



Fleet Electrification Study and Plan

Response to Council Resolution 20160505-025

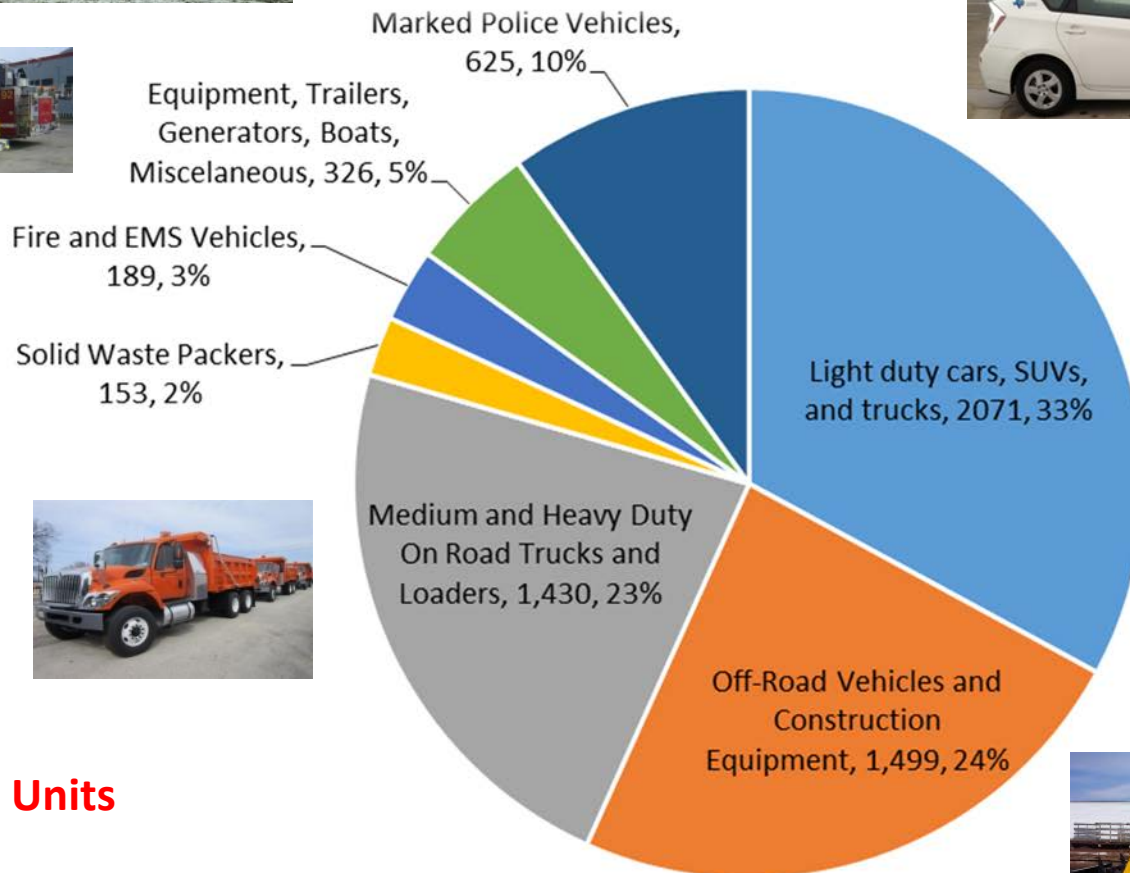
September 2016

Council Resolution 20160505-025

“...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.”

- Evaluate short and long-term cost savings.
- Analyze return on investment options.
- Determine impacts and benefits to Austin Energy.
- Identify electrification targets to achieve carbon neutral fleet by 2020.

Current Fleet Composition



6,293 Total Units

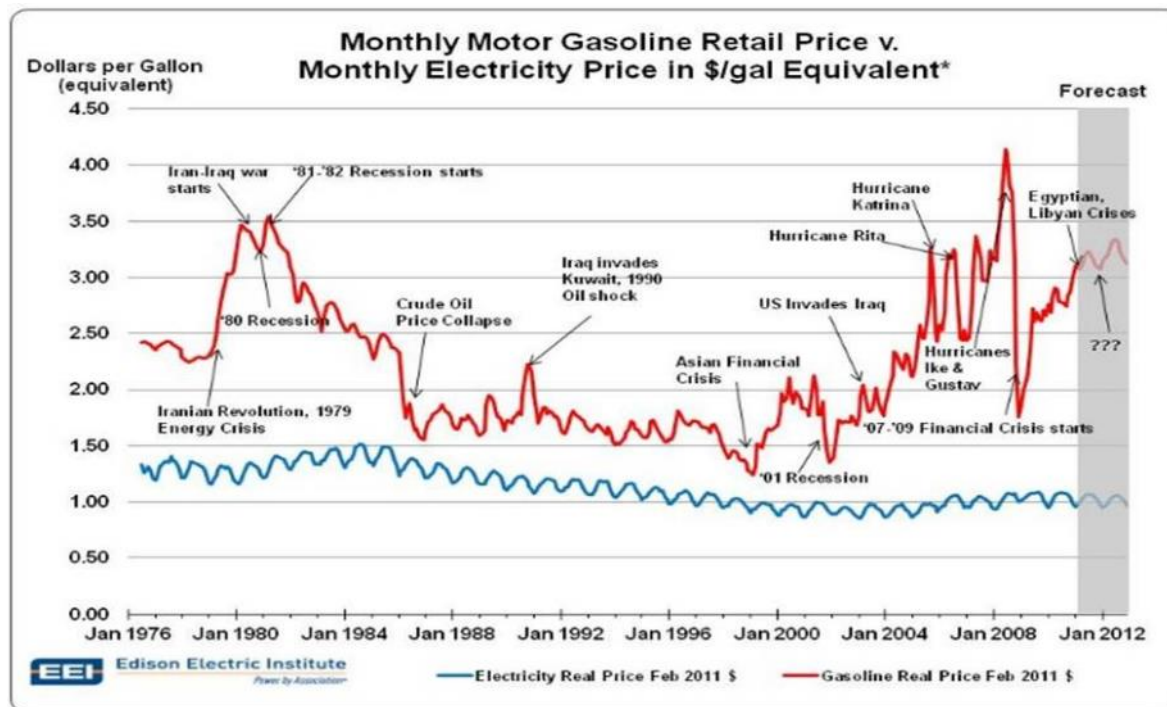
78% are alternative fuel capable or hybrid

Recommendations

1. Add 330 plug-in electric vehicles by 2020.
2. Expand City Fleet charging stations from 33 to 330 by 2020.
3. Fund electric vehicle acquisitions by the execution of municipal leases (lease-to- own).
4. Fund charging infrastructure through an interdepartmental fuel surcharge.

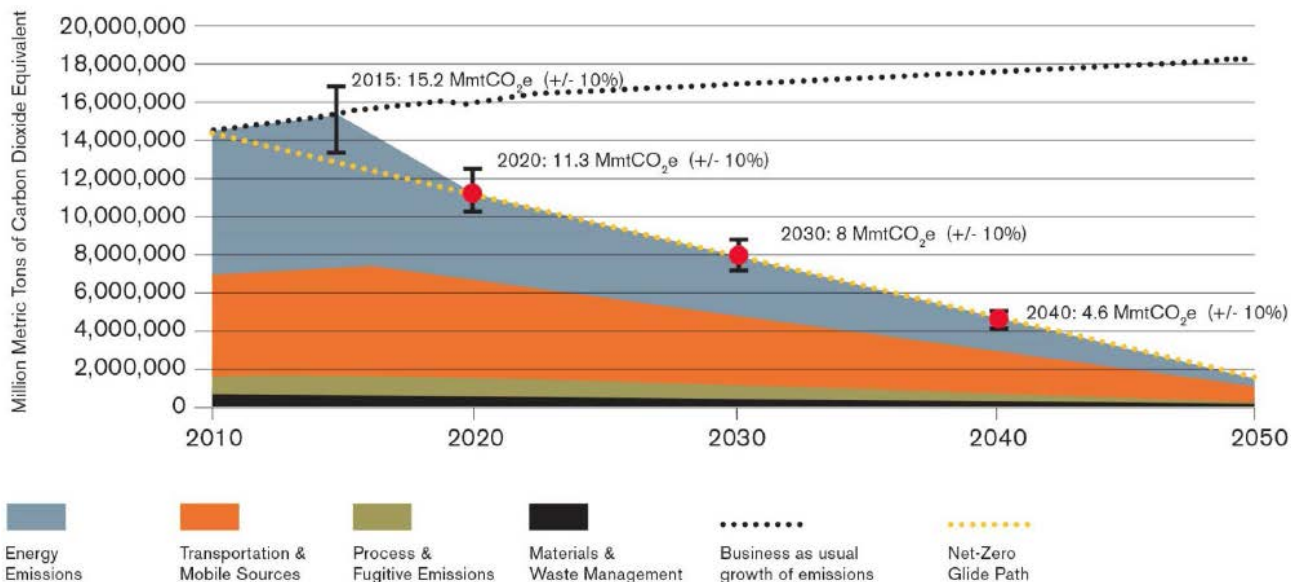
Electric Vehicle Economic Benefits

- Lower life-cycle costs than gasoline vehicles.
- Supports the local economy by purchasing kWh from Austin Energy.
- Reduces fuel price volatility risk.



Electric Vehicle Additional Benefits

- Supports Council adopted goal of Net Zero Community Wide GHG emissions by 2050.
- Demonstrates innovation and leadership to employees and the community.
- Diversifies the City fleet.
- Fuel independence.



Vehicle Technology

Battery Electric Vehicle (BEV)

Example: Nissan Leaf (MPGe: 126/101)



No gasoline used

No oil changes or transmissions required

20-100 kWh batteries

80–300 mile range on a single charge

Plug-in Hybrid Electric Vehicle (PHEV)

Example: Chevy Volt (MPGe: 106/42)



Gasoline engine creates electricity

Oil changes and transmissions required

5-15 kWh batteries

20-50 mile range on a single charge

300 miles of gasoline-extended range

Charging Technology

Level 1:

1kW adds 4 miles per hour

Level 2:

6.6kW adds 25 miles per hour

DC Fast Charge:

50kW+ = full charge in 15 minutes

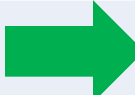


Fleet Analysis

Fleet Electrification Coalition:

- Analyzed over 1,000 City-owned sedans, minivans, and SUVs
 - Excluded marked police vehicles and pickup trucks
- Identified best electric vehicle candidates:
 - Older vehicles
 - Low daily mileage vehicles
 - High lifetime mileage vehicles
 - Expensive-to-operate SUVs and minivans
- 326 vehicles targeted for electrification
- **Fleet Services re-analyzed and recommends 330 by 2020**
 - 72 Plug-in Hybrids, 258 Battery Electric Vehicles

Life Cycle Cost Analysis

10-year Life-Cycle	Continue Current Operations (Gasoline & Alt Fuels)	Electrification of Vehicles (Muni Lease)	Savings
Vehicle Purchase Cost	\$9,400,000	\$9,400,000	\$0
Lifetime Maintenance Cost	\$4,400,000	\$2,300,000	+\$2,100,000
Lifetime Fuel Cost	\$4,200,000	\$1,100,000	+\$3,100,000
Infrastructure Development	\$0	\$1,700,000	-\$1,700,000
Auction Proceeds	(\$1,400,000)	(\$1,400,000)	\$0
TOTAL	\$16,500,000	\$13,000,000	 +\$3,500,000

Based on: 330 Electric Vehicles, 10 year-100,000 mile lifetime,
Electricity at \$0.11 / kWh, \$2.25 gasoline, and a \$7,500 EV Tax Credit

Vehicle Purchases

GOAL:

330 Plug In Hybrid and Battery Electric vehicles that are charged at City facilities by the end of CY 2020.

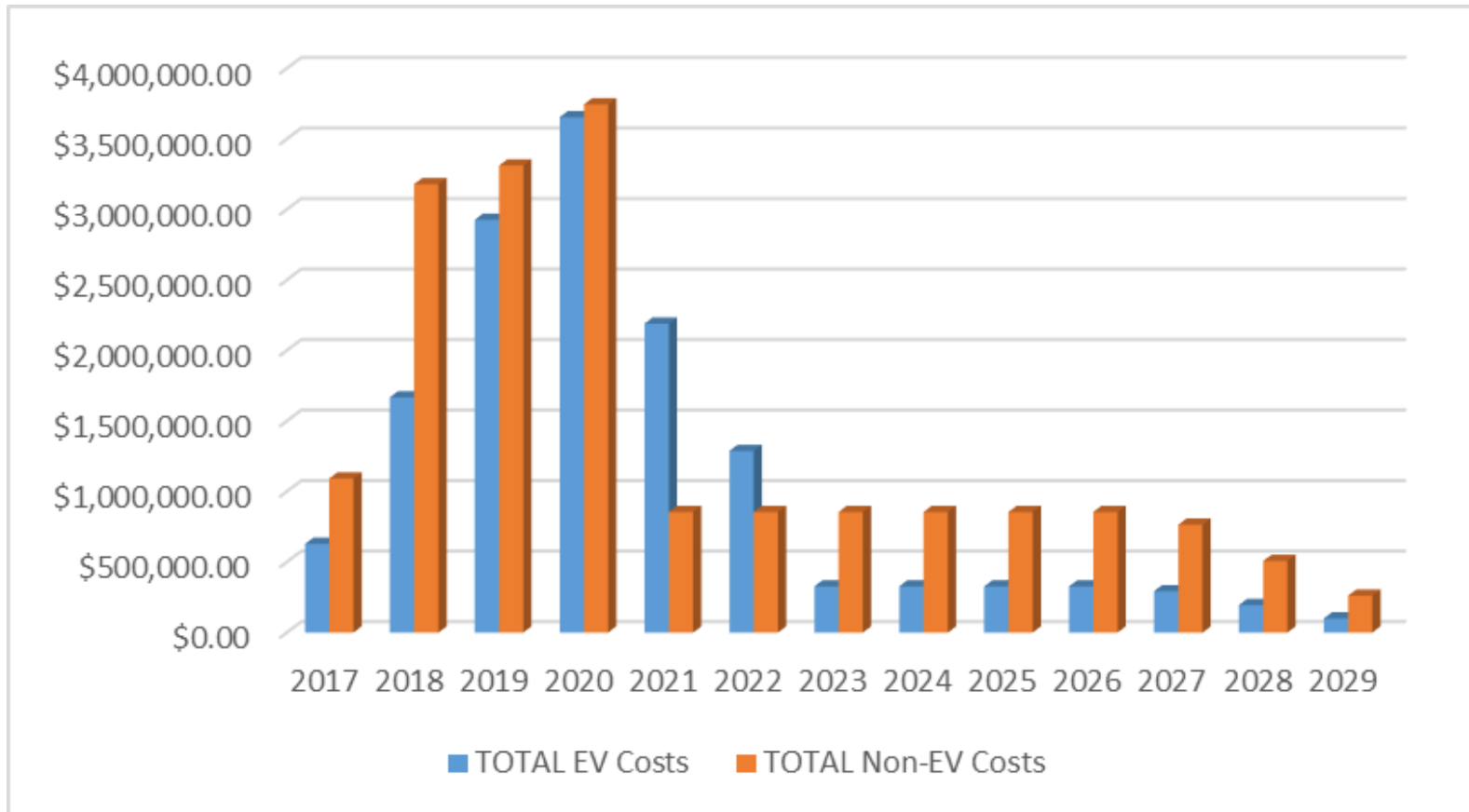
- **35** vehicles by the end of CY 2017
- **134** total vehicles by the end of CY 2018 (add 99)
- **229** total vehicles by the end of CY 2019 (add 95)
- **330** total vehicles by the end of CY 2020 (add 101)

Municipal Lease to own:

- Spreads initial costs over 3 years
- Takes advantage of \$7,500 federal tax credit per vehicle

These vehicles will avoid over 15,000 mt CO₂e over their lifetime

13 year Cash Flow



Total Non-EV Cost: \$16,500,000
Total EV Cost: \$13,000,000
10 Year EV Savings: \$3,500,000

Charging Infrastructure Implementation

Currently 33 charging stations deployed

Add 100 stations by the end of CY 2018:

- 10 Departments
- 15 Building locations
- All Level 2 Charging

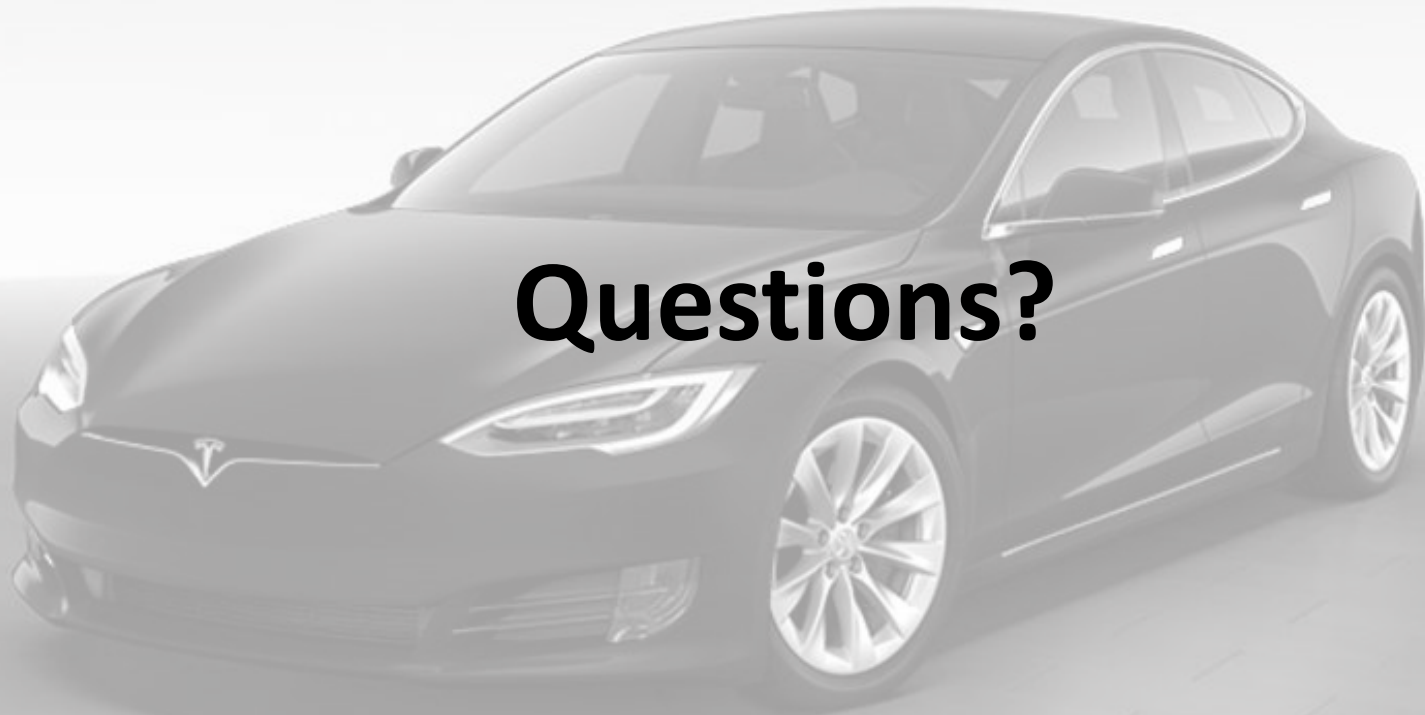
2017 Rollout Process

- Install charging stations
- Buy electric vehicles
- Train City staff on operations
- Deliver electric vehicles
- Evaluate performance and adjust as necessary

Upcoming Presentations

- 9/13 – Urban Transportation Commission
- 9/19 – Electric Utility Commission
- 9/21 – Environmental Commission
- 9/28 – Joint Sustainability Committee
- 10/5 – Council Mobility Committee

Final Report due to City Council by October 5, 2016



Questions?