

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. WHEEL was not approved in the Texas Legislature. On-Bill repayment has many challenges and costs. Austin Energy has supported PACE projects for commercial properties. Austin Energy leverages a loan loss reserve fund to provide loans for bundled energy efficiency projects in single family homes. In FY16 the credit score required was reduced from 740 to 600 to increase participation. Over the winter of FY17, the interest rates were bought down to 1.99%. The rate was increased to 3.99% in the spring of 2017 due to costs. In FY18, AE is reviewing various options to optimize the loan loss reserve.	A loan loss reserve account containing \$5 million established through an ARRA grant for the Home Performance with Energy Star Program. PACE is funded with third party capital and to-date, only one commercial customer has used this relatively new program.	Expected to be very small relative to overall impact of all CES programs (2017 energy efficiency, green building and demand response programs resulted in approximately 70,000 metric tons CO ₂ avoided).	ONGOING	LOW
Buildings and Integrated Efficiency (BIE)-2: Increase funding for energy efficiency rebates within the constraints of rate affordability goals. Emphasize 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 conserving energy will continue to be employed within the current budget as part of Customer Energy Solutions. FY18 focus areas include: <ul style="list-style-type: none">• Commercial customer Tier alerts• Energy audit tool• Strategic Partnership of Utilities and Retailers (SPUR)• Expanded demand response opportunities• Targeted product marketing• Rebates for residential properties to tighten building envelopes and install higher energy efficiency equipment	The CES FY18 budget for all program O&M, rebates and outreach totals \$43.2 MM.	The additional \$2 million budget allocated for FY18 is expected to result in an additional 6,100 metric tons of greenhouse gas emissions avoided per year.	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.	Full implementation of programs using Advanced Meter Infrastructure to analyze and use data in real time is an on-going multi-year project. All customers are currently eligible for AE incentives, if they meet program guidelines. Project underway with Univ. of Florida to use data from a number of sources, including AMI data (eventually) to develop a tool to allow prospective renters of multifamily units to get a prediction of the likely energy burden for a unit based upon historical data from like units, before they rent it.	New programs that use meter data will be evaluated as part of the Advanced Meter Infrastructure initiative, including cost and Return On Investment calculations.	Aggregate benefits to be realized with Advanced Meter Infrastructure program evolution are estimated at 200,000 metric tons of greenhouse gas emissions avoided per year.	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.	<p>High-impact strategies are continuously 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. First, the energy code addresses the vast majority of buildings and has the highest impact / Return On Investment. Second, 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 overall and as a Return On Investment basis for new construction, as well as for existing buildings being retrofitted.</p> <p>Green Building has implemented a new Integrated Modeling Incentive to provide greater energy savings for buildings as part of the design process. Training for third party modelers has taken place, and buildings have begun to register for the program.</p> <p>In 2016, a major update to the building code was also adopted (see BIE-10); subsequently, 'solar ready' code provisions were added to building code updates, and became effective in 2017.</p> <p>Energy Efficiency Services offers rebates and education for all three sectors: commercial, residential and multifamily. These rebates focus on envelope improvements, lighting, HVAC, pumps, motors and industry specific measures.</p>	<p>Austin Energy Green Building will invest \$3 million over 10 years toward the Integrated Modeling Incentive program and support.</p> <p>Energy Efficiency Services FY18 rebate budget is \$15.5 million. (costs and carbon impacts accounted for in BIE-2)</p>	<p>The Integrated Modeling Incentive program is expected to avoid an additional 2,800 metric tons of greenhouse gas emissions over 10 years.</p>	ONGOING	HIGH
Buildings and Integrated Efficiency (BIE)-5: Implement programs to reduce energy use and carbon intensity associated with water consumption.	<p>Austin Energy Green Building ratings encourage reduced water consumption.</p> <p>Austin Energy will continue to coordinate with Austin Water Utility engineers on efficient end-use consumption.</p> <p>Austin Water Utility has on-going programs to promote more water efficient appliances.</p>	<p>This action is integrated into current budgeting for Austin Water Utility.</p>	<p>Sustained benefits of carbon avoided.</p>	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.	<p>Austin Water Utility purchases 100% renewable wind power for all its electricity needs and also tracks its combined water and wastewater energy intensity.</p>	<p>This action is integrated into current budgeting for Austin Water Utility.</p>	<p>Sustained benefits of carbon avoided.</p>	ONGOING	MEDIUM
Buildings and Integrated Efficiency (BIE)-7: Expand the availability and use of automated demand response to more and new technologies.	<p>The new Residential Energy Code adopted in September 2016 mandates internet-enabled thermostats for all new residential construction. Energy Efficiency Services provides rebates for residential, multifamily and commercial participation in demand response. Some demand response is enabled by collection and use of 15-minute interval meter data via Austin Energy's Advanced Meter Infrastructure (see BIE-3 for status update).</p>	<p>The FY18 Energy Efficiency Services budget for demand response initiatives is \$1.6 million.</p>	<p>Aggregate benefits to be realized with Advanced Meter Infrastructure program evolution are estimated at 200,000 metric tons of greenhouse gas emissions avoided per year.</p>	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.	This action depends on full implementation of programs based on the functionality of advanced meters and support systems. (see BIE-3 for status update)	New programs that use meter data will be evaluated as part of the Advanced Meter Infrastructure initiative, including cost and Return On Investment calculations.	Aggregate benefits to be realized with Advanced Meter Infrastructure program evolution are estimated at 200,000 metric tons of greenhouse gas emissions avoided per year.	IN DEVELOPMENT	HIGH
Buildings and Integrated Efficiency (BIE)-9: Create a new minimum standard for existing building energy use; enforce the new standard.	Establishing a new minimum standard 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. Existing programs do report and benchmark 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 or the Key Code Reporting method.	TBD, would be based upon the standard(s) adopted and the enforcement mechanisms.	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.	Net-zero construction is not practical at present; however, each subsequent code cycle continues to address how to reduce energy use in new construction. Green Building will begin to look at local amendments in the 2018 International Energy Conservation Code, with an eye towards passing the new code in late 2019, concurrent with updates to the other technical building codes for the City, all of which are facilitated by DSD.	Increased up-front costs for building owners to pay for new devices, which will be returned through energy savings (a net savings for the community).	Given the recent adoption of the new code, it will take years to see the impact on energy use and carbon savings.	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.	For better compliance through inspections and enforcement additional FTE's dedicated to energy would be necessary for DSD to be able to actively monitor progress and better ensure compliance. Work has just been initiated to look at development of local amendments to the 2018 IECC.	Austin Energy-sponsored education is integrated into existing Customer Energy Solutions operations. Additional code inspectors will increase the City's budget.	In FY 17, the Green Building program (ratings and energy code) resulted in energy savings of almost 42,000 megawatt hours. Over time, it may be possible to assess additional energy savings that are attributable to new energy code officers.	ONGOING	HIGH
Buildings and Integrated Efficiency (BIE)-12: Phase-in requirements to sub-meter new commercial office space as new permits are issued.	This could require future energy code-related changes, and the next code change is due in 2019. There are some difficulties; for example at office buildings with chillers it is difficult to determine who is using what fraction of that chiller/cooling tower at any particular time.	The costs would be borne by developers and building owners as they add in meters. No additional City costs for energy code changes.	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.	Austin Energy launched its 5 year strategic plan in 2017 and as a part of that plan is undertaking initiatives that help to modernize the grid, leverage and optimize Advanced Metered Infrastructure, and integrate and optimize Distributed Energy Resources (DER). Currently the SHINES project along with several other projects such as Conservation Voltage Reduction (CVR) are underway and are expected to result in significant energy savings and improve grid efficiency.	This action is carried within Austin Energy's existing budget. TCEQ and SHINES grants total \$8.5 million, approximately \$3.5 million is matched with funds from Austin Energy (already approved and included in budget).	Evaluations will take place in FY19.	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).	Austin Energy is on track to meet renewable energy, peak demand, and greenhouse gas reduction targets. An update to the resource plan was approved by the Austin City Council on August, 2017 and can be found here . Since the Community Climate Plan was finalized, Austin Energy has signed contracts for 612 MW of utility-scale solar in 2016, 150 MW of utility scale solar in 2017 and 200 MW of wind in 2017. 433.5 megawatts of those contracts is now online, another 178.5 MW is planned to be online by September 2018 and another 150 MW in 2020. Over 7,200 Austin Energy customers have installed solar totaling 54.5 megawatts in addition to the 30 megawatt Webberville Solar Project and Austin Energy's two Community Solar projects - the 185 kilowatt Palmer Events Center array, and the 2.6 megawatt La Loma Community Solar project. Austin Energy on track to meet the 110 megawatt local solar goal by 2020.	Costs of large scale renewable energy agreements are confidential. Austin Energy Solar Incentives in FY18 are budgeted at \$7.5 million.	A projected 8.0 million metric tons of greenhouse gas emissions will be avoided between 2016 and 2025 with new large scale renewable contracts.	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.	A dedicated Austin Energy resource planning team continuously evaluates all resource options as part of the review of the resource plan. Utility resources such as the Electric Power Research Institute are being leveraged in support of these efforts.	This action is integrated within existing program costs.	No additional carbon savings to those achieved through existing programs.	ONGOING	HIGH
Resource Technologies (RT)-4: Evaluate technology and cost options for increasing natural gas system leak detection and reduction programs.	Texas Gas Service (TGS) has reported several key actions to keep gas in the pipe which reduces methane emissions. 1. TGS is improving leak repair times: TGS is repairing leaks more quickly than the code requires us to. The sooner that leaks are repaired, the less gas that escapes into the atmosphere. 2. Improving efforts regarding damage prevention: <ul style="list-style-type: none">Excavation Damage education to the excavators and public has increased in an effort to minimize 3rd party damages. Minimizing 3rd party damages results in less escaping natural gas. Damages per 1000	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 emissions reduction each year as the type of pipe replaced will vary from year to year. However, implementing this commitment will result in a cumulative reduction of methane emissions.	IN DEVELOPMENT	MEDIUM

	<ul style="list-style-type: none"> All new service lines are required to be installed 24 inches in depth (service riser 18 inches) and all mains at 30 inches in depth or have additional protection installed to protect the pipeline from external forces. <p>3. Vintage pipe replacement: All Cast Iron pipe has been retired from service in Austin. This is a significant achievement given that cast iron pipe is the type of pipe that the EPA has assigned the highest default emission rate by over two times the next highest rate. [Cast iron – 27.25 scf/hour/mile; Unprotected steel – 12.58 scf/hour/mile; Plastic – 1.13 scf/hour/mile; Protected steel – 0.35 scf/hour/mile]</p> <p>4. Leak surveying:</p> <ul style="list-style-type: none"> Vintage pipe material is leak surveyed annually. Vintage pipe materials such as cast iron, wrought iron, ABS, PVC, and bare steel can be considered to be surveyed annually Our leak survey program exceeds the minimum standards. In addition, we now have instituted to operational practices, including <p>5. Performing hot taps instead of blowing down lines: TGS conducts “hot taps” when tying in a service line or main connection to minimize blowing down our lines. (we don’t bleed the line of all gas; instead we work on the pipe “hot,” with gas in the pipe)</p> <p>6. Reducing line pressure to reduce vented gas volumes before scheduled blowdowns: We reduce gas pressure (having customers use the gas up) before we perform scheduled maintenance on our pipelines. Thus reducing emissions.</p>				
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.	This action depends on full implementation Advanced Meter Infrastructure (see BIE-3 for status update). Efforts are underway to allow customer service representatives to match customer billing, usage and other demographic information to better serve customers.	No additional cost (part of existing Operations & Maintenance budget).	Aggregate benefits to be realized with Advanced Meter Infrastructure program evolution are estimated at 200,000 metric tons of greenhouse gas emissions avoided per year.	IN DEVELOPMENT	HIGH
Behavior Change (BC)-2: Implement time of use / dynamic rates, including user educational efforts, supported by advanced metering and other technologies.	A time of use residential pilot program was approved as part of the August 2016 rate changes. A pilot time of use program for commercial and house of worship customers became effective January 2018. Full availability of time of use data is dependent on full implementation and functionality of advanced meters and support systems, which will be completed over multiple years (see BIE-3 for status update).	Time of use rates are typically structured to save customers money and be revenue neutral to the utility. The pilot projects will provide data to evaluate the expected impact on consumers.	More work is needed to evaluate the impact of shifting energy usage to hours outside of peak times. Given the increasing amount of solar and renewables in the ERCOT market, this shift may have a minimal impact on carbon emissions.	IN DEVELOPMENT	LOW

<p>Behavior Change (BC)-3: Expand educational efforts through social media, applications, competitions (individual and neighborhood scale) and exposure.</p>	<p>Efforts from 2016 and 2017 are being expanded in 2018 to include Austin Energy-sponsored YouTube videos about specific energy programs and expanded use of Twitter.</p>	<p>Customer Energy Solutions is evaluating the optimal use of its marketing budget to promote energy efficiency – no additional funding needed.</p>	<p>Too uncertain to parse out of overall Customer Energy Solutions program benefits.</p>	<p>ONGOING</p>	<p>MEDIUM</p>
<p>Behavior Change (BC)-4: Utilize meter reads and bill format / presentation to influence behavior. Present energy use in actionable and timelier ways to customers.</p>	<p>This action depends on full implementation Advanced Meter Infrastructure (see BIE-3 for status update). Planning is underway to expand the customer online portal. Customer Energy Solutions is continuing to promote the web app as a way to influence behavior through the knowledge of energy used.</p>	<p>Other programs to use meter data for this purpose are currently being or will be evaluated as part of the Advanced Meter Infrastructure initiative, including cost and Return On Investment calculations.</p>	<p>Aggregate benefits to be realized with Advanced Meter Infrastructure program evolution are estimated at 200,000 metric tons of greenhouse gas emissions avoided per year.</p>	<p>IN DEVELOPMENT</p>	<p>HIGH</p>

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
<p>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.</p>	<p>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."</p> <p>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, as well as identify future improvements.</p> <p>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 analyses of alternatives or environmental studies prior to any future rail investments.</p> <p>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.</p> <p>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.</p> <p>Austin Strategic Mobility Plan (ASMP): Austin Transportation Department is currently updating its transportation plan and the process is being coordinated with Capital Metro’s current refinement of Project Connect. The draft ASMP is anticipated to be complete in late 2018, at which time the adoption process will commence with public hearings at related Boards, Commissions, and City Council.</p>	<p>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/</p> <p>Capital projects identified in the Austin Strategic Mobility Plan will primarily be funded through City bonds, federal and state grants, public-private partnerships, and the development review process. Programming efforts would be funded through the City’s operating budget.</p>	<p>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).</p> <p>The ASMP will calculate the estimated vehicle miles traveled and vehicle hours of delay, as well as calculate VMT reduction strategies.</p>	<p>IN DEVELOPMENT</p>	<p>HIGH</p>

STRATEGY 1: INFRASTRUCTURE AND SERVICE (CONTINUED)					
Action	Current Program	Cost	Carbon Impact	Status	Impact to Reaching 2020 Target
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.	<p>The City's Vision Zero program focuses efforts on addressing transportation safety holistically through education, enforcement, engineering, policy and evaluation. It involves nine other City Departments and all of ATD. Programs include the signal program, which turned on 19 signals and Pedestrian Hybrid Beacons in 2017. A total of 10 bicycle signals were also installed in 2017 as part of a federally funded project to improve bicycle safety and mobility. The City maintains a total of 8 permanent bicycle and pedestrian counters and routinely conducts motor vehicle speed and volume counts on streets throughout the city.</p>	<p>2018 Signals Budget:</p> <ul style="list-style-type: none"> FTEs: \$4.8M Consultants: \$4.37M Commodities: \$1.22M Refunds: (\$1.24M) <p>The 2016 Mobility Bond included \$15M for intersection safety projects. Four intersection projects were completed in 2017 and another two are currently under construction.</p> <p>Staff has made recommendations to the 2018 Bond Advisory Task Force for funding to advance signal technology and safety. The Bond Advisory Task Force has recommended funding this work at \$30M, \$15M for signals and \$15M for safety.</p>	<p>Safety remains Austin Transportation's highest priority. Programs and designs that result in greenhouse gas emissions reductions are currently being identified and implemented. Shifting trips to non-carbon based mobility remains a focus through increased safety investments.</p>	ONGOING	LOW
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.	<p>CMTA Park & Ride Assessment Report: An annual, internal technical assessment of existing and future park-and-ride facilities and needs throughout the Service Area.</p> <p>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.</p> <p>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 needs, analyze service options and financing, and provide recommendations for service.</p> <p>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.</p>	<p>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</p>	<p>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).</p>	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.	<p>The Planning and Zoning Department is coordinating multiple planning initiatives that support the Imagine Austin Comprehensive Plan and implementation of this action:</p> <p>After several years of extensive outreach, the third draft Staff Recommendation of CodeNEXT was released in February 2018. The draft is undergoing additional review by the public, land use commissions, and City Council. The land use commissions and the City Council will be able to consider approval of the new Land Development Code in 2018.</p> <p>Small Area Planning Program includes compact and connected planning efforts associated with the Shoal Creek Neighborhood Plan, Burnet Better Block, and South Central Waterfront Plan Implementation activities.</p> <p>The Austin Transportation Department's update to the Austin Strategic Mobility Plan (see IS-1) will support the growth concept of a compact and connected Austin outlines in Imagine Austin and furthered by CodeNEXT.</p> <p>CMTA Transit Oriented Development Program: Capital Metro's Transit Oriented Development Program completed a Priority Tool that was developed with input from a steering committee which included members of the City of Austin Housing+Transit+Jobs Working Group. Tools like these provide guidance on how to create more compact and connected mixed-use development in close proximity to transit.</p>	<p>Planning and Zoning Initiatives:</p> <ul style="list-style-type: none"> CodeNEXT: \$8.75M <ul style="list-style-type: none"> Staff time: \$650,000 Consultant time: \$8.1M PAZ Long Range Planning Budget (Annual): \$1.71M <p>The 2016 Mobility Bond included \$6M for capital renewal projects, and \$20M for bikeway projects.</p>	<p>Bike Plan outcomes = 109,000 metric tons of greenhouse gas emissions avoided annually.</p> <p>Up to 767 tons of greenhouse gas emissions avoided daily from all Land Use actions.</p> <p>TOTAL = ~389,000 metric tons of greenhouse gas emissions avoided annually.</p>	ONGOING	HIGH
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).	<p>The Planning and Zoning Department is coordinating multiple planning initiatives that support the Imagine Austin Comprehensive Plan and implementation of this action, such as the CodeNEXT update of the Austin Land Development Code, and Small Area Planning Program initiatives that include Shoal Creek Neighborhood Plan, Burnet Better Block, and South Central Waterfront Plan Implementation Activities.</p> <p>CMTA TOD Plan: Capital Metro is creating a Transit Oriented Development plan that will integrate and monitor current and changing land use, as well as the potential for additional MetroRapid stops and MetroRail Stations. The plan will integrate land use decisions with transit operations, promote better TODs, and increase transit ridership and revenue by comprehensively examining existing and planned conditions. It will allow decision-makers to better respond to market forces, community needs, and desired outcomes.</p> <p>ATD is working with the Economic Development Department to enforce its existing policy that incorporates TDM plans. ATD is also participating in the development of a new policy to possibly strengthen TDM incentives and requirements. ATD is also working with Austin Energy to incorporate additional TDM strategies as part of its Green Building certification program.</p>	<p>Costs for all Planning and Zoning initiatives are summarized in LU-1.</p>	<p>Emissions reductions for all Planning and Zoning initiatives are summarized in LU-1.</p>	ONGOING	HIGH

STRATEGY 2: LAND USE (CONTINUED)					
Action	Current Program	Cost	Carbon Impact	Status	Impact to Reaching 2020 Target
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.	<p>Active Transportation and Street Design: Completed over 30 projects in 2017 that added nearly 20 miles of new or improved bike lanes, dozens of pedestrian crossings. Goal: Double ridership in the central city core by 2020.</p> <p>Urban Trails Plan: 62 miles of urban trails were maintained; 2 projects (Phase 1 of the Northern Walnut Creek Trail and a portion of the Violet Crown Trail) were completed; 4 projects are under construction; and 8 projects are in the design phase. CodeNEXT mentions urban trails and allows for their installation/dedication/improvements in several places.</p> <p>Planning and Zoning: Downtown Wayfinding Project; Great Streets Program; Small Area Planning Program including the Shoal Creek Neighborhood Plan and South Central Waterfront Planning.</p> <p>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, as well as identify future improvements.</p>	<p>Costs for all Planning and Zoning initiatives are summarized in LU-1.</p> <p>The 2016 Mobility Bond included \$126M for active transportation and safety investments</p>	<p>Full build-out of the Bicycle Plan would achieve 170,000 fewer daily trips by car. Assuming each trip is 7 miles = 309,400,000 Vehicle Miles Traveled avoided.</p> <p>Over 10 years = 1,090,330 metric tons of greenhouse gas emissions would be avoided.</p> <p>Emissions reductions for all Planning and Zoning initiatives are summarized in LU-1.</p>	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 implementation of this action, such as on-going calibration and implementation of the Density Bonus Program; Transit Oriented Development Program initiatives; the CodeNEXT update of the Austin Land Development Code; Small Area Planning Program including the Shoal Creek Neighborhood Plan and South Central Waterfront Planning .	Costs for all Planning and Zoning initiatives are summarized in LU-1 .	Emissions reductions for all Planning and Zoning initiatives are 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 implementation of this action including the CodeNEXT update of Austin Land Development Code. The draft of CodeNEXT released in February 2018 allows a greater diversity of development types and “missing middle housing” through various zones. The number and types of missing middle housing have been increased in residential, main street, and mixed use zones.	Costs for all Planning and Zoning initiatives are summarized in LU-1 .	Emissions reductions for all Planning and Zoning initiatives are 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.	<p>20/20 Mobility Challenge: This citywide effort was initiated by the Mayor's office and organized by Movability Austin and other partners. Participating organizations and companies include AECOM, American Bank of Commerce, Box, Capital Metro, Concordia University, Eanes Independent School District, Facebook, Hilton Austin, Holtzman Partners, Lone Star Circle of Care, Mcgarrah Jesse, Outbound Engine, Seton Healthcare Family, Silicon Labs, St. Edward's University, and YMCA of Austin. In 2015- 2017, 47 companies went through the program.</p> <p>In 2018, participating organizations will submit an inventory of existing mobility programs and survey employees to find out about current commute behavior. After analyzing the survey results, Movability will lead each company in developing a three- to five-year strategic mobility plan for reducing drive-alone behavior.</p> <p>Movability Austin (Transportation Management Association): Movability is Central Texas' transportation management association (TMA) working hand in hand with organizations to improve the region's economic vitality by connecting organizations with mobility options that save time and money. This non-profit is funded by the City of Austin, Capital Metro, the Downtown Austin Alliance and others to provide focused Transportation Demand Management solutions. Movability currently serves over 40 members.</p> <p>CTMA, MetroRideShare: The MetroRideShare program is sponsored by Capital Metro and operated by vRide, a national vanpool service provider that provides all services necessary to enjoy a comfortable, convenient and economical commute to work.</p> <p>CTMA MetroWorks: MetroWorks is an Employee Transportation Benefits program of Cap Metro, that helps businesses and government agencies implement Transportation Demand Management measures, including public transit and ridesharing opportunities.</p>	<p>2018 Movability Austin Budget:</p> <ul style="list-style-type: none"> Outreach / marketing / contract services: \$350,000 	<p>Baseline data will be collected for all new mobility challenge participants, as well as annual progress updates.</p> <p>Depending on the program, employer Transportation Demand Management programs can reduce Vehicle Miles Traveled 5% - 25%.</p> <p>Based on a 15% Vehicle Miles Traveled reduction and Texas Transportation Institute data:</p> <ul style="list-style-type: none"> 3,675,000 daily vehicle-miles traveled would be saved 260 work days = 955,500,000 Vehicle Miles Traveled At 25mpg, 38,220,000 gallons of gasoline would be saved 336,718 metric tons of greenhouse gas emissions would be 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.	<p>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.</p> <p>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.</p>	<p>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</p>	<p>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 and</p>	ONGOING	HIGH

	<p>The Austin Strategic Mobility Plan, described in IS-1, is incorporating transit priority recommendations from Connections 2025 and Project Connect into the transportation network.</p> <p>The Austin Transportation Department and Capital Metro have a Transit Priority Working Group that meets every other week to address short term transit priority operational and design issues.</p>		Transit Cooperative Research Program.		
<p>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!).</p>	<p>Viva Streets! Open Streets Event: On hold until more resources are identified. Current focus is on building a program that encourages active transportation, of which open streets events will be part.</p> <p>Educational & Encouragement Campaigns: FY16 events included guided walks, bike rides, bike to transit instruction, and other active mode encouragement as part of the Smart Trips program. ATD continues to provide free bike share memberships to city employees through the City of Austin Bike Share Benefit Program and has expanded offerings to City employees to include bicycle commute instruction through The Yellow Bike Project.</p> <p>See also TDM-1 & TDM-8 for overlapping items.</p>	<p>2018 Smart Trips Budget:</p> <ul style="list-style-type: none"> • Consultant: estimated @ \$300,000 • FTEs: ATD 1/8th FTE; Capital Metro 1/8th FTE <p>The 2016 Mobility Bond included \$3M for Safe Routes to School Program projects, \$2M for bikeways, and \$10M for sidewalk projects as Local Mobility – Early Out Projects. See www.austintexas.gov/2016bond for completed and current projects.</p>	Same as those listed in Land Use Strategy actions.	ONGOING	HIGH
<p>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.</p>	<p>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.</p> <p>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.</p> <p>CMTA Mobile App. Capital Metro now offers a free mobile app to promote using public transit. The app includes a Trip Planner, schedule times, service alerts and a mobile ticket option.</p> <p>Austin B-Cycle. B-Cycle is the network of 64 bikeshare stations and 530 bikes. 12 new B-Cycle stations will be installed in 2018 using federal funding matched with private funds. An additional \$2M in federal funding has been sought to continue to expand the system.</p> <p>Market District Shuttle: The Rocky Mountain Institute and Movability Austin moved into the second phase of the Market District, from March 2017-December 2017. The pilot worked with employers in the Market District west of downtown near 6th & Lamar to develop and launch an employer-funded first-/last-mile shuttle to connect employees to Capital Metro services in eastern downtown during peak traffic hours. The initiative also provided off-peak on-demand transportation services for employees via B-cycle, Car2Go and TNC credits. RMI will be translating lessons learned from this initiative into a new pilot focused on the Riverside neighborhood.</p>	<p>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</p> <p>The City continues to provide essential staff support for B-Cycle station location / relocation, contract oversight, strategic planning and other support. The City also supports the Bikeshare Benefit Program that provides free annual memberships to employees. Support is estimated at \$50,000 per year in staff and other support.</p> <p>The 2016 Mobility Bond included \$10M for sidewalk projects as Local Mobility – Early Out Projects. More information on completed projects are available at www.austintexas.gov/2016bond</p>	<p>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 and Transit Cooperative Research Program.</p> <p><u>2018 B-cycle Stats:</u></p> <p>2017 ridership numbers: 189,386 unique riders</p> <ul style="list-style-type: none"> • 719,827 total trips for a total of 2,154,325 miles. • Bike share riders have displaced 187,155 car trips. 	IN DEVELOPMENT	HIGH

<p>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.</p>	<p>Special Events Ordinance: This item will be brought back to Council for consideration in May 2018. Elements from the Traffic Congestion Action Plan (TCAP) will be incorporated into the ordinance.</p> <p>General Planning Assistance: Austin Events conducts meetings with each event organizer to develop transportation options for specific events. Stakeholders involved include: Capital Metro, Austin Transportation Department, Austin Police Department, B-cycle, pedi-cabs, Transportation Network Companies, and taxis.</p> <p>Parkland Events Task Force – The Parkland Events Final Report includes recommendations to develop parking and traffic solutions for parks that would reduce usage of green space parking and enhance traffic flow. The report was reviewed by the Open Space, Environment, and Sustainability Committee on December 14, 2016 and was finalized in January 2017.</p> <p>Green Events Guidebook: A collaboration amongst Parks, Office of Sustainability, Austin Water, Watershed, ARR, and ATD, the Green Events Guidebook provides recommendations for major events along the topics of food, energy, transportation, air quality, water, and waste management. The guidebook was published in January 2018.</p>	<p>2018 Events Budget: 1 FTE @ \$93,000; small percentage of Austin Center for Events staff time allocated.</p>	<p>No data available.</p>	<p>ONGOING</p>	<p>LOW</p>
<p>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.</p>	<p>In 2015 and 2016, the Capital Area Council of Governments (CAPCOG) provided Clean Air Coalition members with fleet outreach and technical assistance through a contracted provider. In Spring of 2017, Travis County and the Clean Cities Coalition of Central Texas (Lone Star Clean Fuels Alliance) hosted an education and outreach event for fleet owners and the public on the topic of alternative-fuel vehicles.</p> <p>City of Austin staff assisted Capital Metro in developing a fleet electrification plan. Capital Metro is now analyzing the feasibility and process for purchasing battery electric buses and sedans.</p>	<p>No FY18 financial support from the City.</p>	<p>No data available.</p>	<p>IN DEVELOPMENT</p>	<p>LOW</p>
<p>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.</p>	<p>Big Jump: The City of Austin was designated a Big Jump city in 2017 with a goal of doubling ridership over a three year period. A robust 8-point ridership plan has been developed which includes encouragement efforts that were integrated into the Smart Trips Program and developing Bicycle Friendly Business districts.</p> <p>Bike Parking: Continued installation of bicycle parking on City-owned right-of-way by request. Approximately 20 new bike racks were installed in 2017 for a total of 3,250.</p> <p>Code Amendments/Manual Updates: The latest draft (3) of CodeNEXT allows for multiple opportunities for parking reductions (location to transit corridor, preservation of trees, carshare, bike parking, showers, participation in affordable housing). In addition, it allows for a 100% reduction in parking requirements if the project is part of a TDM program.</p> <p>The latest draft also requires a TDM plan for a development application that is subject to a Comprehensive Transportation Review and is an option for all development regardless of CTR requirements. See also TDM-8 for overlapping items.</p>	<p>Jump: \$200/year. Community grants and partnerships are being sought.</p> <p>Bike Parking: Approximately 20 bike racks were installed in 2017. Costs are absorbed by operational resources using existing bike rack supply stock. Moving forward, bike racks will be installed with both in-house and outsourced contracts at approximately \$200-\$2,500 per rack, depending on the type. Bike Parking is budgeted at approximately \$10,000 for FY2018.</p> <p>Policy: Efforts are being integrated into existing city initiatives.</p>	<p>Doubling bicycle ridership in the central city core is expected to have a positive impact on reducing carbon emissions. Additional analysis is needed to estimate this impact.</p>	<p>ONGOING</p>	<p>LOW</p>

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: Smart Trips Austin is an active transportation options program that aims to reduce single occupant vehicle trips and increase trips taken by foot, bike, bus or shared car. The City of Austin and Capital Metropolitan Transportation Authority (Capital Metro) are working together to encourage Austinites to consider more sustainable options for getting around town. These options can help you improve your health, save money, avoid traffic congestion and keep Austin a clean and beautiful place to live. A Pilot project kicked off in Fall of 2015, and Phase II was initiated in Spring of 2016. Phase III was initiated in Fall of 2017. <u>Phase 1: North Austin</u> - 315 houses of the total 27,512 houses ordered Smart Trips tool kits. Post-program survey participants reported a 2% relative decrease in car trips and an 11% relative increase in active trips after the completion of the program. Overall active transportation mode share increased by 3% among participants. <u>Phase 2: Central Austin</u> - 531 houses of the total 12,612 houses ordered Smart Trips tool kits. Post-program survey participants reported that drive-alone mode share decreased 3.3%, with a corresponding increase of 5.9% in transit mode share, 2.6% in walking mode share, and 1.2% in “other” mode share. Bicycling and carpool mode share decreased by 1.0% and 5.4%, respectively. These findings show that the program succeeded in decreasing drive-alone trips and increasing active transportation. <u>Phase 3: Central South Austin</u> - included roughly 13,000 households in the Zilker, Bouldin, and Travis Heights neighborhood. Programming implemented from October 2017 through January 2018. Data will be collected similar to phase 1 & 2.	2018 Smart Trips Budget: <ul style="list-style-type: none"> Consultant: estimated @ \$300,000 FTEs: ATD 1/8th FTE; Capital Metro 1/8th FTE 	Other Smart Trips programs throughout the nation have seen anywhere from 3% to 18% reduction in drive-alone trips. Using a 10% reduction of daily trips and Texas Transportation Institute data: <ul style="list-style-type: none"> 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 saved and 224,479 metric tons of greenhouse gas emissions avoided. 	ONGOING	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.	Ongoing coordination with Capital Area Metropolitan Planning Organization and regional partners through CAMPO 2040 Plan and upcoming CAMPO 2045 update. Commute Solutions Steering Committee established by CAPCOG in 2017 to coordinate regional TDM planning and includes representatives from local jurisdictions around the region, transit agencies, and CAPCOG and CAMPO.	N/A	Up to 1054 tons of greenhouse gas emissions avoided per day when combined with Land Use actions ~280 tons of greenhouse gas 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
<p>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.</p>	<p>Plug-In EVerywhere: Austin Energy installed the first Electric Vehicle (EV) charging infrastructure in the region in 2008 and now has over 600 EV charging ports at retail, workplace, multifamily, and fleet locations throughout Austin. Since 2011, the public network of stations has consumed 2 gigawatt hours of clean renewable wind energy, powered by Austin Energy’s GreenChoice program.</p> <p>Austin Energy and Austin Bergstrom International Airport have partnered to install 20 fast-chargers for ground service equipment vehicles (used to power luggage tugs and belt loaders operated by various airlines), reducing annual gas and diesel consumption by an estimated 40,000 gallons.</p> <p>Austin Energy has developed a showcase for sustainable transportation in the heart of downtown Austin, called Electric Drive. It features a DC fast charger that meets both standards for EV charging, as well as level 2 charging. A solar-powered kiosk also includes level 1 charging for electric bikes, scooters, motorcycles, and mopeds.</p> <p>Austin Energy is also integrating electric vehicle charging into their demand response programs, and has recently conducted a pilot to successfully show that PEV charging can be centrally managed to further improve grid reliability.</p> <p>Austin energy also introduced EV360: introduced a fixed, time-of-use pilot rate to support climate protection and affordability goals for home EV charging</p> <p>Regional initiatives led by Austin Energy to plan for and support the adoption of alternative fuel vehicles in the Central Texas region include the Texas River Cities initiative and Central Texas Fuel Independence Project.</p>	<p>Austin Energy Electric Vehicles program has 3 FTEs.</p> <p>FY17 costs for staff, contractor support, services, marketing, station maintenance / networking, and related expenses was \$1,037,020.</p> <p>Electric Vehicle rebates for public and private charging stations and electric bikes for FY17 totaled \$422,638.</p>	<p>In 2017, the electric fuel used at 600+ charging stations consumed 957,073 kilowatt hours, offsetting 125,845 gallons of gasoline and reducing greenhouse gas emissions by 1118 metric tons.</p> <p>EVs in Austin resulted in a total reduction of 2,101,513 gallons of gasoline and 18,676 metric tons of greenhouse gas emissions.</p> <p>4,168 vehicles @ 12,000 miles each = 50,016,000 miles traveled.</p>	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.	<p>Parking Benefit Districts: One is located in West Campus.</p> <p>Parking and Transportation Management Districts: There are two, located in East Austin and Mueller.</p> <p>Metered / Priced Parking: Metered parking rates were raised by \$0.20 in the downtown area only (I-35 to Lamar, and Lady Bird Lake to 10th Street).</p> <p>Downtown Parking on Wednesday nights is currently being enforced. In 2017 City Council approved a code change that allows the City to charge for parking on Wednesday nights.</p>	<p><u>2018:</u></p> <ul style="list-style-type: none"> Parking Enforcement Officers: \$2,772,781 Meter Shop: \$2,899,151 (100% time) 	Not quantified.	*ONGOING	MEDIUM
Economics and Pricing Systems (EPS)-2: Allow high occupancy and zero-emission vehicles access to toll roads at reduced or free rates.	<p>Tolling Pilot: The Carma carpooling app provides toll reimbursements. Analysis of use found that "real-time ridesharing programs, facilitated by smartphone technology, have the potential to incentivize behavior."</p> <p>The original pilot has not been continued.</p>	<p>The initial pilot of the app was conducted at no cost to the City of Austin. Toll discounts were provided by CTRMA through a federal grant.</p>	<p>Based on 95 unique drivers:</p> <ul style="list-style-type: none"> 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 of greenhouse gas emissions avoided) 	NO CURRENT ACTIVITY	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.	A 2016 feasibility study found that the closed City of Austin landfill on FM 812 does not generate a sufficient volume and quality of landfill gas for viable energy recovery. Landfill managers will continue to fine-tune the gas collection system to optimize its effectiveness.	Minimal part of operating costs.	CY 2016 City landfill emissions = 32,917 metric tons of greenhouse gas emissions (4% less than 2015).	ONGOING	MEDIUM
Methane Management (MM)-2: Area landfill operators refine landfill gas capture and combustion systems 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. In 2016, reported emissions from private landfills were 26% less than in 2015. The City will continue to encourage landfill operators to increase the capture and destruction of landfill gas in Travis County.	Costs to refine landfill gas capture and combustion systems is borne by private area landfill operators (not the City of Austin). (Generating energy produces revenue or displaces an expense.)	CY 2016 private landfill emissions = 414,479 metric tons of greenhouse gas emissions (26% less than 2015). 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 single-stream materials collected by Austin Resource Recovery's curbside recycling service. These 20-year contracts provide periodic opportunities to add materials to the single-stream mix. New materials are being analyzed. Weekly recycling service is being considered beginning in FY2021. <i>[Actions RE-1, RE-3, RE-5, and OD-2 have overlapping impacts; implementing all four wouldn't necessarily be the sum of the impacts for each action.]</i>	The Austin Resource Recovery budget forecast estimated this would cost on average about \$3 per month per customer, totaling about \$7 million annually. Many individual customers could offset increased costs by downsizing their trash carts.	The 2014 <i>Residential Diversion Study</i> 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.	IN DEVELOPMENT	MEDIUM
Recycling (RE)-2: Increase convenience, efficiency, and effectiveness of downtown alley trash and recycling collection service.	Austin Resource Recovery has a contract for collection of trash and recyclables in many downtown alleys. Austin Resource Recovery converted separate paper and glass recycling services to single-stream recycling. Since then, diversion continues to increase steadily. ARR is also developing plans to improve communications with the property owners and managers in this area to enhance education.	On a per volume basis, recycling services cost 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

STRATEGY 2: RECYCLING (CONTINUED)					
Recycling (RE)-3: City maintains its Pay-As-You-Throw rate structure to provide a strong financial incentive for residential customers to reduce disposal.	Through the annual budgeting process, Austin Resource Recovery evaluates alternative Pay-As-You-Throw rate structures. <i>[Actions RE-1, RE-3, RE-5, and OD-2 would have overlapping impacts; implementing all four wouldn't necessarily be the sum of the impacts for each action.]</i>	Any impacts to costs and revenues will be included in the annual and 5-year 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 (URO) maximize diversion of recyclable materials.	Austin Resource Recovery helps commercial and multifamily properties maximize diversion by administering the URO and other Zero Waste programs. The URO requires that all commercial and multifamily properties ensure that employees and tenants have access to on-site recycling services, and that food-permitted businesses ensure that employees have access to on-site diversion of organic materials. ARR staff also helps businesses that want to go above and beyond the minimum requirements by conducting in-person site consultations, providing trainings and presentations, and administering a Zero Waste Business rebate program.	<u>FY2018:</u> <ul style="list-style-type: none"> 8 FTEs \$1.75 million for Business Outreach Team Note: These costs also include actions to implement OD-1.	If diversion as reported by Licensed Haulers increases from 425,000 tons per year (2015 Community Diversion Study) to 700,000 tons per year (FY20), this action would reduce direct emissions by 89,000 metric tons and indirect emissions by 777,000 metric tons annually.	ONGOING	HIGH
Recycling (RE)-5: Research peer cities and explore phase-in of mandatory recycling and composting.	The Universal Recycling Ordinance requires that all commercial and multifamily properties ensure that employees and tenants have access to on-site recycling services, and that food-permitted businesses ensure that employees have access to on-site diversion of organic materials. Austin Resource Recovery is continually researching best practices and initiatives in other communities to explore other mandatory diversion policies. <i>[Actions RE-1, RE-3, RE-5, and OD-2 would have overlapping impacts; implementing all four wouldn't necessarily be the sum of the impacts for each action.]</i>	Research costs covered by existing staff time and any ancillary costs.	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	LOW
STRATEGY 3: ORGANICS DIVERSION					
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.	Austin Resource Recovery helps food-permitted businesses maximize diversion by administering the URO and other Zero Waste programs. In FY16, food-permitted businesses 15,000 square-feet and larger were required to ensure that employees have access to on-site diversion of organic materials per the Universal Recycling Ordinance. In FY17, food-permitted businesses 5,000 square-feet and larger were affected. In FY19, all food-permitted businesses will be required to comply.	Costs to implement this action are included with RE-4 because the two programs are interrelated.	ARR's 2015 Community Diversion Study estimated that 37% of materials discarded are organic – meaning that, in 2016, some 178,000 tons of discarded materials in Austin were organic. <u>BY FY2020:</u> Assuming food-permitted businesses affected by the URO generate 50% of the 178,000 tons of discarded organic materials, diverting 50% of that will avoid	ONGOING	MEDIUM

	ARR staff also helps businesses that want to go above and beyond the minimum requirements by conducting in-person site consultations, providing trainings and presentations, and administering a Zero Waste Business rebate program.		13,100 metric tons of direct emissions and 6,000 metric tons of indirect emissions annually.		
Organics Diversion (OD)-2: Expand collection of food residuals and other compostable, non-recyclable materials to all residential customers.	The adopted FY17 budget assumed a 4-year citywide phase-in, with service expanding to all households by FY20. <i>[Actions RE-1, RE-3, RE-5, and OD-2 would have overlapping impacts; implementing all four wouldn't necessarily be the sum of the impacts for each action.]</i>	The Austin Resource Recovery FY18 budget forecast estimated this cost would average \$4 or more 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.	ONGOING	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.	Currently, Austin Resource Recovery delivers yard trimmings to Austin Water's biosolids composting facility at Hornsby Bend. The Federal Aviation Administration does not allow food in these operations given the location of the facility in relation to the airport and flight paths. Thus, as ARR expands its residential curbside composting services, the quantity of yard trimmings delivered by ARR to Hornsby Bend will gradually decrease. Work is underway to identify and accept other carbon sources, such as tree trimmings from Austin Energy and the Parks and Recreation Department. Austin Water is working to determine the best course of action regarding the contracting of composting operations at Hornsby Bend.	No cost to Austin Resource Recovery; costs to Austin Water should be minimal; Austin Energy, the Parks and Recreation Department and contractors may incur some costs to shift materials to Hornsby Bend if current destinations for such materials is closer or more convenient.	Currently Austin Resource Recovery delivers ~ 29,000 tons of yard trimmings annually; new material delivered to Hornsby Bend would reduce emissions by 1,950 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 be needed to foster this service.	If a new policy requiring this were adopted, ARR would likely need to hire additional staff as well as budget for increased costs for education and outreach. Affected businesses and multi-family properties would also potentially or likely incur additional costs to provide these services. The FY18 budget to administer the URO as it is currently written is: <ul style="list-style-type: none"> • 8 FTEs • \$1.75 million for the Business Outreach Team 	Unknown without specifying materials and quantities that would have to be collected, though ARR's 2015 <i>Community Diversion Study</i> estimated that 37% of materials discarded are organic – meaning that, in 2016, some 178,000 tons of discarded materials in Austin were organic.	IN DEVELOPMENT	MEDIUM

STRATEGY 3: ORGANICS DIVERSION (CONTINUED)					
Organics Diversion (OD)-5: Urban agricultural operations, from community gardens to regional farmers, produce and use compost from local sources.	<p>The City of Austin sponsors 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.</p> <p>Additionally, there are several organizations in Austin that are working to connect organic feedstock to community compost operations to minimize the amount of organic materials transported to landfills.</p>	Staff and program budgets are included in Office of Sustainability, and Parks and Recreation operations.	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 (PWD) already uses a significant amount of Reclaimed Asphalt Pavement (RAP) and small amounts of recycled tire rubber in asphalt mixes. Crushed concrete is also being used as a base material with increasing frequency by PWD. Full Depth Recycling (FDR) of roadway materials by stabilization in-place is a common practice for street rehabilitation projects and will continue to be highly encouraged in the capital program. PWD will consider specifying and using additional recycled materials in roadway and public works projects as they are proposed by Austin Resource Recovery (ARR). ARR and PWD will develop an inventory of materials with possible construction and maintenance applications.	<p>RAP is a by-product of street milling for overlays. Clean RAP is sold to local asphalt producers for \$3/TON and ~30,000 TON/year is reused in new asphalt. Asphalt mixes (~\$66/TON) with RAP can be as much as a \$10/TON (15%) less expensive at \$56/TON. SBO used about 64,894 TONS of asphalt with 20% RAP in FY17 resulting in the reuse of about 13,000 TONS of RAP.</p> <p>FDR is a cost competitive means of street rehabilitation and about 40% the cost of remove and replace (full reconstruction).</p>	Unknown without specifying materials, applications, and quantities.	ONGOING	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. The primary focus for this year is on large, multi-departmental contracts, centered on furniture, office supplies, janitorial supplies/services, and uniforms.	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 centers 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 in north Austin. Additional drop-off centers will depend on funding.	12.5 FTEs \$1.8 million per year 2nd Drop-Off Center, in FY20: 4 FTEs; ~\$600K for expenses	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 Shop Zero Waste initiative promotes more than 80 local repair businesses. Austin Resource Recovery and Recycled Reads' Fix-It Clinics encourage Austinites to repair items rather than dispose of them.	Shop Zero Waste Marketing: \$5,000/year Fix-It Clinics: \$1,500/year	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's Shop Zero Waste initiative promotes more than 150 local reuse-related businesses. Austin Resource Recovery contracted with the Austin Eco Network to launch an online reuse directory (austinreusedirectory.com). Austin Resource Recovery has a curbside textile recovery service through Simple Recycling. The City of Austin, led by ARR, hosts the annual [RE]Verse Pitch Competition that awards prizes to launch new reuse businesses. Based upon information from a third-party consultant's feasibility analysis and the high cost, ARR recommended in August 2017 that the City not construct the [re]Manufacturing Hub at 10108 FM 812. Staff are exploring alternative economic development opportunities to support recycling and reuse manufacturers. Austin Resource Recovery is undertaking a reuse market research study that will be followed by hiring a consultant to develop and execute a reuse marketing strategy. Austin Resource Recovery is spearheading a pilot initiative to divert material in high student density areas, starting with West Campus, during move-out to reuse organizations.	Shop Zero Waste Marketing: \$5,000/year AMM: Current contract year: \$70,515-\$86,215 (depending on performance) Austin Reuse Directory: \$40,000 for 3 years [Re]Verse Pitch Competition: approx. \$5,000/year event costs; \$20,000 prize funds Reuse Market Research Study: approx. \$2,000 Reuse Marketing Strategy Contract & West Campus Pilot costs: TBD	AMM: 758 MTCO2E avoided since August 2015 (Contractor estimate)	IN DEVELOPMENT	LOW
Reuse / Reduce (RR)-4: The City implements policies to reduce the use of single-use products in addition to carryout bags.	ARR continues to evaluate policies that would reduce the use of single-use products, such as polystyrene foam.	Depends on products to be impacted.	Depends on products.	IN DEVELOPMENT	LOW