Response To:
Paul G. Allen Family Foundation Smart City Challenge

Submitted To:
Vulcan Philanthropy

In Partnership with the City of Austin Submission For:
US Department of Transportation's Funding Opportunity
Notice of Funding Opportunity DTFH6116RA00002
"Beyond Traffic: The Smart City Challenge – Phase 2"

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Vulcan and Paul G. Allen Family Foundation Smart City Challenge
City of Austin Proposal

I. EXECUTIVE SUMMARY

In partnership with PGA Foundation, Vulcan, The Electrification Coalition, and U.S. Department of Transportation, Austin is the ideal place to demonstrate to the nation and the world how electric vehicles can scale quickly, enhance grid reliability, and bring value to owners all while being powered by renewable energy to maximize reductions in greenhouse gas (GHG) emissions.

Significantly reducing GHG emissions in the transportation sector is a critical component of Austin's Smart City transportation program, Climate Protection Plan, Austin Energy Generation Plan, and *the* focus of the Vulcan Smart City Challenge. It is important that transportation electrification does not just transfer GHG inventory to electricity. Austin Energy has a world-class 55% renewable (and approximately 80% carbon free generation) goal but in addition will continue to charge all public, multifamily, workplace, and fleet charging stations with 100% renewable energy from Texas' growing wind and solar resources through its GreenChoice program.

Austin Energy Generation and Climate Protection Leadership

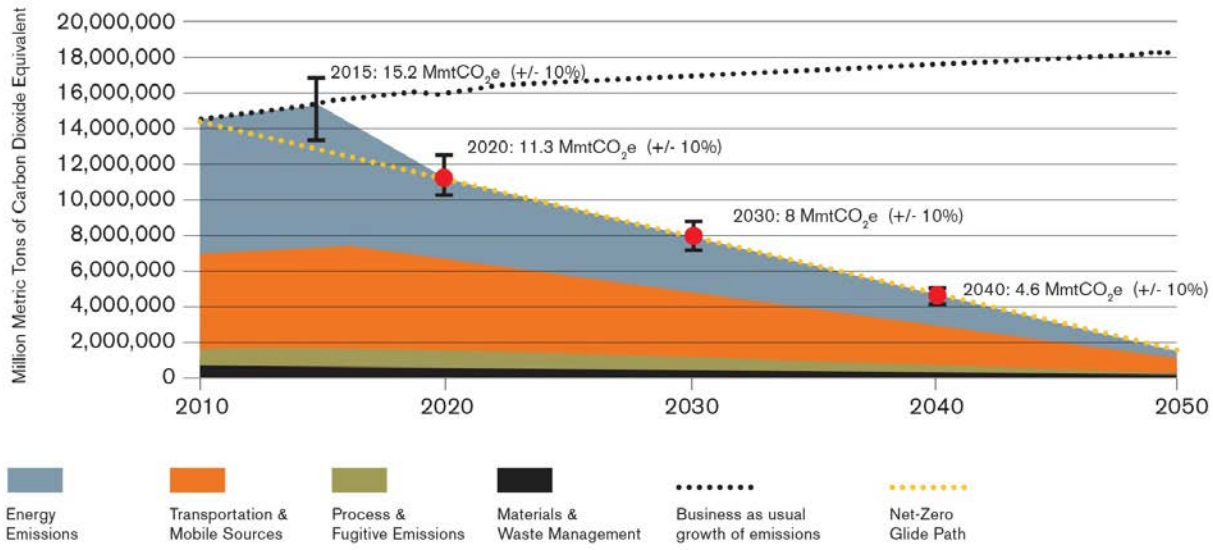
Plan Attribute	2020 Plan	2025 Plan	Improvement	Leadership
% Renewable	35%	55%	71% Increase	Exceeds leading state goals (Hawaii 40%) and top European goals (Germany/Sweden 50%)
Solar	200MW	950MW	375% Increase	If Austin were a state it would rank second behind California
Wind	1,200MW	1575MW	31% Increase	Austin will have 14% share of Texas wind, 3.5x its load share
Demand-Side Management	800MW	900MW	12% Increase	Covers 3 years of peak demand growth
Fossil Fuel	Fleet as is	Retire FPP coal & Decker gas, add 500MW CC	36% decrease	Nearly 80% carbon free
Storage	NA	30MW	NA	Nearly equal to ERCOT's current installed battery storage (34MW)

For the transportation sector to maximize the benefits of Austin's low-carbon grid and 100% renewable charging stations, we must scale electric vehicles miles traveled (eVMT) quickly and aggressively. This combination of accelerated eVMT growth and fossil fuel free energy equates to maximum GHG reductions not just for Austin but for other cities to follow. The business models, strategies, and tactics used will be scalable and repeatable for other cities such that we see massive CO2 reduction from the transportation sector as a whole.

Austin Energy, as a fully integrated utility (generation, transmission, distribution, and customer support) is the nation's 8th largest public power provider and is well positioned to share best practices with other cities and utilities. Community support of climate protection is part of the

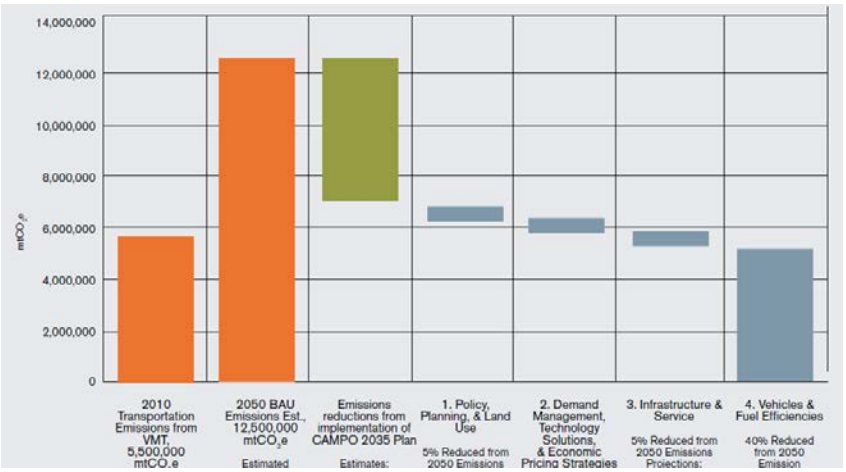
"core DNA" of who we are as a city. In April of 2014, City Council passed Resolution No. 20140410-024 that set the target of net zero community wide emissions from all sources by 2050.

City of Austin Net-Zero by 2050 Goals, By Category



In 2015 City council then passed resolution 20150604-048 which adopted the Net-Zero Austin Community Climate Plan. This plan was developed with the assistance of over 50 community members and outlines actions to reduce emissions from all community sources by over 90% in 35 years. Living in a community that produces zero CO2 emissions is not just a lofty vision but is backed by tangible projects and investments. Major strategies outlined and included in the plan are: infrastructure and service, land use, transportation demand management, policy and planning, vehicles and fuel efficiency, economic and pricing systems, and technology.

Austin Community Climate Plan, Transportation Sector, 2050 Zero Emissions Scenario



In addition to climate protection, this program will improve air quality and keep millions of energy dollars in the local economy. Winning the Smart Cities Challenge will be a key "tipping point" project in Austin's trajectory to achieve its vision with support from our partnership with Vulcan, Electrification Coalition, and US Department of Transportation.

With all of their promise, electric vehicles still face a few barriers including higher capital cost for long range EVs, consumer/dealer ambivalence, and lack of electric vehicle service equipment (EVSE) ubiquity. The Vulcan Smart City grant is the perfect opportunity to create innovative projects to remove these barriers.

To execute this proposal, the City of Austin is bringing together a team of government, utility, university, research, non-profit, community, and industry stakeholders to design, deploy, and share best practices from the funding of this program. Specific biographies and project assignments of key staff can be found in Section VI "Leadership Team" and Appendix E "Bios".

To address each of the 5 Vulcan Elements, the City of Austin is proposing a synergetic portfolio of projects to maximize results (see Section V "Metrics").

Table 1: Proposed Project Portfolio & Alignment to the Five Program Elements

Project	Element 1: Decarbonization	Element 2: Fleets	Element 3: Alt Trans	Element 4: Consumer Adopt	Element 5: Infrastructure	Supporting Programs
Integrating Electric Vehicles into the existing DOE SHINES grant	√			√		• 55% Renewables target as part of "Austin Energy Generation and Climate Protection Plan" • DOE/Austin SHINES Project
Electrifying Taxis: Bergstrom Airport Concession Project	√		√		√	• City opportunity to change Taxi regulation and opportunity to electrify airport taxi concession • RMI Program
Electrifying TNC vehicles: Enabling new business models (note will use leveraged funds only)	√		√	√	√	• Austin Energy's "Electric Drive" DCFast public station program • RMI Program
Innovative EV financing	√		√			• Existing city financing programs
Increasing EV sales: Outreach and Incentives	√	√	√	√		• Austin's "Charge Forth" and "electric>gas" campaigns • Austin Energy's dealership outreach
Electrifying the Municipal Fleet	√	√			√	• City resolution on carbon net zero in fleets • City resolution to accelerate the adoption of EVs in the city fleets

Project	Element 1: Decarbonization	Element 2: Fleets	Element 3: Alt Trans	Element 4: Consumer Adopt	Element 5: Infrastructure	Supporting Programs
Learning, Scaling, and Playbook Creation	√			√		• Outreach website and materials
Electric, Autonomous Vehicles	√		√			• DOT/COA Autonomous vehicle project
Program Strategy, Design, Execution, Monitoring, Reporting	√	√	√	√	√	• Smart Cities program management office

Statement of Understanding

In the Unites States, roughly one third of all GHG emissions come from the transportation sector. These emissions are particularly difficult to mitigate due to the fact that in the US alone, we have 250 million vehicles that rely on fossil fuel. Biofuel is a promising solution, but is not technologically or economically ready to be a major factor in the coming years. Hydrogen fuel cells also present interesting possibility, but like biofuel, are still a future scenario.

This leaves cities like Austin with stubborn GHG emissions from transportation, as well as health impacts from tail-pipe pollution in the city core. A critical part of Austin's long-term plan is to become 100% carbon neutral and eliminate emissions from the transportation sector. This is a challenging task, but one that the City is committed to take on aggressively.

The good news is that electric vehicles are here now and the rate of technology advancement is exponentially growing. Every major car manufacturer either has or has plans for a plug-in electric vehicles.

II. STRATEGY TO MAXIMIZE RESULTS

Strategy Part 1: Target high-mileage, best ROI vehicles

The core of Austin's strategy to greatly proliferate electric vehicles and eVMT is to target high mileage, mobility service vehicles. These vehicles include taxis, municipal vehicles, transportation network companies (TNC) vehicles, certain corporate fleet vehicles, and public transit vehicles (including buses). There are four key reasons we are primarily targeting high-mileage, mobility service vehicles:

1. **Replace VMT quickly:** Displacing one high mileage vehicle is the equivalent of replacing up to 10 personally owned vehicles.
2. **Compelling economics to benefit drivers, consumers, and allow scaling:** At high mileage, electric vehicles make pure economic sense over internal combustion vehicles due to lower total cost of ownership (TCO).
3. **High visibility to Austinites and visitors:** Taxis, TNCs, the municipal fleet, and public transit vehicles are highly visible. They give millions of rides combined per year, so when we electrify these fleet vehicles we essentially have created the world's largest EV "ride and drive." In addition, Austin TNC and taxi drivers are very friendly and if properly trained can become EV evangelists to tout the benefits of EVs.
4. **Paved path for rapid scaling of eVMT in Austin and beyond:** Mobility as a Service (MaaS) is growing rapidly and we must ensure that the vehicles providing these services are electric by ramping up infrastructure, friendly policies, and business models in parallel. This will become even more critical as autonomous service vehicles enter the market and "automated MaaS" begins to displace personally owned vehicles.

Our Other Critical Consideration: Driving Consumer EV Adoption

We believe we get the most value for our effort and per grant-dollar by primarily targeting high-mileage fleets. However, personally owned vehicles will still be the primary mobility method of most Austinites for some time and we would be remiss to not engage in high-leverage efforts to enable and increase personal electric vehicle adoption. Therefore, as part of our holistic EV strategy, we also have plans to target personal vehicles as well. This includes outreach, smart infrastructure, direct engagement with auto dealers, and bulk purchases.

Strategy Part 2: Ensure eVMT are low-carbon:

Power EVs with renewable energy

A key element of our plan is to ensure we do not just shift CO2e from transportation to electricity generation. As such, we propose to continue to power all public and fleet stations by Austin Energy's GreenChoice™ program, a green-e certified 100% renewable energy program.

Integrate EVs into existing DOE SHINES grant

To further increase benefits of mass EV adoption, we propose to launch the Vulcan Foundation Residential EV+Solar Grid Integration Pilot to demonstrate the benefits and feasibility of EVs providing value to the electric grid. This will be part of Austin Energy's larger Austin SHINES project. Austin SHINES leverages funding by the US Department of Energy and others to affordably integrate distributed solar and storage into homes, business, and substations.

Use EVs to increase renewable penetration on the entire grid

Austin Energy has a goal of 55% renewables (and approx. 80% zero carbon) by 2025. Increasing renewables mix at these levels is a significant technical challenge due to the non-dispatchable nature of solar and wind. Recently, electricity prices in Texas have gone negative on nights with high wind and moderate temperature. This lack of nighttime demand decreases value to developers considering new wind installations. However, recent analysis by Rocky Mountain Institute indicates that electric vehicles have the potential to create enough off-peak demand to reduce and even eliminate renewable spillage by providing adequate demand at midday (solar) and nighttime (wind). This allows renewable energy to proliferate with consistent value to developers and installers.

Austin's Mueller neighborhood is home to the residential Austin SHINES project, Pecan Street Lab, and touts the largest concentration of residential EVs in the nation.

Many other cities have low renewables penetration and do not face issues yet with renewable generation spillage. But once they begin bringing renewable energy online in a meaningful way, they will be able to look to Austin as an example of how to continue to displace fossil fuels and create a truly sustainable, low carbon grid.

Maximize "smart charging" to support renewable generation

As part of the Smart City project, we will test smart charging and other methods to incentivize off peak charging in order to ensure that EVs benefit a renewable grid and don't add to peak demand. Austin will then relay these methods to other cities with high renewable penetration as a playbook and roadmap to use EVs as grid resources.

Austin's EV360 residential Time of Use EV Rate launched in 2016 and is another item for the playbook on the technical and business model approach in maximizing value of EVs. The current program allows for a $0.0/kWh (zero) variable cost during off peak with a $30/month fixed cost.

<u>Strategy Part 3: Scaling solutions to maximize impact</u>

Austin is developing a comprehensive scaling strategy characterized by:

1. Development of a roadmap and playbook for other cities to follow based on lessons learned from the program
2. Deployment and vetting of new financing and business models to allow the private sector to proliferate EVs rapidly
3. Collaboration with other cities through a city liaison program
4. Engage local auto dealers and their sales staff

III. **ALIGNMENT TO PROGRAM ELEMENTS**

Element 1: Electricity Supply Decarbonization

Specific Supporting Projects (See Section IV: Implementation):

Integrating Electric Vehicles into the existing DOE SHINES grant
Electrifying Taxis: Bergstrom Airport Concession Project
Electrifying TNC vehicles: Enabling new business models
Innovative EV financing
Increasing EV sales: Outreach and Incentives
Electrifying the Municipal Fleet
Learning, Scaling, and Playbook Creation
Electric, Autonomous Vehicles
Program Strategy, Design, Execution, Monitoring, Reporting

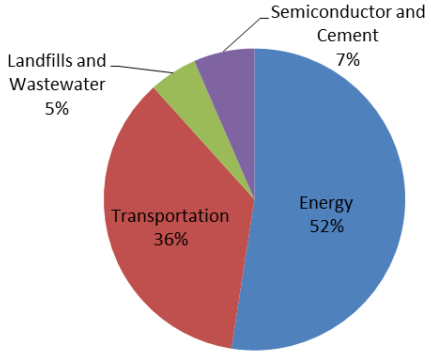
With high concentrations of intermittent renewable energy, energy storage is key component of maintaining grid reliability in the near future. EVs are one of the key energy storage technologies that will pave the way to a 100% renewable future.

Austin is a leading city for grid decarbonization. However, we are starting to face new challenges of high renewable penetration. For instance, Texas produces so much wind power that energy prices can go negative at night due to high wind and low energy demand. Negative energy prices can discourage additional renewable projects, which is a barrier to achieving 80% and beyond renewable energy. We see the Vulcan Smart City grant as a critical catalyst to use electric vehicles to "crack the code" of intermittent renewable generation. We have the political will, technical capability, and a parent project that aligns well with this proposal. All that is missing is the funding and catalyst that the Smart City grant will provide to launch the "Integrating EVs into the SHINES grant" project.

Austin Energy's Webberville Solar Farm east of Austin.

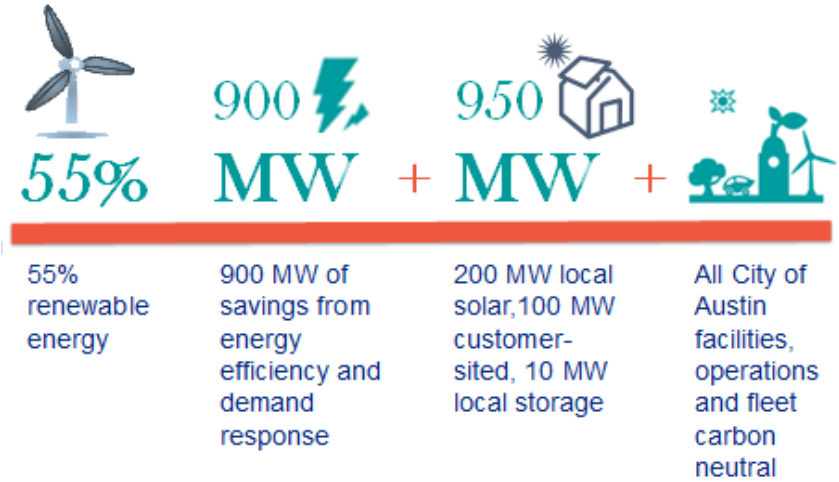
In April of 2014, City Council passed Resolution No. 20140410-024 that set the target of net zero community wide emissions from all sources by 2050, or sooner if feasible. In 2015 City council then passed resolution 20150604-048 which adopted the Net-Zero Austin Community Climate Plan.

Travis County Greenhouse Gas Inventory
(2012 15.2M metric tons CO2e)



Austin Energy has one of the most aggressive renewable energy commitments of any major utility in the U.S. and is well underway to achieve its 55% renewable energy goal by 2025 mostly from expanding wind and solar resources but also includes CO2e reduction strategies via demand response, energy efficiency, and local storage goals. Details of this comprehensive plan are online: http://austinenergy.com/wps/wcm/connect/461827d4-e46e-4ba8-acf5-e8b0716261de/aeResourceGenerationClimateProtectionPlan2025.pdf?MOD=AJPERES

Austin Energy's 2025 Climate Protection & Generation Goals



Austin Energy with leadership from City Council & City Management is on the forefront of new technologies and programs to advance a renewable energy future. This is demonstrated by its SHINES project to integrate solar and storage, Plug-in EVerywhere Electric Vehicle program, Central Texas Fuel Independence Project, The Texas River Cities Initiative, GreenChoice renewable energy program, and its 25th year of Green Building.

Element 2. Fleet Electrification

Specific Supporting Projects (See Section IV: Implementation):

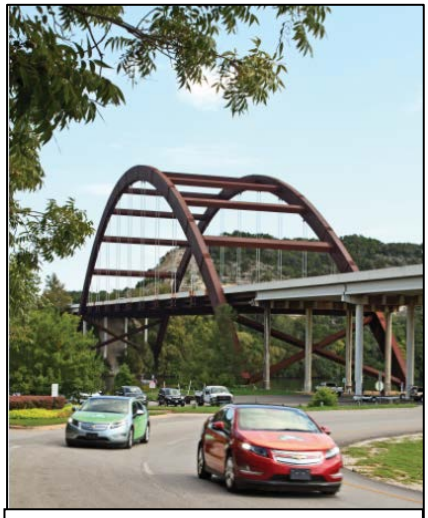
Electrifying Taxis: Bergstrom Airport Concession Project
Electrifying TNC vehicles: Enabling new business models
Increasing EV sales: Outreach and Incentives

Electrifying the Municipal Fleet
Program Strategy, Design, Execution, Monitoring, Reporting

Electrifying Municipal & Corporate Fleets

City council passed a resolution on May 5, 2016 to "The City Manager is directed to work with Rocky Mountain Institute, Vulcan, Inc., and Electrification Coalition on an assessment to determine the benefits, timeline, and feasibility of increasing electric vehicle adoption into the City's Fleet Services vehicles". With help from Electrification Coalition, the city will create tactics and strategies to electrify the municipal vehicle fleet. Significant infrastructure and fleet purchases will be 100% funded by City of Austin budgets.

Current status: The City of Austin has a target of carbon neutral municipal operations by 2020. More than 50% of those emissions have been eliminated through the purchase of 100% renewable electricity for all city buildings and facilities. The largest remaining emission source is our vehicle fleet which includes over 6,200 units, of which 4,100 are on-road vehicles.



City electric vehicles next to Austin's "360 Bridge".

Since 2012, Fleet Services and the Office of Sustainability have planned, coordinated, and implemented "The Carbon Neutral Fleet Plan" which proposes to purchased alternative fuel or hybrid vehicles, maximize the use of alternative fuels in vehicles, and train city staff on driving and operating vehicles properly and efficiently. In 2012, very few plug in or battery electric vehicles were available, and the city has focused on alternative fuels. Currently, 75% of city vehicles are alternative fuel or hybrid, and use E85 ethanol, biodiesel, propane, or compressed natural gas. In the past few years, the landscape of plug-in hybrid and battery electric vehicles has changed rapidly, thus a perfect opportunity to adopt EVs

Barrier Mitigation Plan: From the technology side, we are confident that the vehicle choices offered by manufacturers will evolve quickly and larger, off-road, and pickup vehicles will be offered with plug-in options soon. For training, we need city council direction and city management support. This can be achieved and the benefits are easily sold, as we are reducing emissions and saving money. Finally, charging infrastructure is going to come at a cost, but Austin Energy can assist with rebates and incentives, as well as the pursuit of emission reduction grants from the State and Federal agencies. In addition, the City of Austin will commit funding to install charging for the municipal fleet.

Electrifying Taxis

The City of Austin plans to use its authority at the airport to make taxi ground transport a concession. This means that any company can bid to be the taxi provider, but must follow the concession rules as determined by the city. If awarded the grant, we will execute Project #2, "Electrifying Taxis" and require that a certain portion of the taxi vehicles be electric. The vision is to start with 25% and ramp up to 90% over the grant period. The remaining 10% will be converted when a long-range, ADA compliant vehicle becomes available.

Barriers and mitigation plan

1. Lack of incentives and forcing mechanisms to change status quo. Lack of incentives and forcing mechanisms to change status quo and "split incentive". While many taxi companies have been jolted into action by the recent TNC disruption, they still lack the "carrots and sticks" to disrupt their own business enough to deploy electric vehicles in mass. Currently, most taxi companies have a "split incentive" whereby the company licenses its brand and service, but the drivers pay for fuel. This means that taxi companies do not see the reward of lower fuel cost that EVs provide, so they do not have sufficient motivation. Drivers would reap the fuel saving benefit, but often lack the awareness, capital, and/or credit to procure an EV.

   Mitigation: Through a taxi concession, the city will mandate that all airport taxis are electric. This will require the taxi companies to modify their business model to procure and deploy electric taxis..

2. Taxi Driver/Taxi company lack of awareness of EV value proposition. If awarded the grant, we will fund outreach to the taxi companies and their drivers to provide information, training, and tools to procure and operate EVs.
3. Limited range of lower cost EVs + burgeoning charge infrastructure. Vehicles like Nissan LEAF are quite affordable today. The main issue preventing them from being ideal taxis is that a taxi drives 150 or more miles per day, and even the latest LEAF has a range of 113 miles. This means that to successfully deploy lower range EVs as high-mileage service vehicles we need to provide adequate and strategically located DCFast-charge stations.

   Mitigation: If awarded the grant, we will deploy strategically located DCFast charging stations. In addition, we will create a methodology to optimally deploy the infrastructure so that other cities can replicate and scale what we have done.

4. Higher capital cost of long range EVs. Ubiquity of fast charge infrastructure becomes less of an issue when the EV has a 200 mile or greater range since this is more mileage than even a typical high-use taxi drives in a day. However, even the lowest cost used Model S is $50,000 and the new Chevy Bolt will cost $37,500 (before incentives). For companies used to procuring large number of gasoline vehicles for $15,000 or less, the jump in capital cost is hard to mitigate.

   Mitigation: One of our major efforts if awarded the grant will be Project #4, "Innovative EV Financing" to create a financing program for high-mileage EVs like taxis and buses. Analysis by Rocky Mountain Institute indicates that a $37,500 cost EV (even with no tax incentives and $2.50/gal gasoline) will save the average Austin taxi driver thousands of dollars TCO due to lower fuel cost. The city will loan the taxi companies money for the batteries and the company will pay the city monthly at a cost significantly lower than the avoided gasoline cost. The city will make a reasonable return on its investment and taxi drivers and companies will save money and reduce risk.

5. New Vehicle availability. This year, GM will introduce the first "lower-cost" long range EV, The Chevy Bolt. We are partnering with GM to ensure that Austin has access to some of the first Bolts that come off the production line.

Element 3: Transit, Autonomous and Multimodal Systems in the City (Alternative Transportation and Public Transportation Electrification)

Specific Supporting Projects (See Section IV: Implementation):

Electrifying Taxis: Bergstrom Airport Concession Project
Electrifying TNC vehicles: Enabling new business models
Innovative EV financing
Increasing EV sales: Outreach and Incentives
Electric, Autonomous Vehicles
Program Strategy, Design, Execution, Monitoring, Reporting

Bus Electrification

Capital Metropolitan Transportation Authority (CMTA) is aggressively exploring electric bus options and has pursued funding through Texas Emission Reduction Program grants and through this year's No-Lo Emission Bus funding. CMTA has partnered with Austin Energy, UT-Austin and UT- San Antonio to analyze the implementation of an electric bus fleet and has worked with providers to demonstrate the technology. CMTA is proposing the conversion of a major route connecting the Austin-Bergstrom Airport with downtown and the UT Campus to an all-electric, high frequency route. Initial total cost analysis shows that this option is very favorable compared to current traditional diesel units. In addition, we will partner with OEMs like BYD with a plan to automate the busses.

Barriers

- Higher initial cost of electric bus. Adapting procurement policies and funding options to include total cost of operating / life-cycle cost in decision making.
- Operator and maintenance staff training.
- Energy/battery storage to avoid peak grid energy use and highest energy costs.
- Miles per charge and assuring that buses can maintain charge during all expected route conditions.
- Battery disposal costs and replacement.
- Assuring grid infrastructure and charging infrastructure at maintenance yard can support ramp up and full electrification.

Electric Buses Barrier Reduction: Capital Metro will purchase between 8 and 16 electric buses at an approximate premium of $300,000 per bus for electric powertrain versus diesel. The City of Austin will loan Capital Metro $300,000 per bus to cover the additional capital cost of an electric powertrain at an approximate interest rate of 3% for 12 years (the warranty life of the buses). Vulcan funds will be used as a "backstop" to de-risk the investment for the city. Additionally, Cap Metro participated as a recipient of the US DOE / Austin Energy "Central Texas Fuel Independence" grant to do a full electric bus analysis and business case.

Electrifying TNC Vehicles

In Austin, we estimate that there are over 2,000 high-mileage (>30,000 mi/yr) TNC vehicles. Since electric vehicles have lower TCO than gasoline vehicles at this mileage, there is a clear business opportunity for an innovative company to match high-mileage drivers with EVs. The challenge is aggregating a dis-aggregated TNC fleet.

A key part of our strategy is to enable innovative new business that pair TNC drivers with EVs. Los Angeles based start-up Evercar has created a unique business model that solves this challenge and capitalizes and the TCO advantage of high-mileage EVs. They currently rent BEVs to TNC drivers for a flat fee of $5/hr, which covers vehicle, fuel, insurance, maintenance, and cleaning.

Austin will partner with Evercar to bring their business to Austin and scale it quickly. Evercar will bring 100 vehicles and their software+telematics system, and the city will provide parking and EVSE support the Mobility Centers described in detail in the DoT application. The infrastructure created and lessons learned from our Evercar partnership will also open the door for the robust start-up community in Austin to launch additional electric mobility businesses with a greater chance for success. We will partner with Austin Technology Incubator (ATI) to enable entrepreneurs to launch new businesses that provide efficient, low cost, electric mobility services.

Risk Mitigation

TNC availability: Recently, Uber and Lyft paused operation in Austin due to a public vote result that confirmed voters' desire for TNC drivers to be fingerprinted and adhere to other existing laws. This has caused a temporary disruption to travelers who use TNCs as well as to TNC drivers. However, our mitigation plan is quite exciting. First, Austin is enabling the launch and scaling of other TNCs like GetMe, Fare, Arcade City, Fasten, Wingz, and others. Though not as prolific as Uber and Lyft, these new TNCs have different business models that can now compete in a much more open market than in cities dominated by Uber and Lyft.

In addition, On May 23rd, entrepreneurs from Austin's "Silicon Hills" announced a very exciting new business that has the possibility to reshape the TNC market. Already funded with over $4million and leadership to include Joe Liemandt, the founder of Austin-based software company Trilogy, this could truly be the next generation in ride-hailing services. The concept is a non-profit TNC that works in *partnership* with cities to provide mobility at a low price and a fair wage for drivers. Named "RideAustin," the company will share all data, adhere to all regulations and laws, and become an integral part of the city. This is a new concept that highlights the innovative and robust nature of Austin.

Barriers and mitigation:

1. Lack of fleet aggregation: TNC vehicles make prime candidates for electrification, but targeting the owners of these vehicles is difficult because they aren't explicitly identified and are diffuse individuals.

   Mitigation: We are partnering with new businesses that aggregate vehicles and provide them to TNC drivers like Evercar. We will provide charging for these new businesses so they can launch and flourish.
2. TNC drivers' lack of awareness of EV value proposition. If awarded the grant, we will fund outreach to the TNC drivers to provide information, training, and tools get them interested in driving an EV.
3. Limited range of lower cost EVs and burgeoning charge infrastructure. Vehicles like Nissan LEAF are quite affordable today. The main issue preventing them being ideal

TNCs is that many drivers drive 150 or more miles per day, and even the latest LEAF has a range of 113 miles.

Mitigation: If awarded the grant, we will do just this – deploy strategically located DC fast charging stations. In addition, we will create a methodology to optimally deploy the infrastructure so that other cities can copy what we have done.

4. Higher capital cost of long range EVs. Ubiquity of fast charge infrastructure becomes less of an issue when the EV has a 200 mile or greater range since this is more mileage than even a typical high-use taxi drives in a day.

   Mitigation: One of our major efforts if awarded is "Innovative EV Financing" to create a financing program for high-mileage EVs.

5. Vehicle availability. This year, GM will introduce the first "lower-cost" long range EV, the Chevy Bolt. We are partnering with GM to ensure that Austin has access to some of the first Bolts that come off the production line.

Autonomous and Packaged Mobility

Though not the core focus of Austin's Vulcan grant program, Autonomous and Packaged Mobility services are key elements of our holistic DoT SCC program. However, we are requesting supporting Vulcan funds to sync with a larger DOT funded program to incorporate EVs into Autonomous and Packaged Mobility solutions.

Autonomous Mobility Services:

The City of Austin is already home to some of the most advanced electric, autonomous mobility testing. Google X chose Austin as its second city, after its home town of Mountainview, to deploy its autonomous vehicles. The city has a commitment from Google X to collaborate on consumer-facing mobility service pilots in Austin as part of the SCC.

Element 4: Driving Consumer adoption (Education & Outreach programs)

Specific Supporting Projects (See Section IV: Implementation):

Integrating Electric Vehicles into the existing DOE SHINES grant
Electrifying TNC vehicles: Enabling new business models
Increasing EV sales: Outreach and Incentives
Learning, Scaling, and Playbook Creation
Program Strategy, Design, Execution, Monitoring, Reporting

If selected for the smart cities grant, Austin will evolve and expand the existing campaign into more markets to help drive growth of EVs. In 2012, Austin Energy launched a community awareness campaign for Plug-in Electric Vehicles called "ChargeForth". This award-winning campaign has provided information and benefits of electric vehicle ownership and leverages customer testimonials. To maximize consumer adoption we look to leverage the following:

- Austin Energy Plug-in EVerywhere $4.17/month unlimited public charging
- Plug-in EVerywhere backed by 100% GreenChoice renewable energy program
- Auto dealer program
- Stakeholder groups to include the Central Texas Fuel Independence Board Members
- Multifamily charging program
- Electric Drive – sustainable transportation demonstration/street

- Home rebates (50%/$1,500) for level 2 hardware and installation
- Residential Time of Use "EV360" rate; includes zero variable cost for charging off peak

Austin Energy has also aggressively deployed charging infrastructure in support of local adoption of EVs. In 2011-2012 Austin Energy deployed 112 Level-2 public charging stations as part of the ChargePoint America grant. Today there are over 250 charging stations managed by Austin Energy to include the new deployments of several DCFast stations. This deployment has not only provided convenient public chargers for current EV drivers, but also acts as a showpiece that makes potential EV drivers aware of the availability and ease of charging infrastructure.

Austin Energy actively participates in community outreach and engagement at various events and venues throughout the city to promote electric transportation. These events are used to engage the community and other entities about the ease and cost savings of driving electric, as well as the local programs that we have available for EV drivers. Some of the venues and events that AE has participated in are: The Austin Auto Show, National Drive Electric Week, The Austin Apartment Association, City of Austin Health Fair, Austin Public Library events, Earth Day events, SXSW Eco, among many others.

Element 5: Charging infrastructure

Specific Supporting Projects (See Section IV: Implementation):

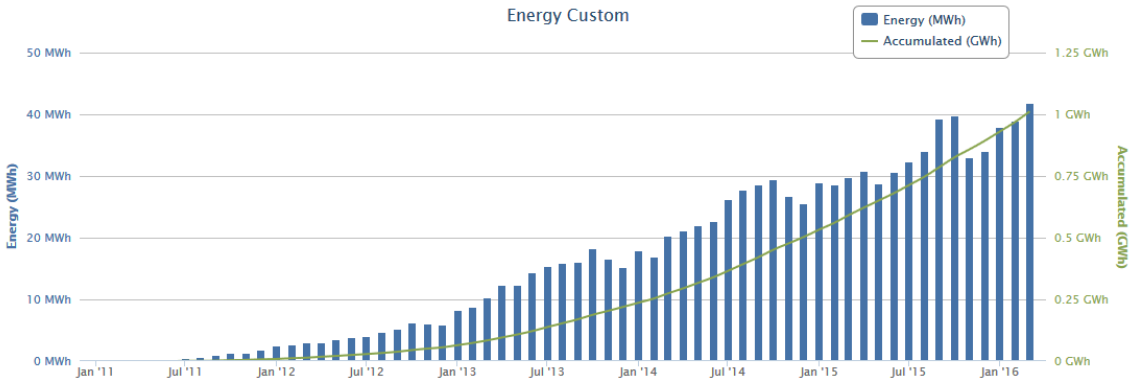
Electrifying Taxis: Bergstrom Airport Concession Project
Electrifying TNC vehicles: Enabling new business models
Electrifying the Municipal Fleet
Program Strategy, Design, Execution, Monitoring, Reporting

Austin Energy has over 250 EV charging stations at retail, workplace, multifamily, and fleet location throughout the city of Austin. Customers have access to unlimited electric "fill-ups" to stations in the Plug-In EVerywhere™ network for a flat fee of $4.17 per month. Since inception in 2011, this public network of stations has delivered over 1 GWh (approximately 3 Million vehicle miles travelled) of clean, renewable energy, powered by Austin Energy's GreenChoice™ program.

This low cost, fixed-fee price simplifies and improves the business case for driving electric for personal, taxi, and fleet transportation. Of the 250+ public charging stations available, nearly half of them also have a level 1 charging port (110v) to allow electric bicycles, motorcycles, and scooters to recharge.

Most of these 250 stations are level 2 but there has been a roll-out of 3 DCFast stations with 8 more planned in the next 24 months. However, as part the SCC program, we need to rapidly accelerate DCFast infrastructure to support taxi fleet operations.

Energy Usage – Plug-in EVerywhere Network (Monthly)



1.012 GWh consumed through 147,575 charging sessions since program inception.

Austin Energy offers a 50% rebate (up to $4,500) for public charging installations at workplace, retail, and multifamily locations. There is also a utility rebate for electric bikes, scooters, and motorcycles to promote additional options to driving electric.

Important Considerations: Land Use Codes

Objectives, tasks, deliverables, timeline, metrics, and milestones. The City of Austin is currently updating its land development code for the first time in thirty years. Called CodeNext, this effort is a priority program of Imagine Austin, a comprehensive plan for the future of Austin, which was adopted by City Council in 2012. In addition to significant land use changes, CodeNext will establish development policies that can facilitate significant growth in the electric vehicle market. The City of Austin looks to incorporate codes that require buildings and parking spaces to pre-wire for or install electric vehicle charging infrastructure.

Barriers and Risks. As with any significant change to zoning and land development code, we anticipate some degree of inertia. The code will take nearly two years to finalize and full implementation is not a certainty.

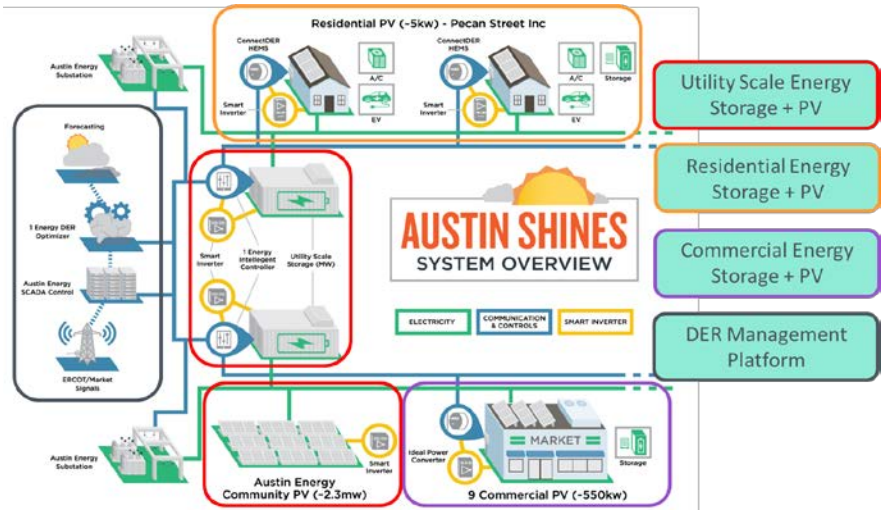
IV. IMPLEMENTATION: PROJECTS

With a clear vision and strategy established, Austin is proposing a portfolio of interrelated projects that have both immediate C02 reduction and long-term impact on eVMT. Vulcan Smart City Funding will be the key enabler while heavily leveraging city, state, federal, and industry funding and resources to ensure maximum impact of the critical Vulcan funding and a diverse, collaborative effort.

1. Integrating Electric Vehicles into the existing DOE SHINES Project.

Leverage Vulcan funding to incorporate EVs in an existing Austin Energy/DOE funded program, Austin SHINES, to investigate potential for EVs to provide grid services and mitigate the variability of renewable energy generation. SHINES is a 39 month project that started Feb 1, 2016 and works well with a proposed 3 year Smart Cities Challenge timeline. Austin Energy's partners include The University of Texas Pecan Street Research and the US Department of Energy Sunshot/SHINES program.

Austin Energy SHINES Project Conceptual Architecture



Austin SHINES will integrate PV Solar, battery storage, and smart controls at residential, commercial, and grid scale. Adding EVs to the residential storage solution is an incredible opportunity to leverage two key technologies; PV Solar and residential-scale energy storage. Key components of the Austin SHINES project includes:

- Open standards based Distributed Energy Resource (DER) management platform
- Includes the integration and optimization of DERs at the utility distribution level
- Enables diverse strategies/business models for both utility and customer owned resources; to include direct, third-party, and autonomous resource management of DERs
- Integrates 4 MW of distributed PV, more than 3 MW of distributed energy storage, 31 smart inverters and includes more than 700 PV customers
- With support from the Vulcan/DOT grant we propose to expand the residential storage solution to include EV as a storage asset

As part of the project, the team will leverage existing assets from the Mueller neighborhood, Pecan Street's lab, and the SHINES project such as high penetrations of rooftop solar, electric vehicles, and residential energy storage. Pecan Street will acquire commercially available V2G equipment and install it in their lab and in one or two homes that are connected to heavily monitored distribution transformers and substations in Mueller. Initial steps will be to develop control algorithms and evaluate equipment performance at the Pecan Street Lab isolated from the utility grid to ensure hardware/software effectiveness. The proven systems will then be deployed to residential structures in the Mueller neighborhood.

Since SHINES partners already monitor grid assets, PV array production, disaggregated home energy use, energy storage charging/discharging, and EV charging, they will be able to conduct a comprehensive before-and-after comparison of how V2G impacts the distribution system and the homeowners lifestyle.

The goal is a sustainable business model that allows consumers to share in the value proposition of using an EV beyond just transportation thus driving EV sales. Business cases for the utility and grid operator are also validated to demonstrate a "win-win" business model that can be replicated in other energy markets. High EV adoption has tremendous potential as a distributed storage asset that could eliminate renewable spillage/shortfalls and help make technically feasible an 80-100% renewable grid.

2. Electrifying Taxis: Bergstrom Airport Concession Project

The City of Austin is in the process of deregulating the taxi industry and turning airport taxi service into a concession whereby taxi companies will bid to become the sole airport taxi provider. In return for the concession, the city can dictate certain parameters of the service, including vehicle type.

If awarded the Smart City grant, Austin proposes to require that all taxis operating as part of the airport concession will be required to be electric vehicles. This is an extremely aggressive and impactful move that will convert 300 high-mileage gasoline vehicles into electric vehicles in less than 3 years.

We face several barriers to implementation including refueling time and EVSE ubiquity, vehicle range, vehicle capital cost, and availability of new EVs like Chevy Bolt. We have a solid plan to mitigate these barriers. We will partner with ChargePoint to deploy their latest fast charging technology at the airport. Their new system can charge dozens of taxis simultaneously at powers up 10x150kW, which is 3 times faster than most "fast chargers" on the market today thus reducing one of the last key barriers to high mileage vehicle adoption.

ChargePoint will provide up to 20 ChargePoint Express (CPE) 1500 Power Port dispensers. CPE1500 is a next-generation, DC charging solution which provides a scalable fast charging solution that will support today's cars and future cars with higher charge rates. Today's EVs typically max out when charging at 50kW power level; however, EVs with 100kW charging rates are anticipated to dominate the market in years to come. As EVs with 100kW charging rates and above proliferate, the CPE1500 will easily steer power to maximize each EV's

maximum charging rate, providing a future proof and scalable system. Power sharing capabilities further enable full utilization of electrical capacity, increasing throughput at the lowest cost.

In addition, we will provide the taxi company with financing to aid in the procurement of electric vehicles. In addition, we will partner with General Motors to procure 100 of the first Chevy Bolts produced.

3. Electrifying TNC Vehicles Project: Enabling new business models

Transportation Network Companies (TNCs) like Uber and many others deploy thousands of vehicles on their networks in Austin alone. Many of these vehicles drive similar mileage to taxis, so many times as many miles per year than a typical vehicle.

Electric vehicles make pure economic sense for many TNC vehicle usage cases. Innovative companies have begun taking advantage of this economic advantage by procuring electric vehicles and making them available to rent by TNC drivers. This aggregates the once disaggregated TNC fleet and allows drivers without personal vehicles to participate in the on-demand economy. We will use a portion of the grant funding to enable these new businesses to launch and thrive in Austin and scale to other US and global cities quickly. This includes providing DC fast and overnight L2 EVSE as well as providing depot space to rent in our Smart Stations.

We face several barriers to implementation including integration of a disaggregated fleet, refueling time and EVSE ubiquity, vehicle range, vehicle capital cost, and availability of new EVs like Chevy Bolt. We have a solid plan to mitigate these barriers. We will partner with Evercar, a company that rents EVs to TNC drivers for $5 per hour currently operating in Los Angeles, to enable their business model to launch and flourish in Austin. Evercar solves two of our barriers by aggregating a fleet of TNC vehicles and purchasing the EVs to mitigate capital cost barriers to drivers.

As with the taxis, we will partner with ChargePoint and GM to provide advanced EVSE and access to long-range electric vehicles respectively.

ChargePoint and Austin Energy have been partners since January 2011 when the first ChargePoint station (then known as Coulomb Technologies) was installed as part of a US Department of Energy ChargePoint America grant. ChargePoint has a full portfolio of charging station options and services to support smart city programs including: residential, multi family, commercial, fleet, DCFC and services like load control, fifteen minute interval data, and driver tools like wait list and digital mapping.

A key barrier to be addressed in any networking infrastructure includes a consistent customer experience and efficient back-office administration. Having the ChargePoint standard for Austin area charging infrastructure addresses both barriers and have been working well since the Plug-in EVerywhere rollout in 2011.

The ChargePoint network is an integral part of the Austin Energy Plug-In Everywhere Program and connects over 2,400 ChargePoint drivers to the Austin Energy stations. The ChargePoint Mobile App allows drivers to see in real time which stations are available to use as well as allows them to start charging sessions and receive important notifications. Drivers have additional tools provided by ChargePoint including a 24x7x365 call center, detailed reports on charging use and individual carbon footprint reductions.

ChargePoint provides usage reports to help site hosts and Austin Energy manage their network in many ways—including visibility in to GHG savings, energy usage, unique drivers, utilization, session length and other key performance metrics and reports.

Ultimately the goal is for a completely open standard to encourage innovation, maximize efficiency, and provide an excellent customer experience across all networks. ChargePoint network uses NEMA open standards for internetwork roaming protocols with a goal to use one credential to access all charging networks. ChargePoint chairs ROEV, an industry trade organization committed to accelerating EV adoption by promoting open standards related to interoperability across networks and charging infrastructure. Additional protocols and industry standards supported by ChargePoint include OpenADR 2.0 for cloud to cloud communications that is used primarily by utilities for load control including Demand Response (DR). ChargePoint continues to lead open standards discussion at the national level and participate in global discussions for standards related to EV charging infrastructure.

Important Note on TNCs in Austin: While Uber and Lyft have paused service in Austin, we have several other local TNCs including Texas' own GetMe and new entrants Fare and Wingz. We are working hard to get Uber and Lyft to return, but have others to fill the void as needed and help drive innovation.

4. Innovative EV Financing Program

The City of Austin proposes to create a financing program for electric vehicles that uses city funds backed by Vulcan grant funding to mitigate the increased capital cost EVs and ultimately pay back economically due to the lower operating cost of EVs. Essentially, the city will "pay for the batteries" in the EVs such that fleet operators can buy an EV for the same cost as a gasoline or diesel vehicle and then "pay rent" on the batteries to the city. This "rent" will be lower than what they previously paid for gasoline or diesel, so the operators save money and the city makes a reasonable rate of return on its loan. If successful, this will give other cities a precedent to electrify high mileage vehicles.

Electric Buses: Capital Metro will purchase between 8 and 16 electric buses at an approximate premium of $300,000 per bus for electric powertrain versus diesel. The City of Austin will loan Capital Metro $300,000 per bus to cover the additional capital cost of an electric powertrain at an approximate interest rate of 3% for 12 years (the warrantee life of the buses). Capital Metro will then owe the city $357,604 per bus, to be repaid monthly over 12 years, or $2483 per month. The city will make a reasonable 3% return and Capital Metro will actually save money versus a diesel bus as the diesel cost per bus would be $2610 per month at EIA's projected diesel cost of $2.90/gallon and electric fuel will cost just $4.17 per month due to Austin Energy's Plugin Everywhere program. Vulcan funds will be used as a "backstop" to de-risk the investment for the

city and provide downside protection in the event of low diesel price, OEM bankruptcy, or other unforeseeable downsides.

Taxis: The taxi company that is awarded the Airport concession will be required to upgrade its fleet of 300 vehicles to be fully electric. Each vehicle will cost roughly $20,000 each more than a comparable gasoline sedan. The city will loan the taxi company $20,000 per vehicle at an approximate interest rate of 3% for 4 years (the low end of Taxi service life). The taxi company will pay the city $443 per month "for the battery" while saving $520 per month in avoided gasoline cost ($2.50 per gallon). Electric fuel will cost just $4.17 per month due to Austin Energy's Plugin Everywhere program. Vulcan funds will be used as a "backstop" to de-risk the investment for the city and provide downside protection in the event of low gasoline price, OEM bankruptcy, or other unforeseeable downsides.

Electric, Automated Transit. As part of our Smart Corridor project with US DOT, we will deploy electric buses in partnership with BYD. BYD has committed to working with Capital Metro to automate the buses during the grant period. This is very exciting as this would be the first deployment of this kind in the world. Creative EV financing developed as part of the Vulcan grant will be a key enabler of this being a sustainable business model for other public bus fleets.

5. Increasing EV Sales Project: Outreach and Incentives

This is a multi-pronged strategy to engage various, key stakeholders to increase the adoption of electric vehicles. Specific programs of outreach, incentives, and engagement include:

- Public Awareness Campaign. Expand messaging content, media types, and exposure of Austin Energy's existing and award-winning "Charge Forth" campaign. By exposing more recipients to the core messages developed from multiple interviews and focus groups this will have an overall impact in EV adoption. Since 2011, Austin has seen a 100-200% annual growth rate in EV adoption supported by the "ChargeForth" campaign and affordable/innovative utility programs to include a flat fee of $4.17/month for unlimited fill-ups at public charging stations.
- Auto Dealership Incentives/Outreach. A key barrier is lack of incentives and training for auto dealer sales staff to sell EVs to customers that walk in the door looking to buy a new vehicle. We will help remove this barrier by setting up an incentive program for sales staff for attending training, demonstrating proficiency in EV benefits/programs, and provide incentives to promote EV sales.
- Train TNC/EV Taxi "Ambassadors". A major push of our electrification efforts is to support the purchase and infrastructure of electric vehicles for TNC and Taxi drivers. Training these new EV drivers is an excellent opportunity to host an informed and to scale conversation between drivers and their passengers on the benefits and real-world experiences of driving an EV.
- Industry and Community Outreach. A key partner in industry outreach is the University of Texas Austin Technology Incubator. Specifically, they have agreed to launch a specific transportation incubator vertical. We wish to support this organizational founding to increase the impact of our messaging, host events, leverage their existing network, and help vet the most promising start-ups to participate in this overall effort.

- Fleet Owners: As part of the Vulcan funding, we propose to develop materials and assistance for private, university, and other governmental fleets to go electric. This will include TCO cost analysis support with partnership with the Electrification Coalition as well as promotion in targeted events.

6. Electrifying the Municipal Fleet

In 2007 the City Council adopted Resolution No. 20070215-023 addressing global warming and greenhouse gas emission reduction at the local level. The City Council established the following fleet related goal:

"Making the entire City fleet of vehicles carbon neutral by 2020 through the use of electric power, non-petroleum fuels, new technologies, mitigation, and other measures as necessary, prioritizing the earliest possible conversion to such fuels and technologies and establishing timelines and benchmarks for such" conversions;

The largest remaining emission source is our vehicle fleet which includes over 6,200 units, of which 4,100 are on-road vehicles. These units include police, fire, EMS, waste packers, heavy duty haulers and loader, off road equipment, boats, landscape equipment, and light duty vehicles. Since 2012, Fleet Services and the Office of Sustainability have planned, coordinated, and implemented "The Carbon Neutral Fleet Plan". This plan included a three part strategy that incorporated policies and goals addressing vehicle and equipment purchases fuel purchases, fueling infrastructure development, and driver education.

In 2012, very few plug in or battery electric vehicles were available, and the city has focused on alternative fuels. Currently, over 77% of our vehicles are alternative fuel, PHEV/HEV or EV and use E85 ethanol, biodiesel, propane, or compressed natural gas. We have been very successful at focusing on tested, low cost, and reliable vehicles and fuels while reducing our environmental footprint substantially.

In the past few years, the landscape of plug-in hybrid and battery electric vehicles has changed rapidly allowing the City Fleet access to a wider variety of electric options for the various applications required by our departments. Currently the city has 33 plug-in Prius vehicles and five Ford Focus electric vehicles in operation with hopes of growing this number substantially in the next 3 years with support from the Smart Cities challenge.

With the changing dynamic of the automotive and equipment industry, we must have a framework that allows us the flexibility to capture the pace of market changes and technology to ensure that we maximize our opportunities both environmentally and economically. With such a large and diverse fleet, the City of Austin elected to undergo the rapid fleet assessment (RFA) offered by Electrification Coalition. The assessment revealed many opportunities for electrification of the fleet as well as a launch pad for analyzing other opportunities to expand upon the assessment. Outlined below are the results and our plan to exceed the fleet assessment number of EV vehicles.

Results: The RFA identified 878 vehicles out of 4,214 potential candidates. Of the 878 vehicles identified, 326 were targeted for transition into an electric platform. These vehicles ranged from sedans, SUVs, and minivans with a targeted life of 7 years. Based upon their current usage and application, replacing these units with BEVs and PHEVs would yield the following estimated environmental impact:

Fleet Vehicle Miles Travelled (VMT) Analysis

	old vehicle		New Vehicle		
Annual Impacts	Baseline	PHEV	BEV	TOTAL	% Change
G-VMT	1677195	232439	-	232439	-86%
E- VMT	-	697316	747440	1444756	-
Gasoline (gal)	84423	5534	-	5534	-93%
Electricity (GGE)	-	6578	6556	13135	-
MPGe	19.9	76.8	114	89.8	352%
GHG (MTCO2e)	938	193	131	325	-65%
GHG (g/mile)	559	268	3	271	-52%

The City of Austin Fleet Department reviewed the 878 potential candidates and found an additional 82 vehicles, above and beyond the initial fleet assessment, that due to their service application can be potentially transitioned to an electric model.

Fleet Plug-in EV Opportunity Assessment

Vehicle type	# of Vehicles	Vehicle age (avg)	Annual VMT (avg)	Annual VMT (total)	Lifetime VMT (avg)	TCO (avg)	MPG (avg)	Est. % E-VMT	Est. Electric VMT
PHEV	157	10.6	12397	1946329	110388	0.55	19.6	75%	1459746.8
BEV	251	12.6	8978	747440	71857	0.78	20.2	100%	747440
TOTAL	**408**	11.6	5145	1677195	91122	0.67	19.9		2207186.8

Barriers & Mitigation Plan

Technology and Infrastructure. There are several factors that will impact our ability to achieve this goal. We are limited by the technology available on the market. In addition we have a very large (4100 units) and diverse fleet ranging from sedans to fire trucks. While the market has expanded for light duty applications, finding electric vehicles in the heavy duty cycle continues to pose a challenge as it depends greatly on the auto manufacturers producing these options. Additionally, once an option is found, as with any new technology, we have to ensure that the vehicle can perform without diminishing the service levels to our end customers, the citizens of Austin. Another challenge is the availability of charging infrastructure.

Mitigation to barrier. The City of Austin Fleet has worked with the Electrification Coalition on a Rapid Fleet Assessment (RFA) that identified the best opportunities to maximize

electrification of the Fleet. Based on this assessment our focus over the next three years will be on the light duty portion of the city fleet where options have expanded. The assessment has also identified opportunities to "smart size" the fleet through the removal and or pooling of underutilized vehicles. We will also be looking at opportunities to "right size" vehicles with a focus on conducting a deeper analysis during the approval process for pick-up truck service applications to identify opportunities for conversion to sedans and electrification. The charging infrastructure presents a true real estate challenge. We will look to telematics information and shared service areas to maximize opportunities for vehicles to share charging infrastructure as well as opportunities to share infrastructure with other government agencies and private industries. Additionally, our current replacement process requires analysis of the market for electric and alternative fuel options prior to purchase. We will capture and incorporate heavy duty electrification as it emerges.

Financial. Changing technologies always come at a cost in both time and money. The City's current replacement model focuses on keeping units until they have maximized their useful and economic life. Costs to train technicians and purchase tooling are obvious. There is an underlying cost in downtime and productivity during the initial stages of change. The cost of fueling and charging infrastructure impact our progress along with the premium on new vehicle technologies as they come onto the market. While costs are an important issue, they must be weighed against the benefit of clean air and energy independence, along with the intangible costs of not moving towards this goal, including the cost of non-attainment and related health care cost associated with poor air quality.

Mitigation to barrier. Fleet will be looking at the RFA data to build the case for early replacement of high cost/emission vehicles. Once they are identified we will be exploring cost mitigation strategies including volume purchase dealer incentives, pass through dealer tax rebates, grants (The City of Austin Fleet has a dedicated grant position and has received close to ten million dollars in grant funds for alternative fuel/ hybrid vehicles and infrastructure over the past 8 years) and financing options including municipal leases to expedite conversion.

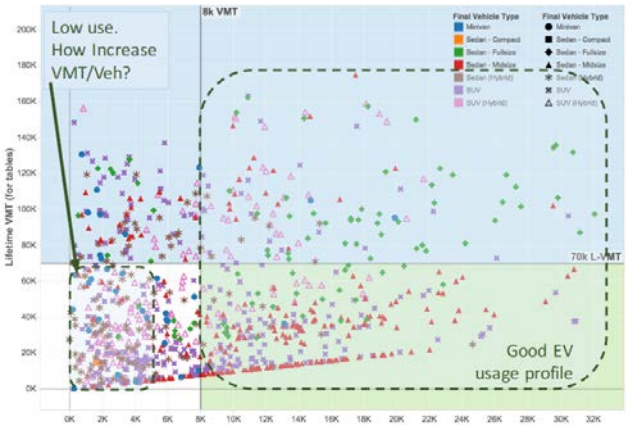
Human. As new vehicle technologies come on to the market there can be varying opinions as to the level of benefit that emission reductions offers. We have a lot of education and training to do, not only with staff that will receive and operate vehicles, supervisors, maintenance staff, and departmental leadership, but with the public who we serve. We must have full buy-in and cooperation for this much change. Managing the need to move forward with these differing options can prove difficult.

Mitigation to barrier. Since the initial resolution was enacted we have had many challenges as well as successes. However, we do not work in isolation. To achieve these goals we enjoy a tremendous amount of support from the City's Sustainability Office as well as customer departments. This support is strengthened by a centralized, highly integrated and collaborative vehicle purchasing process that involves providing cost benefit analysis reports prior to purchases, vehicle operator training, and approval process. Our City Management and Council whose commitment to clean air has remained solid and is reflected in the development of policy and is highly integrated into our city values.

Additionally, the city Fleet Department has a partnership with the local school district to assist in the development of curriculums, provide hands on year round training at the schools as well as paid summer internships to students attending schools located in traditionally

underserved areas of Austin. Since the program started in 2014, Fleet has hired 8 of these graduating students into full time jobs as mechanics with the city. This is an opportunity to engage the community and train these young automotive students on emerging vehicle technologies.

Electrification Coalition Fleet Assessment of City of Austin Fleet



7. Learning, Scaling, and Playbook Development

As part of the grant, Austin will fund and staff a project to monitor, evaluate, report, and record information and lessons from the other projects. This information will be used to evaluate success, report to USDOT and Vulcan, and create a "playbook" for other cities. This project will also serve as a "city liaison" to other US and global cities, both learning best practices and sharing insights from Austin's efforts.

Summary: Under this project, ATI will deploy its expert staff to help develop and execute the innovative technology-to-market process and associated duties. ATI will expand its capacity to include a dedicated Transportation/Mobility industry vertical.

- Promote innovative solutions to transportation/mobility in the entrepreneurship community and generate new startups
- Identify and vet transportation/mobility technology companies
- Leverage the expertise of ATI's 350+ member mentor network
- Design and deploy pilot programs with strategic partners,
- Prepare incubated companies for success in the capital markets

ATI is embedded in both the university and the community. It has longstanding, successful partnerships with both the City of Austin and Austin Energy that have delivered significant ROI for public-sector partners.

First Year Deliverables:

- Form and industry advisory board of leading professionals in transportation, mobility, investors, and relevant public sector institutions and strategic partners.

- Identify and vet companies for incubation in ATI-Transportation. In Year 1, approximately 24 companies (minimum) will be screened, and it is anticipated that at least 3 will formally enter the incubator (ATI's acceptance rate is approximately 8%).
- Scope and launch the beta-grant program to test/demonstrate transportation and mobility technologies in Austin (modeled after existing Austin Energy program)
- Host Transportation/Mobility track of SXSW Eco Startup Showcase (200 applications received overall in 2015)
- Host statewide Cleantech Three Day Startup event (55+ applications received in 2016) with partners in the Southwest Clean Energy Incubation Initiative (SRCEII).
- Create/host transportation/mobility "hackathon" to address specific energy/transportation/mobility challenges identified in the execution of the Smart Cities Challenge grant scope of work to engage the entrepreneurship community in Transportation/Mobility challenges and problem-solving.
- Host a community networking and education event in partnership with the CleanTX Foundation to activate the broader cleantech community in Austin around transportation/fleet electrification and energy use in the transportation sector.

The depth of municipal partnerships in the sector and depth of entrepreneurial talent will attract corporate centers of excellence, R&D, sponsored university research, and relocations, which will reinforce the regional/statewide transportation and mobility cluster.

8. Electric, Autonomous Vehicles

Beyond Google, we are working with other leaders in the space to bring autonomous mobility service into Austin as part of the grant. GM and Lyft just announced that they will deploy automated TNC service next year in their Chevy Bolt vehicle. The city is in talks with them about making Austin a test site as part of the grant.

Other AV leaders like Nissan and Car2Go have also expressed interest in Austin as the initial launch site of their autonomous technology. Winning the Vulcan and DoT grant will help turn Austin into the world's center for electric, autonomous mobility service.

The City of Austin has a very friendly regulatory environment for AVs. Unlike some states, Texas has passed no laws that hinder deployment of fully self-driving vehicles. There are still risks and barriers. For instance, we are working with TxDMV on how to license the "computer system driver" and with TxDOT to handle insurance/info exchange in the event of an accident. In addition, we are working closely with the leaders to ensure safe and optimal deployment of the vehicles. Google, for instance, shared incident data with the city so was can ensure that the vehicles are performing safely.

Packaged Mobility: Please see the full DOT grant for more information, but a key piece of Austin's holistic SCC program is to increase public transit usage, create seamless multi-modal options, and provide citizens with convenient, cost-effective alternatives to personal vehicles ownership.

V. METRICS: METHODS FOR MEASURING IMPACT

All project metrics will be tracked as part of the overall program management approach of this proposal. This includes an annual report supported by an updated "dashboard view" to track progress and to maximize effectiveness.

Success Metrics per Project

Project	Metric	3 Year Goal	3 Year Stretch Goal
Integrating Electric Vehicles into the existing DOE SHINES grant	CO2e / mile	35% reduction in CO2 / mile	50% reduction in CO2 / mile
Electrifying Taxis: Bergstrom Airport Concession Project	# of EVs deployed CO2e Avoided (kt/yr)	500 13	1000 26
Electrifying TNC vehicles: Enabling new business models	# of EVs deployed CO2e Avoided (kt/yr)	300 8	1000 26
Innovative EV financing	#EVs/#Bus financed	300/4	400/10
Increasing EV sales: Outreach and Incentives	Additional EV Sales in Austin due to SCC support	3,000 *see chart below	9,000 *see chart below
Increasing EV sales: Outreach and Incentives Electrifying the Municipal Fleet	CO2e Avoided (kt/yr)	12	36
	# Dealer sales staff trained	100	200
	#TNC/EV Taxi drivers trained "ambassadors"	400	1000
	#Fleets participating in a fleet assessment	5	10
	EVs In the City Fleet CO2e Avoided (kt/yr)	150 65	300 13
Learning, Scaling, and Playbook Creation	Document & measure	Annual report with dashboard	Annual report with dashboard, exceed metrics
Electric, Autonomous Vehicles	Deployment	Successful Deployment	2+ successful deployments "proliferation"
Program Strategy, Design, Execution, Monitoring, Reporting	Project oversight	Manage schedule, cost, and scope/quality	Manage schedule, cost, and scope/quality. No delays or overruns.

Success Beyond The 3-Year Funding Period

Austin will leverage the Vulcan and DoT funding to greatly accelerate incorporation of EVs and eVMT in Austin and produce a roadmap and support for other cities. But the efforts will not stop there. Most of what Austin has proposed in this application will be self-sustaining by 2020 and some programs will finance themselves well beyond the grant term. Our projects are aimed at mitigating and eliminating the specific barriers that are stopping the open market and motivated cities from proliferating electric vehicles at "market pace." Here is how we see the efforts continuing after the grant period:

Using EVs to decarbonize the grid: 10-year Goal: EVs make money by providing grid services. EVs eliminate renewable spillage and enable an 80%+ renewable grid.

By demonstrating that electric vehicles actually help the grid decarbonize, other utilities and cities will copy Austin's lead. The knowledge created from the Vulcan, DOT, DOE, and SHINES program will be invaluable. Decarbonization will perpetuate because renewable energy will be the lowest cost energy (as it is close today in many regions) and the limiting factor of wind and solar variability has been solved, thanks in large part to electric vehicles.

Electrifying Taxis: 10-year Goal: 90% of all taxis in Austin are electric. 50% of taxis in the top 50 US cities are electric by following Austin's playbook

By starting at a place that Austin can influence, the airport, we can ensure a critical mass of EV taxis. The SCC program will allow Austin to figure out financing, EVSE, and other logistics. With these barriers removed, taxis will make the logical financial choice to procure EVs. In turn, we will continue to build out EVSE intelligently even after the grant ends.

Electrifying TNC vehicles: 10-year Goal: 75% of TNC vehicles electric in Austin and 50% in top 50 US cities by following Austin's playbook

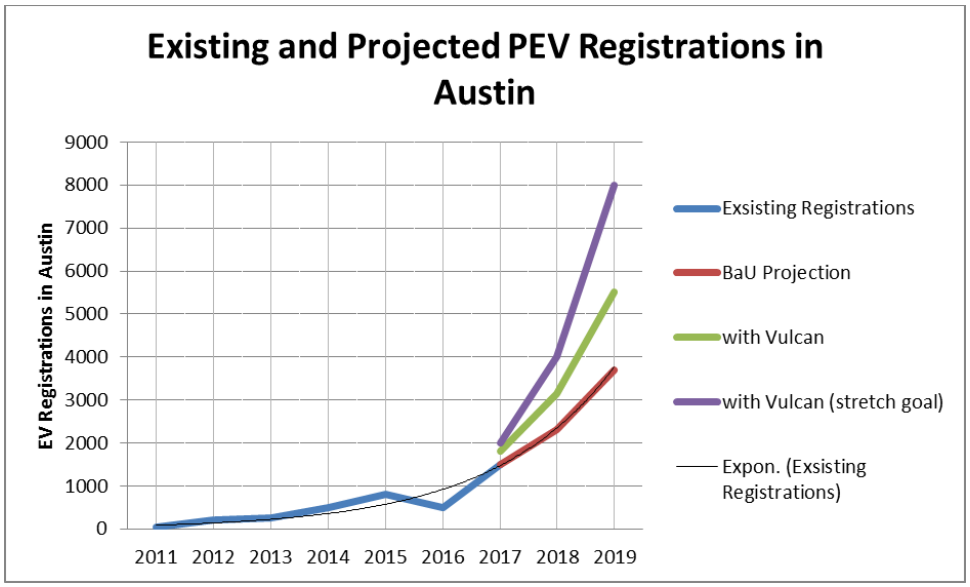
Innovative businesses like Evercar will help pair TNC drivers with EVs. By the end of the grant period, we envision a robust ecosystem of electric mobility companies pairing drivers with EVs. With EVSE barriers removed, we envision most TNC drivers choosing electric vehicles through the mechanism that makes the most sense for their driving habits. As with taxis, we will continue beyond the grant period to ramp up EVSE networks in coordination with increased demand.

Providing Innovative EV Financing: 10-year Goal: Long term TCO advantage of EVs is established. Normal lending takes over for the special program and scales globally.

If successful, our Financing Fund will actually grow and can be used in perpetuity to finance EVs in Austin. In addition, our effort will reduce risk for these types of capital funds, allowing the program to scale and become a mainstream financial product.

Driving Consumer Adoption of Electric Vehicles: 10-year Goal: All EV salespeople and EV taxi/TNC drivers are incented.

By the end of the grant period, many automakers will offer electric vehicles with different range, size and features. Our grant effort is aimed at removing the barrier of education, knowledge, and motivation for both dealers/sales and consumers. If the incentive and education programs are successful, we will continue them beyond the duration of the 3 year grant. The EVSE infrastructure developed for Taxis and TNCs will also aid in consumer adoption



Electrifying the Municipal Fleet: 10-year Goal: 30% of all municipal, 50% of buses, and many corporate fleet vehicles electric.

Cities like Austin are motivated to electrify their fleets, but face procurement, capital cost, market availability, and EVSE challenges. As a results of our project, the city will develop more flexible procurement processes, capital cost and market availability will improve (mostly due to the market, partly due to increased demand from cities like Austin), and the city will have a robust EVSE network. With the barriers removed, the city can continue to replace ICEs with EVs at a rapid pace until the city is 100% EV. The city will also learn and share with corporations, so that their fleets can follow the same trajectory.

VI. LEADERSHIP TEAM & PARTNERING STRATEGY

The core leadership team includes city and named partners with significant experience in delivering the proposed solution. Detailed background and experience of each named member below are included in the bio section of this proposal.

City of Austin Staff & Assigned Projects

- Rob Spillar: Transportation Director, Austin Transportation Department – Overall Program Control, Airport Taxi Concession
- Karl Popham: Manager of Electric Vehicles & Emerging Technologies, Austin Energy - Strategy, SHINES, Outreach, Charging Infrastructure (Taxi, TNC, City Fleet)
- Jennifer Walls: Deputy Fleet Services Officer, Austin Fleet Services – Municipal Fleet
- Rob Borowski: Sustainability Officer, Capital Metropolitan Transportation Authority – electric bus (part of innovative EV financing)
- Zach Baumer: Climate Protection Manager, Austin Sustainability Office – Monitoring, Reports, & Strategy

Named Partners & Assigned Projects

- Jon Walker: Manager of Electric Vehicle Projects, Rocky Mountain Institute – TNC enablement, EV Financing, Learning/Playbook, Electric Autonomous Vehicles
- Bert Haskell: Chief Technology Officer, Pecan Street Inc. – Residential EV Grid Renewables Integration (SHINES)

Partners will be managed by a central Program Management Office (PMO). Letters of commitment have already been received from all named partners to expedite expectations and support of this program. Contracts will be in accordance with city procurement rules to include T&Cs to help manage partner risk and performance. Although there is a lot of opportunity for partnering, initial key partners that assisted with the solution development include:

- Pecan Street, Inc. – EV Residential grid integration (SHINES)
- ChargePoint – Public and Fleet charging infrastructure and network services to include an advanced fueling station to support e-Taxi service at the airport
- Evercar – EV rentals to support more drivers for TNCs
- Rocky Mountain Institute – Strategy, best-practices playbook, and program development
- Austin Technology Incubator – Coalition building, events, and collaboration

Appendix A: Budget

Vulcan $10M Budget Summary

Project	Sub-Project(s)	Vulcan Funding Request
Integrating Electric Vehicles into the existing DOE SHINES grant		$600,000
Electrifying Taxis: Bergstrom Airport Concession Project		$1,000,000
Electrifying TNC vehicles: Enabling new business models		$0
Innovative EV financing		$3,000,000
Increasing EV sales: Outreach and Incentives	Expand messaging content, media types, and exposure of ChargeForth & electric>gas campaigns	$200,000
	Incentive program for Auto Dealers to promote EVs	$200,000
	Train TNC/EV Taxi "Ambassadors"	$91,000
	Outreach for Non-Muni (e.g. Corporate) Fleet electrification	$100,000
Electrifying the Municipal Fleet		$50,000
Learning, Scaling, and Playbook Creation	Co-found the Transportation Incubator @Austin Technology Incubator	$150,000
	City Liaison Office	$600,000
	Playbook Creation	$600,000
Electric, Autonomous Vehicles		$1,000,000
Program Strategy, Design, Execution, Monitoring, Reporting		$2,409,000
	TOTAL	**$10,000,000**

Detailed Budget Breakdown with DOT/Leveraged Funds

Project	Sub-Project(s)	Vulcan Funds	DOT Grant Funds	Non DOT Leveraged Funds	Non DOT Leverage Source	Total Project Cost
Integrating Electric Vehicles into the existing DOE SHINES grant		$600,000	$0	$11,560,000	SHINES (DOE, TX, COA)	$12,160,000
Electrifying Taxis: Bergstrom Airport Concession Project		$1,000,000	$1,500,000	$500,000	COA	$3,000,000
Electrifying TNC vehicles: Enabling new business models		$0	$2,600,000	$100,000	COA	$2,700,000
Innovative EV financing		$3,000,000				$3,000,000
Increasing EV sales: Outreach and Incentives	Expand messaging content, media types, and exposure of ChargeForth & electric>gas campaigns	$200,000		$90,000	COA	$290,000
	Incentive program for Auto Dealers to promote EVs	$200,000				$200,000
	Train TNC/EV Taxi "Ambassadors"	$91,000				$91,000
	Outreach for Non-Muni (e.g. Corporate) Fleet electrification	$100,000				$100,000
Electrifying the Municipal Fleet		$50,000		$500,000	COA	$550,000
Learning, Scaling, and Playbook Creation	Co-found the Transportation Incubator @Austin Technology Incubator	$150,000		$150,000	COA	$300,000
	City Liaison Office	$600,000				$600,000
	Playbook Creation	$600,000				$600,000
Electric, Autonomous Vehicles		$1,000,000				$1,000,000
Program Strategy, Design, Execution, Monitoring, Reporting		$2,409,000		$5,091,000		$7,500,000
	TOTAL	**$10,000,000**	**$4,100,000**	**$17,991,000**		**$32,091,000**

Quarterly Budget Estimated Spend Plan

	Project	Sub-Project(s)	Q316	Q416	Q117	Q217	Q317	Q417	Q118	Q218	Q318	Q418	TOTAL
1	Integrating Electric Vehicles into the existing DOE SHINES grant		$0	$180,000	$120,000	$60,000	$60,000	$60,000	$60,000	$60,000	$0	$0	$600,000
2	Electrifying Taxis: Bergstrom Airport Concession Project		$25,000	$210,000	$640,000	$25,000	$25,000	$25,000	$25,000	$25,000	$0	$0	$1,000,000
3	Electrifying TNC vehicles: Enabling new business models		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
4	Innovative EV financing		$25,000	$720,000	$2,080,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$3,000,000
5	Increasing EV sales: Outreach and Incentivization	Expand messaging content, media types, and exposure of ChargeForth & electric>gas campaigns	$0	$40,000	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$200,000
		Incentive program for Auto Dealers to promote EVs	$0	$40,000	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$200,000
		Train TNC/EV Taxi "Ambassadors"	$0	$18,200	$9,100	$9,100	$9,100	$9,100	$9,100	$9,100	$9,100	$9,100	$91,000
		Outreach for Non-Muni (e.g. Corporate) Fleet electrification	$0	$20,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$100,000
6	Electrifying the Municipal Fleet		$25,000	$25,000	$0	$0	$0	$0	$0	$0	$0	$0	$50,000
7	Learning, Scaling, and Playbook Creation	Co-found the Transportation Incubator @Austin Technology Incubator	$50,000	$0	$50,000	$0	$0	$0	$50,000	$0	$0	$0	$150,000
		City Liaison Office	$60,000	$60,000	$60,000	$60,000	$60,000	$60,000	$60,000	$60,000	$60,000	$60,000	$600,000
		Playbook Creation	$0	$0	$60,000	$60,000	$60,000	$60,000	$60,000	$60,000	$120,000	$120,000	$600,000
8	Electric, Autonomous Vehicles		$10,000	$10,000	$25,000	$25,000	$25,000	$25,000	$500,000	$250,000	$75,000	$55,000	$1,000,000
9	Program Strategy, Design, Execution, Monitoring, Reporting		$240,900	$240,900	$240,900	$240,900	$240,900	$240,900	$240,900	$240,900	$240,900	$240,900	$2,409,000
		TOTAL	$435,900	$1,564,100	$3,335,000	$555,000	$555,000	$555,000	$1,080,000	$780,000	$580,000	$560,000	**$10,000,000**
			$2,000,000		**$5,000,000**				**$3,000,000**				

Appendix B: Partners & Stakeholders

Key Partners:

- Cross-department City of Austin program to include: City Management Office, Transportation Department, Austin Energy, Sustainability Office, and City Fleet Services
- Rocky Mountain Institute
- General Motors
- ChargePoint
- Evercar
- Austin Technology Incubator, a University of Texas IC2 Institute Organization
- Pecan Street Research, Inc. a University of Texas Research Non-Profit
- Capital Metropolitan Transportation Authority
- U.S. Department of Energy (SHINES SunShot Program)

Key Stakeholders:

- City of Austin Council
- Non-municipal fleets (corporate, county, university, Cap Metro, etc.)
- Auto Dealerships and sales staff
- Community groups and city boards & commissions
- Transportation Network Companies and their drivers
- Media and Event Management
- Austin Taxi Companies
- Local Corporations to include startup community and established companies

Appendix C: Letters of Support

City of Austin
Steve Adler, Mayor
301 W. 2nd St., Austin, TX 78701
(512) 978-2100, Fax (512) 978-2120
steve.adler@austintexas.gov

May 20, 2016

Dear Secretary Foxx,

Our community is excited to submit the accompanying Phase II application for USDOT's Smart City Challenge. It's clear that Austin has already benefitted from this process, which has focused us on our biggest challenges and encouraged us to draw from what is best about Austin. It has also plainly laid out that overcoming our greatest liabilities – those around growing inequity – are directly linked to our ability to transform our mobility infrastructure.

We know well that our city faces a confluence of mobility, equity and opportunity challenges that has plainly reached crisis levels. It's estimated that our region's population will double in the next 30 years. At the same time, many are being left behind. Austin is the most economically segregated community in the country, and this segregation increases as the poor are pushed to the margins of an increasingly unaffordable city and region.

As we became a technology hub and center for entrepreneurship over the last 30 years, much of our local workforce wasn't sufficiently prepared to compete for the new jobs that were created. While this has drawn new people into the city, the resulting increase in housing costs has forced many to move to places inaccessible to public transit and employment centers. This makes our residents more car-dependent, effectively doubling Austin's congestion problems.

The timing of this Challenge couldn't be better. Austin has been building the networks, policies and framework for a model 21st-Century region over the past decade. The concept of complete, sustainable communities as advanced by the current Federal administration is being put to action already in Austin. It is a cornerstone of our Imagine Austin comprehensive plan, and a guiding principle behind our current revision of the development code. The Smart City Challenge presents an opportunity to bring all of that together to capture and accelerate a truly transformative period in Austin's history.

We envision this partnership as an opportunity to not only improve everyday lives and reach our sustainability goals, but also an opportunity to strike at the heart of a historic divide that is symbolized by the most visible piece of transportation infrastructure in Austin: IH35. Austin's notorious 1928 city plan segregated the African-American community (and later the Hispanic community) east of downtown. That dividing line became what is now the most congested highway in the state of Texas. It is time to reconnect Austin, both physically and virtually, using every tool at our disposal.

Admittedly, we initially saw the Smart City Challenge exclusively as a "tech grant" to deal

with mobility. After all, applying technology to our world-class traffic problems is in our DNA. Our partnership with the University of Texas' Center for Transportation Research has focused on using data to manage traffic. The creation of a new research triangle with the University of Texas at Austin, Texas A&M Transportation Institute, and the Southwest Research Institute is designed to bring together the brightest traffic engineers in the state. We were at the front of the line to leverage Google's work on automated vehicles. Austin has innovation and technology to spare – now it's time to bring that to a human scale.

You've made us focus further – to address the fundamental reasons why it's important to fix our traffic problems. This proposal begins with the transformative change we seek for underserved communities. Driverless shuttle buses, smart traffic signals and Smart Transit Stations make mobility a service that is accessible to all. At the same time they reconnect low-income Austinites to workforce development programs, increase their access to health care, and make their commutes cheaper and easier.

Our work on this Challenge has informed community conversations across a variety of initiatives that will continue even if we're not selected. We're closing in on an initiative to lower a significant segment of IH35 to reconnect our city. We're about to launch new social investment initiatives to preserve affordable housing. We're already considering a substantial $40 million investment in our proposed East Riverside Drive Smart Corridor. And in the proposed Rundberg Smart Station area of north Austin, we will strategically align capital and social equity projects to accelerate proposed improvements.

In short, Austin is ready to put "skin in the game" should we be selected, and believe that our selection would greatly accelerate our current trajectory:

- If awarded the grant, the City will commit a significant contribution of in-kind staff support, which we currently estimate to have a value of $10 million over a three-year period, and which will come from City operating funds.

- We will jointly propose to the City Council a mobility bond in November 2016 to include $40 million in physical improvements to the Riverside Corridor to allow the proposed e-BRT to operate on this multi-lane arterial. The investments will establish the future cross-section of the roadway by funding the final configuration of transit priority lanes and stations, and bike and pedestrian facilities in the corridor.

- We will recommend to the City Council that we join our state senator and regional partners to find the financing to lower lanes on I-35 in a way that will decrease traffic congestion, increase transit options, and finally reunite our city.

There is no other city in the country more in need of transforming mobility to make it more accessible and equitable, and there is no other city better positioned to accelerate the potential of the Smart City initiative and serve as a model and partner worldwide. Austin is ready, Austin is smart, and an investment in Austin will be an investment not just in our

country but also in the world.

We hope you will choose Austin to be the USDOT's Smart City of the future. But if you do not, trust that we will look back on this application process as the moment Austin focused on the opportunity to transform itself into a more equitable, more mobile, and more connected version of itself – and seized it.

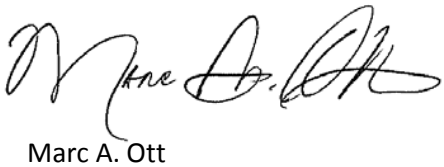
We are honored to be among the 78 cities that initially applied for this Challenge, and the seven finalists. We commit to work with this community so that we all learn from one another and move forward together.

Thank you.

Sincerely,

Steve Adler
Mayor, City of Austin

Sincerely,



Marc A. Ott
City Manager, City of Austin

United States Department of Transportation
1200 New Jersey Avenue, SE
Washington, DC 20590

May 16th, 2016

RE: Austin's Smart Cities Challenge Grant Application

Dear Mr. Secretary:

Rocky Mountain Institute (RMI) is writing to express its continued commitment to Austin's United States Department of Transportation (USDOT) and Vulcan Smart Cities Challenge grant applications. After a nationwide search, RMI selected Austin to be the lead implementation city for our Mobility Transformation Program aimed at catalyzing and accelerating the same new mobility paradigm being endorsed by USDOT, Vulcan, and cities around the world. We began our efforts in the middle of last year and are focused on the same levers and outcomes as USDOT/Vulcan – reduced CO2e, improved mobility, increased safety, and increased mobility affordability and access for all people.

Going in, RMI is committed to this 3-5 year engagement with Austin focusing on interoperable transit data, fleet electrification, mobility as a service, mobility oriented development and autonomous vehicle acceleration. Per our co-development agreement with the City of Austin and its stakeholders, RMI is currently bringing six full time employees to bear on the program. If Austin is awarded the grant, RMI will increase its efforts from six up to 12 full time employees to support the increased grant work, with funding from the award at significantly reduced labor rates – essentially providing "two for one matching" effort for every grant dollar. RMI will support the Electric Fleets, Data Rodeo, Autonomous and Connected Vehicles, and Packaged Mobility projects as part of the grant execution. RMI has also proposed a Collaborative Learning/Scaling concept to Austin via separate budget, and are prepared to staff and operate the broad-based effort in conjunction with the city of Austin and its SC Challenge partners. All-in, RMI is prepared to bring up to 45 high-skill FTE-years worth of effort over the grant execution period, at costs equal to or lower than city employee billing rates on federal grant programs, representing over a 50% reduction to RMI's normal fully burdened GSA billing rates.

As a non-aligned, non-profit, RMI's mission is to reduce carbon emissions through economically viable solutions. We bring technical expertise, business model development and analysis, stakeholder engagement, and facilitation to the team. RMI has a long history with advancing disruptive change and is excited to be engaged with Austin to drive toward the future of mobility.

Sincerely,

Jerry Weiland
Managing Director
Rocky Mountain Institute

ChargePoint, Inc.
254 East Hacienda Avenue | Campbell, CA 95008 USA
+1.408.841.4500 or US toll-free +1.877.370.3802

May 6, 2016

RE: City of Austin Smart City Challenge Proposal

Dear Mr. Spillar,

ChargePoint is pleased to support the City of Austin's Smart City Challenge grant proposal. To jumpstart electric vehicle (EV) adoption, Austin has set forth a bold agenda to electrify high-mileage vehicle fleets at scale. Austin's "Fleet Electrification Marketplace" will connect fleet owners with fleet electrification specialists, education, incentives, and smart, networked quick charging solutions at strategically placed service hubs. ChargePoint will design and provide EV charging solutions that optimize and simplify operations, accelerating Austin's fleet electrification goals.

ChargePoint designs, builds, supports, and operates the world's largest and most open EV charging network. We have more than 28,000 total charging spots and over 300 Express direct current (DC) fast charging spots. Our charging station customers span across various verticals including workplace, fleet, retail, hospitality, government, utility, public parking, multi-family and home segments. As our network grows, it makes driving an EV accessible to more and more people. Our mission is to get everyone behind the wheel of an EV and provide a place for them to charge wherever they go. As such, ChargePoint enthusiastically supports Austin's goal to incite mainstream acceptance and usage of electric vehicles to lower transportation costs and reduce carbon emissions by using 100% renewable certified electricity as fuel.

ChargePoint charging stations and network operating system (NOS) enable remote access to real-time, charging station information, detailed reports on energy use, greenhouse gases avoided, fuel savings and more, all from a single dashboard. The ChargePoint NOS tracks data in real-time and stores the data in the cloud, making real-time and historical data available to Austin's regional operations management center (ROMC) via web services application programming interface (API). Station utilization is maximized with Reservations, the ability to remotely reserve a charging station in the future, and Waitlist, a cloud-based notification system that allows drivers to get in line for charging and notify them via a phone app when it's their turn to charge.

ChargePoint provides a world-class support team and call center to help EV charging owners, fleet operators and drivers. ChargePoint also provides an industry-leading parts and on-site labor maintenance program with Assure, an optional service available to Austin. Assure includes maintenance of the charging stations and preventative maintenance procedures. Assure addresses issues such as, but not limited to, malfunctions, repairs, or vandalism within 48 hours of the initial notice. Assure ensures that the equipment is operational at least 97% of the time. ChargePoint makes processing payments hassle free by handling all collections and funds transfers with Flex Billing.

Austin-Bergstrom International Airport (ABIA) Travel Access Hub
In support of Austin's goal to transition approximately 300 taxi vehicles servicing ABIA to EVs, assuming three, 25 minute charging sessions per day, per vehicle, ChargePoint will provide up to 20 ChargePoint Express (CPE) 1500 Power Port dispensers. CPE1500 is a next-generation, DC charging solution which provides a scalable fast charging solution that will support today's cars and future cars with higher charge rates. Today's EVs typically max out when charging at 50kW power level; however, EVs with 100kW charging rates are anticipated to dominate the market in years to come. As EVs with 100kW charging rates and above proliferate, the CPE1500 will easily steer power to maximize each EV's maximum charging rate, providing a future proof and scalable system. Power sharing capabilities further enable full utilization of electrical capacity, increasing throughput at the lowest cost.

Transit Access Hubs
In support of Austin's goal to transition approximately 500 TNC vehicles to EVs, assuming 3 charging sessions per day, per vehicle, ChargePoint will help establish two Transit Access Hubs through the provision of up to twenty eight (28) Charge Point Express 200, 50 kW DC fast charging stations (56 total DC fast charging spots). Express 200 charging stations charge at a rate of up to 200 miles of range per hour. Each dual-connector Express 200 includes both CHAdeMO and SAE Combo connectors and is capable of fueling all EVs equipped with DC fast charging (Tesla drivers can charge with the proper adapter). ChargePoint will also provide up to ten (10) dual port CT 4000 Level 2 charging stations (twenty (20) total Level 2 charging spots). ChargePoint's CT4000 stations offer two standard SAE J1772 charging ports supplying up to 7.2 kW and the Commercial Network Plan enables municipal fleet vehicles, TNC vehicles, and the public to share infrastructure, and set different prices across multiple charging applications if required in the future. The CT4000s will largely serve over night TNC vehicle charging and public vehicles that are not DC fast charge compatible.

Municipal Depots
In support of Austin's goal to transition approximately 100 municipal fleet vehicles to EVs, ChargePoint will provide up to 100 ChargePoint CPF 25, Level 2 stations. ChargePoint CPF 25 stations and the Fleet Network Plan are designed for dedicated depot applications. CPF 25 stations ensure that only fleet vehicles can use the depot chargers through Access Control, promote installation cost savings and lower energy costs through electrical service Panel Sharing, and additional energy cost savings with Scheduled Charging. The ChargePoint Network enables fleet operators to manage and view usage for all charging sessions whether they be at the depot, on route, or at the driver's home-from a single dashboard, helping track total cost of ownership and greenhouse gas reductions.

City of Austin Contribution
To implement this transformational program at scale, Austin is expected to procure the charging station hardware and network services after a 20% match commitment on products and services from ChargePoint. The proposed model provides infrastructure at approximately $6,864 per EV per hub, after estimated installation costs. To support 900 vehicles (300 airport taxi, 100 municipal fleet, 500 TNC), Austin's estimated costs include: ChargePoint's hardware, 3 years of network services, and 3 years of Assure Maintenance

	$4,928,344
ChargePoint's contribution	<$ 985,669>
Budget requirement	$3,942,675 (hardware, network, activation,

	and shipping)
Estimated installation cost (AE)	$2,235,000 (downstream of transformer)
Estimated Budget	**$6,177,675**
Cost per car/hub	**$6,864**

This scalable model can be deployed in the existing two hub design or over multiple smaller hubs. The model serves as a blueprint for other municipalities to promote what is possible to electrify fleets at scale. The City of Austin and their partners will be responsible for site selection and acquisition as well as managing into the construction phase of site implementation. While construction is unable to occur prior to the completion of host negotiation, the installation of charging infrastructure must be a consideration from both a cost perspective and a feasibility standpoint. Realistically, installation of charging infrastructure can be accomplished anywhere, but in order to optimize for cost, these are the components that must be considered:

Site Selection, Acquisition Engineering and Design

- Site identification
- Site securing/acquisition
- Engineering Site Plans
- Host approval of install scope

Utility Services

- Determining load and applying for electrical service
- Evaluating chosen location based on existing capacity and infrastructure

Permitting and Zoning

- Engineering site plan check and compliance
- Parking impact analysis
- Possible zoning board approval

Construction

- Civil Work
- Coordination amongst utility, electrical installer, & host needs
- Obtaining municipal permit sign-offs for compliance throughout

Activation

- Validating install to meet ChargePoint

While this list is not comprehensive, it should provide some insight into the level of coordination that these efforts will require.

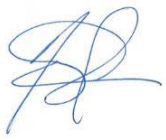
ChargePoint has an acknowledged reputation for delivering difficult projects on time and under budget, including the deployment of over 5,000 charging stations funded by the US Department of Energy. The ChargePoint team is well suited to assume project management responsibilities upon request and entering a project management subcontract with the City.

ChargePoint Contribution
To demonstrate our support, we have committed to providing over $1,000,000 in cost share to the program. ChargePoint calculated this value as follows:

- $985,669 of match relation to a discount on equipment, activation, and 3-year NOS services offered at a discounted rate
- $15,000 in staff salaries to support implementation and administration of the project
- **$1,000,669 total in-kind contribution**

We appreciate the opportunity to support this project and wish you a successful outcome from the proposal selection process. If you have any questions about our position, please contact Dedrick Roper, Grant Operations and Public Policy Manager at dedrick.roper@chargepoint.com or 408-841-4585.

Sincerely,



Antonio Canova
Chief Operating Officer
ChargePoint, Inc.

Draft Statement of Work
Pecan Street role for Austin Energy's Vulcan Smart Cities proposal

Objective
Pecan Street will conduct residential vehicle-to-grid (V2G) charging studies to determine the impacts of V2G technology on the distribution grid. Based on an assessment of these impacts, Pecan Street and Austin Energy will perform feasibility testing on different control policy approaches that will mitigate any negative grid impacts and maximize the grid benefits of V2G.

Approach
Pecan Street will leverage existing assets from the Mueller neighborhood, Pecan Street's lab, and the SHINES project such as high penetrations of rooftop solar, electric vehicles and residential energy storage. Pecan Street will acquire commercially available V2G equipment and install it in our lab and in one or two homes that are connected to heavily monitored distribution transformers and substations in Mueller.

Initial steps will be to develop control algorithms and evaluate equipment performance at the Pecan Street Lab isolated from the utility grid to ensure hardware/software effectiveness. The proven systems will then be deployed to residential structures in the Mueller neighborhood. Since Pecan Street already monitors grid assets, PV array production, disaggregated home energy use, energy storage charging/discharging, and EV charging, we will be able to conduct a comprehensive before-and-after comparison of how V2G impacts the distribution system and homeowners' lifestyle.

In the event that sufficient V2G vehicles or charging stations are not available, Pecan Street has developed a proxy battery method for evaluating V2G energy flows. A surrogate storage partition is configured within the residential energy storage system that then charges the vehicle. The surrogate partition is the same capacity as the vehicle and mirrors the vehicle battery charge level. When a V2G discharge event is called for, the surrogate partition pushes energy back to the grid with the same characteristics as the vehicle would, in spite of the absence of an actual V2G vehicle or charger. With this method at our disposal, the ability to do V2G testing is guaranteed even though future V2G product availability is uncertain.

Pecan Street will also contribute to this project by putting all non-sensitive data onto Dataport for free access by over 150 universities worldwide. Other energy and transportation data developed under the larger proposal may be shared through Dataport if desired by other proposal partners.

Cost
V2G hardware acquisition OR Proxy battery solution development: $100K
Residential Installations and testing: $100K

Cost Share
Dataport services: $50K/year

Thank you for the opportunity to participate in this proposal and to contribute to smart transportation solutions that will improve quality of life in cities across the country while rapidly reducing greenhouse gas emissions.

Sincerely,

Brewster McCracken
President & CEO

May 6, 2016

Robert Spillar
Director, Department of Transportation
City of Austin
P.O Box 1088
Austin, TX 78767-1088

RE: Vulcan Smart Cities Challenge & U.S. Department of Transportation Notice of Funding Opportunity Number DTFH6116RA00002 "Beyond Traffic: The Smart City Challenge – Phase 2"

Dear Mr. Spillar,

We are writing in support of the City of Austin's application for the Smart City Challenge grant. The Austin Technology Incubator (ATI), the startup incubator of The University of Texas at Austin, is the longest-established venture incubator in the nation. ATI works with both university-derived and non-university-derived startups, preparing them to compete in the markets for risk capital.

Under this project, ATI will deploy its expert staff to help develop and execute the innovative technology-to-market process and associated duties. Isaac Barchas will be the project director (principle investigator) for the work designated to be performed by Austin Technology Incubator. Under this grant, ATI will expand its capacity to include a dedicated Transportation/Mobility industry vertical. The total costs for the activities of ATI under these tasks will be $150,000 over three years.

Summary: Co-found the Transportation Incubator @Austin Technology Incubator
ATI will expand its capacity to include a dedicated Transportation/Mobility industry vertical. ATI-Transportation/Mobility will:

- Promote innovative solutions to transportation/mobility in the entrepreneurship community and generate new startups in this industry,
- identify and vet transportation/mobility technology companies sourced through ATI's local, regional, national, and international networks of partners,
- leverage the expertise of ATI's 350+ member mentor network on behalf of selected companies,
- design and deploy pilot programs with strategic partners,
- and prepare incubated companies for success in the capital markets ("get them funded").

Partners: ATI-Transportation/Mobility Incubator Advisory Board Members
ATI is embedded in both the university and the community. It has longstanding, successful partnerships with both the City of Austin and Austin Energy that have delivered significant ROI for public-sector partners.

- Vulcan (designated member)
- Austin Energy
- Rocky Mountain Institute (RMI)
- TXDOT
- UT-CTR
- SWRI
- TTI
- Department of Energy
- NREL
- NextEnergy (Detroit)
- Prospect Silicon Valley (San Jose, CA)
- +Corporate partners (TBD)
- +transportation/mobility investors (TBD)

First Year Deliverables:

- Form and industry advisory board of leading professionals in transportation, mobility, investors, and relevant public sector institutions and strategic partners.
- Identify and vet companies for incubation in ATI-Transportation. In Year 1, approximately 24 companies (minimum) will be screened, and it is anticipated that at least 3 will formally enter the incubator (ATI's acceptance rate is approximately 8%).
- Scope and launch the beta-grant program to test/demonstrate transportation and mobility technologies in Austin (modeled after existing Austin Energy program)
- Host Transportation/Mobility track of SXSW Eco Startup Showcase (200 applications received overall in 2015)
- Host statewide Cleantech Three Day Startup event (55+ applications received in 2016) with partners in the Southwest Clean Energy Incubation Initiative (SRCEII).
- Create/host transportation/mobility "hackathon" to address specific energy/transportation/mobility challenges identified in the execution of the Smart Cities Challenge grant scope of work to engage the entrepreneurship community in Transportation/Mobility challenges and problem-solving.
- Host a community networking and education event in partnership with the CleanTX Foundation to activate the broader cleantech community in Austin around transportation/fleet electificiation and energy use in the transportation sector.

2019 Deliverables:

- Screen approximately 150 companies/year for admission into ATI-transportation.
- Grow ATI-Transportation vertical to include 5-10 companies accepted into the incubation program at any time.
- Continue to host a dedicated Transportation/Mobility track of SXSW Eco Startup Showcase (annual). Grow the application pool in this specific vertical.
- Showcase ATI-Transportation/Mobility technologies at key forums in Austin and nationally. Create a funding "roadshow" for transportation/mobility technology companies.

- Support a transportation working group within the CleanTX Foundation to create a regular series of networking and educational opportunities in the Transportation/Mobility sector.
- Host an annual hackathon, 3 Day Startup, and technical conference focused on transportation/mobility.
- Demonstrate nationally and internationally promising technologies in Austin. Incubate and grow those companies in the Austin region.
- Increasing incubator size/screening pool over time (24+ in year 1, growing to 150+ in year 5, with average acceptance rate of 8%).

10-year Goal: Attract cutting-edge transportation and mobility innovators to Austin.

- ATI-Transportation/Mobility will have a 90% funding success rate (aligned with existing verticals at ATI) and will be recognized as a best in class transportation/mobility incubator.
- 5-year deliverables/activities will be sustained over time and will grow and/or become increasingly selective
- Austin will be positioned as a global transportation/mobility hub for entrepreneurs and access to testing/validating/growing companies who have developed next generation of solutions for the sector.
- The depth of municipal partnerships in the sector and depth of entrepreneurial talent will attract corporate centers of excellence, R&D, sponsored university research, and relocations, which will reinforce the regional/statewide transportation and mobility cluster.

ATI is among the most successful incubators in the nation. In October 2015, it was selected by the Kauffman Foundation as one of eight "best in class" startup support programs (out of more than 300). Over the past 7 years that the current team and model have been in place, roughly 90% of ATI companies have received investment, totaling almost $700 million dollars. (Over the same time period, ATI companies have accumulated total book value of $1.5-2 billion.) ATI alumni have contributed almost $1 billion and over 6,500 jobs to Central Texas; each public $1 invested in ATI has yielded $66 of economic activity.

ATI's Energy & Cleantech program is also a national leader, recognized by the U.S. Department of Energy as one of the three "best practices" energy/cleantech incubators. ATI is a node in the DOE's National Incubator Initiative for Clean Energy (NIICE) and acts as a hub of university-based clean energy incubation programs in the Southwest. ATI's Energy & Cleantech companies have raised more than $200 million in investor capital (including one IPO). These companies have generated more than $85 million in economic impact.

This partnership will accelerate the deployment of ATI-Transportation/Mobility and leverage our growing nationwide network of sustainable transportation partners. Thanks to significant public and private investment, there is now a robust national network of programs and events designed to showcase promising startups in the transportation space, including the Cleantech Open, SxSW Eco, Texas Venture Labs Investment Competition's Clean Energy track, the Rice Alliance Energy and Clean Technology Venture Forum, NREL Industry Growth Forum, LACI Glo Sho, Greentown Labs, Clean Energy Trust, Prospect Silicon Valley, NEXT Energy

and others. At this time, however, there is no national-scale incubation capability to "catch" the companies participating in these events and prepare them for the next stage of their development, where they must compete successfully in the capital markets. Support from the City of Austin will allow us to build this capability, in cooperation with our state and national incubator partners.

In partnering with ATI, Austin Energy will leverage a strong nationwide network built with nearly $2 million dollars in state, national and foundation funding awarded since 2010:

- In 2010, ATI partnered with the Texas State Energy Conservation Office to develop clean energy incubators based on the ATI model in El Paso and San Antonio.
- In 2014, the Department of Energy made ATI a best practices node NIICE, along with high-performing cleantech incubators in Chicago, Detroit, Los Angeles and Silicon Valley.
- 2015, the Ewing Marion Kauffman foundation awarded ATI a grant to build a 10-university network to employ ATI's innovative and successful model of academic entrepreneurship.

These funded, active networks make ATI uniquely suited to identify and develop the most promising transportation companies nationwide. Austin Technology Incubator is committed to this innovative project and welcomes the opportunity to work with you should it be funded. Thank you for including Austin Technology Incubator as part of your team for this very important project.

Sincerely,

Isaac Barchas
Director, Austin Technology Incubator
IC^2 Institute – University of Texas at Austin

Appendix D: Methods for Measuring Impact:

The Smart Cities will from a Program Management Office to manage reports, outreach, liaison activities, and a dashboard to measure impact of each program goal. Specific metrics to measure are listed in Section V “Metrics”.

The City of Austin tracks two greenhouse gas inventories for the City of Austin. These initiatives are key to understanding our sources of emissions, trends of those sources, and tracking increases as well as decreases and why. These inventories inform our plans, city management, and City Council on what efforts should be focused in which areas to reduce emissions and get closer to net zero emissions by 2050.

The first is the City of Austin, direct control, greenhouse gas inventory. This data is collected on an annual basis, calculations to greenhouse gas emissions are completed, and this information is reported annually to the Austin City Council. We follow the Climate Registry’s General Reporting protocol for GHG reporting. Sources include Austin Energy owned electricity generation facilities, water and wastewater facilities, the Austin airport, the Austin convention center, Austin waste and recycling pickup, all city owned facilities and buildings, and fuel from all city owned vehicles and equipment in the City vehicle fleet. The goal of this effort is to track trends, success stories, identify problems, and communicate progress towards our goal of carbon neutral city operations by 2020.

The second greenhouse gas inventory that we track is the Travis County community inventory. Data for this inventory is collected every third year and we may begin collecting and reporting every other year. For this inventory we use a combination of the ICLEI Community Inventory protocol and the Global Protocol for community greenhouse gas inventories. Data collected includes all electricity usage for all customers, emissions from power plants, all natural gas sales in the area, all vehicle miles traveled and modeled carbon intensity of the transportation, emissions from landfills, emissions from wastewater facilities, and industrial process emissions from semiconductor and lime manufacturing facilities in our area.

Appendix E: Core Team Technical Qualifications (Bios)

Robert Spillar, P.E.
Director of Transportation, City of Austin Transportation Department

Robert Spillar currently serves as the City of Austin Transportation Director. As the lead transportation professional for the City of Austin, he is responsible for the City's multi-modal transportation portfolio, including mobility technologies, rail planning, traffic engineering and operations, signal operations, parking enterprise operations, right-of-way permitting, and special events management. Prior to the City of Austin, Spillar served as Vice President with Parsons Brinckerhoff and as the Director of Traffic Management for the City of Seattle. Robert holds a Bachelor and Master's of Civil Engineering from the Universities of Texas and Washington respectively. His accomplishments at the City of Austin include:

- Establishment of Austin Transportation Department in 2008, growing the department from a single transportation professional to a department of over 200 by 2016
- Full modernization of the City's Parking Management System, introduction of pay stations, pay by phone, and other parking technologies
- Authorization of Bicycle Green Lanes in Austin
- Funding, launch, and conceptual design for the replacement of the IH-35 corridor through Austin using an innovative approach to traffic management (construction starting 2016)
- Establishment of Austin's first successful transit priority lanes and priority transit signalization, supporting Capital Metro (Guadalupe, Lavaca and Lamar Corridors)
- Introduction of Corridor Master Planning for urban arterials to Austin (7 Corridors)
- Sponsored Project Connect, the first adopted regional high capacity transit plan
- Establishment of neighborhood and business parking benefit districts
- Alternative roadway design for the MoPac S. improvement project
- Conception of a Regional Infrastructure Bank – a financial mechanism to reuse federal pass-through funding by applying it to flexible toll-lane projects and then generating repayment to the region for other critical transportation projects
- Launch of the first North American Car-2-Go car sharing program
- In partnership with Capital Metro, TxDot, and the Central Texas Regional Mobility Authority, establishment of a "One System" management philosophy and pursuit of a Regional Operations Management Center (ROMC)
- Development and funding for innovative intersection construction at the US290/SH71 Interchange (Oak Hill Y), introducing continuous flow intersections, improving mobility
- Support of an open data policy that enabled the smartphone application "Park Me", resulting in a predictive model based on parking meter transactions that directs users to available on-street parking – at no cost to the City of Austin
- The proactive support of transportation network companies in Austin and the development of progressive regulations to assure the safety of our residents, including the introduction of some five different dispatch companies to Austin (and growing)
- Founding member and active board member of Moveability Austin, the first transportation demand management organization in the region
- Hosting of the 2015 National Association of City Transportation Official's (NACTO) Designing Cities national conference in Austin
- Enabling of the launch of B-Cycle, Austin's nationally recognized bike share program

Karl Popham
Electric Vehicles & Emerging Technologies Manager, Austin Energy

Karl Popham is the Manager of Emerging Technologies & Electric Vehicles at Austin Energy, the 8th largest public power utility in the nation. He is also a Principal Investigator for several US Department of Energy funded projects that include smart-grid innovation, renewable energy, energy storage, distributed energy resources, and sustainable transportation. Popham has published articles, given talks, and contributed research in energy emerging technologies.

Karl has led Austin Energy's transportation electrification strategy and operations since its inception in 2011 to include launching its award-winning Plug-In EVerywhere™ program. Karl has served as the chair of the Central Texas Fuel Independence Project and as a board advisor to SXSW Eco, Austin Forum on Technology & Society, The University of Texas Electric Vehicle Transportation and Electricity Convergence Center, and is a "legacy thought leader" for the Energy Thought Summit.

Austin Energy	Mar 2006-Present
Manager, Emerging Technologies & Electric Vehicles	
Chief Information Officer, interim	
Division Manager, Program Management Office	
IT Project Manager	
Hewlett-Packard	Dec 2002 – Sep 2005
Director of e-Center & Principal, Managed Services	
Trapdoor Net Systems	Jul 2001 – Jul 2002
Vice-President, Consulting Services	
Cap Gemini Ernst & Young (CGE&Y)	Nov 1997 – May 2001
Director & Principal, eCommerce Practice	
Catapult Systems	Jan 1997 – Oct 1997
Technical Architect	
The State of Texas – Adjutant General's Department	Feb 1992 – Jan 1997
IT Manager, Engineering Directorate	
U.S. Army Corps of Engineers	Feb 1991 – Feb 1992
Project Officer, Construction & Land Acquisitions	
Texas Army National Guard	Feb 1987 - Dec 1997
Captain (highest rank achieved)	

Education - BBA, The University of Texas, McCombs School of Business, Austin, Texas, 1990

Zach Baumer
Climate Program Manager, Office of Sustainability, City of Austin

Zach is the Climate Program Manager in the City of Austin's Office of Sustainability. His primary duties include overseeing the implementation of climate change mitigation and adaptation strategies across the City organization and community.

Zach leads the effort to implement programs and track progress towards the City of Austin's goal of Net-Zero Community-wide Greenhouse Gas Emissions by 2050. He has led the City's award winning climate program since 2011 and regularly speaks at conferences such as the EPA Climate Leadership Conference, SXSW Eco, the National Adaptation Forum, and the National League of Cities on the issues of climate change and resilience.

Zach has been a core member of the Urban Sustainability Directors Network since 2012 and has served on the Planning Committee since 2014.

Prior to the City of Austin, Zach spent nine years working in the environmental consulting industry, primarily assisting large industrial clients with environmental data management, greenhouse gas inventories, sustainability planning, and corporate sustainability reporting.

City of Austin — May 2011-Present
Climate Program Manager

URS Corporation — May 2007–May 2011
Sustainability Consultant

Malcolm Pirnie, Inc. — June 2002–May 2007
Environmental Consultant

Education
MBA Sustainable Business, Presidio Graduate School, San Francisco, CA, 2009
BS Chemistry, Purdue University, West Lafayette, IN, 2002
BS Chemical Engineering, Purdue University, West Lafayette, IN, 2002

Jennifer Walls

Deputy Fleet Officer, City of Austin Municipal Fleet

Jennifer's responsibilities include management oversight of the Vehicle Maintenance, Vehicle support and Operations support divisions of the city's Fleet Department. These divisions are responsible for the acquisition, maintenance, fueling and disposal process for the city's 6200+ vehicles and pieces of equipment.

In her capacity as Deputy Fleet Officer Jennifer is responsible for implementing the City' environmental initiatives through the development of overall strategies, policies and procedures designed to reduce emissions in the city fleet. She has led the city through the adoption of alternative fuel and hybrid /electric vehicles and fueling infrastructure and has been a member of the Fleet team for 16 years.

Jennifer is a member of NAFA (National Association of Fleet Administrators) Board of Governors and a former board member of the RMFMA (Rocky Mountain Fleet Management Association, Texas Chapter) and has earned the CAFM (Certified Automotive Fleet Manager) designation.

Education

- Bachelor of Business Administration; Major Accounting, Texas State University
- Master of Public Affairs, University of Texas at Austin, LBJ School of Public Affairs.

Jonathan Walker

Manager, Rocky Mountain Institute

Jon Walker is a Manager in RMI's Boulder office. He is focused on reducing energy and CO2 intensity of our mobility system. He has over ten years of experience designing products and systems as a design engineer and manager in the aerospace and IT industries. Jon joined RMI in July 2013.

Jon leads RMI's efforts to rapidly scale electric vehicles and electric vehicle miles traveled (eVMT). He also leads RMI's research and work to accelerate and optimize the introduction of electric, autonomous mobility services.

Background

Prior to joining RMI, Jon worked as a design engineer for Hamilton Sundstrand Aerospace developing an energy efficient starter/generator for regional aircraft. He also worked on improving efficiency of integrated drive generators for large commercial aircraft.

Jon has also performed extensive research and has written several grant requests to the Department of Energy in the field of novel distributed solar power systems.

Most recently, Jon worked as a product development engineer and engineering manager at Panduit Corporation. In these roles, Jon designed and implemented energy-efficient data center systems. These systems reduce energy consumption in IT and datacenter environments.

Education

- Bachelor of Science in Mechanical Engineering, Northwestern University, 2003.
- Master of Engineering in Energy Systems Engineering, University of Michigan - Ann Arbor, 2013

Bert Haskell
Chief Technology Officer, Pecan Street Inc.

Bert Haskell is Chief Technology Officer for Pecan Street Inc., a company known globally for its cutting edge research and product development in the areas of residential energy and water systems. He is also a Principal Investigator for the Energy Switch project funded under the US Department of Energy, SunShot SPARC program.

Bert started his career as a mechanical engineer working in a vertically integrated manufacturing division for Eastman Kodak in 1985. His roles have included technology development, product development, product marketing, and technology strategy in the microelectronics and consumer electronics industries. Bert has published numerous papers on a range of technical topics and is the author of a McGraw-Hill textbook titled "Portable Electronic Product Design and Development"

Bert transitioned into renewable energy in 2007 as the Director of Product Development for Heliovolt, a manufacturer of thin-film CIGS PV modules. He has been at Pecan Street since 2007 where he played a key role in crafting their adaptive approach to innovative research and product development.

Chief Technology Officer, Pecan Street Inc.	8/10 – Present
Director of Product Development , Heliovolt	8/07 - 8/10
Director of Product Development , Staktek	3/06 - 7/03
Director of Product Marketing , Motion Computing	3/04 – 3/06
President & General Manager, Wireless Age	2/03 -3/06
Product Technology Strategist, AMD	12/01 – 1/03
VP, Product Development, Stellar Display	1/00 – 12/01
Founder and Board Member, Portelligent, Inc.	12/01 – 10/07
Director of Strategy, Concero	12/99 – 12/01
VP, Consumer Electronics Research, MCC	1/93 – 12/99
Manufacturing Technology Engineer, Kodak	3/85 – 1/93

Education – M.S.M.E, University of Rochester; B.S.M.E UW Milwaukee.