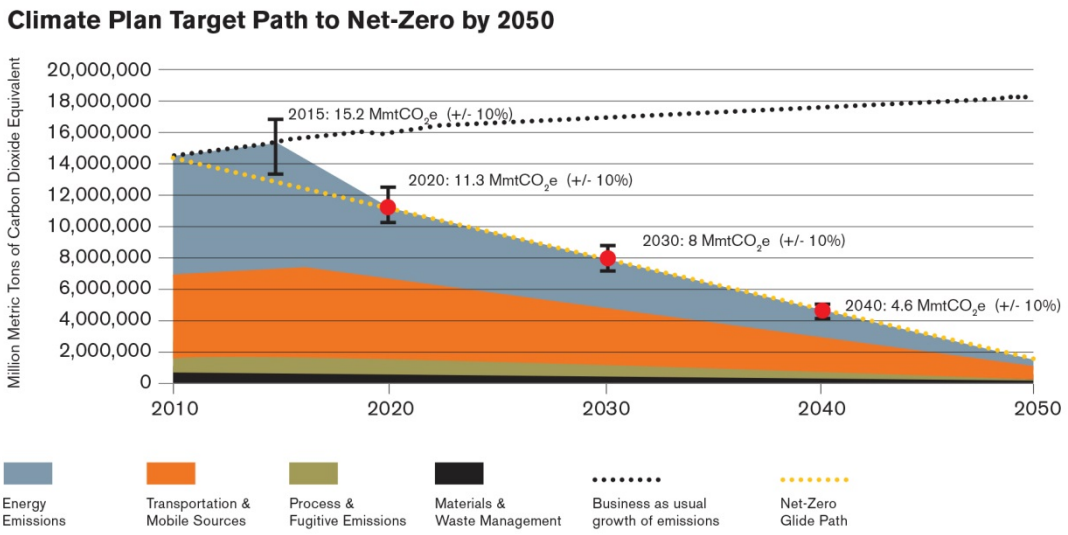
net-zero

AUSTIN COMMUNITY CLIMATE PLAN

IMPLEMENTATION PLAN

PHASE 1

The 2015 Austin Community Climate Plan outlines numerous strategies and actions for achieving net-zero community-wide greenhouse gas emissions by 2050. In particular, 58 actions designed to reduce emissions resulting from electricity and natural gas, transportation and land use, and materials and waste management sources were prioritized as Phase 1 actions; execution of these actions is necessary to achieve the first interim reduction target of 11.3 million metric tons of greenhouse gas emissions by 2020.



This implementation plan concept was adapted from other U.S. cities that lead in climate action – Seattle, Chicago, and Philadelphia – and accomplishes the following:

- Transparency and accountability to stakeholders by providing a detailed snapshot of which actions are underway and the projected impact of those actions.
- A clear understanding of the roles and responsibilities of various City departments in implementing specific strategies from the plan to support climate action.
- Well-defined requirements for Phase 1 actions to be successful, including identification of those needing additional funding or resources, and those that are not achieving anticipated emissions reductions or come at too high a cost.

The Office of Sustainability led the effort to develop this Implementation Plan, working closely with staff from Austin Energy, Austin Transportation, Planning and Zoning, and Austin Resource Recovery. This effort resulted in detailed descriptions for each action and whether or not a current program exists to support it, cost information where clearly available, quantification of the potential carbon reductions associated with each action, and categorization of each action's implementation status and impact in terms of reaching the 2020 interim reduction target.

Implementation status: Each action has been identified as Ongoing, In Development, or Not Yet Begun:

- **Ongoing** – the action is currently being implemented or part of an existing program already underway.
- **In development** – the action is currently in the planning stage, about to be implemented, or being piloted.
- **Not yet begun** – no program currently exists to support implementation of the action.

Across all emissions sectors the majority of Phase 1 actions are In Development or are being implemented as part of an Ongoing program or initiative. The costs associated with implementing these actions are, for the most part, carried in existing program budgets.

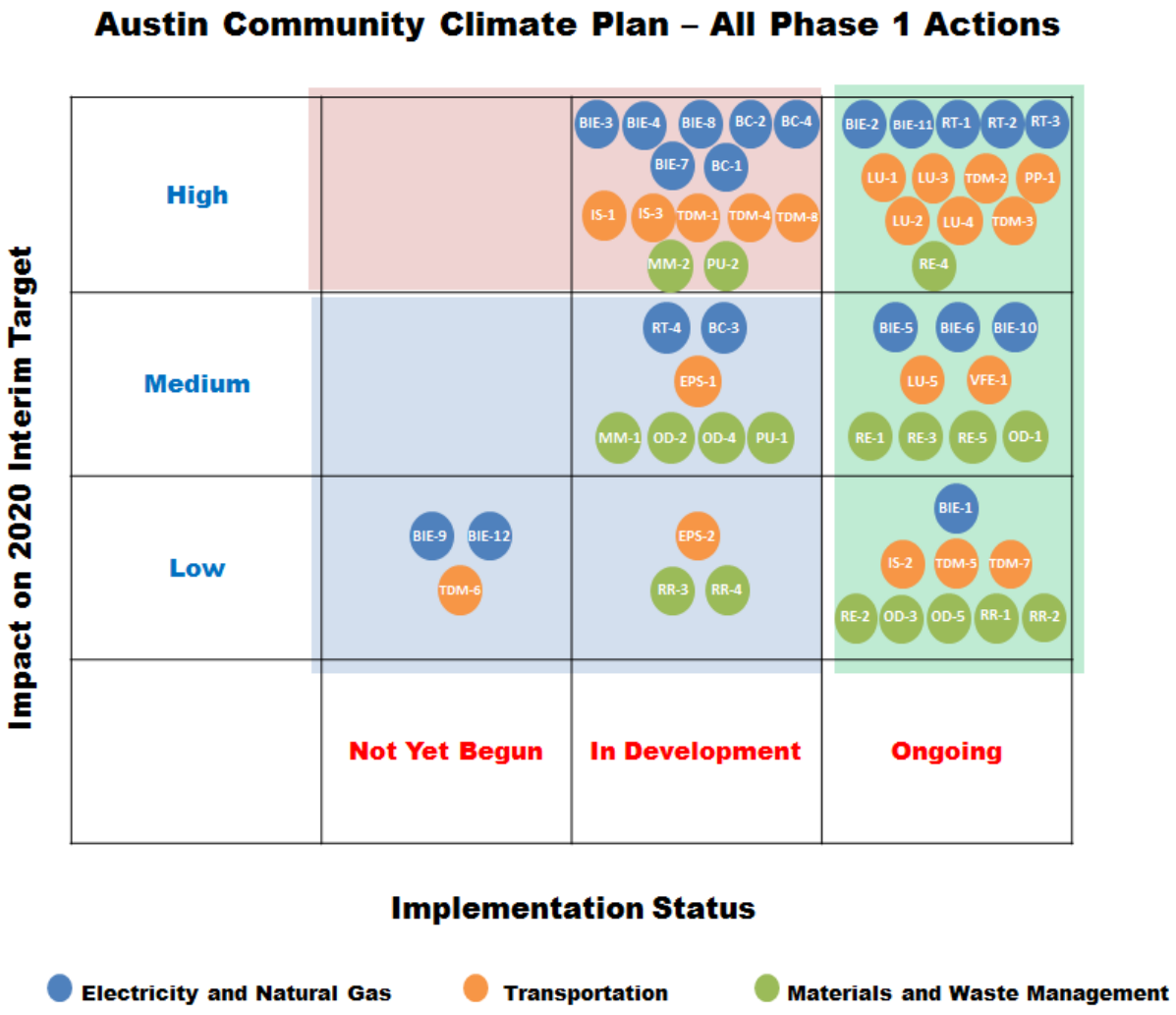
Impact on reaching the 2020 interim reduction target: Each action has been rated as High, Medium or Low impact:

- **High** – Large direct greenhouse gas emissions reductions is likely to be achieved with City action and community participation.
- **Medium** – Direct greenhouse gas emissions reductions may occur, but the size and scope of these reductions is limited.
- **Low** – Greenhouse gas emission reductions may be small, indirect, or unclear, but the action has importance for safety, health, or long-term community benefits.

Almost all Phase 1 actions that are currently underway have been categorized as High or Medium in impact to reach the 2020 interim target for emissions reduction. Only two actions ranked as High or Medium in impact have not yet begun implementation.

The figure below shows the distribution of Phase 1 actions in terms of implementation status and impact. This chart illustrates actions needing additional support and attention to meet the 2020 emissions reduction target as follows:

- **Cells shaded RED = [High Impact] + [In Development, Not Yet Begun]**
  These actions are particularly important to meeting the 2020 interim target, but need focused attention, further investment, and / or policy action to realize all potential emissions reductions.
- **Cells shaded GREEN = [High, Medium, Low Impact] + [Ongoing]**
  In addition to contributing to successfully meeting the goals of the Community Climate Plan, these actions are part of ongoing initiatives that are funded and already underway. While these actions require ongoing support and funding, they already have significant momentum and are on the way to successful outcomes.
- **Cells shaded BLUE = [Low, Medium Impact] + [Not yet Begun, In Development]**
  These actions benefit the community, but the primary outcome may not be related to greenhouse gas reductions. These actions are less important in terms of meeting interim targets, but are not as high priority as other Phase 1 actions.



Based on this analysis, the following actions have been identified as Actions for Focus:

- **Buildings and Integrated Efficiency Actions 3, 7, and 8, and Behavior Change Actions 1, 2, and 4** depend on full implementation programs based on the functionality of advanced meters and support systems. Austin Energy continues to update its Advanced Meter Infrastructure. This system of meters and supporting technology enables Austin Energy to record and report energy usage in 15 minute intervals (or less), which is a capability needed to provide customers with actionable data and to support detailed behavioral programs in which customers can rapidly respond to changing energy needs or plan for upcoming energy events. Austin Energy is currently evaluating traditional and Distributed Energy Service metering programs that will utilize energy usage data to benefit both customers and emissions reduction targets. This evaluation process will continue through FY17.
- **Transportation Demand Management Actions 1 and 8:** These actions support efforts to reduce single occupancy vehicle trips. This involves working with large employers and academic institutions to implement and improve trip reduction programs, including a regular survey of how the workforce commutes, an explanation of benefits to commuters, and promotion of transportation alternatives (e.g. carpool/vanpool, bus/rail, bike/walk, flex/compressed work schedules). These actions also encourage residents to take alternative modes of transportation by providing adequate information about travel choices.

- **Purchasing Actions 1 and 2:** These actions call for the City of Austin to develop and adopt:
    - construction specifications for citywide building permits and public works contracts
    - specifications for roadway projects that include more locally-produced, recycled-content materials
    - procurement specifications for materials reuse, reduced packaging, products with low embodied energy, materials with recycled content, and locally manufactured products

- **Methane Management Action 2:** The City of Austin will continue to encourage the landfill operators to increase the capture and destruction of landfill gas in Travis County.

- **Recycling Action 4 and Organics Diversion Action 1:** These actions ensure that businesses and multifamily properties affected by the Universal Recycling Ordinance maximize diversion of recyclable materials and that businesses maximize diversion of organics.

Electricity and Natural Gas Sector – Phase 1 Strategies and Actions

STRATEGY 1: DECREASE ENERGY USE IN NEW AND EXISTING BUILDINGS					
Action	**Current Program**	**Cost**	**Carbon Impact**	**Status**	**Impact to Reaching 2020 Target**
Buildings and Integrated Efficiency (BIE)-1: Explore financing mechanisms to enable energy efficiency, demand response, distributed generation and energy storage. Possible financing mechanisms which could enable large amounts of private sector retrofits include Property Assessed Clean Energy (PACE) and Warehouse for Energy Efficiency Loans (WHEEL), and privately financed on-bill repayment.	Austin Energy continuously tracks and evaluates ways to provide demand-side management benefits to customers. Austin Energy was part of the initial team on PACE and actively supports, advertises, and educates prospective customers. PACE has their first customer as of February 2016. WHEEL was not approved in the Texas Legislature. On Bill repayment has many challenges and costs.	Austin Energy staff continue to monitor financing mechanisms available as part of Customer Energy Solutions programs. No additional cost.	PACE has their first customer as of February 2016. Austin Energy will begin to document savings as this program progresses.	**ONGOING**	**LOW**
Buildings and Integrated Efficiency (BIE)-2: Increase funding for energy efficiency rebates within the constraints of rate affordability goals. Emphasize and market offerings or higher amounts that may attract new customers.	Austin Energy continuously evaluates optimal ways to use rebates to the benefit of customers and to achieve existing peak demand and climate goals. Strategies aimed at effectively reducing peak demand and conserving energy will continue to be employed within current budget, and within bounds of affordability, as part of core Customer Energy Solutions. Recent efforts and near term focus include: • Commercial customer Tier alerts • Energy audit tool • Strategic Partnership of Utilities and Retailers (SPUR) • Targeted product marketing • Rebates for residential properties to tighten the building envelope and install higher energy efficiency equipment	This action is integrated into existing Customer Energy Solutions programs. No additional cost.	None in addition to carbon savings from existing Customer Energy Solutions programs; FY14 achieved ~ 80,000 tonnes carbon avoided annually.	**ONGOING**	**HIGH**
Buildings and Integrated Efficiency (BIE)-3: Identify high energy users in all sectors and target incentives and initiatives to those users to maximize impact.	**BIE-3, BIE-7, BIE-8, BC-1, BC-2, and BC-4** depend on full implementation programs based on the functionality of advanced meters and support systems. Austin Energy continues to update its Advanced Meter Infrastructure. This system of meters and supporting technology enables Austin Energy to record and report energy usage in 15 minute intervals (or less), which is a capability needed to provide customers with actionable data and to support detailed behavioral programs in which customers can rapidly respond to changing energy needs or plan for upcoming energy events. Austin Energy is currently evaluating traditional and Distributed Energy Service metering programs that will utilize energy usage data to benefit both customers and emissions reduction targets. This evaluation process will continue through FY17.	New programs to use meter data for this purpose are currently being or will be evaluated as part of the AMI initiative, including cost and Return On Investment calculations.	Supports aggregated benefits to be realized with AMI program evolution; estimated at 200,000 tonnes of CO2 emissions reduced per year. AMI will reduce the need for service calls, resulting in potentially significant transportation carbon reductions because of reduced vehicle use (not yet included in estimates).	**IN DEVELOPMENT**	**HIGH**

STRATEGY 1: DECREASE ENERGY USE IN NEW AND EXISTING BUILDINGS (CONTINUED)					
Action	**Current Program**	**Cost**	**Carbon Impact**	**Status**	**Impact to Reaching 2020 Target**
Buildings and Integrated Efficiency (BIE)-4: Promote specific high-impact strategies including envelope improvements (biggest impact), lighting retrofits (LEDs), HVAC improvements, water heating efficiency, and plug load reduction.	High-impact strategies are constantly being researched and evaluated by Austin Energy staff. Strategies vary as technologies evolve. Austin Energy's Green Building program has two primary approaches for addressing building energy improvements. The energy code addresses the vast majority of buildings and has the highest impact / Return On Investment. Performance-based approaches can accommodate higher efficiency HVAC and water heating. Green Building ratings provide incremental benefits above code and are still a fantastic value on both an overall basis and a Return On Investment basis for new construction, as well as for existing buildings being retrofitted. Green Building is working on a new Performance Based Incentive (PBI) program that will look to provide greater savings through modeling of buildings in design. As noted above, other high impact strategies will continue to be employed within current budget, and within bounds of affordability, as part of core Customer Energy Solutions including: • Commercial customer Tier alerts • Energy audit tool • Strategic Partnership of Utilities and Retailers (SPUR) • Targeted product marketing • Rebates for residential properties to tighten the building envelope	This action is integrated into existing Customer Energy Solutions programs – no additional costs. Austin Energy Green Building will invest $3 million of its budget over 10 years in the Performance Based Incentive program and support.	Performance Based Incentive program expected to avoid additional 2800 tonnes of CO2 emissions over 10 years.	**IN DEVELOPMENT**	**HIGH**
Buildings and Integrated Efficiency (BIE)-5: Implement programs to reduce energy use and carbon intensity associated with water consumption.	Austin Energy Green Building ratings encourage reduced water consumption. Austin Energy will continue to coordinate with Austin Water Utility engineers on efficient end-use consumption. Austin Water Utility has on-going programs to promote more water efficient appliances.	This action is integrated into current budgeting for Austin Water Utility.	Sustained benefits of carbon avoided.	**ONGOING**	**MEDIUM**
Buildings and Integrated Efficiency (BIE)-6: Coordinate effort with Austin Water Utility to reduce energy use and carbon intensity associated with consumption, treatment, and delivery of water and wastewater.	Austin Water Utility purchases 100% renewable wind power for all electricity needs. Austin Water Utility actively tracks its combined water and wastewater energy intensity; its 2015 metric of 2.22 kilowatt hours per 1,000 gallons was 2% lower than 2014, and is the lowest value to date.	This action is integrated into current budgeting for Austin Water Utility.	Sustained benefits of carbon avoided.	**ONGOING**	**MEDIUM**
Buildings and Integrated Efficiency (BIE)-7: Expand the availability and use of automated demand response to more and new technologies.	**BIE-3, BIE-7, BIE-8, BC-1, BC-2, and BC-4** depend on full implementation programs based on the functionality of advanced meters and support systems. Austin Energy continues to update its Advanced Meter Infrastructure. This system of meters and supporting technology enables Austin Energy to record and report energy usage in 15 minute intervals (or less), which is a capability needed to provide customers with actionable data and to support detailed behavioral programs in which customers can rapidly respond to changing energy needs or plan for upcoming energy events. Austin Energy is currently evaluating traditional and Distributed Energy Service metering programs that will utilize energy usage data to benefit both customers and emissions reduction targets. This evaluation process will continue through FY17.	New programs to use meter data for this purpose are currently being or will be evaluated as part of the AMI initiative, including cost and Return On Investment calculations.	Supports aggregated benefits to be realized with AMI program evolution; estimated at 200,000 tonnes of CO2 emissions reduced per year. AMI will reduce the need for service calls, resulting in potentially significant transportation carbon reductions because of reduced vehicle use (not yet included in estimates).	**IN DEVELOPMENT**	**HIGH**

STRATEGY 1: DECREASE ENERGY USE IN NEW AND EXISTING BUILDINGS (CONTINUED)					
Action	**Current Program**	**Cost**	**Carbon Impact**	**Status**	**Impact to Reaching 2020 Target**
Buildings and Integrated Efficiency (BIE)-8: Increase meter reading frequency and use the information to identify opportunities for utility action, customer conservation, and demand response.	**BIE-3, BIE-7, BIE-8, BC-1, BC-2, and BC-4** depend on full implementation programs based on the functionality of advanced meters and support systems. Austin Energy continues to update its Advanced Meter Infrastructure. This system of meters and supporting technology enables Austin Energy to record and report energy usage in 15 minute intervals (or less), which is a capability needed to provide customers with actionable data and to support detailed behavioral programs in which customers can rapidly respond to changing energy needs or plan for upcoming energy events. Austin Energy is currently evaluating traditional and Distributed Energy Service metering programs that will utilize energy usage data to benefit both customers and emissions reduction targets. This evaluation process will continue through FY17.	New programs to use meter data for this purpose are currently being or will be evaluated as part of the AMI initiative, including cost and Return On Investment calculations.	Supports aggregated benefits to be realized with AMI program evolution; estimated at 200,000 tonnes of CO2 emissions reduced per year. AMI will reduce the need for service calls, resulting in potentially significant transportation carbon reductions because of reduced vehicle use (not yet included in estimates).	**IN DEVELOPMENT**	**HIGH**
Buildings and Integrated Efficiency (BIE)-9: Create a new minimum standard for existing building energy use; enforce the new standard.	Effort would require wide-ranging stakeholder participation. Austin Energy currently does not have the programs / resources or authority in place to act in an enforcement capacity. Programs are in place that allow reporting and benchmarking of energy use. The ECAD ordinance is used to benchmark energy use for existing buildings (commercial, multifamily and single family). Commercial buildings are required to report their energy use through either the Energy Star Portfolio Manager (widely accepted national standard), or the Key Code Reporting method.	Austin Energy will explore this further in next FY as a multi-departmental effort with undetermined Return On Investment.	To be determined.	**NOT YET BEGUN**	**LOW**
Buildings and Integrated Efficiency (BIE)-10: Consider the potential for net-zero new construction of residential and commercial buildings.	On-going effort in Austin Energy Green Building, driven by ordinance to make capable. May be less practical for the commercial sector. Accomplished through ratings and code advancements. Currently staff time is devoted.	This action is integrated into existing Customer Energy Solutions operations.	None in addition to carbon savings from existing Customer Energy Solutions programs; FY14 achieved ~ 80,000 tonnes of CO2 avoided.	**ONGOING**	**MEDIUM**
Buildings and Integrated Efficiency (BIE)-11: Educate designers, builders, code inspectors, and plan reviewers to gain higher compliance with new energy codes as they are implemented every three years.	Part of core Austin Energy Green Building program is interaction with builders on rated projects. Working with Development Services Department and Code inspectors to get better training on codes and a higher level of compliance.	This action is integrated into existing Customer Energy Solutions operations.	None in addition to carbon savings from existing Customer Energy Solutions programs; FY14 achieved ~ 80,000 tonnes of CO2 emissions avoided.	**ONGOING**	**HIGH**
Buildings and Integrated Efficiency (BIE)-12: Phase-in requirements to sub-meter new commercial office space as new permits are issued.	This is not a current process and could require code-related changes. Austin Energy to reconsider in future FY pending availability of resources. One possibility in the next code cycle – Development Services Department to be the lead department.	Needs further exploration.	To be determined.	**NOT YET BEGUN**	**LOW**

STRATEGY 2: LOWER GREENHOUSE GAS INTENSITY OF GENERATION RESOURCES SERVING THE COMMUNITY					
Action	**Current Program**	**Cost**	**Carbon Impact**	**Status**	**Impact to Reaching 2020 Target**
Resource Technologies (RT)-1: Begin a coordinated effort to prioritize strategic development and evolution of Smart Grid / Intelligent Energy Management Systems, within constraints of rate affordability goals, to further enable intermittent resources and use of electric vehicles for storage / demand shift.	1) In 2014 Austin Energy commissioned the Technology Strategy & Roadmap to coordinate technology decisions, and smart grid efforts were identified as a near-term priority initiative. 2) In 2015 Austin Energy initiated an internal Smart Utility planning effort with several new cross-departmental work groups, including future use of Electric Vehicles. 3) In 2015 and 2016 Austin Energy announced major grant funded pilot projects with Texas Commission on Environmental Quality (TCEQ) and Department of Energy (DOE) to advance our understanding and capabilities to maximize benefits of distributed energy resources, including battery resources and electric vehicles. 4) Several in house pilot projects focused on making the distribution grid more efficient are currently underway; if successful and expanded system-wide, these have the potential to result in significant energy savings.	This action is carried within existing budget - no additional cost. Total cost of TCEQ and SHINES grants are $8.5 million, approximately $3.5 million of which is matching funds from Austin Energy (already approved and included in budget).	Effort underway to calculate long-term benefits of distributed technologies including storage. Evaluations will take place in FY17.	**ONGOING**	**HIGH**
Resource Technologies (RT)-2: Prioritize investment in zero carbon-emitting resources at utility and / or customer scale: community and distributed solar, including concentrating solar; and wind (inland and coastal).	Since adoption of the Community Climate Plan, Austin Energy has signed four major contracts in excess of 580 megawatts combined of utility scale solar. In addition, Austin Energy is developing the first community solar program in Texas, starting with a 1-2 megawatt project at the Kingsbery substation in East Austin; these investments are part of a larger set of resource initiatives (identified in the 2014 resource plan) designed to meet Austin's climate goals while keeping rates affordable.	Competitive.	5,540,000 tonnes of CO2 emissions avoided between 2016 and 2025 with just the new solar contracts starting 2015.	**ONGOING**	**HIGH**
Resource Technologies (RT)-3: Routinely evaluate resource technologies for opportunities to incrementally reduce carbon intensity, including storage, distributed chilled water, biomass, geothermal, and nuclear, within constraints of rate affordability goals.	Dedicated Austin Energy resource planning team continuously evaluates all resource options for biannual review of resource plan. Leveraging new resources such as Electric Power Research Institute support.	This action is integrated with existing program costs.	None in addition to carbon savings through existing programs.	**ONGOING**	**HIGH**

STRATEGY 2: LOWER GREENHOUSE GAS INTENSITY OF GENERATION RESOURCES SERVING THE COMMUNITY (CONTINUED)					
Action	**Current Program**	**Cost**	**Carbon Impact**	**Status**	**Impact to Reaching 2020 Target**
Resource Technologies (RT)-4: Evaluate technology and cost options for increasing natural gas system leak detection and reduction programs.	**EPA Methane Challenge Program.** Texas Gas Service actively participated with the American Gas Association and the U. S. Environmental Protection Agency (EPA) to develop the proposed Natural Gas STAR Methane Challenge Program ("Methane Challenge") which provides a mechanism for natural gas distribution and pipeline operators to make and track ambitious voluntary commitments to reduce methane emissions. Texas Gas Service is evaluating the feasibility of EPA's available commitment options to become one of the Methane Challenge inaugural natural gas distribution partner companies in early 2016. By joining the Methane Challenge, Texas Gas Service's current practices will be enhanced, leading to increased efforts to locate and mitigate leaks, and reducing the amount of emissions in future years. Texas Gas Service currently employs a number of practices that result in reduced methane (greenhouse gas) emissions including: • Multi-year programs to replace certain pipeline mains and service lines with newer materials that have lower leak/emission rates. • Programs to routinely test for leaks at our larger valve junctions, meter and regulator stations and city gates. If leaks are found, the leaks are repaired within a prescribed timeline. • Participation in general public and contractor education outreach programs to increase awareness and use of the utility locate "one-call" systems. The purpose of these programs is to reduce pipeline damages and the emissions that result from excavation incidents. • Implementation of reasonable practices that reduce emissions from scheduled operational releases of natural gas.	The cost of implementing these activities is included Texas Gas Service's normal annual operations and maintenance expense.	It is difficult to quantify the precise levels of reduction in gas emissions. However, increasing these activities will result in reductions over previous years' emissions.	**IN DEVELOPMENT**	**MEDIUM**

STRATEGY 3: PROMOTE BEHAVIOR CHANGE TO REDUCE GREENHOUSE GASES					
Action	**Current Program**	**Cost**	**Carbon Impact**	**Status**	**Impact to Reaching 2020 Target**
Behavior Change (BC)-1: Increase efforts to engage customers to drive energy efficiency and demand response: increase transparency of energy costs in multifamily and commercial buildings; evaluate feasibility of neighborhood-wide energy efficiency challenges.	**BIE-3, BIE-7, BIE-8, BC-1, BC-2, and BC-4** depend on full implementation programs based on the functionality of advanced meters and support systems. Austin Energy continues to update its Advanced Meter Infrastructure. This system of meters and supporting technology enables Austin Energy to record and report energy usage in 15 minute intervals (or less), which is a capability needed to provide customers with actionable data and to support detailed behavioral programs in which customers can rapidly respond to changing energy needs or plan for upcoming energy events. Austin Energy is currently evaluating traditional and Distributed Energy Service metering programs that will utilize energy usage data to benefit both customers and emissions reduction targets. This evaluation process will continue through FY17.	Internal efforts underway to allow customer service reps to match customer billing, usage and other demographic information to better serve customers. Part of Operations & Maintenance budget, no additional cost.	Supports aggregated benefits to be realized with AMI program evolution; estimated at 200,000 tonnes of CO2 emissions reduced per year. AMI will reduce the need for service calls, resulting in potentially significant transportation carbon reductions because of reduced vehicle use (not yet included in estimates).	**IN DEVELOPMENT**	**HIGH**

STRATEGY 3: PROMOTE BEHAVIOR CHANGE TO REDUCE GREENHOUSE GASES (CONTINUED)					
Action	**Current Program**	**Cost**	**Carbon Impact**	**Status**	**Impact to Reaching 2020 Target**
Behavior Change (BC)-2: Implement time of use / dynamic rates, including user educational efforts, supported by advanced metering and other technologies.	**BIE-3, BIE-7, BIE-8, BC-1, BC-2, and BC-4** depend on full implementation programs based on the functionality of advanced meters and support systems. Austin Energy continues to update its Advanced Meter Infrastructure. This system of meters and supporting technology enables Austin Energy to record and report energy usage in 15 minute intervals (or less), which is a capability needed to provide customers with actionable data and to support detailed behavioral programs in which customers can rapidly respond to changing energy needs or plan for upcoming energy events. Austin Energy is currently evaluating traditional and Distributed Energy Service metering programs that will utilize energy usage data to benefit both customers and emissions reduction targets. This evaluation process will continue through FY17.	Piloting a Time-of-Use Rates program before end of FY16 – Part of Operations & Maintenance budget, no additional cost. Other programs to use meter data for this purpose are currently being or will be evaluated as part of the AMI initiative, including cost and Return On Investment calculations.	Supports aggregated benefits to be realized with AMI program evolution; estimated at 200,000 tonnes of CO2 emissions reduced per year. AMI will reduce the need for service calls, resulting in potentially significant transportation carbon reductions because of reduced vehicle use (not yet included in estimates).	**IN DEVELOPMENT**	**HIGH**
Behavior Change (BC)-3: Expand educational efforts through social media, applications, competitions (individual and neighborhood scale) and exposure.	This is similar to **BC-1,** with the inclusion of social media. Austin Energy can further expand our social media and marketing reach to solicit participation in current and future volunteer conservation and efficiency programs.	Customer Energy Solutions evaluating optimal use of marketing budget to promote energy efficiency – no additional funding needed.	Too uncertain to parse out of overall Customer Energy Solutions program benefits.	**IN DEVELOPMENT**	**MEDIUM**
Behavior Change (BC)-4: Utilize meter reads and bill format / presentation to influence behavior. Present energy use in actionable and timelier ways to customers.	**BIE-3, BIE-7, BIE-8, BC-1, BC-2, and BC-4** depend on full implementation programs based on the functionality of advanced meters and support systems. Austin Energy continues to update its Advanced Meter Infrastructure. This system of meters and supporting technology enables Austin Energy to record and report energy usage in 15 minute intervals (or less), which is a capability needed to provide customers with actionable data and to support detailed behavioral programs in which customers can rapidly respond to changing energy needs or plan for upcoming energy events. Austin Energy is currently evaluating traditional and Distributed Energy Service metering programs that will utilize energy usage data to benefit both customers and emissions reduction targets. This evaluation process will continue through FY17.	Planning underway to expand customer online portal – Part of Operations & Maintenance budget, no additional cost. Other programs to use meter data for this purpose are currently being or will be evaluated as part of the AMI initiative, including cost and Return On Investment calculations.	Supports aggregated benefits to be realized with AMI program evolution; estimated at 200,000 tonnes of CO2 emissions reduced per year. AMI will reduce the need for service calls, resulting in potentially significant transportation carbon reductions because of reduced vehicle use (not yet included in estimates).	**IN DEVELOPMENT**	**HIGH**

Transportation and Land Use Sector – Phase 1 Strategies and Actions

STRATEGY 1: INFRASTRUCTURE AND SERVICE					
Action	**Current Program**	**Cost**	**Carbon Impact**	**Status**	**Impact to Reaching 2020 Target**
Infrastructure and Service (IS)-1: Continue planning efforts to complete a connected network of proven high-capacity transit, including intracity and intercity systems, using the major projects identified in the Austin Strategic Mobility Plan and Project Connect to improve Austin's transportation and economic connections with other major cities in Texas.	**Capital Metropolitan Transportation Authority (CMTA) Strategic Plan (2014-2019)**: CMTA's strategic plan is reviewed and updated annually. The mission of CMTA is to "connect people, jobs and communities by providing high quality and sustainable transportation choices." **CMTA's Transit-Cycling Action Plan**: Through the Bike-Transit Advisory Team (internal), Capital Metro is developing a plan to assess current cycle-transit facilities and connections, and identify future improvements. **CMTA's MetroRail Long-Range Feasibility Study**: An internal technical feasibility study of the MetroRail system, both existing and future. The outcome of the feasibility study may result in more formal alternatives analyses or environmental studies prior to any future rail investments. **CMTA's Connection 2025**: Connections 2025 is an in-depth review of the transit system with the purpose of meeting future demands and increasing public transit ridership. Connections 2025 will assess existing / projected future conditions and develop short- and long-range recommendations that result in an efficient, effective transit system with a clear direction for future development. Overall, the plan aims to utilize both innovative and proven solutions to create a more effective and integrated system to address the region's transportation challenges. **Project Connect**: Project Connect is the vision for Central Texas' high-capacity transit system, endorsed by the Transit Working Group, as a subcommittee of the Capital Area Metropolitan Planning Organization (CAMPO). Linking activity centers within the fastest growing region in the country, Project Connect aims to connect people, places and opportunities in an easy and efficient way. **Austin Strategic Mobility Plan (ASMP):** Austin Transportation Department is kicking off the efforts to update the 1995 ASMP. Additional detail will be available in the fall update.	CMTA's funding comes from federal and state sources, local designated sales tax, and individual fares. Information about the budget can be found at: http://www.capmetro.org/transparency/	Capital Metro will measure greenhouse gas emissions and energy use related to operations and vehicles, ridership and passenger miles traveled (on transit), and land use / Transit Oriented Development. Methods used will be consistent with those used by other transit agencies and developed through the American Public Transportation Association (APTA) and Transit Cooperative Research Program (TCRP). Expect to publish data in 2017.	**IN DEVELOPMENT**	**HIGH**
Infrastructure and Service (IS)-2: Protect the safety of all right-of-way users and increase mobility by managing traffic speeds with regular synchronizing / retiming all traffic signals along arterials, adjusting speed limits within the urban core as appropriate, adding more volume-count stations to make informed traffic system improvements, installing more roundabouts, using enhanced bicycle signal detection technologies, and installing Pedestrian Hybrid Beacons.	Austin Transportation Department has multiple programs that manage and implement assets in this item such as: signals (including bicycle specific signal improvements), Pedestrian Hybrid Beacons (PHB), and arterial geometric improvements; voter approved bonds as well as maintenance and operational funds pay for these improvements. Austin Transportation Department currently houses a data collection section within Traffic Engineering. Needs always outweigh available funding. For example:~1/3 of signals should be re-timed yearly, while currently ~1/6 are achieved.	TOTAL SIGNALS BUDGET: 2016: • FTEs: $3.5M • Consultants: $3.5M • Commodities: $0.4M • Refunds: ($1.4M)	Safety is our highest priority and components of this action are expected to make an impact on the 2020 interim target but are difficult to quantify.	**ONGOING**	**LOW**

STRATEGY 1: INFRASTRUCTURE AND SERVICE (CONTINUED)					
Action	**Current Program**	**Cost**	**Carbon Impact**	**Status**	**Impact to Reaching 2020 Target**
Infrastructure and Service (IS)-3: Request and promote extended transit service to suburban areas, while providing more service interconnections, exploring additional transit centers / park-and-rides, and transit vehicle amenities.	**CMTA Park & Ride Assessment Report:** An annual, internal technical assessment of existing and future park-and-ride facilities and needs throughout the Service Area. **CMTA, CAMPO & Central Texas Regional Mobility Authority Coordination:** Capital Metro participates in interagency coordination efforts on all regional transportation planning and projects that could benefit and / or impact public transit. **CMTA Transit Development Plans:** Capital Metro is working with several suburban cities (Georgetown, Buda, Hutto and Pflugerville) on Transit Development Plans, which are short range plans that identify need, analyze service options and financing, and provide recommendations for service. **Project Connect:** Project Connect is the vision for Central Texas' high-capacity transit system, endorsed by the Transit Working Group, as a subcommittee of the Capital Area Metropolitan Planning Organization (CAMPO). Linking activity centers within the fastest growing region in the country, Project Connect aims to connect people, places and opportunities in an easy and efficient way.	CMTA's funding comes from federal and state sources, local designated sales tax, and individual fares. Information about the budget can be found at: http://www.capmetro.org/transparency/	Capital Metro will measure greenhouse gas emissions and energy use related to operations and vehicles, ridership and passenger miles traveled (on transit), and land use / Transit Oriented Development. Methods used will be consistent with those used by other transit agencies and developed through the American Public Transportation Association (APTA) and Transit Cooperative Research Program (TCRP). Expect to publish data in 2017.	**IN DEVELOPMENT**	**HIGH**

STRATEGY 2: LAND USE					
Action	**Current Program**	**Cost**	**Carbon Impact**	**Status**	**Impact to Reaching 2020 Target**
Land Use (LU)-1: Prioritize mixed-use development integrated with transit and the creation of compact, walkable and bikeable places, with a commitment to plan transportation systems using an objective analysis of environmental considerations, demand models, congestion models, safety, and full life-cycle costs and benefits.	The Planning and Zoning Department is coordinating multiple planning initiatives that support the Imagine Austin Comprehensive Plan and further implementation of this action: **CodeNEXT** update of Austin Land Development Code; **Small Area Planning Program** including Burnet-Anderson Corridor Plan and **South Central Waterfront Planning** **CMTA TOD Plan**: Capital Metro is developing a high-level Transit Oriented Development plan that integrates and monitors current and changing land use and potential for the MetroRapid stops and MetroRail Stations in the service area. The plan will integrate land use decisions with transit operations, promote better Transit Oriented Development, and increase transit ridership and revenue by offering a comprehensive understanding of existing and planned conditions to better respond to timely market forces / needs, and desired outcomes to catalyze Transit Oriented Development and transit system projects.	Bicycle Master Plan: $437,000 CodeNEXT: $650,000 Staff time + $1.25M Consultant time = $1.9M Burnet – Anderson (Small Area Planning): $155,000 South Central Waterfront: $135,000 + $200,000 Consultant time = $335,000 Downtown Wayfinding: $125,000 + $40,000 Consultant time = $165,000 Great Streets Program: $100,000 Density Bonus Program: $22,000 Transit Oriented Development Program: $90,000 **FY16 TOTAL: ~$3.2M**	Bike Plan outcomes (109,000 metric tons of CO_2 emissions avoided annually). Up to 767 tons of CO_2 emissions avoided daily from all Land Use actions. Total = ~389,000 metric tons of CO_2 emissions avoided annually.	**ONGOING**	**HIGH**

STRATEGY 2: LAND USE (CONTINUED)					
Action	**Current Program**	**Cost**	**Carbon Impact**	**Status**	**Impact to Reaching 2020 Target**
Land Use (LU)-2: Promote growth within designated activity centers as identified in Imagine Austin, where dense, mixed-use development supports centers and transit corridors, and incentives for infill development with long-term affordability for residents and businesses; develop an outreach program for available incentives and enhanced property locator tools (e.g. location efficient mortgages, tax credits).	The Planning and Zoning Department is coordinating multiple planning initiatives that support the Imagine Austin Comprehensive Plan and further implementation of this action: **CodeNEXT** update of Austin Land Development Code; **Small Area Planning Program** including Burnet-Anderson Corridor Plan and **South Central Waterfront Planning** **CMTA TOD Plan**: Capital Metro is developing a high-level Transit Oriented Development plan that integrates and monitors current and changing land use and potential for the MetroRapid stops and MetroRail Stations in the service area. The plan will integrate land use decisions with transit operations, promote better Transit Oriented Development, and increase transit ridership and revenue by offering a comprehensive understanding of existing and planned conditions to better respond to timely market forces / needs, and desired outcomes to catalyze Transit Oriented Development and transit system projects.	All Planning and Zoning Plans summarized in **LU-1.**	All Planning and Zoning Plans summarized in **LU-1.**	**ONGOING**	**HIGH**
Land Use (LU)-3: Create pedestrian- and bicycle-friendly districts connecting urban centers and transit stops; optimizing safety for people of all ages and abilities through clearly marked, dedicated, and separated urban trails and bike lanes; and wayfinding systems that incorporate national best practices.	**Bicycle Master Plan:** Bike Plan goals include: • Increase citywide workforce bicycle commuting to 5% by 2020 (currently 1.4%). • Increase central city workforce bicycle commuting to 15% by 2020 (currently 5.6%). • 170,000 fewer daily trips; 460,000 reduction in vehicle miles traveled. **Urban Trails Plan** **Planning and Zoning**: Downtown Wayfinding Project; Great Streets Program; Small Area Planning Program including Burnet-Anderson Corridor Plan and South Central Waterfront Planning. **CMTA's Transit-Cycling Action Plan**: Through the Bike-Transit Advisory Team (internal), Cap Metro is developing a plan to assess current cycle-transit facilities and connections, and identify future improvements.	**BICYCLE MASTER PLAN BUDGET:** <u>2016:</u> • FTEs: $430,000 • Outreach / Marketing / Contract staff: $7,000 <u>Per Bike Plan:</u> Annual implementation cost (assuming 10 year build out) is estimated to be $15,170,000. All Planning and Zoning Plans summarized in **LU-1.**	All Planning and Zoning Plans summarized in **LU-1.** Bike plan at full build-out would achieve 170,000 fewer daily trips. Assuming each trip is 7 miles = 309,400,000 Vehicle Miles Traveled avoided. Over 10 years = 1,090,330 metric tons of CO2 emissions avoided.	**ONGOING**	**HIGH**
Land Use (LU)-4: Ensure that affordable housing and residential neighborhoods are within a quarter mile of existing or funded new transit options.	The Planning and Zoning Department is coordinating multiple planning initiatives that support the Imagine Austin Comprehensive Plan and further implementation of this action: On-going calibration and implementation of Density Bonus Program; Transit Oriented Development Program; **CodeNEXT** update of Austin Land Development Code**; Small Area Planning Program** including Burnet-Anderson Corridor Plan and **South Central Waterfront Planning.**	All Planning and Zoning Plans summarized in **LU-1.**	All Planning and Zoning Plans summarized in **LU-1.**	**ONGOING**	**HIGH**
Land Use (LU)-5: Within the CodeNEXT land development code rewrite and its related public process, consider lowering barriers of adoption for duplexes, triplexes, and quadplexes, as well as accessory dwelling units, as appropriate.	The Planning and Zoning Department is coordinating multiple planning initiatives that support the Imagine Austin Comprehensive Plan and further implementation of this action including the **CodeNEXT** update of Austin Land Development Code.	All Planning and Zoning Plans summarized in **LU-1.**	All Planning and Zoning Plans summarized in **LU-1.**	**ONGOING**	**MEDIUM**

STRATEGY 3: TRANSPORTATION DEMAND MANAGEMENT					
Action	**Current Program**	**Cost**	**Carbon Impact**	**Status**	**Impact to Reaching 2020 Target**
Transportation Demand Management (TDM)-1: Support efforts to work with large employers and academic institutions to implement and improve trip reduction programs that include a regular survey of how the workforce commutes, explanation of benefits to commuters, and includes promotion of transportation alternatives (e.g. carpool/vanpool, bus/rail, bike/walk, flex/compressed work schedules) to their employees; celebrate successful programs.	**20/20 Mobility Challenge:** Citywide effort initiated by the Mayor's office and organized by Movability Austin (and other partners). Reached out to ~50 companies. Expecting 10 -15 early participants. **Downtown Transportation Management Association (Movability Austin):** Non-profit funded by the City, Capital Metro, and others to provide focused Transportation Demand Management solutions to the downtown core. ~37 members. **CTMA, MetroRideShare**: The MetroRideShare program is sponsored by Capital Metro and operated by vRide, a national vanpool service provider. Provides all services necessary to enjoy a comfortable, convenient and economical commute to work. **CTMA MetroWorks**: MetroWorks is an Employee Transportation Benefits program of Cap Metro, to help businesses and government agencies implement Transportation Demand Management measures that include public transit and ridesharing opportunities.	<u>Movability Austin 2016 Budget:</u> Cost of FTEs: $151,000 Cost of outreach/ marketing/ contracts staff: $75,000	Baseline data will be collected for all new mobility challenge participants, as well as annual updates. Depending on the program, employer Transportation Demand Management programs can reduce Vehicle Miles Traveled 5% - 25%. Based on 15% Vehicle Miles Traveled reduction and Texas Transportation Institute data: • 3,675,000 daily vehicle-miles of travel saved • 260 work days = 955,500,000 Vehicle Miles Traveled • At 25mpg = 38,220,000 gallons of gasoline saved • 336,718 metric tons CO2 emissions avoided	**IN DEVELOPMENT**	**HIGH**
Transportation Demand Management (TDM)-2: Seek opportunities to prioritize public transit within the network, and seek financing to extend service hours and frequency to increase use.	**CMTA's Connection 2025**: Connections 2025 is an in-depth review of the transit system with the purpose of meeting future demands and increasing public transit ridership. Connections 2025 will assess existing / projected future conditions and develop short- and long-range recommendations that result in an efficient, effective transit system with a clear direction for future development. Overall, the plan aims to utilize both innovative and proven solutions to create a more effective and integrated system to address the region's transportation challenges. **CMTA Frequent Service Network:** Capital Metro has invested in five routes based on ridership, productivity and coverage to create more frequent, reliable bus service and reduce wait times at stops.	CMTA's funding comes from federal and state sources, local designated sales tax, and individual fares. Information about the budget can be found at: http://www.capmetro.org/transparency/	Capital Metro will measure greenhouse gas emissions and energy use related to operations and vehicles, ridership and passenger miles traveled (on transit), and land use / Transit Oriented Development. Methods used will be consistent with those used by other transit agencies and developed through the American Public Transportation Association (APTA) and Transit Cooperative Research Program (TCRP). Expect to publish data in 2017.	**ONGOING**	**HIGH**

STRATEGY 3: TRANSPORTATION DEMAND MANAGEMENT (CONTINUED)					
Action	**Current Program**	**Cost**	**Carbon Impact**	**Status**	**Impact to Reaching 2020 Target**
Transportation Demand Management (TDM)-3: Increase bicycle and pedestrian mode share by promoting cycling for workers living near their workplace and children commuting to school. Increase safety and program performance based engineering, enforcement, education, and evaluation. Encourage the development of web-based tools / mobile applications / other educational materials. Increase the scope and impact of bike promotional events (e.g. Bike to Work Day and VIVA Streets!).	**Viva Streets! Open Streets Event:** 2015 ~2,500 people participated. Plan to expand Viva Streets! in FY16 to target 5,000 people. **Educational & Encouragement Campaigns:** FY15 events included Bike Month activities (Bike to School, Bike to Work, Cyclofemme and other community-based events). The Active Transportation Program also launched the City of Austin Bike Share Benefit Program which provides free bike share accounts to employees who take a 1 hour education course through TRAIN. The City recently received "Gold" status for bicycle friendly community and recently hosted the National Association of City Transportation Officials (NACTO) conference. FY16 plans calls for expanded educational, encouragement and enforcement programs with additional program staff. See also **TDM-1** & **TDM-8** for overlapping items.	2016: • FTEs: ~$140,000 (some of this is accounted for in other strategies) • Consultants: ~$40,000 • Outreach / Marketing / Contract staff: $100,000	Same as those listed in Land Use Strategy actions.	**ONGOING**	**HIGH**
Transportation Demand Management (TDM)-4: Support programs that help commuters make first and last mile transit connections, including promotion of first / last mile modes such as free circulator buses, collective zoned vanpool service, flex route systems, and bikeshare.	**CMTA Trail Feasibility Study.** Capital Metro conducted a study of potential bike-pedestrian route connections along the MetroRail route. Capital Metro and City of Austin are working to prioritize and implement improvements, such as the Crestview to Highland station Urban Trail. **CMTA Frequent Service Network.** Capital Metro has invested in five routes based on ridership, productivity and coverage; to create more frequent, reliable bus service and reduce wait times at stops. **CMTA Mobile App.** Capital Metro now offers a free mobile app. It includes a Trip Planner, schedule times, service alerts and a mobile ticket option. **Austin B-Cycle.** B-Cycle is the network of more than 50 bike share stations and bikes.	CMTA's funding comes from federal and state sources, local designated sales tax, and individual fares. Information about the budget can be found at: http://www.capmetro.org/transparency	Capital Metro is measuring greenhouse gas emissions and energy use related to operations and vehicles, ridership and passenger miles traveled (on transit), and land use / Transit Oriented Development. Methods used are consistent with those used by other transit agencies and developed through the American Public Transportation Association (APTA) and Transit Cooperative Research Program (TCRP). Expect to publish data in 2017.	**IN DEVELOPMENT**	**HIGH**
Transportation Demand Management (TDM)-5: Work with major event promoters to establish innovative transportation plans to ensure that visitors to the City have full information about transportation options.	**Special Events Ordinance:** This will be brought back to Council in 2016. Elements from the Traffic Congestion Action Plan (TCAP) will be incorporated into the ordinance. **General Planning Assistance**: Austin Events conducts meetings with each event organizer to develop transportation options. Groups involved include: Capital Metro, Austin Transportation Department, Austin Police Department, B-cycle, pedi-cabs, Transportation Network Companies, and taxis.	1 FTE @ $93,000; small percentage of Austin Center for Events staff time allocated.	No data available.	**ONGOING**	**LOW**

STRATEGY 3: TRANSPORTATION DEMAND MANAGEMENT (CONTINUED)					
Action	**Current Program**	**Cost**	**Carbon Impact**	**Status**	**Impact to Reaching 2020 Target**
Transportation Demand Management (TDM)-6: Perform education and outreach to fleet owners on how to conduct a business evaluation of fleet usage, including operation and right-sizing analysis. Identify which incentives are available to replace older, higher-emission vehicles.	Currently, some efforts are completed by the Clean Cities Coalition of Central Texas (Lone Star Clean Fuels Alliance). A new program would need to be developed in this area, working with Texas Commission on Environmental Quality (TCEQ), Capitol Area Council of Governments (CAPCOG), and the City of Austin to achieve results.	Unknown.	No data available.	**NOT YET BEGUN**	**LOW**
Transportation Demand Management (TDM)-7: Provide amenities and incentives for programs that support active transportation, such as showers, tree shading, community gardens, neighborhood bike ambassadors, mobile bike repair, and bike cages.	**Land Use Code Amendments:** 2012 code amendment allowing reduced parking requirements if bike showers are built; continuing work with CodeNEXT on additional bike amenities to include in code. See also **TDM-8** for overlapping items.	Mostly built into CodeNEXT.	No data available.	**ONGOING**	**LOW**
Transportation Demand Management (TDM)-8: Encourage residents to limit single occupancy vehicle trips by taking alternative modes of transportation (e.g. carpool / vanpool, bus / train, bike / walk) by providing adequate information about their travel choices.	**Smart Trips:** Pilot project kicked off in fall 2015. Anticipate Phase II (partnership between City of Austin and Capital Metro) to kick off in Spring 2016.	<u>2016:</u> • FTEs: $120,000 • Consultants: $40,000 • Outreach / Marketing / Contract staff: $140,000	Other Smart Trips programs throughout the nation have seen anywhere from 3 to 18% reduction in drive alone trips. If use 10% reduction of daily Texas Transportation Institute data that is 2,450,000 daily vehicle-miles of travel saved. 260 work days = 637,000,000 Vehicle Miles Traveled at 25mpg = 25,480,000 gallons of gasoline = 224,479 metric tons CO2 emissions avoided.	**IN DEVELOPMENT**	**HIGH**

STRATEGY 4: POLICY AND PLANNING					
Action	**Current Program**	**Cost**	**Carbon Impact**	**Status**	**Impact to Reaching 2020 Target**
Policy and Planning (PP)-1: Establish intergovernmental agreements between municipalities that include commitments to increase density around Centers.	Coordination with Capital Area Metropolitan Planning Organization and regional partners through CAMPO 2040 Plan.	N/A	Up to 1054 tons of CO2 emissions avoided per day (when combined with Land Use actions) ~280 tons of CO2 emissions avoided per day as a stand-alone action	**ONGOING**	**HIGH**
STRATEGY 5: VEHICLES AND FUEL EFFICIENCIES					
Action	**Current Program**	**Cost**	**Carbon Impact**	**Status**	**Impact to Reaching 2020 Target**
Vehicles and Fuel Efficiencies (VFE)-1: Support programs and efforts that expand electric / alternative fuel infrastructure and consider incentives for the purchase of electric / alternative fuel vehicles by individuals and fleet owners. Pursue code options to increase “charger ready” parking.	**Plug-In EVerywhere:** Austin Energy installed the first Electric Vehicle (EV) charging infrastructure in the region in 2008 and now has over 250 EV charging stations at retail, workplace, multifamily, and fleet locations throughout the city of Austin. Since inception in 2011, the public network of stations has consumed 776 megawatt hours of clean renewable win energy, powered by Austin Energy’s GreenChoice program. Austin Energy and Austin Bergstrom International Airport have partnered to install 20 fast chargers for ground service equipment vehicles that are used on the airfield. The new charging stations are used to power luggage tugs and belt loaders operated by various airlines. These 20 fast electric charging stations for support vehicles will reduce annual gas and diesel consumption by an estimated 40,000 gallons. Regional initiatives led by Austin Energy to plan for and support the adoption of alternative fuel vehicles in the Central Texas region: Texas River Cities initiative, Central Texas Fuel Independence Project.	Austin Energy Electric Vehicles program has 3 FTEs. Cost for staff, contractor support, services, marketing, and related expenses for FY15 was $647,000. Electric Vehicle rebates for public and private charging was approximately $300,000.	In 2015, the electric fuel used at 250+ charging stations consumed 381,528 kilowatt hours, offsetting 49,954 gallons of gasoline and reducing CO2e emissions by 440 metric tons. 2,000 vehicles @ 12,000 miles each = 24,000,000 miles traveled. Avoided gasoline of regular car (25mpg) = 960,000 gallons of gasoline or 8,458 metric tons of CO2 emissions.	**ONGOING**	**MEDIUM**

STRATEGY 6: ECONOMICS AND PRICING SYSTEMS					
Action	**Current Program**	**Cost**	**Carbon Impact**	**Status**	**Impact to Reaching 2020 Target**
Economics and Pricing Systems (EPS)-1: Pursue a fair market value for parking through demand-based commodity pricing.	**Parking Benefit Districts:** One located in West Campus. **Parking and Transportation Management Districts:** Two, located in East Austin and Mueller. **Metered / Priced Parking:** Will be raising metered parking rates by $0.20 in 2016. The increase will be in the downtown area only (I-35 to Lamar and Lady Bird Lake to 10th Street).	2016: • Parking Enforcement Officers: $2,218,517 • Meter Shop: $2,048,254 (100% time)	Not quantified.	**IN DEVELOPMENT**	**MEDIUM**
Economics and Pricing Systems (EPS)-2: Allow high occupancy and zero-emission vehicles access to toll roads at reduced or free rates.	**Tolling Pilot:** Carma carpooling app (through a federal grant) provided toll reimbursements for carpoolers using the app - study found, "Real-time ridesharing programs, facilitated by smartphone technology, have the potential to incentivize behavior." For 2016, Carma may continue the pilot with CTRMA (and potentially Texas Department of Transportation).	Pilot conducted at no cost to the City. Toll discounts provided by CTRMA through federal grant.	Based on 95 unique drivers: • 2,200 trips • 80% were 2 person but the others were 3+ • No data on average trip length, but targeted employers averaged ~50 miles round trip to downtown • 110.000 miles at 25 mpg = 4,400 gallons of gas (39 metric tons CO2 emissions)	**IN DEVELOPMENT**	**LOW**

Materials and Waste Management – Phase 1 Strategies and Actions

STRATEGY 1: METHANE (LANDFILL GAS) MANAGEMENT					
Action	**Current Program**	**Cost**	**Carbon Impact**	**Status**	**Impact to Reaching 2020 Target**
Methane Management (MM)-1: Austin Resource Recovery refines landfill gas capture and combustion system to destroy methane.	If feasibility study estimates that the closed City of Austin landfill on FM 812 generates a sufficient volume and quality of landfill gas, the next step is to estimate financial requirements.	Unknown.	2014 City landfill emissions = 48,282 (9% less than 2013). Taking this action would reduce net emissions by the amount generated from an equivalent amount of power from fossil fuels.	**IN DEVELOPMENT**	**MEDIUM**
Methane Management (MM)-2: Area landfill operators refine landfill gas capture and combustion system to destroy methane at their landfills.	The City of Austin engaged local landfill operators during the development of the Community Climate Plan and informally in 2015. The landfill with the fewest gas wells, Texas Disposal Systems, more than doubled the number of wells from 2013 to 2014 and reported emissions from the private landfills dropped 9% even though disposal increased 4%. The City of Austin will continue to encourage the landfill operators to increase the capture and destruction of landfill gas in Travis County. Number of wells (2013 / 2014): • City of Austin: 67 / 63 • Republic: 222 / 222 • Texas Disposal Systems: 6/15 • Waste Management: 126 / 126 **TOTAL: 421 / 426**	No City of Austin cost. Generating energy produces revenue or displaces an expense.	2014 private landfill emissions = 543,844 (9% less than 2013 even though disposal increased 4%). Taking this action would reduce some but not all of these emissions.	**IN DEVELOPMENT**	**HIGH**

STRATEGY 2: RECYCLING					
Action	**Current Program**	**Cost**	**Carbon Impact**	**Status**	**Impact to Reaching 2020 Target**
Recycling (RE)-1: Expand materials accepted by curbside recycling service and increase the service to weekly collection.	Austin Resource Recovery contracts with Texas Disposal Systems and Balcones Recycling to process the single-stream materials collected by Austin Resource Recovery curbside recycling service. These 20-year contracts provide periodic opportunities to add materials to the single-stream mix, but no new materials are currently under discussion. Weekly service is under consideration for FY17. *[Actions **RE-1, RE-3, RE-5,** and **OD-2** have overlapping impacts; implementing all three wouldn't necessarily be the sum of the impacts for each action.]*	The Austin Resource Recovery FY17 budget forecast estimates this would cost about $3 per month per customer.	The *2014 Residential Diversion Study* found about 40,000 tons per year of single-stream recyclables in trash carts. Diverting 100% would reduce direct emissions by 1,900 metric tons and indirect emissions by 89,000 metric tons annually.	**ONGOING**	**MEDIUM**

STRATEGY 2: RECYCLING (CONTINUED)					
Action	**Current Program**	**Cost**	**Carbon Impact**	**Status**	**Impact to Reaching 2020 Target**
Recycling (RE)-2: Increase convenience, efficiency, and effectiveness of downtown alley trash and recycling collection service.	Austin Resource Recovery's 3-year contract with Texas Disposal Systems, which began in 2014, provides for collecting trash and recyclables in many of the downtown alleys. Austin Resource Recovery converted separate paper and glass recycling services to single-stream recycling. Since then, diversion continues to increase steadily.	On a per volume basis, recycling service costs less than trash ($2.74 vs. $3.30 per cubic yard of service). The primary cost to increase diversion is marketing, which is a significant variable.	Using rough estimates of the Central Business District material stream, the collection of single-stream recyclables could increase from 1,700 to 2,500 tons per year, reducing direct emissions by 230 metric tons and indirect emissions by 2,270 metric tons annually.	**ONGOING**	**LOW**
Recycling (RE)-3: City maintains its Pay-As-You-Throw rate structure to provide a strong financial incentive for residential customers to reduce disposal.	For FY17, Austin Resource Recovery is evaluating alternative Pay-As-You-Throw rate structures including eliminating the 96-gallon cart in FY20. *[Actions **RE-1, RE-3, RE-5,** and **OD-2** would have overlapping impacts; implementing all three wouldn't necessarily be the sum of the impacts for each action.]*	Any cost impacts will be included in the FY17 budget.	The *2014 Residential Diversion Study* found about 40,000 tons per year of single-stream recyclables in trash carts. Diverting 100% would reduce direct emissions by 1,900 metric tons and indirect emissions by 89,000 metric tons annually.	**ONGOING**	**MEDIUM**
Recycling (RE)-4: Ensure that businesses and multifamily properties affected by the Universal Recycling Ordinance maximize diversion of recyclable materials.	Universal Recycling Ordinance performance data needs to be collected.	Costs to implement action **OD-1** are included with this action. <u>FY2016:</u> • 10.7 FTEs • $843,000 for outreach, data management, & enforcement	If single-stream material diversion increases from 450,000 tons per year (FY15) to 700,000 tons per year (FY20), this action would reduce direct emissions by 81,200 metric tons and indirect emissions by 707,000 metric tons annually.	**ONGOING**	**HIGH**
Recycling (RE)-5: Research peer cities and explore phase-in of mandatory recycling and composting.	Currently researching best practices in communities including San Francisco, San Diego, Pittsburgh, Portland, and Seattle. *[Actions **RE-1, RE-3, RE-5,** and **OD-2** would have overlapping impacts; implementing all three wouldn't necessarily be the sum of the impacts for each action.]*	Research FTE costs can be borne by existing staff; other costs could include conference participation and travel.	The *2014 Residential Diversion Study* found about 40,000 tons per year of single-stream recyclables in trash carts. Diverting 100% would reduce direct emissions by 1,900 metric tons and indirect emissions by 89,000 metric tons annually.	**ONGOING**	**MEDIUM**

STRATEGY 3: ORGANICS DIVISION					
Action	**Current Program**	**Cost**	**Carbon Impact**	**Status**	**Impact to Reaching 2020 Target**
Organics Diversion (OD)-1: Ensure that businesses affected by the Universal Recycling Ordinance maximize diversion of organics.	Food enterprises affected by the Universal Recycling Ordinance will increase through 2018, when all will be required to comply.	Costs to implement this action are included with **RE-4** because the two are intertwined; 2 of the FTEs listed in **RE-4** focus more than half their time on this action.	FY2015: 14,500 metric tons of direct emissions and 7,000 metric tons of indirect emissions avoided based on diverting 50,000 tons of organics annually. FY2020: 29,000 metric tons of direct emissions and 14,000 metric tons of indirect emissions avoided based diverting 100,000 tons of organics annually.	**ONGOING**	**MEDIUM**
Organics Diversion (OD)-2: Expand collection of food residuals and other compostable, non-recyclable materials to all residential customers.	The adopted FY16 budget planned for a 5-year citywide phase-in, beginning with purchasing new vehicles and expanding service in FY17. Austin Resource Recovery may modify this as part of the FY17 budget planning process. *[Actions **RE-1, RE-3, RE-5,** and **OD-2** would have overlapping impacts; implementing all three wouldn't necessarily be the sum of the impacts for each action.]*	The Austin Resource Recovery FY17 budget forecast estimates this cost would average at least $4.10 per month per customer, phased in over 5 years.	Diverting 50% of 30,000 tons of residential food scraps reduces greenhouse gas emissions by 10,700 metric tons.	**IN DEVELOPMENT**	**MEDIUM**
Organics Diversion (OD)-3: Austin Water Utility's compost operation transitions from yard trimmings to other carbon sources and bulking agents, such as clean lumber and tree trimmings from other City departments and their contractors.	Austin Water Utility's biosolids compost permit does not allow food to be included in the mix. The Office of Sustainability will work with Austin Water Utility to accept other carbon sources, such as Austin Energy and Parks and Recreation Department tree trimmings.	No cost to Austin Resource Recovery; Austin Water Utility costs should be minimal; Austin Energy and Parks and Recreation Department staff and contractors may incur some costs to shift materials to alternate destination (Hornsby Bend WWTP).	Currently, Austin Resource Recovery delivers ~ 28,000 tons of yard trimmings annually; new material delivered to Hornsby Bend would reduce emissions by 1,900 metric tons.	**ONGOING**	**LOW**
Organics Diversion (OD)-4: Private haulers collect all organics and non-recyclable materials from their customers (including multifamily housing).	A new policy or regulation would need to be developed to foster this service, between licensed private haulers and multi-family property managers. Compost Pedallers and others offer this service, but their recovered volumes are very small in aggregate (~100 tons / year).	Zero Waste Rebate: $1,800 each, for up to 50 businesses per year.	Unknown without specifying materials and quantities.	**IN DEVELOPMENT**	**MEDIUM**

STRATEGY 3: ORGANICS DIVISION (CONTINUED)					
Action	**Current Program**	**Cost**	**Carbon Impact**	**Status**	**Impact to Reaching 2020 Target**
Organics Diversion (OD)-5: Urban agricultural operations, from community gardens to regional farmers, produce and use compost from local sources.	The City of Austin has several programs working to increase the production and use of compost from local sources including: • Austin Resource Recovery's Home Composting Rebate, which offers free community composting classes, and an online tutorial managed by full-time compost coordinator position. • Curbside Organics Collection Pilot that serves ~14,000 households with weekly curbside collection of organics that is processed locally. • City-sponsored community gardens in fourteen locations across the city, almost all of which accept organic materials generated within the neighborhood to create compost for use on-site. Additionally, there are several organizations in Austin that are working to connect organic feedstock to community compost operations in order to minimize the amount of organic materials that is transported to landfills.	Staff and program budgets from Austin Resource Recovery, Office of Sustainability and Parks and Recreation.	By producing and utilizing compost on-site, urban agricultural operations can contribute to greenhouse gas reductions by avoiding the emissions associated with transporting and turning compost.	**ONGOING**	**LOW**

STRATEGY 4: PURCHASING					
Action	**Current Program**	**Cost**	**Carbon Impact**	**Status**	**Impact to Reaching 2020 Target**
Purchasing (PU)-1: City develops construction specifications for citywide building permits and public works contracts and adopts specifications for roadway projects that include more locally produced recycled-content materials.	The Public Works Department will consider specifying recycled materials in some roadway and public works projects. Austin Resource Recovery and Public Works will develop an inventory of materials with possible public works applications.	Unknown until materials and applications are identified.	Unknown without specifying materials, applications, and quantities.	**IN DEVELOPMENT**	**MEDIUM**
Purchasing (PU)-2: City adopts procurement specifications for materials reuse, reduced packaging, products with low embodied energy, materials with recycled content, and locally manufactured products and the City encourages other agencies and enterprises to follow suit.	Printer and paper policy is in place. The Office of Sustainability is working with Central Purchasing to perform annual training on sustainable procurement specifications, as well as development of a spend analysis and strategic approach for FY17. Purchases are tracked through the Office of Sustainability's annual Sustainability Key Performance Indicators report.	Limited time from FTEs in both Office of Sustainability and Central Purchasing.	Unknown without specifying materials, applications, and quantities.	**IN DEVELOPMENT**	**HIGH**

STRATEGY 5: REUSE / REDUCE					
Action	**Current Program**	**Cost**	**Carbon Impact**	**Status**	**Impact to Reaching 2020 Target**
Reuse / Reduce (RR)-1: Austin Resource Recovery adds new Reuse Centers, including for hard-to-recycle items.	On October 17, 2015, Austin Resource Recovery combined and expanded the Household Hazardous Waste and Resource Recovery Center into the Reuse and Recycling Drop-Off Center. The Center accepts household hazardous waste and hard-to-recycle items, such as Styrofoam, plastic film, and electronics. A similar facility will be located at the future northeast Austin service center scheduled to open in 2018. Additional drop-off centers are will depend on funding.	12.5 FTEs $1.8 million per year	Not able to quantify at this time.	**ONGOING**	**LOW**
Reuse / Reduce (RR)-2: City supports local enterprises that repair goods and products.	Austin Resource Recovery's Locally Austin initiative promotes more than a dozen local repair businesses.	Marketing costs are minimal.	No information reported from private businesses.	**ONGOING**	**LOW**
Reuse / Reduce (RR)-3: The City supports local economic development through the (re)Manufacturing Hub, Austin Materials Marketplace, and reuse enterprises for reuse of production byproducts or general reuse of goods.	Austin Resource Recovery and the Economic Development Department are evaluating (re)Manufacturing Hub Letters of Interest; Federal Economic Development Administration approved grant. Austin Resource Recovery promotes Fixit clinics and dozens of reuse businesses, including non-profits like Goodwill, Habitat for Humanity's ReStore, and Austin Creative Reuse.	<u>Materials Marketplace:</u> FY16: $175,000 FY17: $78,000 <u>(Re)Manufacturing Hub:</u> $6.9 million for development	Depends on types and quantities of materials and goods.	**IN DEVELOPMENT**	**LOW**
Reuse / Reduce (RR)-4: The City implements policies to reduce the use of single-use products in addition to carryout bags.	City to develop and implement expanded policies around polystyrene foam use.	Depends on products to be impacted, which have not been identified	Depends on products.	**IN DEVELOPMENT**	**LOW**

net-zero

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Austin Transportation Department