Mobility: EV Infrastructure

Building New Mexico's Clean Energy Future

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08/05/2019

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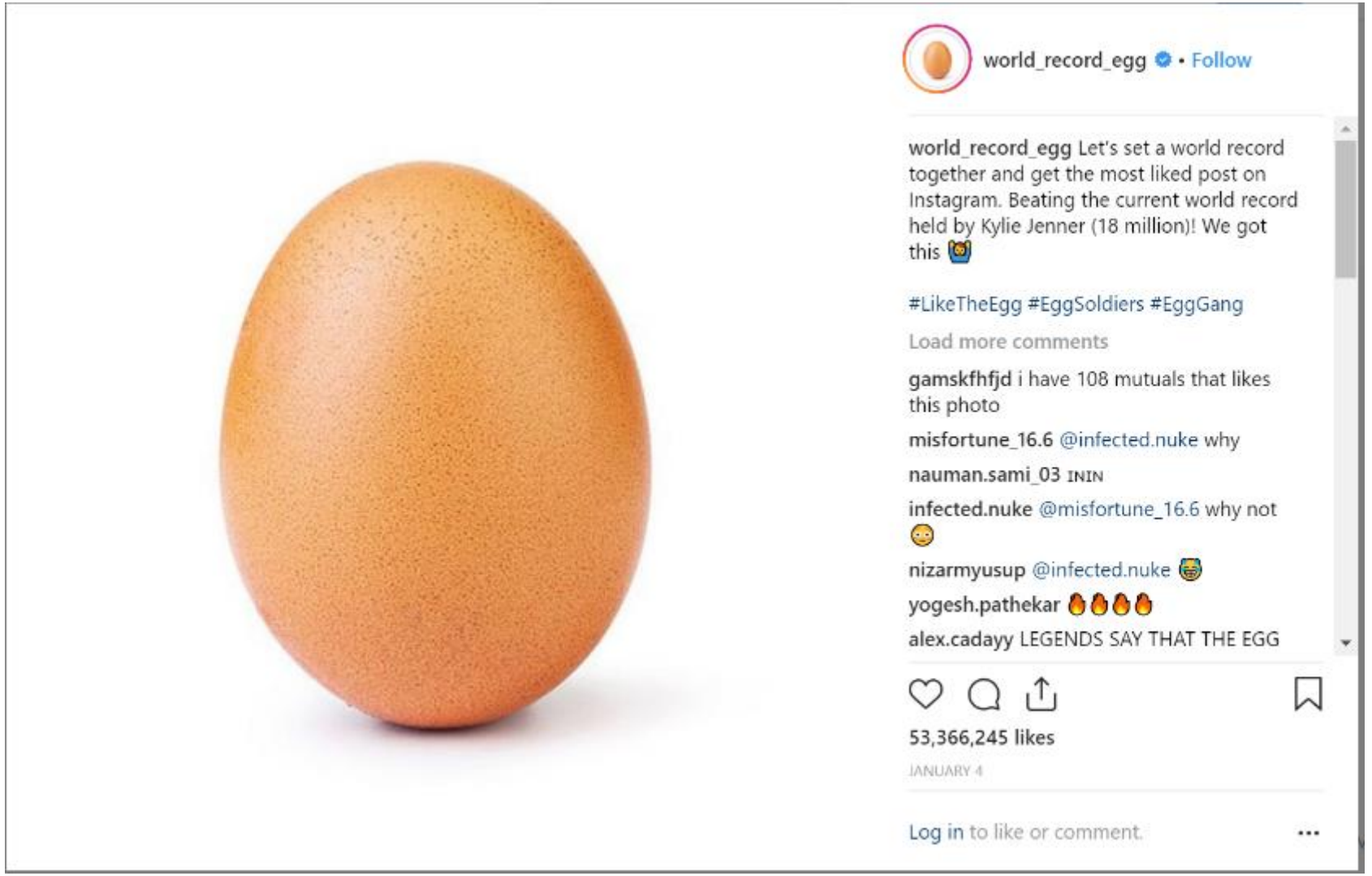
Austin, Texas

The Electrification Problem



Network Growth 2011-2018

Starting Point
City of Austin applied for and received a Department of Energy grant which provided 113 charging stations to be deployed.

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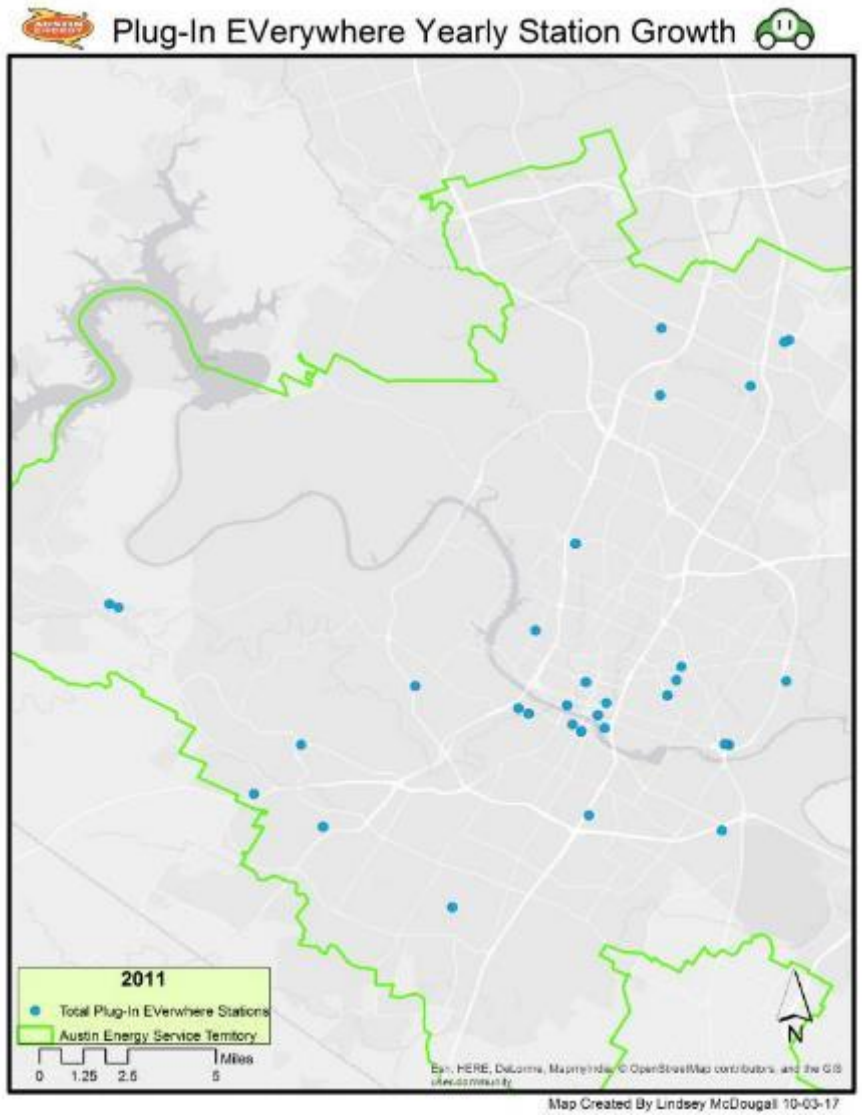

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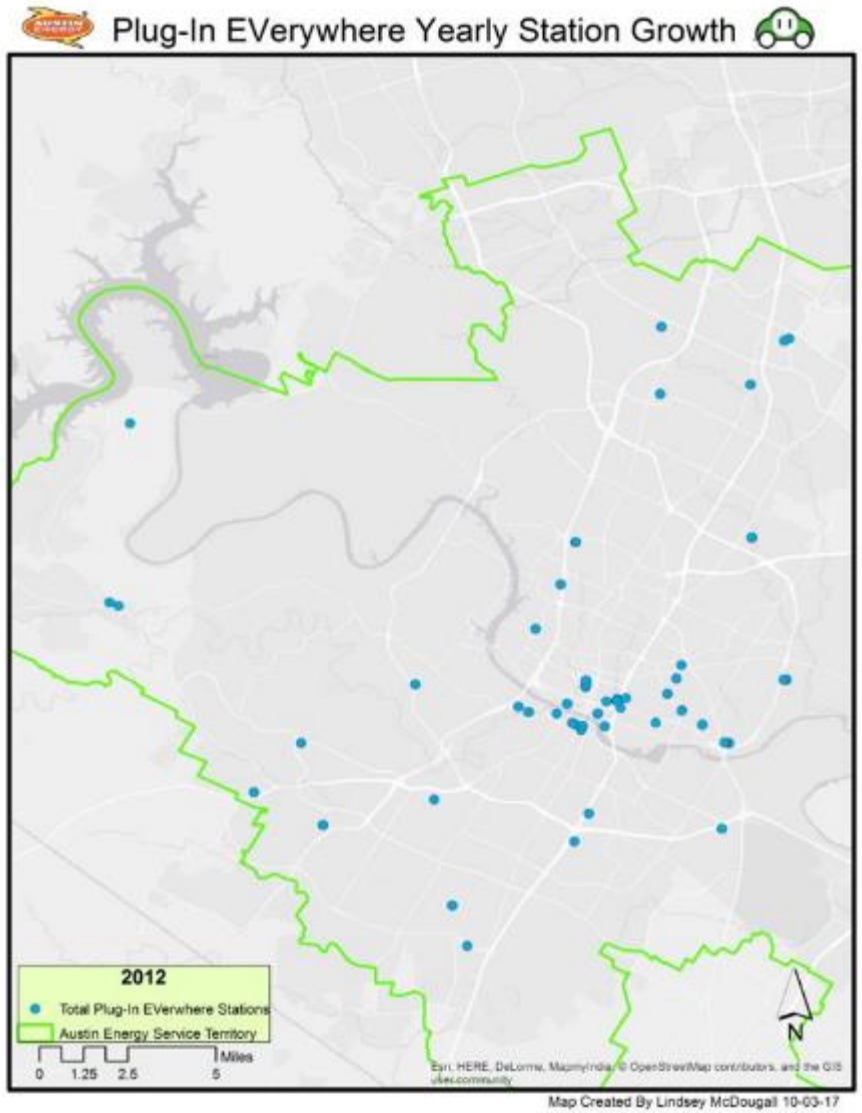

Selection Criteria

Site selection process involved placing infrastructure in places where vehicles were not yet part of the conversation.

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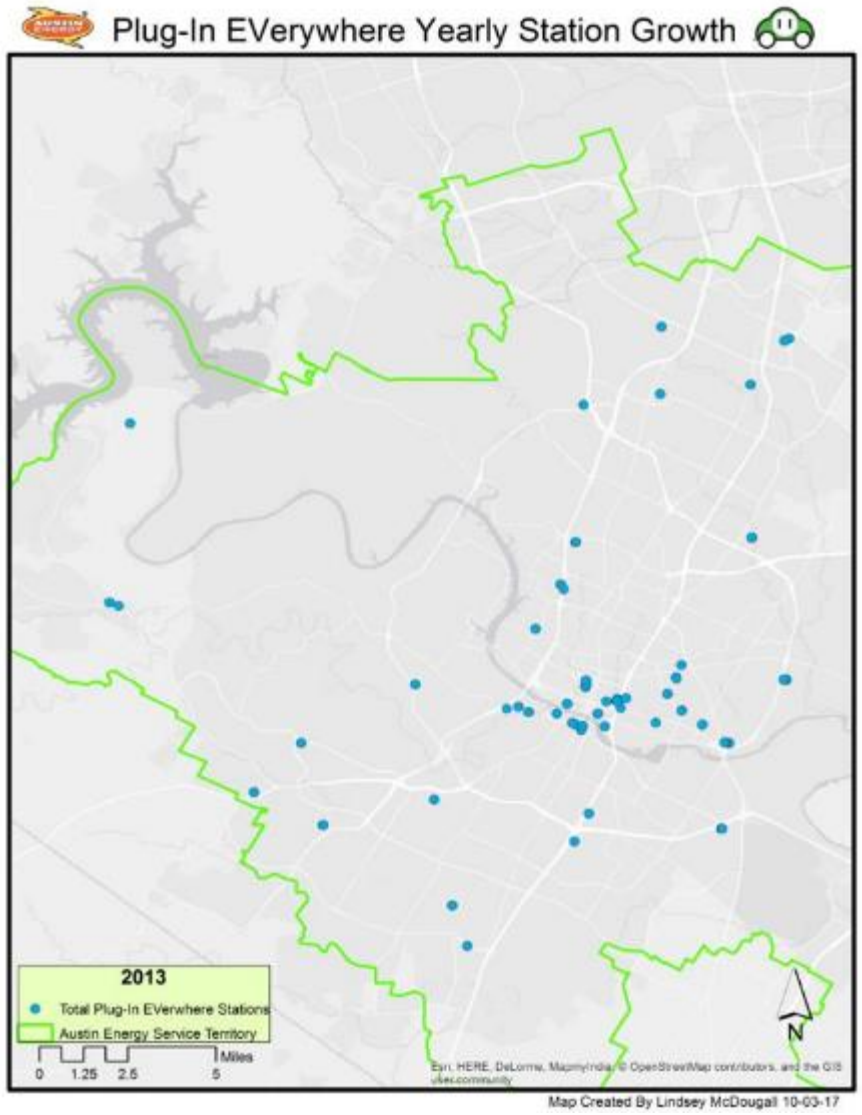

Barriers to Deployment

Implementation can take multiple years. Delays occur from permitting issues, staff constraints, non-committal hosts, and electrical panel restrictions.

Network Growth 2011-2018

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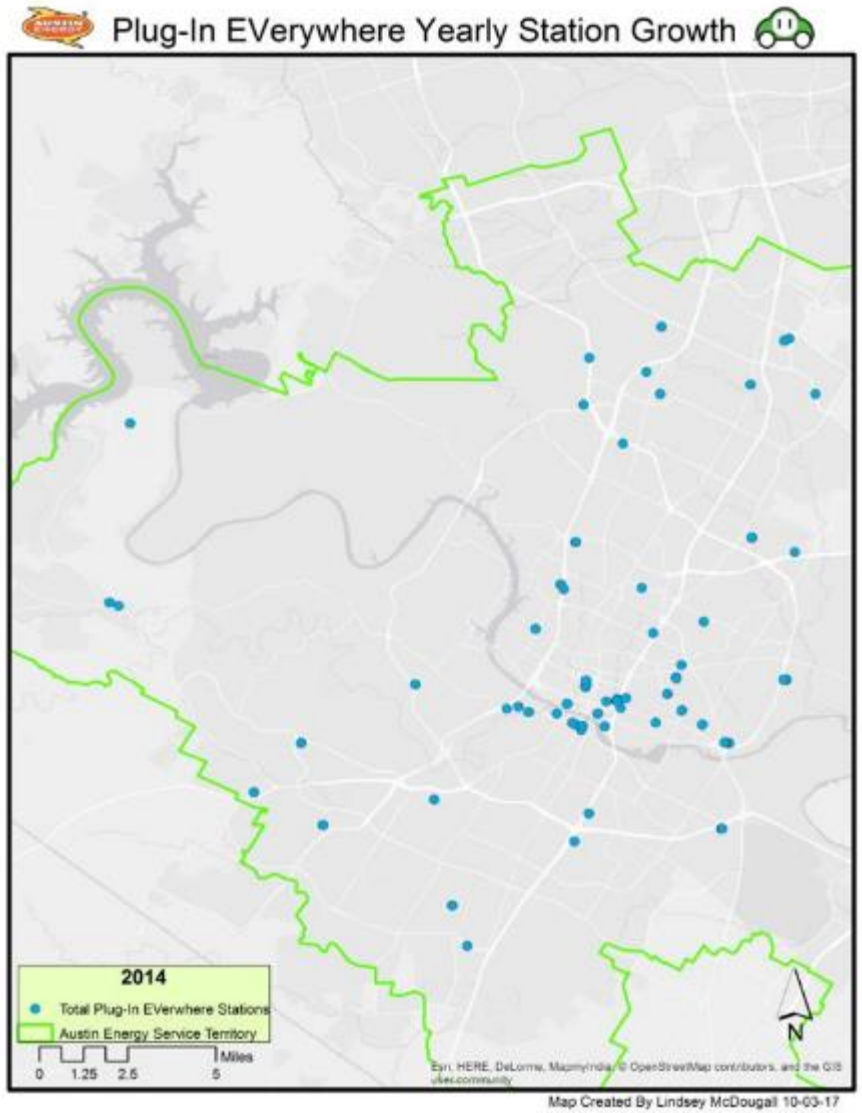
Incentivize Infrastructure

Austin Energy expanded the Plug-In Everywhere rebate program to allow for a market-driven approach for charging station development.



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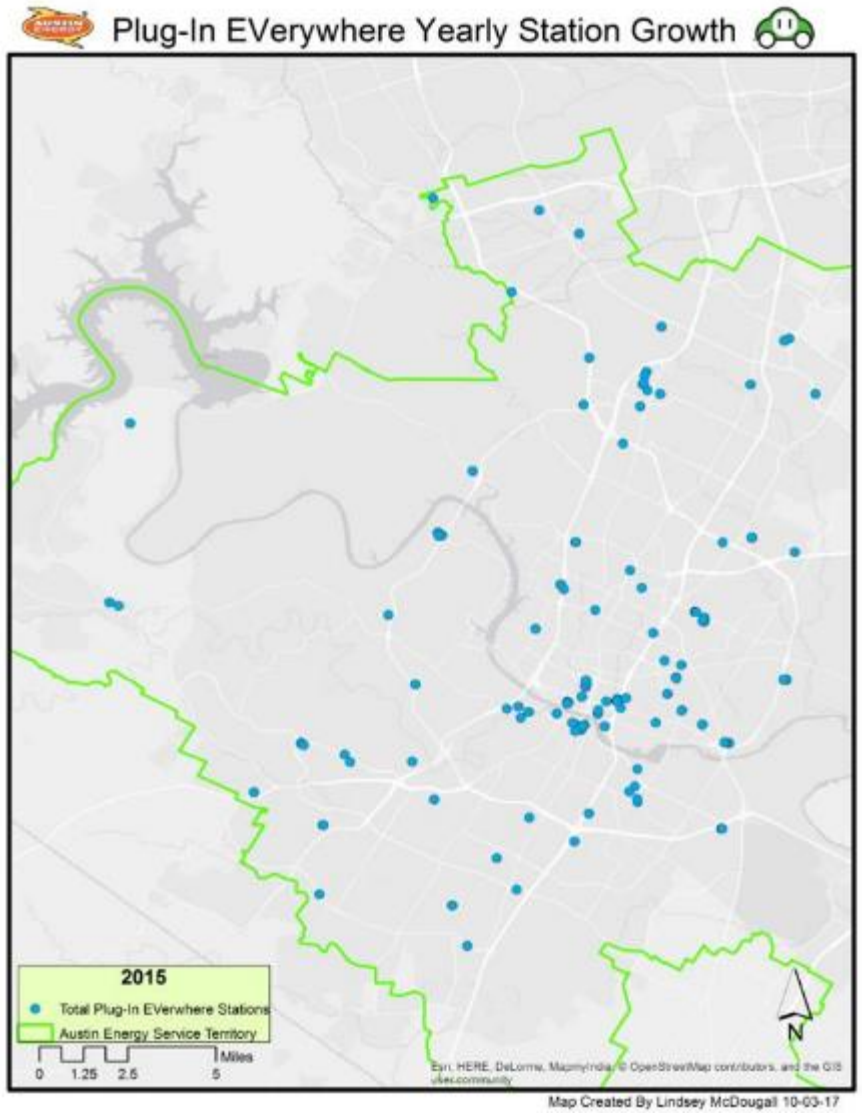

Multi-Family Pilot

Increased the financial incentive for 20 multi-family properties to bring charging infrastructure to hard-reach communities.

Network Growth 2011-2018

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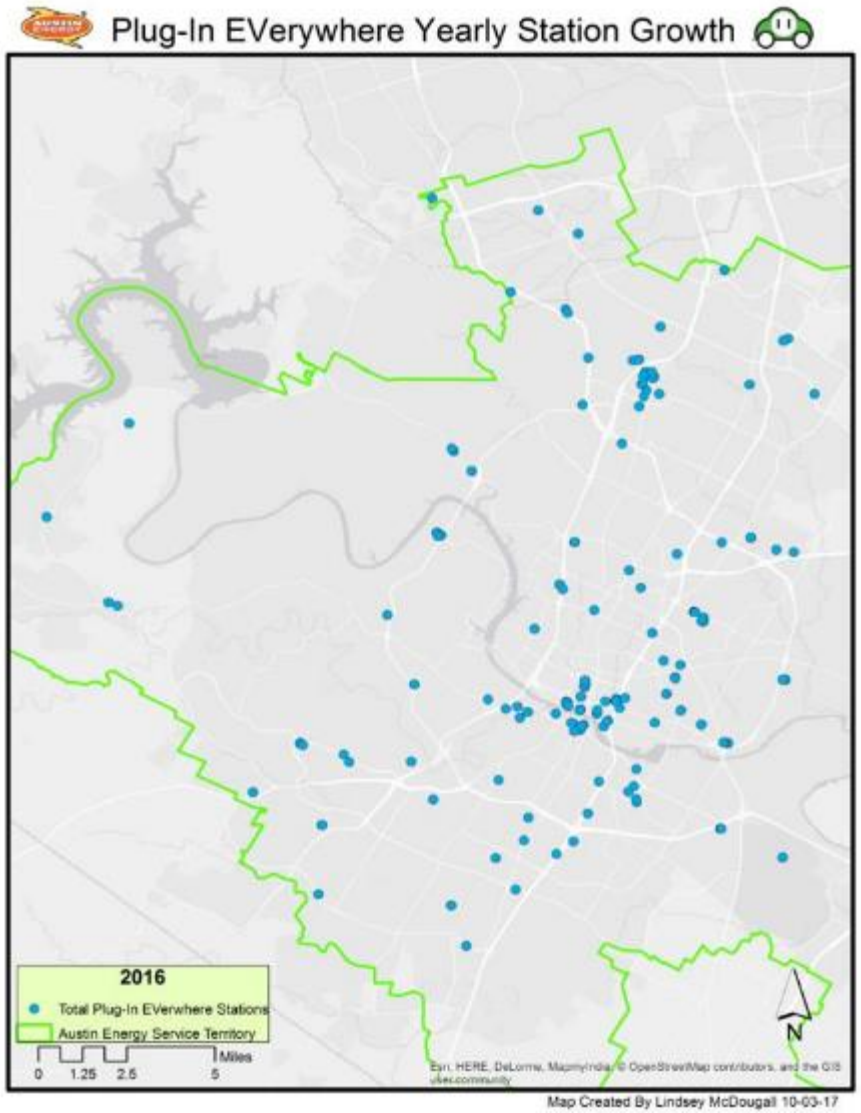
Smart Cities Challenge

Working group of the Mayor, City Council, Austin Energy, and Austin Transportation Department created a mobility marketplace strategy to connect underserved communities to economic opportunities and reduce the spread of poverty.



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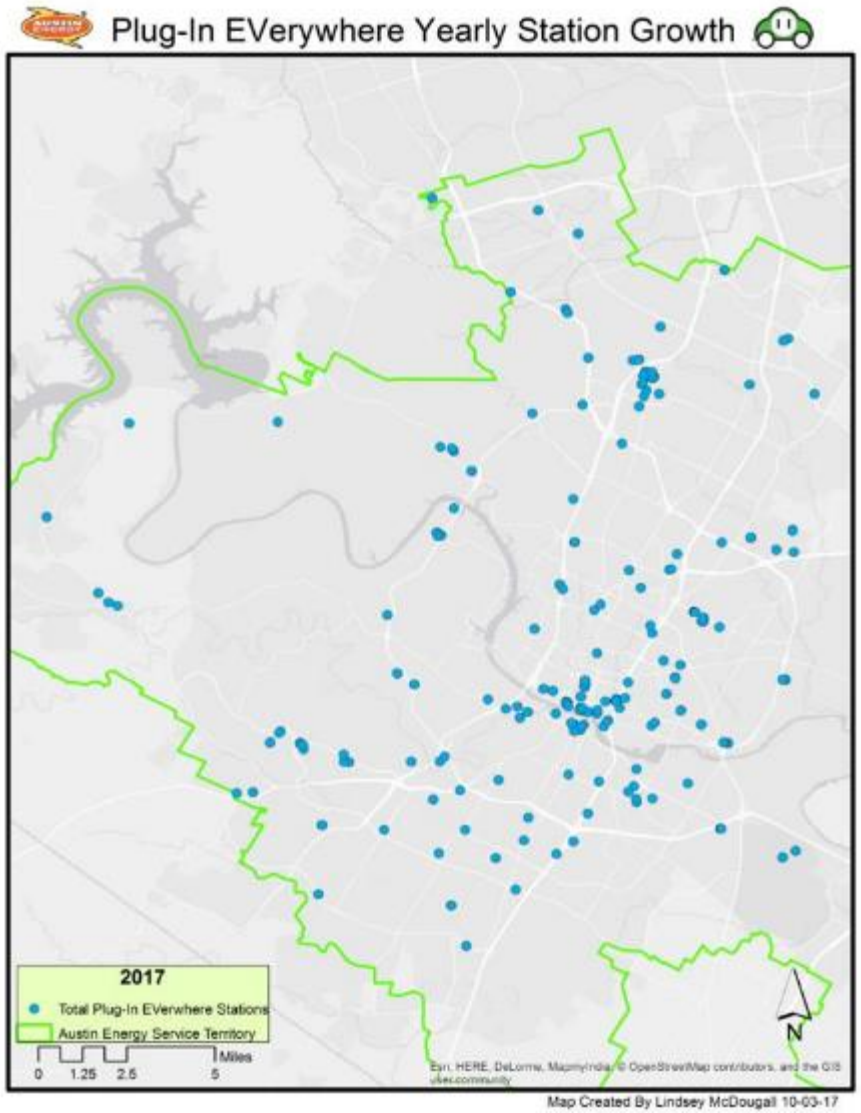
Fast Charger Introduced

Electric Drive Project was launched providing fast charging in downtown Austin. Smart mobility project that included DC Fast, level 2 charger, and a solar kiosk for e-bike charging.



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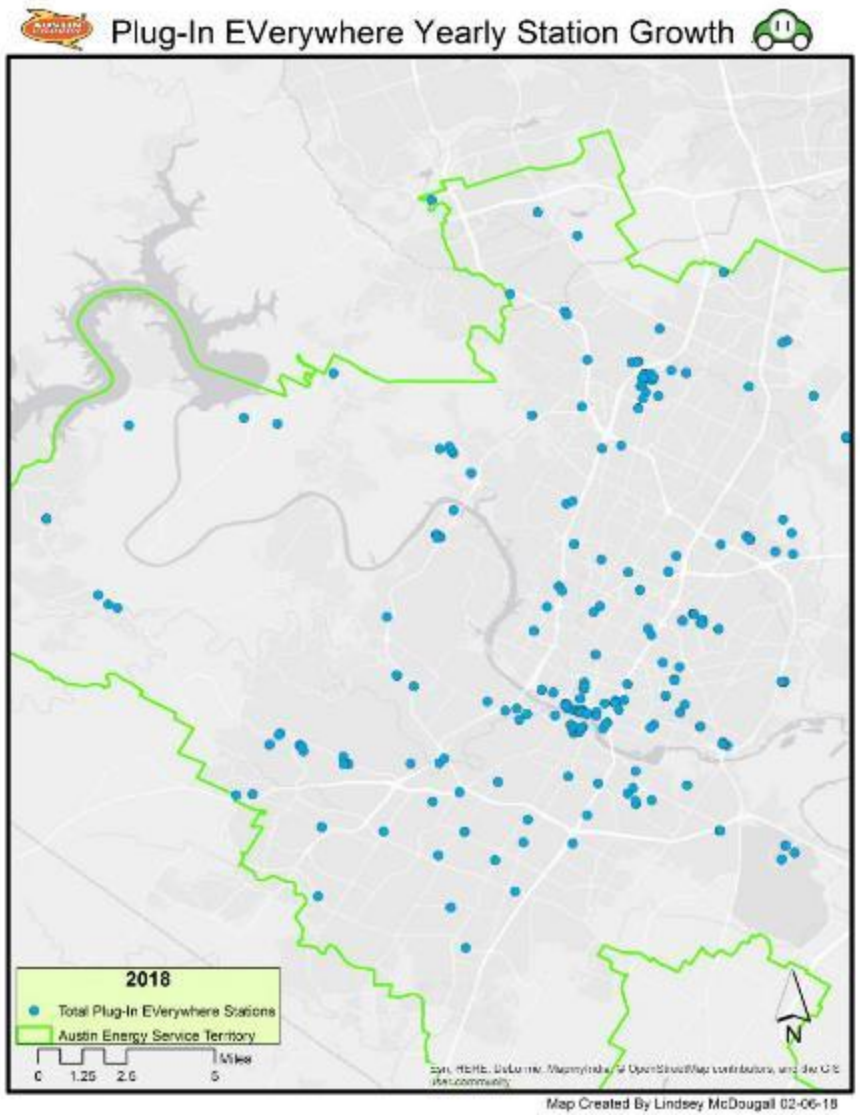
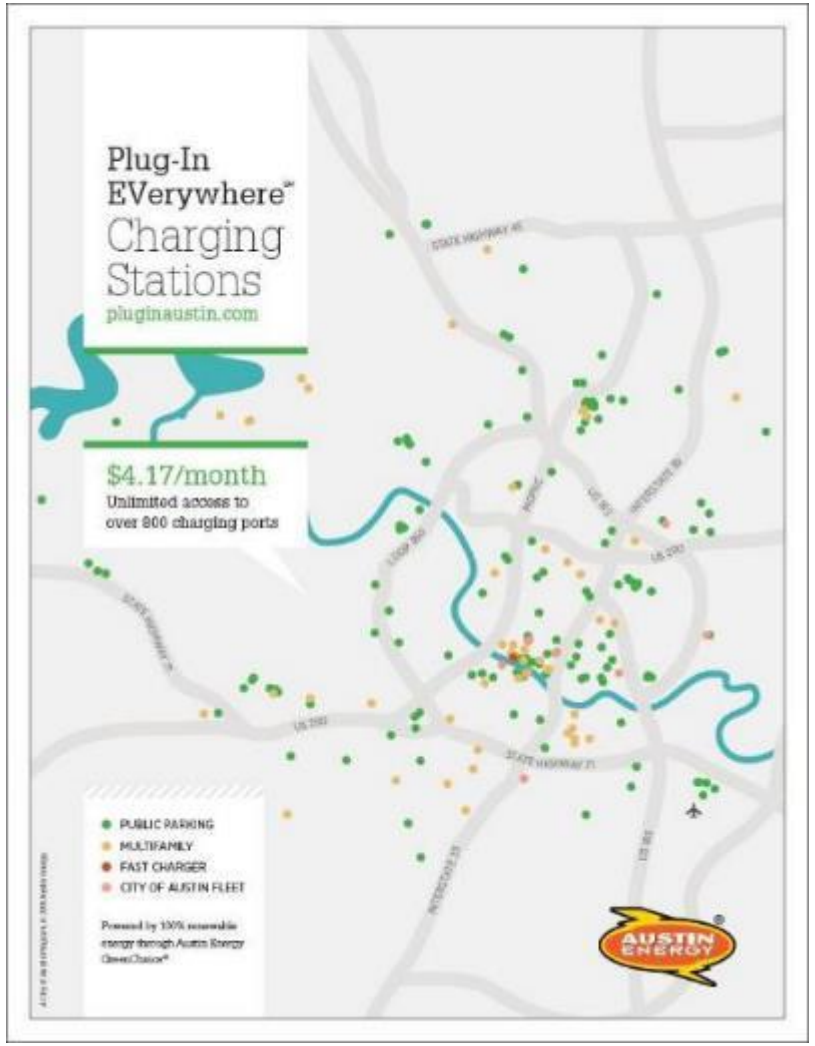
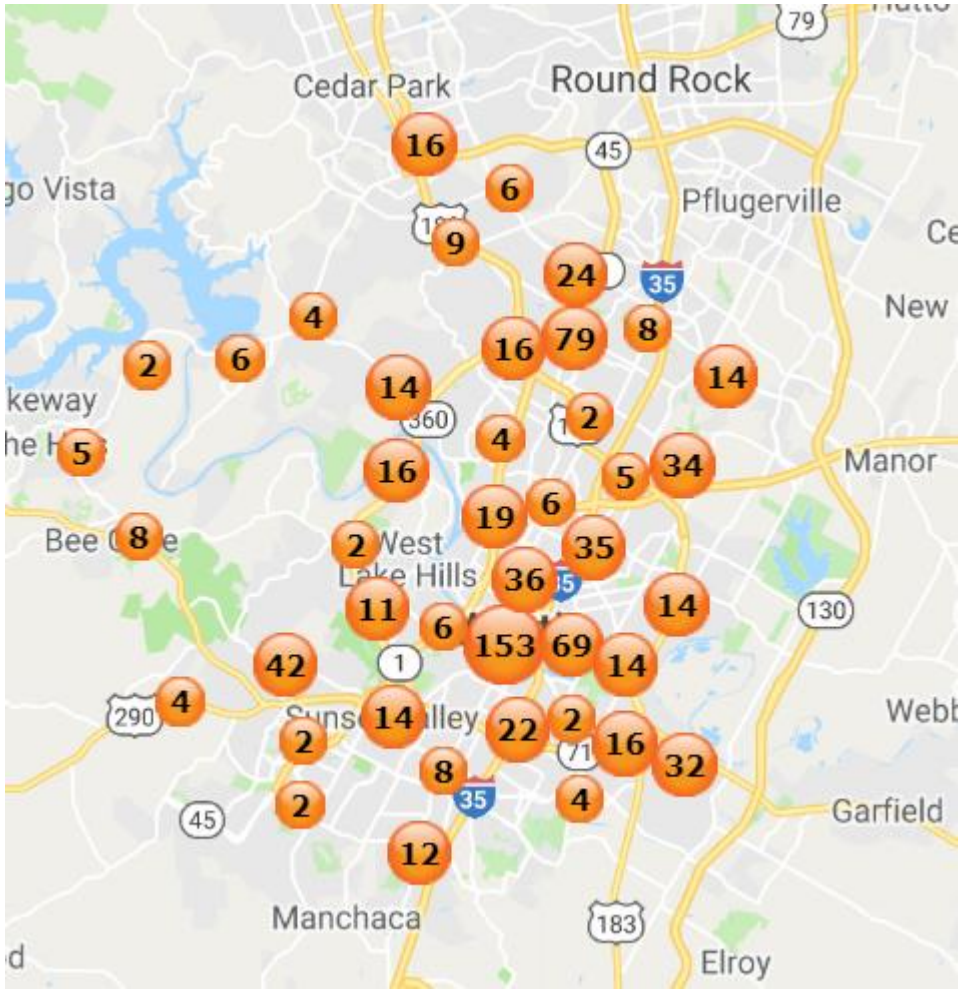


Mobility Services

ExecuTesla, MavenGig, and other high-mileage participants brought the need for increased fast charger. City of Austin was awarded a grant to expand fast charging infrastructure.

Current Network 2019





EV Infrastructure Management System

ChargePoint EV Dashboard April 2019

4 Key Questions for EV Infrastructure

01 What is the optimal location for charging stations?

02 When and how quickly is charging needed?

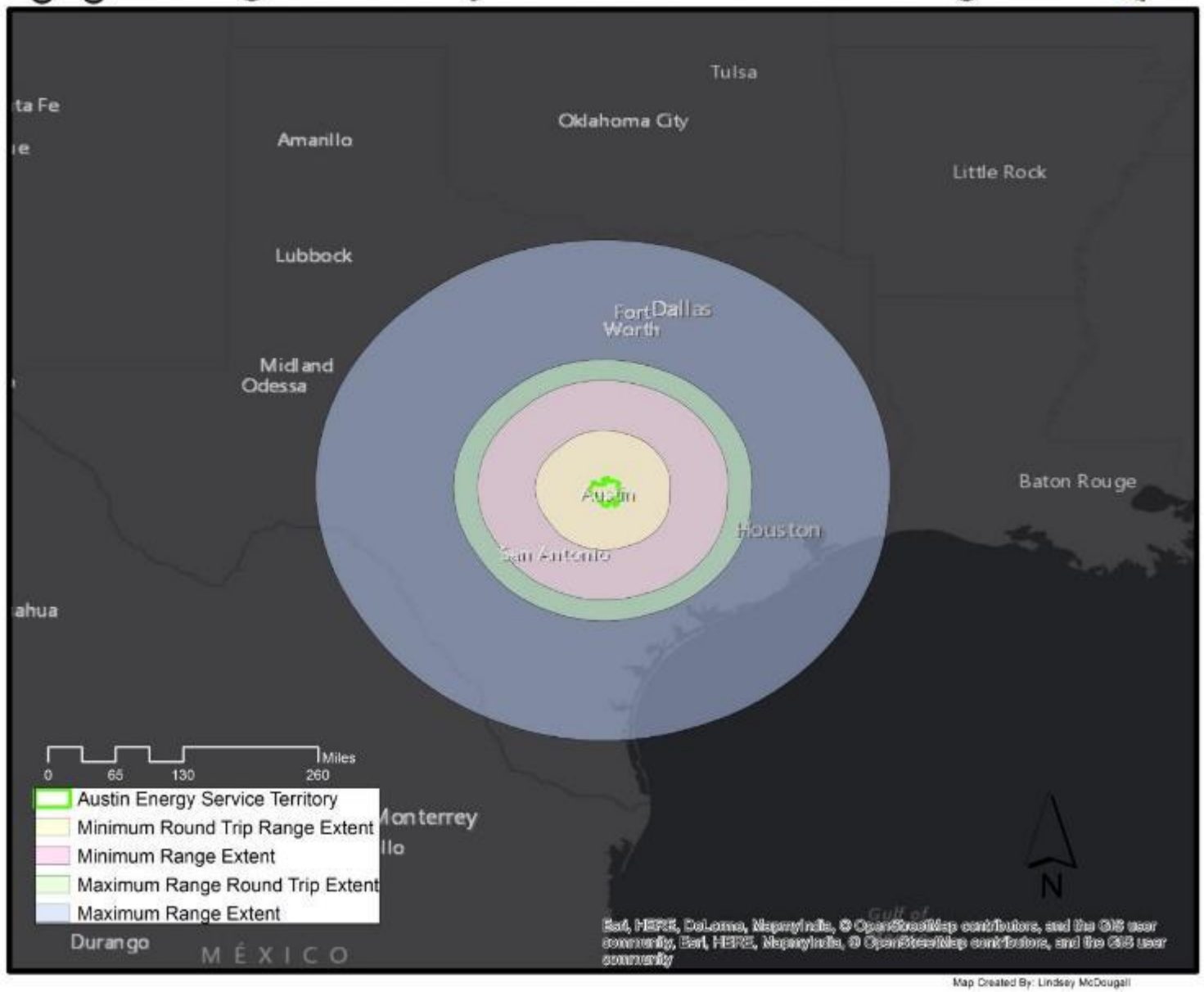
03 Who are the critical partners for electrification?

04 Which policies or programs will accelerate adoption?

Plug-In EVerywhere Service Range

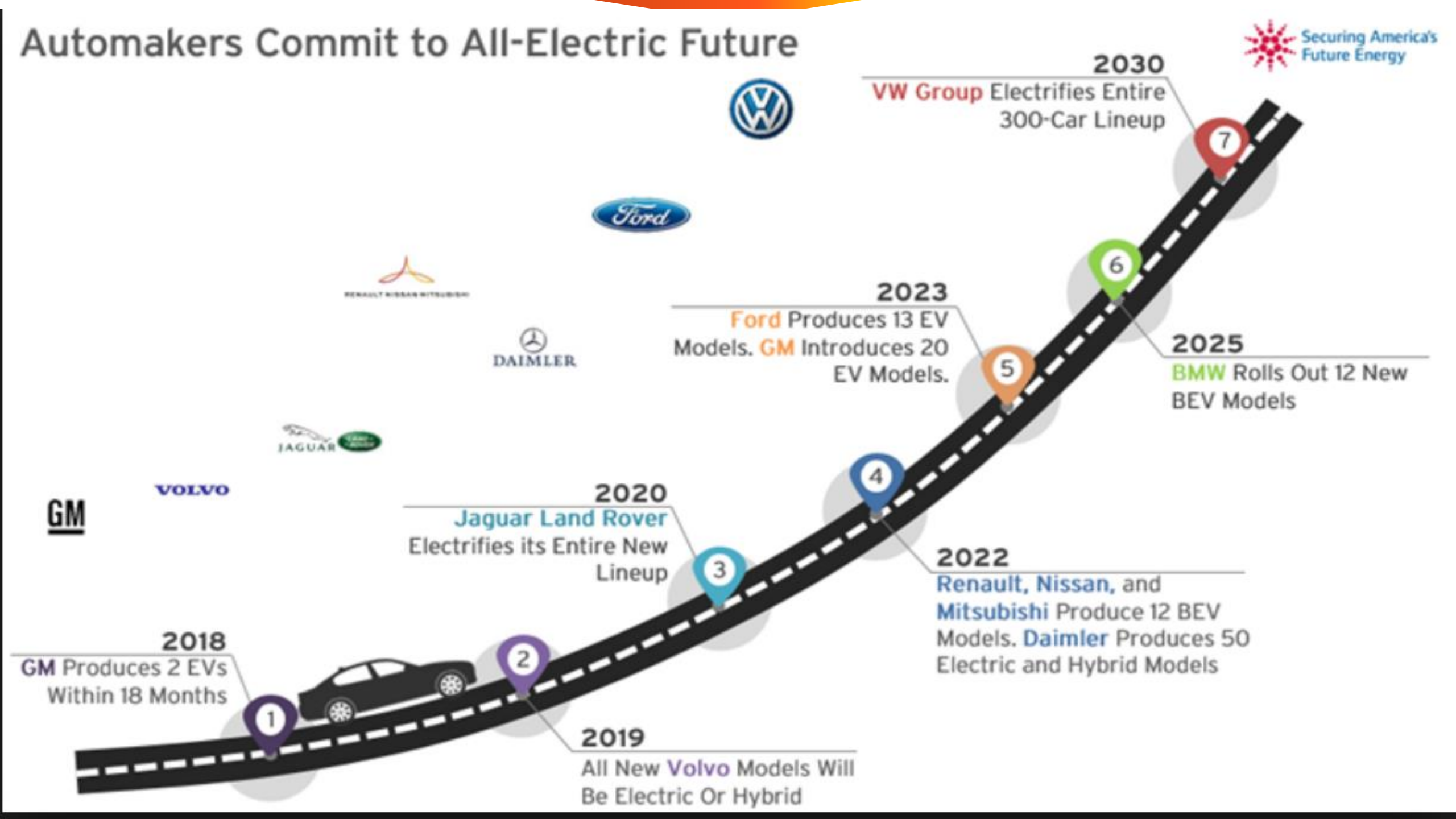
Why Corridors Matter?

Charging Infrastructure goes beyond the traditional borders of territory and governance.



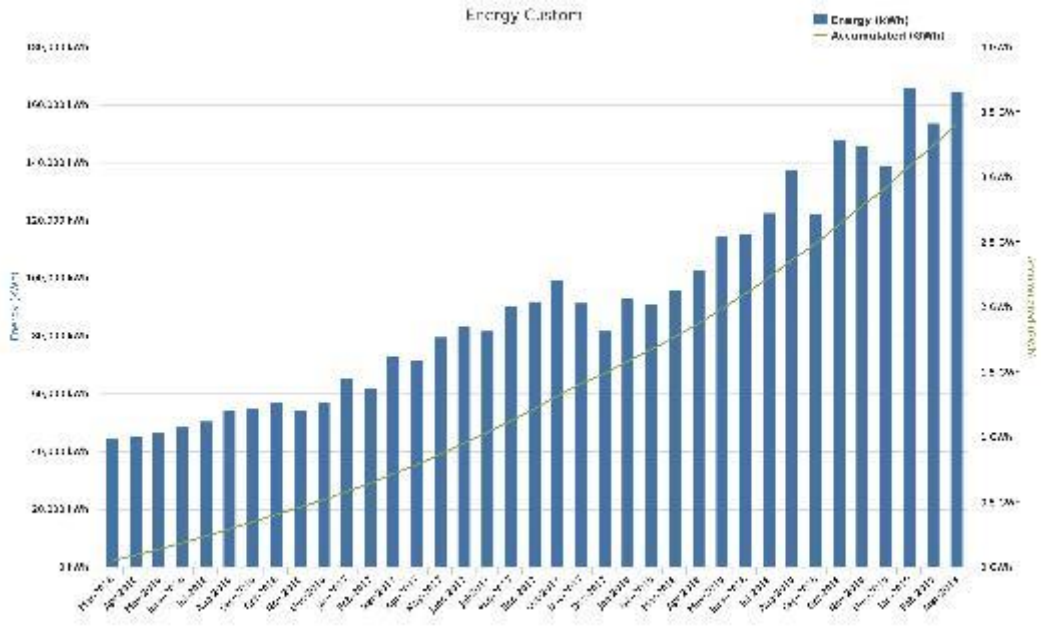
Automakers Commit to All-Electric Future

Securing America's Future Energy



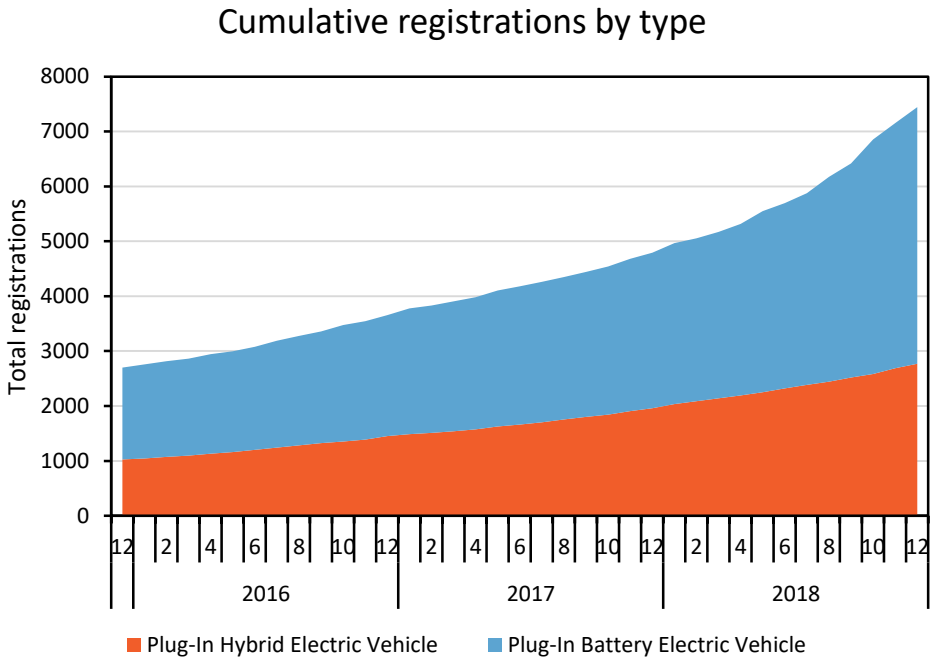
Electric Vehicles Charging & Adoption

Plug-In EVerywhere kWh Charging
(Monthly, 3 Year Rolling)



Public Charging: 4.31 GWh consumed through 513,301 charging sessions since 2012 with 800+ ports.

Austin Area EV Consumer Adoption
(Monthly, 3 Year Rolling)



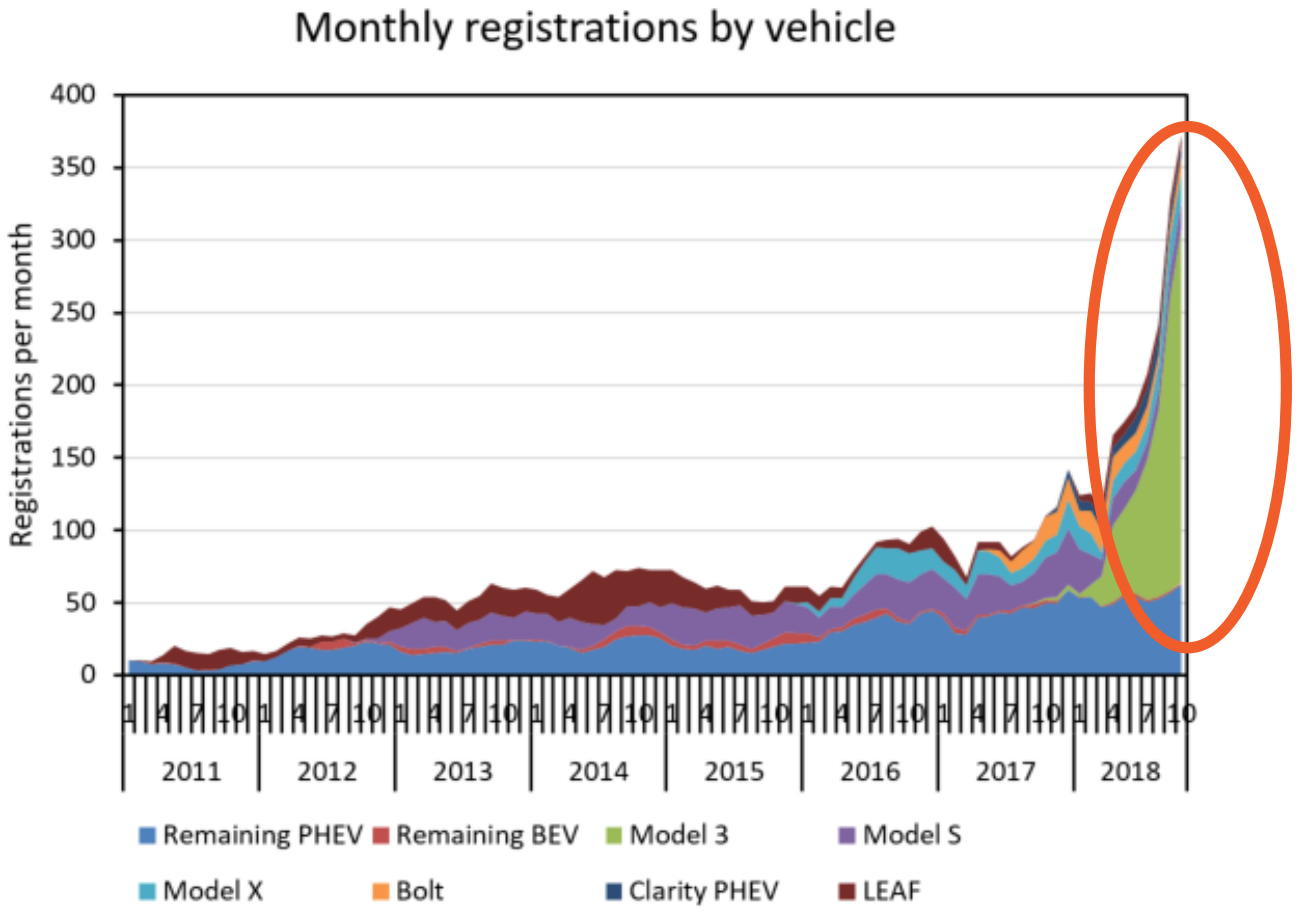
7445 EVs consume approx. 29.78 GWh/year.

**Data provided from EPRI for Travis and Williamson County.*

One new vehicle can spike adoption

Partner with Auto Manufacturers

Economic development, incentivizes for operating in your city, county, or state.

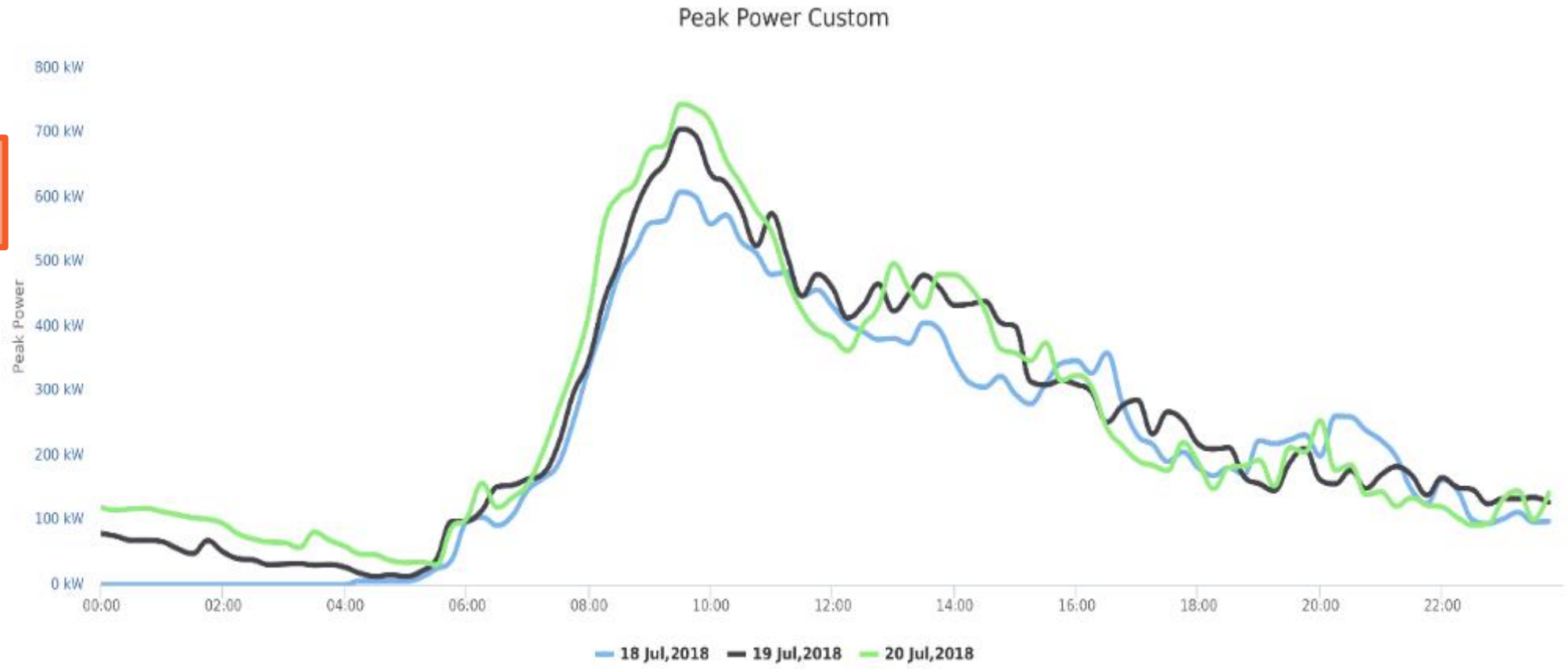


Data provided quarterly from EPRI for Travis and Williamson County.

Public Charging Infrastructure Demand Curve

4CP Contribution + Demand Shapes

Demand?
Demand = $$$



July 19, 2018 EV Peak Demand

The Cost of Electrification

Role of Electric Rates

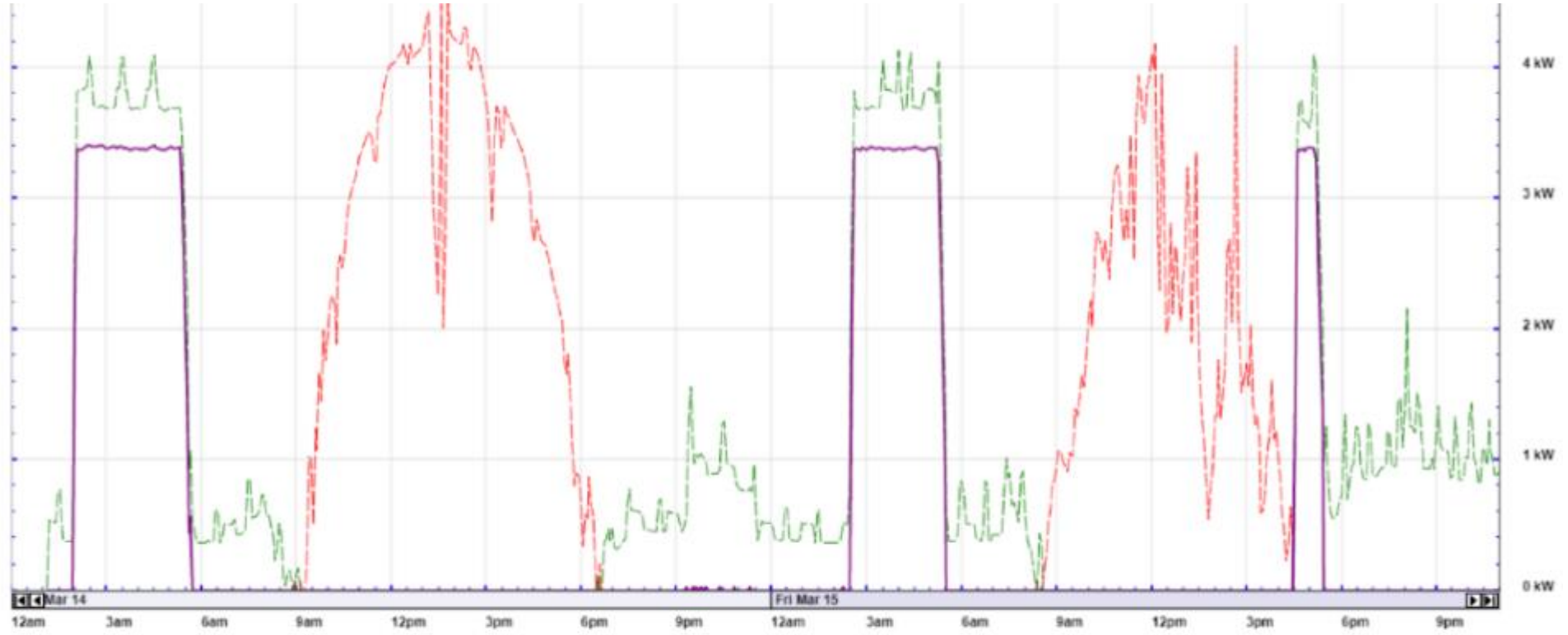
EV Charger Rate	Equates	Demand Charge
Level 1 (1 kW)		$0 / kW
Level 2 (7 kW)		$ 0 / kW
Current DCFC (50 kW)		$ 4 / kW*
Future DCFC (150 kW)		3x more expensive than the current DCFC
Bus Charger (350+ kW)		10x more expensive than the current DCFC

Financial Concerns

Demand charges can be preventative for EV charging market participation by outside vendors.

*Costs are simplified ignoring power factor adjustment, electric delivery charge, customer charge, etc.

Grid-Challenges



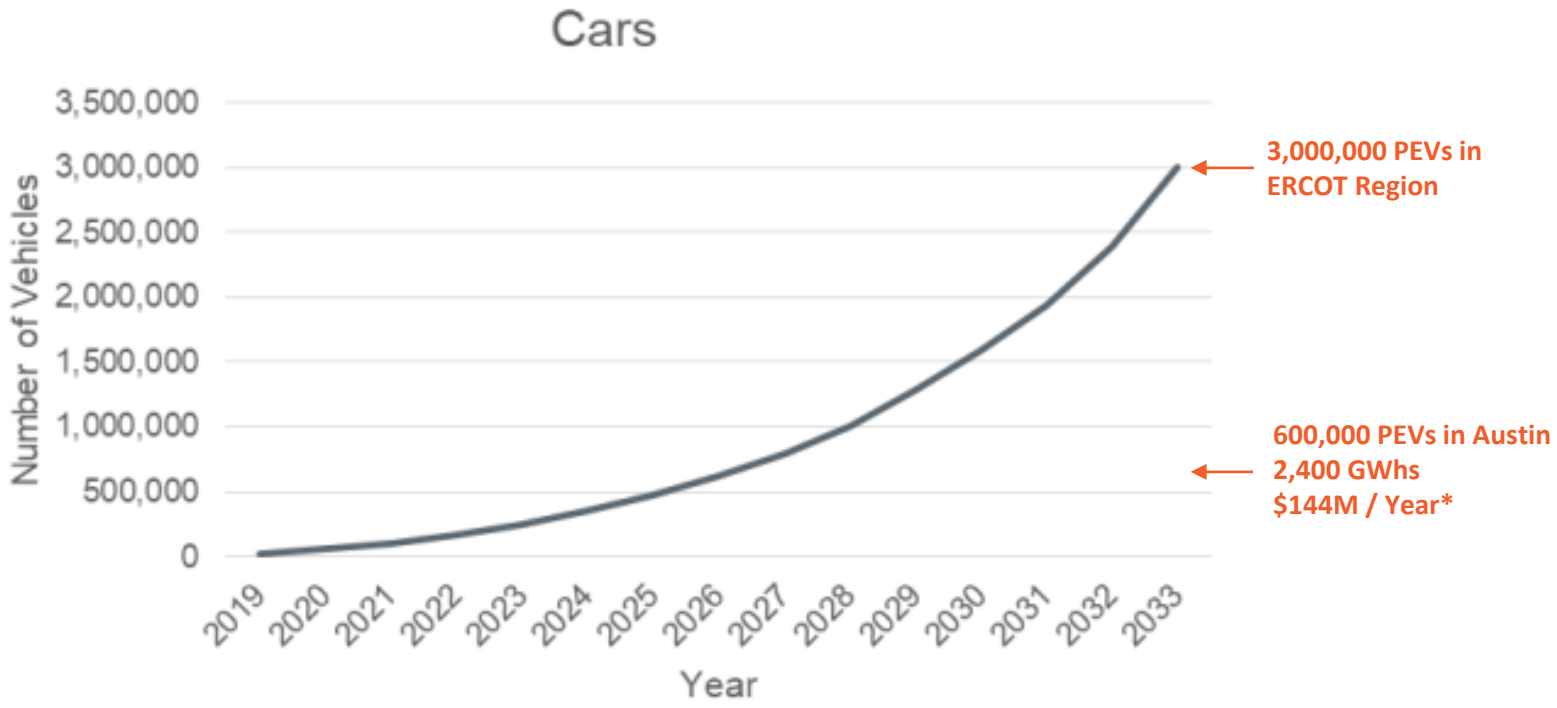
Addressing Utility Concerns

Research grid challenges early on the process. EV charging is rooted in human behavior and application need. Encouraging "good" charging etiquette is as important as infrastructure.

Source: Pecan Street Lab

ERCOT LTSA

Expectations for Austin Energy



Adoption of Electric Cars from 2019 - 2033

3,000,000 PEVs in ERCOT Region

600,000 PEVs in Austin
2,400 GWhs
$144M / Year*

2018 Public EV Contribution to 4CP
≈ **300 kW**

2033 Public EV Contribution to 4CP
≈ **30,000 kW !?**

"Transportation Electrification was assumed to start slowly but grow exponentially…"

- Source ERCOT 2018 Long-Term System Assessment (LTSA)

*Projected Revenue does not include pass-through costs or riders

DCFast Enables High Mileage Adoption

High-mileage applications require adequate DCFast

- Taxi fleets
- “Gig economy” to include ride-share and delivery services
- Intercity corridor travel
- The future of autonomous mobility

Maven Joins City of Austin, Texas in Deploying All-Electric Shared Use Fleet of Chevrolet Bolt EVs

gtm:

Electric Cars Could Save Ride-Sharing Drivers $5,200 a Year

Lyft, Uber and Ride Austin drivers are ideal candidates for electric vehicles, according to a Rocky Mountain Institute analysis.


SEAHOLM
ECODISTRICT


ELECTRIC DRIVE

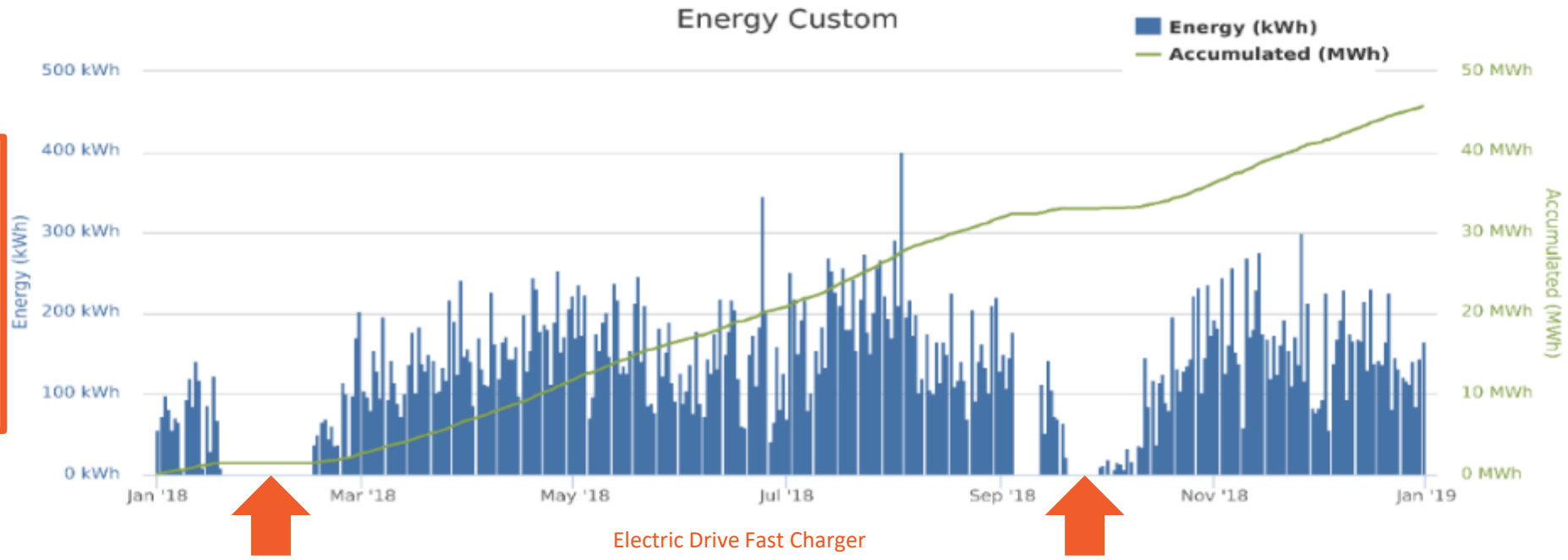

ELECTRIC DRIVE

DC Fast Charging on Electric Drive

Most Used Station in Texas

Reliability

No technology can be defective-free or perfect. Encourage redundancy for reliability.



A Typical DC Fast Charging Hub

Example: 8 DCFast Stations is a new commercial customer that can generate high Demand (450+ kW) on small footprints (1,000sf).

ELECTRIC VEHICLES

Austin Energy sees third party EV charging as win-win

October 25, 2018 Peter Maloney

AUSTIN ENERGY

AMERICAN PUBLIC POWER ASSOCIATION

eGSE at Austin-Bergstrom International Airport

- Improve air quality by replacing aging gas and diesel ground support equipment (GSE)
- Currently 20 charging stations
- 12 plug-in baggage trucks and belt loaders
- Divert power to greatest need
- Tie to Jet Bridge Circuit

Public-Private Partnership

Delta, Southwest, and United Airlines took the charger partnered with ABIA to reduce their vehicle emissions by electrifying transportation.

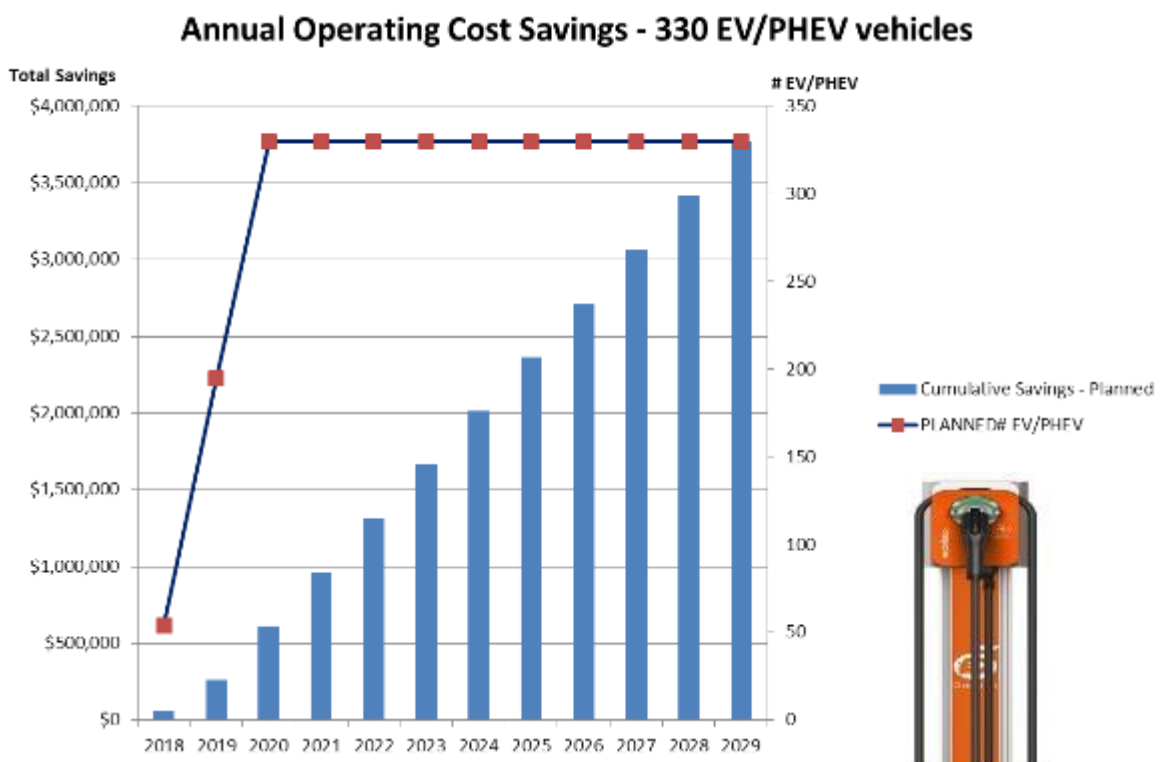
Source: United Airlines eGSE

Fleet Services Electrification Plan

- 2016 Council Resolution in response to Smart Cities Challenge
- $3.5M Savings in Total Cost of Ownership
- Replace 330 vehicles with EV/PHEV
- Expand Charging Infrastructure
- Fund through interdepartmental fueling charging

Policy Drives Change

City Council's resolution re-energized the fleet electrification plan. Cities need to lead by example.



CPF25 Charger

Fleet Services: Design Plan

- Design, construct, and energize charging stations at City-owned Sites

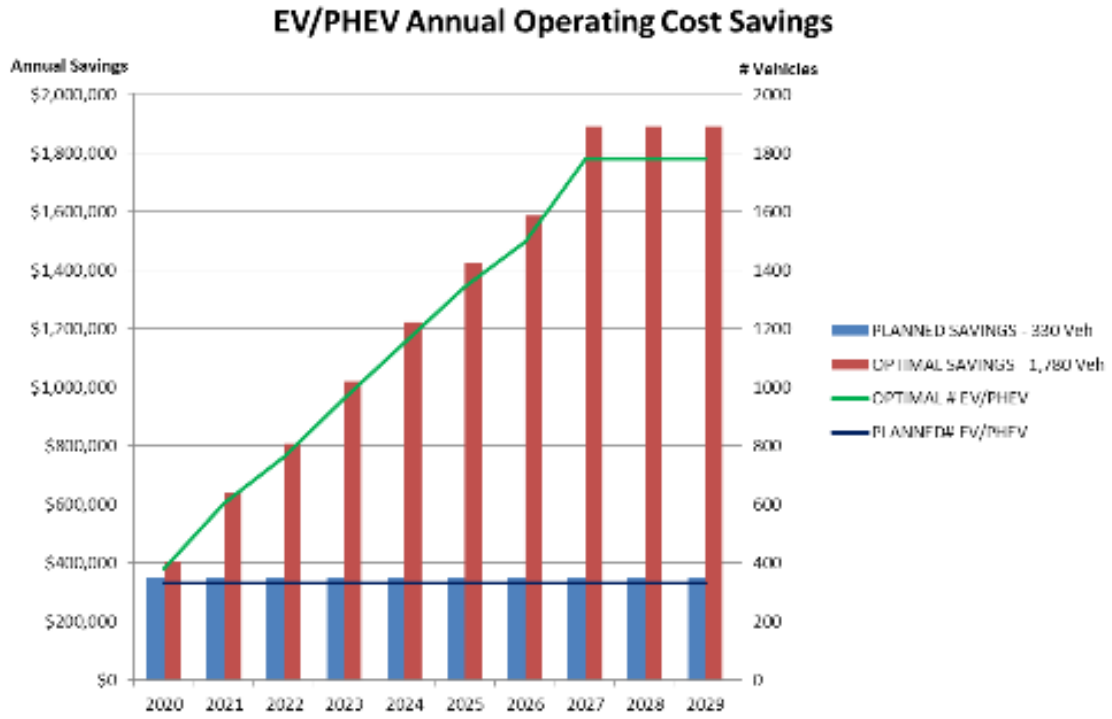
AE Distribution North (Kramer C) – Scope of Work

Plan for the Future

Don't just design for yesterday's needs but design for tomorrow's challenges.

Fleet Services Electrification Plan Expanded

- Current fleet size is 6,652 with 33% light-duty
- Retirement eligibility of 1,780 more vehicles
- Up to 12.5M of Total Cost of Ownership Savings
- Expand on initial site designs



Big Picture

The goal should always be full conversion and have infrastructure to support a 100% electric fleet.

Level 1 Fleet Opportunities

"Right Size" Infrastructure
Understand the use cases of your fleet and explore cost-benefits.

Source: St. Elmo Yard & CTEC

Cap Metro Fleet Electrification Project

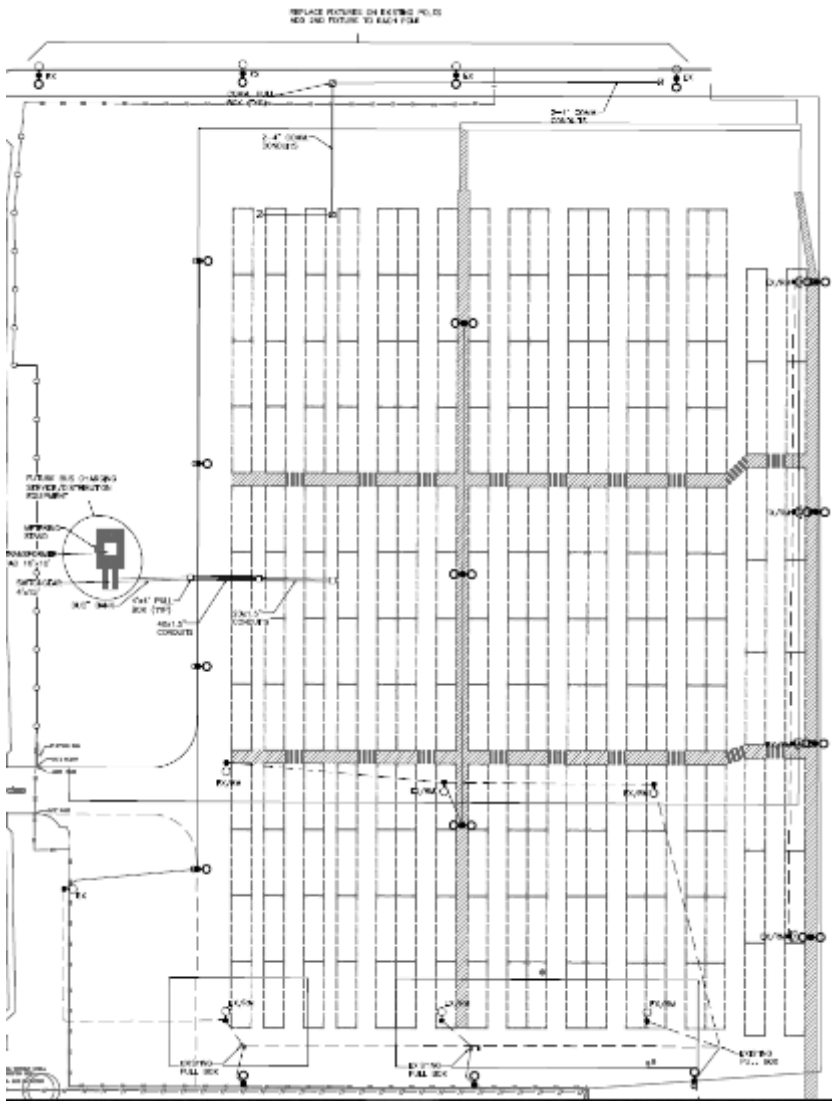
- Former Serta warehouse on McNeil to become Bus Charging Depot
- Support up to 200 electric buses
- Rate & Infrastructure Planning
- Role of the Transit Authority
- Vendor Beware
- Route Analysis

Impact with Infrastructure

Bus electrification has the opportunity to not only decarbonize transportation but educate the public on the benefits of electrification.

Source: Capital Metro

Bus Electrification – Charging Depot



Proposed Site Clearances

- Determine when to charge.
- Identify required clearances
- Estimate peak demand / load factor
- Size transformer
- Effect of terrain/temperature/use

Importance of the Utility

Get the electric utility involved in the discussion early for any bus electrification or large-scale depot charging project.

Austin American-Statesman

Charging stations at schools to power electric vehicles, student minds

AUSTIN ENERGY®

"EVs for Schools" Program

EV’s for Schools Curriculum Overview

EV Lessons for Schools Overview

This EV Lessons for Schools program introduces students to electric vehicles (EVs) and helps them understand why it is helpful to think about our transportation habits and their environmental impacts. Students build awareness of advancing electric vehicle technologies as they examine different types of EVs, consider the advantages and disadvantages of EVs, and compare EVs to traditional cars. They also think through important considerations related to an EV purchase, such as factors that might offset initial costs and how an EV owner plans a long-distance trip. They explore the issue of EV equity and think about ways they could help make sure EVs are accessible to everyone, including people in low-income communities that are often hardest hit by emissions pollution. Students also examine an EV charging station and its related app to see first-hand how the technology works and to gather data on electric vehicles. In the final lesson, students learn a design-thinking process to help them tackle a short-term or long-term capstone project related to EVs that could have long-lasting impacts for their community.

...

This program includes:

- 3 engaging lessons that encourage awareness, personal development, project-based learning, and design-thinking methods with a range of teaching strategies, including presentations, videos, activities, assessments, portfolio assignments, technology integration, and community extensions.
- 7 additional lessons from our Sustainable Intelligence program to provide additional instruction on foundational topics of energy, transportation, and sustainability.
- Student worksheets that engage students in real-world learning exercises.
- Standards alignment to the Texas Essential Knowledge and Skills (TEKS) for Environmental Systems, Integrated Physics and Chemistry, and Physics; Common Core State Standards (CCSS) for ELA/Literacy and Mathematics; Next Generation Science Standards (NGSS) for high school; and the Cloud Education for Sustainability (EFS) Standards & Performance Indicators.

Next ▸

Electric School Buses: “Go Yellow to Go Green”

- Route Analysis – stacked routes
- Identify charging at bus depot (L2)
- Determine if other use cases
- Get utility / board/ construction involved

Public-Private Partnership Opportunity

Funding is the biggest challenge when it comes to school bus electrification. It takes a village of partners (OEMs, Charging Station Manufacturers, School Districts, Electric Utility, Transportation Department, and local government) to support a project like this.

EV Current Events

PUCT Docket 49125

Review of issues relating to electric vehicles

- Grid impact
- Business models

86th TX Legislature

Variety of bills

- Repeal $2500 incentive
- Fees in lieu of gas tax
- eMotorcycle rebate

City of Austin

Ordinances and Codes

- Smart Mobility Roadmap
- Local support for carbon neutral fleet
- Net-zero by 2050

Funding Sources

Alternative Fuel Grant

Provide infrastructure for the Clean Transportation Zone

- Interstate Highway focused
- Houston, San Antonio, and DFW triangle

Electrify America

$2 Billion

- 1.2B outside of California
- DC Fast High Corridors
- Education & Outreach

VW Settlement Funds

$209M – Texas

- 81% vehicles to priority areas
- 15% for charging infrastructure

Codes and Ordinances

Green Building Codes

Expand third-Party Charging

ADA Accessibility

Policy Impacts

Supporting electric vehicle charging friendly policy is CRITICAL to the success of infrastructure expansion.

How can you support Infrastructure in your ____?

Infrastructure Location

Prioritize corridors for maximum impact.

New Mobility Services

High VMT (vehicle miles traveled) drivers (Uber, Lyft, Favor) will come if you build it.

Create an Open Market

Encourage third-party EV charging. Remove any restrictive code/ordinance barriers.

Build Relationships

Collaboration between OEMs, businesses, the local utility, and government is key.

Educate the Public

Community outreach and education on infrastructure – both on vehicles and on charging stations.

Funding Options

Grants, Capital Improvement Projects, rebates, and public-private partnership.

State EV Policy Actions

Utility-Investment

Austin Energy, AEP Ohio, Duke Energy, Baltimore Gas & Electric. California – SB350 states "widespread transportation adoption requires electric corporations to increase access to the use of electricity as a transportation fuel."

Right-of-Way

New Orleans – permit to install on sidewalks between home and street. Seattle – EVCROW program for curbside charging.

EV-Ready Wiring Codes

% EV requirement for parking spaces, EV-readiness for buildings. Adopted in Georgia, Washington, and California.

Vehicle Rebates

Federal incentives, states rebates (TCEQ), and utility-rebates.

Low-income investment

EVs for Everyone in Austin, Power Your Drive in San Diego. SB 1275 in California. Oregon - increased EV rebate for low-income.

Protect Parking Spots

Arizona – 28-2416 fines an ICE driver. Maryland – SB 340 potentially penalized cars not charging. Washington – RCW 46.08.185 – vehicles not connected fined.

Source: Sierra Club Policy Toolkit

Monday

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10 NEW TV SHOWS TO CHECK OUT THIS FALL

VICTORY AT LAST

Tour Championship is Tiger Woods' first win since 2013

SWARMING SECONDARY HELPS HORNS JOIN TOP 25

Austin is going all in on charging stations

Kavanaugh's accuser reaches deal to testify

AUSTIN MONITOR BETA

Monday, June 25, 2018 by Jessi Devenyns

Austin's electric vehicle programming is revving up

DailyEnergyInsider
Your Resource for Energy Policy and News

Austin Energy focuses on innovative solutions to help city of Austin meet clean energy goals

myStatesman

Popularity of electric cars fuels Austin plan to add charging stations

AUSTIN GREEN AWARDS

11TH HOUR PROJECT
THE SCHMIDT FAMILY FOUNDATION
Grant Award

TCEQ
Grant Award

1st Place
E SOURCE AD AWARDS 2017

greentechmedia: GRID EDGE innovation AWARDS

FAST COMPANY WORLD CHANGING IDEAS 2019

Electric Vehicles & Emerging Tech Team

Bloomberg Philanthropies
Grant Award

SMART 50 AWARDS RECIPIENT

SMART 50 AWARDS RECIPIENT

SMART AWARDS RECIPIENT

Smart Electric Power Alliance
Utility of the Year

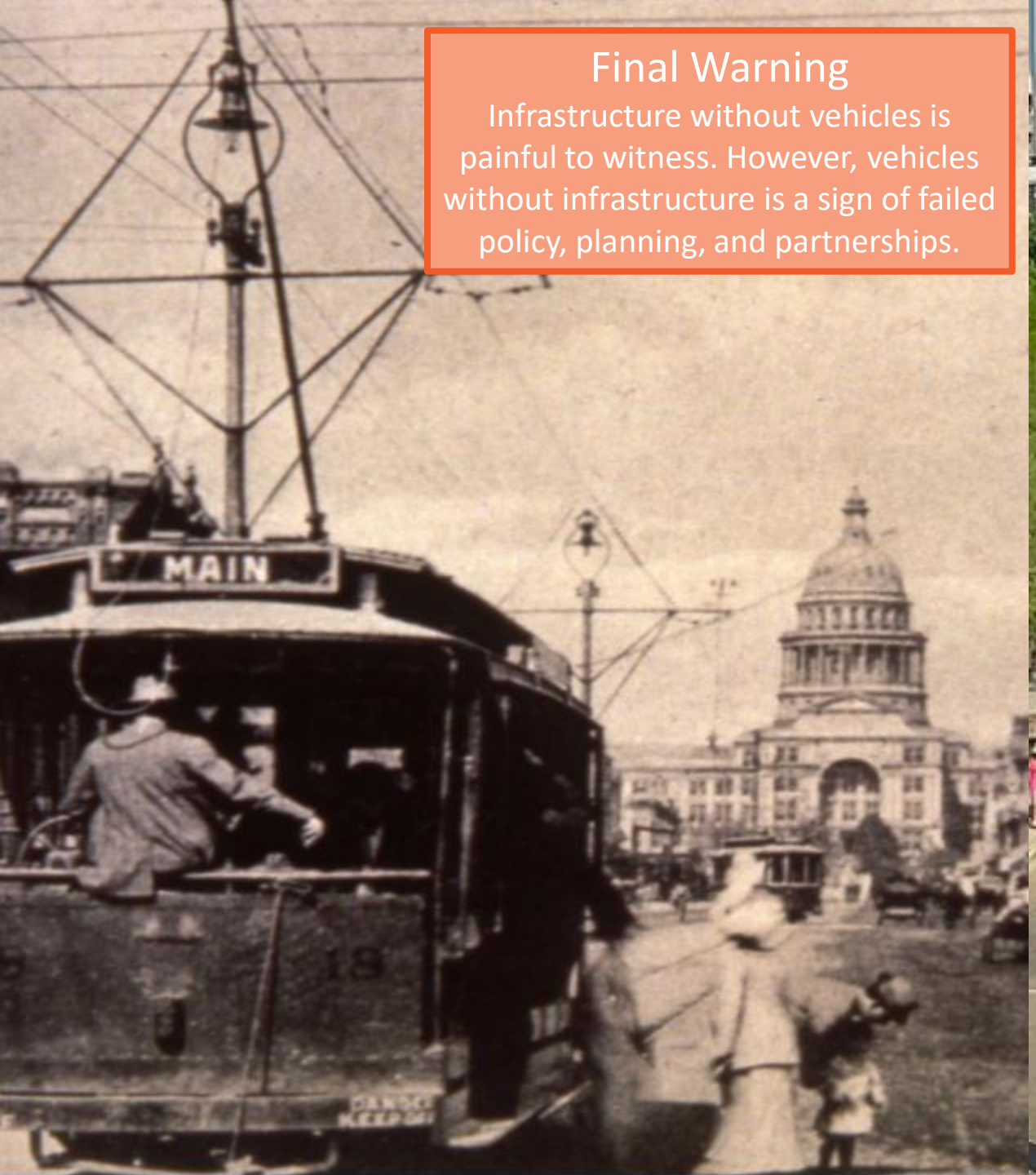
U.S. DEPARTMENT OF ENERGY
Grant Award

SMARTCITIESDIVE
Utility of the Year

DEED PUBLIC POWER RESEARCH & DEVELOPMENT
American Public Power Association

Final Warning

Infrastructure without vehicles is painful to witness. However, vehicles without infrastructure is a sign of failed policy, planning, and partnerships.



Thank You!

Questions?

Kevin.Chandra@austinenergy.com

https://www.youtube.com/austinenergy