EV Roadmap 10
Smart Cities
Electric Cities

Karl Popham
Mgr, Electric Vehicles & Emerging Tech
Austin Energy
Karl.popham@austinenergy.com

June 2017
What does Net-zero in 2050 Mean?

City of Austin Sustainability Office
Austin Energy 2025 Goals

55% renewable energy

900 MW of savings from energy efficiency and demand response

950 MW

200 MW local solar, 100 MW customer-sited, 10 MW local storage

All City of Austin facilities, operations and fleet carbon neutral

Subject to Affordability Goals
EV Program Value Proposition

We have to do it:
- Compliant with State Law (PURA)
- City Council resolutions
  - EV specific
  - Climate / Clean Air “Community Net Zero”
  - Shared, Autonomous, & Electric Mobility Plan

And it’s good for AE & our community:
- Supports DER storage goals
- National fuel independence
- Austin Energy’s culture as an industry leader
- Positive community feedback
- Economic impact
- New revenue stream for the utility/city
1. New Outreach Campaign
2. Electric Drive
3. Low-income initiative with 11th Hour Project
4. **Shared, autonomous, & electric mobility**
5. **City fleet EV deployment**
6. Residential EV TOU pilot
7. DCFast deployment
8. CapMetro e-Bus pilot
9. Ride-hail adoption pilot
10. **Austin SHINES**
Autonomous, Shared, & Electric

Three Revolutions in Urban Transportation

<table>
<thead>
<tr>
<th>Business-as-Usual Scenario</th>
<th>2 Revolutions (2R) Scenario</th>
<th>3 Revolutions (3R) Scenario</th>
</tr>
</thead>
<tbody>
<tr>
<td>20th Century Technology</td>
<td>Electrification + Automation</td>
<td>Electrification + Automation + Sharing</td>
</tr>
<tr>
<td>Through 2050, we continue to use vehicles with internal combustion engines at an increased rate, and use transit and shared vehicles at the current rate, as population and income grow over time.</td>
<td>We embrace more technology. Electric vehicles become common by 2030, and automated electric vehicles become dominant by 2040. However, we continue our current embrace of single-occupancy vehicles, with even more car travel than in the BAU.</td>
<td>We take the embrace of technology in the 2R scenario and then maximize the use of shared vehicle trips. By 2030, there is widespread ride sharing, increased transit performance—with on-demand availability—and strengthened infrastructure for walking and cycling, allowing maximum energy efficiency.</td>
</tr>
</tbody>
</table>

Number of Vehicles on the Road by 2050:

- 2.1 billion
- 2.1 billion
- 0.5 billion

CO₂ Emissions by 2050:

- 4,600 megatones
- 1,700 megatones
- 700 megatones

City Council Resolution: New Mobility EV/AV Plan for autonomous, shared, and electric
GOAL:
330 Plug In Hybrid and Battery Electric vehicles that are charged at City facilities by the end of CY 2020.

- **35** vehicles by the end of CY 2017
- **134** total vehicles by the end of CY 2018 (add 99)
- **229** total vehicles by the end of CY 2019 (add 95)
- **330** total vehicles by the end of CY 2020 (add 101)

City Council Resolution on City EV Fleet Leadership

These vehicles will avoid over 15,000 mt CO2e & estimated **TCO savings of $3.5M** over their lifetime
Utility Scale Energy Storage + PV
Commercial Energy Storage + PV
Residential Energy Storage + PV
DER Management Platform

Illustrative

SHINES – Integrated Solar+Storage

Austin Energy Substation
Forecasting
Doosan DER Optimizer
Austen Energy SCADA Control
ERCOT/Market Signals
Austin Energy Substation

-100 Residential PV (-5kw) - Pecan Street Inc
ConnectDER HEMS
Smart Inverter
A/C
EV
Smart Inverter
A/C
EV

Austin Energy Community PV (-2mw)
Smart Inverter

9 Commercial PV (-550kw)
Ideal Power Converter
Storage
MARKET

AUSTIN SHINES SYSTEM OVERVIEW
ELECTRICITY COMMUNICATION & CONTROLS SMART INVERTER