluate the health, safety, and economic benefits of various development and policy options that could bring Houston closer to a carbon-neutral future. As sustainability and resiliency go hand in hand, the plan is also a critical component of the City's Resilience Strategy – currently in development – and recovery efforts after Hurricane Harvey.

Houston is one of the largest per capita greenhouse gas emissions in the country with 14.9 metric tonnes of CO₂ per capita per year. A baseline of greenhouse gas emissions inventory was developed using 2014 data to guide the CAP strategies and track the implementation progress. In 2014, Houston residents and businesses generated nearly 35 million tons of greenhouse gases through carbon-fueled buildings, cars, and waste. As Houston gains population, jobs, and buildings each year, the associated projected emissions also grow; thus, Houston needs to define an ambitious agenda for the future.

How to use this document

This document is an outline that the public is invited to review before the CAP is drafted. These draft strategies and actions have been recommended by community stakeholders brought together by the City over the past few months and were evaluated for technical feasibility by our partners (HARC and C40).

Please submit your comments by August 31, 2019.

Online Form:

<http://greenhoustontx.gov/climateactionplan/comment.html>

Mail or Drop off:

City of Houston - Office of Sustainability
611 Walker, 13th Floor, Houston, TX 77002

Emissions Reductions Goals

Strategies and actions were recommended based on their potential to reduce greenhouse gas (GHG) emissions and equitably benefit the community. Any initial actions that could negatively impact disadvantaged populations were either removed from consideration or revised to ensure positive, equitable outcomes for the whole community.

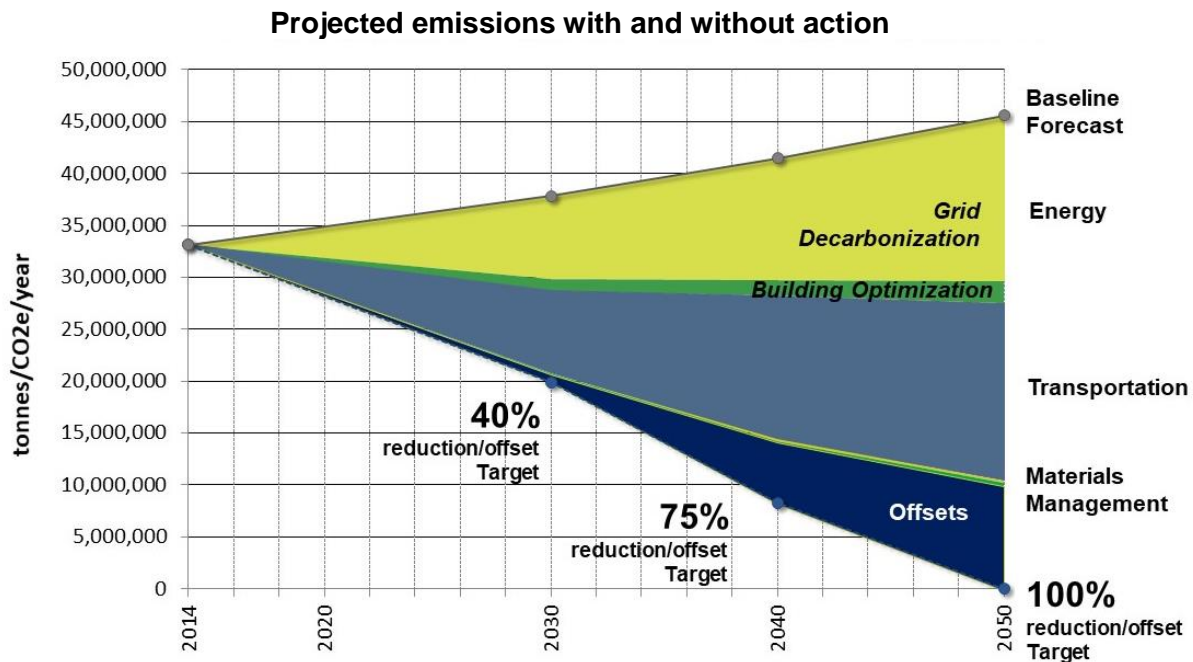


Figure 1. GHG emissions were projected without actions (baseline forecast) alongside the emission reduction potential of recommended actions. Emission reduction goals of 40%, 75%, and 100% of the baseline forecast were modeled for 2030, 2040, and 2050 respectively.

GHG Reduction Potential (by 2050):

GHG Impact	Definition
Enabling	Indirect Impact/Supporting
Low	Less than 10,000 tCO ₂ e per year
Medium	10,000 – 100,000 tCO ₂ e per year
High	More than 100,000 tCO ₂ e per year

Overview of Goals

The following goals guide the strategies and actions that the City and community can take to reduce our GHG emissions and help prepare for a changing climate.

Transportation
T1 Shift regional fleet to electric vehicles (EV) and alternative renewable fuels.
T2 Reduce vehicle miles traveled (VMT) per capita.
T3 Provide equitable mobility.
Energy Transition
E1 Increase local solar generation and storage.
E2 Increase renewable energy generated outside the city limits.
E3 Invest in green infrastructure and carbon capture technology to offset emissions.
Building Optimization
B1 Reduce building energy use and maximize savings.
B2 Expand investment in energy efficiency.
B3 Optimize building operations through investing in skilled local jobs.
Materials Management
M1 Improve public awareness of sustainable material consumption and disposal choices.
M2 Reduce tonnage of landfilled waste.
M3 Protect public health and the environment through optimized waste operations/management.

In addition to having a more-stable climate, implementation of certain CAP activities may also produce the following co-benefits:

- Economy/Innovation
- Affordability
- Accessibility
- Cost-Savings
- Health and Well-being
- Community Resilience
- Environmental Quality
- Workforce Development

Leading By Example: Summary of City-Specific Actions

Implementation of these actions by the City of Houston in the short term can build community capacity to reduce greenhouse gas emissions and achieve our 2050 carbon neutral goal.

Activity	Year Completed
Transportation	
Increase public infrastructure for EV and alternative renewable fuels, installing EV charging stations at public-facing City buildings.	2025
Convert non-emergency, light-duty municipal fleet to 100% EV.	2030
Expand City's Transit Oriented Development and densification ordinance inside the Sam Houston Tollway.	2030
Energy Transition	
Power municipal operations with 100% renewable energy and evaluate onsite solar.	2025
Work with Texas cities to increase the state renewable portfolio standard.	2030
Strengthen City of Houston's tree planting and greenspace protection policies.	2025
Building Optimization	
Update and enforce building and energy codes leading to net-zero commercial buildings.	2025
Require all new City of Houston owned/occupied buildings to be designed and operated as net-zero by 2030.	2030
Update municipal benchmarking and energy audit policy.	2030
Continue the City's leadership in engaging and enabling building owners, operators, and tenants to adopt efficient building practices.	ongoing
Reduce drinking water operations and wastewater treatment plant energy consumption by 10% through optimization of facility operations and implement city-wide water conservation program.	2025
Materials Management	
Update and adopt more stringent Green Procurement Policy.	2022
Implement a phased "universal" recycling ordinance to require businesses and multifamily residents to participate in recycling.	2025
Phase in requirement for source-separated food waste collection from large, commercial food processors and manufacturers.	2025

Strategies and Actions by key area

Note: Action items in GREEN denote City of Houston actions.

Action items in BLACK denote community actions.

Transportation Strategies	Actions
Goal: Shift regional fleet to EV and alternative renewable fuels.	
<p>T1.1 Increase infrastructure and incentives for EV and alternative renewable fuels use in commercial and private sector.</p> <p>GHG Impact: Enabling-High</p> <p>Year Completed: 2030</p> <p>Lead: ARA</p> <p>Partners: CenterPoint, Private sector, Harris County, H-GAC, Port of Houston</p>	<ol style="list-style-type: none"> 1. Install EV charging stations at libraries, community centers, and other public-facing City buildings by 2025 2. Adopt EV-ready building codes and streamline permitting for EV charging 3. Commission EVolve Houston Coalition PPP to establish conversion goals, plan system of charging infrastructure, and promote EV consumer education in all transportation sectors 4. Pursue state, federal, and local incentives for EV infrastructure
<p>T1.2 Convert 100% of the non-emergency, light-duty municipal fleet (cars and trucks) to EV technologies by 2030.</p> <p>GHG Impact: Medium</p> <p>Year Completed: 2030</p> <p>Lead: Fleet Management</p>	<ol style="list-style-type: none"> 1. Publish and implement recommendations from City Green Fleet Study 2. Rebuild and Expand Green Fleet Share Program 3. Adopt Green Fleet Procurement Policy
Goal: Reduce vehicle miles traveled (VMT) per capita.	
<p>T2.1 Implement integrated multi-modal transportation systems</p> <p>GHG Impact: Enabling-High</p> <p>Year Completed: 2030, 2040 METRONext</p> <p>Lead: Planning</p> <p>Partners: H-GAC, Harris County, METRO, TxDOT, Private sector</p>	<ol style="list-style-type: none"> 1. Expand shared/micro mobility options (e.g., bike sharing and car share) 2. Extend METRO network, particularly BRT 3. Expand focus of TIRZ and Management Districts to champion multi-modal access and information 4. Coordinate regional transit operations and payment systems 5. Prioritize funding mechanisms toward multi-modal transportations (especially MPO funds)

Transportation Strategies	Actions
<p>T2.2 Build and retrofit complete, transit-oriented neighborhoods</p> <p>GHG Impact: High</p> <p>Year Completed: 2030</p> <p>Lead: Planning, Housing, Mayor’s Office of Complete Communities</p> <p>Partners: Private sector</p>	<ol style="list-style-type: none"> 1. Expand City’s Transit-Oriented Development and densification ordinance, Complete Neighborhood and Livable Cities Programs, Transit Corridor and Walkable Places Ordinance inside the Sam Houston Tollway 2. Reduce parking requirements 3. Implement pricing strategies for public parking 4. Create incentives and prioritize public financing mechanisms to support infill development
<p>T2.3 Implement traffic demand reduction programs with governmental, institutional and commercial anchors.</p> <p>GHG Impact: Enabling</p> <p>Year Completed: 2030</p> <p>Lead: H-GAC, Private sector, Special districts</p> <p>Partners: ARA</p>	<ol style="list-style-type: none"> 1. Provide real-time transit and traffic information 2. Encourage employers to offer financial incentives for transit use, implement flex time, and expand bicycle parking/showers
<p>Goal: Provide equitable mobility.</p>	
<p>T3.1 Reduce the costs of early adoption of transportation technologies and services for vulnerable populations</p> <p>GHG Impact: Enabling</p> <p>Year Completed: 2040</p> <p>Public-Private Partnership: City of Houston, Harris County, METRO, Private sector</p>	<ol style="list-style-type: none"> 1. Provide vulnerable populations with transit cost offsets 2. Require transit partners to bridge technology gap and language barrier 3. Promote second-hand EV market
<p>T3.2 Improve interconnectedness and safety of pedestrian and transit networks</p> <p>GHG Impact: Enabling-High</p> <p>Year Completed: 2025</p> <p>Lead: Planning, HPW</p> <p>Partners: H-GAC, Harris County, METRO, TxDOT, Private sector</p>	<ol style="list-style-type: none"> 1. Develop and implement a sidewalk plan 2. Continue to implement Complete Streets initiative and expand investment in construction and repair of sidewalk and bike lanes 3. Support and fully implement Houston Bike Plan and Bayou Greenways 2020 initiatives 4. Implement Vision Zero

Energy Transition Strategies	Actions
Goal: Increase local solar generation and storage.	
<p>E1.1 Support installation of rooftop and community solar</p> <p>GHG Impact: Enabling</p> <p>Year Completed: 2025</p> <p>Lead: ARA, GSD, HPW, CenterPoint, Harris County</p> <p>Partners: Private sector</p>	<ol style="list-style-type: none"> 1. Develop and enforce specific standards requiring that new commercial and industrial buildings accommodate solar and battery installation 2. Assess potential for solar at City facilities 3. Investigate development of distributed energy/microgrid of local community solar projects on City of Houston and Harris County surplus land 4. Utilize the electricity storage potential of electric vehicles to support renewable energy integration
<p>E1.2 Advance investment and workforce development in renewable energy across business, financial, and transportation sectors</p> <p>GHG Impact: Enabling</p> <p>Year Completed: 2025</p> <p>Lead: Private sector, community colleges</p> <p>Partners: ARA, CRO, Mayor’s Office of Education</p>	<ol style="list-style-type: none"> 1. Partner with local educational institutions, Hire Houston Youth to support distributed generation and electric vehicle charging infrastructure 2. Support existing and new financing models to promote investment in renewable energy, including the existing Property Assessed Clean Energy (PACE) program 3. Assess opportunity to leverage Opportunity Zones to accelerate renewable energy investment
Goal: Increase renewable energy generated outside the city limits.	
<p>E2.1 Promote the purchase of retail renewable power by residents and businesses</p> <p>GHG Impact: Enabling-Medium</p> <p>Year Completed: 2025</p> <p>Lead: Private sector</p> <p>Partners: ARA, Finance</p>	<ol style="list-style-type: none"> 1. Power municipal operations with 100% renewable energy 2. Purchase retail renewable power (i.e. Renewable Energy Credits acquisition) 3. Negotiate and sign individual Power Purchase Agreements to acquire renewable energy 4. Partner with retail electric providers to improve consumer awareness of renewable retail product options
<p>E2.2 Advocate for renewable energy policies at the state and federal levels</p> <p>GHG Impact: High</p> <p>Year Completed: 2030</p> <p>Lead: ARA</p> <p>Partners: Private sector, Nonprofit & Advocacy groups</p>	<ol style="list-style-type: none"> 1. Through Climate Mayors, lobby for federal policies that facilitate decarbonizing the U.S. power sector 2. Organize Texas mayors to lobby state legislature to increase the Texas Renewable Portfolio Standard to 80% zero-carbon electricity by 2050

Energy Transition Strategies	Actions
Goal: Invest in green infrastructure and carbon capture technology to offset emissions.	
<p>E3.1 Utilize Houston’s abundant greenspace to capture and store carbon</p> <p>GHG Impact: Enabling-Medium</p> <p>Year Completed: 2030, 2040</p> <p>Lead: ARA, Parks and Recreation</p> <p>Partners: Private sector, Nonprofit & Advocacy groups</p>	<ol style="list-style-type: none"> 1. Create a tree canopy plan to increase coverage 25% by 2040 2. Revise existing tree and shrub ordinance and provide incentives to landscape with native plants 3. Create a grassland management plan for the City of Houston 4. Support development of regional and local ecosystem credit markets for carbon and storm water capture
<p>E3.2 Offset municipal emissions (e.g. Fleet)</p> <p>GHG Impact: Enabling</p> <p>Year Completed: 2030</p> <p>Lead: Finance</p> <p>Partners: ARA</p>	<ol style="list-style-type: none"> 1. Develop a plan to secure material quantities of low-cost emission offset credits, prioritizing Texas-based CO₂ sequestration projects
<p>E3.3 Promote Carbon Capture, Utilization, and Sequestration (CCUS) from industrial processes</p> <p>GHG Impact: Enabling</p> <p>Year Completed: 2030</p> <p>Lead: Private sector</p> <p>Partners: ARA</p>	<ol style="list-style-type: none"> 1. Encourage private sector and universities to build upon current CCUS research and development, initiatives, and pilot programs

Building Optimization Strategies	Actions
Goal: Reduce building energy use and maximize savings.	
<p>B1.1 Update energy code and increase compliance</p> <p>GHG Impact: High</p> <p>Year Completed: 2025</p> <p>Lead: HPW</p> <p>Partners: Private sector, Nonprofit & Advocacy groups</p>	<ol style="list-style-type: none"> 1. Increase capacity and training for plan review and code inspection staff 2. Evaluate, improve, and update municipal code enforcement procedures 3. Accelerate energy code adoption
<p>B1.2 Develop programs that improve building energy efficiency</p> <p>GHG Impact: High</p> <p>Year Completed: 2030</p> <p>Lead: ARA, GSD, BOMA</p> <p>Partners: Private sector, Nonprofit & Advocacy groups</p>	<ol style="list-style-type: none"> 1. Work with Building Owners and Managers Association (BOMA) and building industry partners to develop benchmarking and audit programs for commercial, industrial, and residential buildings 2. Update municipal building benchmarking and energy audit policy
<p>B1.3 Reduce water and wastewater energy consumption by 10% through optimization of facility operations and water conservation</p> <p>GHG Impact: Medium</p> <p>Year Completed: 2025</p> <p>Lead: HPW</p> <p>Partners: Regional water providers, Municipal Utility Districts, Private sector, HOA's, Nonprofit & Advocacy groups</p>	<ol style="list-style-type: none"> 1. Implement water conservation education campaigns 2. Consider water rates that encourage water conservation 3. Implement technologies and programs to reduce water loss and waste 4. Implement water reuse strategies to use non-potable water where appropriate

Building Optimization Strategies	Actions
Goal: Expand investment in energy efficiency.	
<p>B2.1 Promote clean energy financing programs</p> <p>GHG Impact: Enabling</p> <p>Year Completed: 2025 (Commercial); 2030 (Residential)</p> <p>Lead: Private sector</p> <p>Partners: Economic Development, HPW, ARA, Nonprofit & Advocacy groups</p>	<ol style="list-style-type: none"> 1. Provide training and education resources on building optimization and available finance mechanisms, such as PACE, green leases, on-bill financing, etc. 2. Promote tools that identify financial incentives and assistance with efficiency programs, i.e. partnership with Incentifind
<p>B2.2 Expand utility energy efficiency programs</p> <p>GHG Impact: High</p> <p>Year Completed: 2025</p> <p>Lead: CenterPoint, Electricity providers</p> <p>Partners: ARA</p>	<ol style="list-style-type: none"> 1. Implement city-wide weatherization program to reduce residential energy consumption and focus on reducing energy burden of low-income populations 2. Update and align CenterPoint’s rebate and incentive programs with City's goal to reduce energy consumption
Goal: Optimize building operations through investing in skilled local jobs.	
<p>B3.1 Provide training in the operation, management and maintenance of relevant building systems</p> <p>GHG Impact: High</p> <p>Year Completed: 2025</p> <p>Public-Private Partnership: HPW, Private sector, Community Colleges, Nonprofit & Advocacy groups</p>	<ol style="list-style-type: none"> 1. Promote existing building owner/operator trainings and certifications and identify programs that need to be developed 2. Educate, engage and connect the community to create sustainability training programs and provide career pathway opportunities 3. Provide training and education resources for single and multi-family residences 4. Educate owners/operators on the Federal Rules governing refrigerant management

Materials Management Strategies	Actions
Goal: Improve public awareness of sustainable material consumption and disposal choices.	
<p>M1.1 Engage public on waste reduction solutions</p> <p>GHG Impact: Enabling</p> <p>Year Completed: 2025</p> <p>Lead: ARA, SWD, H-GAC</p> <p>Partners: Private sector</p>	<ol style="list-style-type: none"> 1. Provide training and education resources to community leaders 2. Lead by example and promote initiatives that reduce consumption of high GHG-impact goods (e.g. plastic-free July) 3. Develop robust multimedia campaign with local talent and promote existing private sector marketing initiatives
<p>M1.2 Develop, implement, and promote sustainable municipal procurement strategies</p> <p>GHG Impact: Enabling</p> <p>Year Completed: 2025</p> <p>Lead: ARA, SPD</p>	<ol style="list-style-type: none"> 1. Prioritize buying local, from small, minority-owned businesses 2. Create procurement policy that requires City to purchase products that have a low life cycle GHG impact and contract with sustainable vendors 3. Support and incentivize producers and suppliers who offer reduced-GHG goods
<p>M1.3 Promote upstream solutions to reduce/manage disaster debris</p> <p>GHG Impact: Enabling</p> <p>Year Completed: 2025</p> <p>Lead: CRO, SWD, OEM</p> <p>Partners: Private sector</p>	<ol style="list-style-type: none"> 1. Require proper disposal of organic storm debris 2. Promote spring cleaning of hazardous materials in advance of hurricane season 3. Raise awareness of flood and hurricane resilient construction materials
Goal: Reduce tonnage of landfilled waste.	
<p>M2.1 Expand and innovate recycling opportunities to all Houston residents and businesses to increase diversion and recovery, while reducing contamination</p> <p>GHG Impact: Medium</p> <p>Year Completed: 2030</p> <p>Lead: SWD, H-GAC</p> <p>Partners: Private sector</p>	<ol style="list-style-type: none"> 1. Implement a phased “universal” recycling ordinance for businesses and multi-family apartment buildings 2. Encourage recycling building materials with permitting incentives 3. Increase the number of drop-off locations and pick up services, expanding materials accepted 4. Conduct cart audits to educate residents to prevent contamination and maximize diversion 5. Measure contamination rates for all commercial, residential, and industrial recycling
<p>M2.2 Strengthen and support efforts to reduce food waste and create</p>	<ol style="list-style-type: none"> 1. Phase in requirement for source-separated food-waste collection from large, commercial food-waste generators

Materials Management Strategies	Actions
<p>infrastructure for food organics collection and composting</p> <p>GHG Impact: High</p> <p>Year Completed: 2025</p> <p>Lead: Private sector</p> <p>Partners: SWD, HHD</p>	<ol style="list-style-type: none"> 2. Develop food organics residential collection pilot program and create infrastructure for collection 3. Create a network platform for partnership between large food waste generators with local composting companies 4. Facilitate food donation for human consumption and animal-feed production 5. Facilitate the development of commercial composting facilities and food waste haulers
<p>M2.3 Support and expand market development and diversion infrastructure</p> <p>GHG Impact: Enabling</p> <p>Year Completed: 2025</p> <p>Lead: Private sector</p> <p>Partners: SWD, H-GAC</p>	<ol style="list-style-type: none"> 1. Expand programs like Repair Café for appliance/electronics reuse and repair 2. Promote awareness of end markets for commercial and consumer waste products and take-back programs 3. Increase visibility of businesses and services that sell or repair used goods
<p>Goal: Protect public health and the environment through optimized waste operations/management.</p>	
<p>M3.1 Improve efficiency of all landfill, transfer stations and waste transportation.</p> <p>GHG Impact: Medium</p> <p>Year Completed: 2030</p> <p>Lead: Private sector</p> <p>Partners: SWD, TCEQ, EPA</p>	<ol style="list-style-type: none"> 1. Require City of Houston-contracted landfills to capture landfill gas. 2. Set enforceable environmental standards for all SWD facilities and require third party inspections 3. City of Houston convert solid waste fleet to low emission vehicles by 2030 4. Assess opportunities for waste conversion technologies (e.g. anaerobic digestion, pyrolysis, gasification, etc.) for economic and technical feasibility
<p>M3.2 Ensure long-term disposable capacity and solid waste infrastructure</p> <p>GHG Impact: Enabling</p> <p>Year Completed: 2030</p> <p>Lead: Private sector</p> <p>Partners: SWD, H-GAC</p>	<ol style="list-style-type: none"> 1. Provide sustainable funding for municipal solid waste services 2. Improve capacity for managing and recovering disaster debris 3. Monitor and track all City of Houston-generated waste volumes and their waste-types 4. Require anonymous reporting of waste and recycling tonnages to an independent

Acronyms

ARA	City of Houston Department of Administration and Regulatory Affairs
BOMA	Building Owners and Managers Association
BRT	Bus Rapid Transit
CAP	Climate Action Plan
CCUS	Carbon Capture, Utilization, and Sequestration
CO ₂	Carbon Dioxide
tCO _{2e}	Tons of Carbon Dioxide Emitted
CRO	City of Houston Chief Resilience Officer
EV	Electric Vehicle
EPA	Environmental Protection Agency
GHG	Greenhouse Gases
GSD	City of Houston General Services Department
H-GAC	Houston-Galveston Area Council
HHD	Houston Health Department
HPW	Houston Public Works Department
MPO	Metropolitan Planning Organization
OEM	City of Houston Office of Emergency Management
PACE	Property Assessed Clean Energy
PPP	Public-Private Partnership
SWD	City of Houston Solid Waste Management Department
TCEQ	Texas Commission on Environmental Quality
TIRZ	Tax Increment Reinvestment Zone
TxDOT	Texas Department of Transportation
VMT	Vehicle Miles Traveled

List of Implementation Leads and Partners

City of Houston (COH) Departments:

- Administration and Regulatory Affairs
- Chief Resilience Officer
- Economic Development
- Finance
- Fleet Management
- General Services Department
- Housing
- Houston Health Department
- Houston Public Works
- Mayor's Office of Complete Communities
- Mayor's Office of Education
- Office of Emergency Management
- Parks and Recreation
- Planning
- Solid Waste Management

Community:

- BOMA
- CenterPoint Energy
- Electricity providers
- EPA
- Harris County
- H-GAC
- METRO
- Municipal Utility Districts
- Nonprofit & Advocacy groups
- Port of Houston
- Private sector
- Regional Water Providers
- Solar United Neighbors
- TCEQ
- TxDOT

Complimentary Initiatives

Cross-Cutting:

- Climate Mayors
- Green Building Resource Center
- Hire Houston Youth
- Our Great Region (H-GAC)
- Plan Houston
- Resilient Houston
- Smart Cities

Transportation:

- Active Living Plan
- Bayou Greenways 2020
- Complete Communities
- Houston Bike Plan
- Houston ConnectSmart (TxDOT)
- EVOlve Houston
- Green Fleet Study
- Livable Centers (H-GAC)
- METRONext (METRO)
- Vision Zero
- Walkable Places Committee

Energy Transition:

- Baker Institute and Mitchell Foundation CCUS Initiative
- Fast-track solar permitting
- Green Power Program
- Houston Parks Board
- Solarize Houston
- TREES Program
- 50-for-50 initiative

Materials Management:

- Long Range Solid Waste Plan

Building Optimization:

- City Energy Efficiency Policy
- Green Building Advisory Council
- Houston Green Office Challenge
- Residential Energy Efficiency Program
- Regional Water Plan
- TX-PACE

Addendum #1

July 29, 2019

Revision:

- 1) The Energy Transition Strategy Lead and Partners (E3.1-E3.3) referenced on page 9 were corrected.**

DRAFT