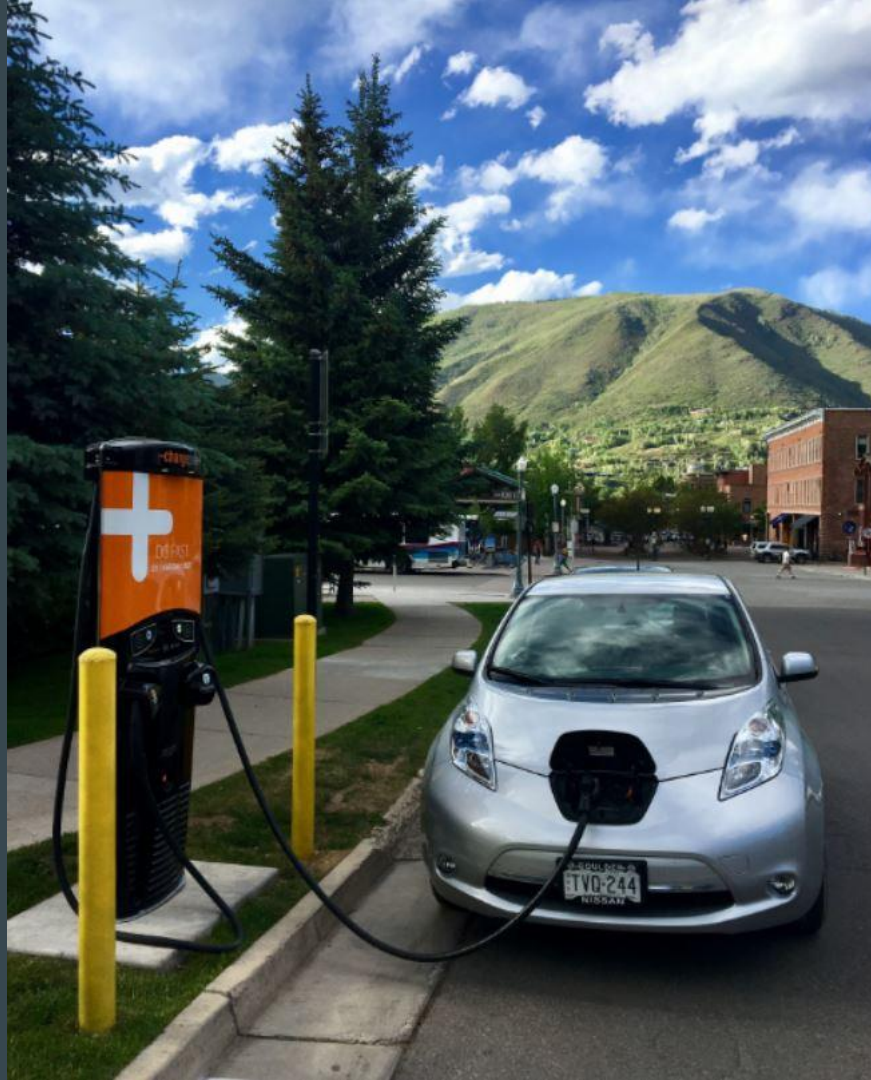


# Electrifying the Transportation Sector

Matt Frommer

Southwest Energy Efficiency Project (SWEET)

January 22, 2020

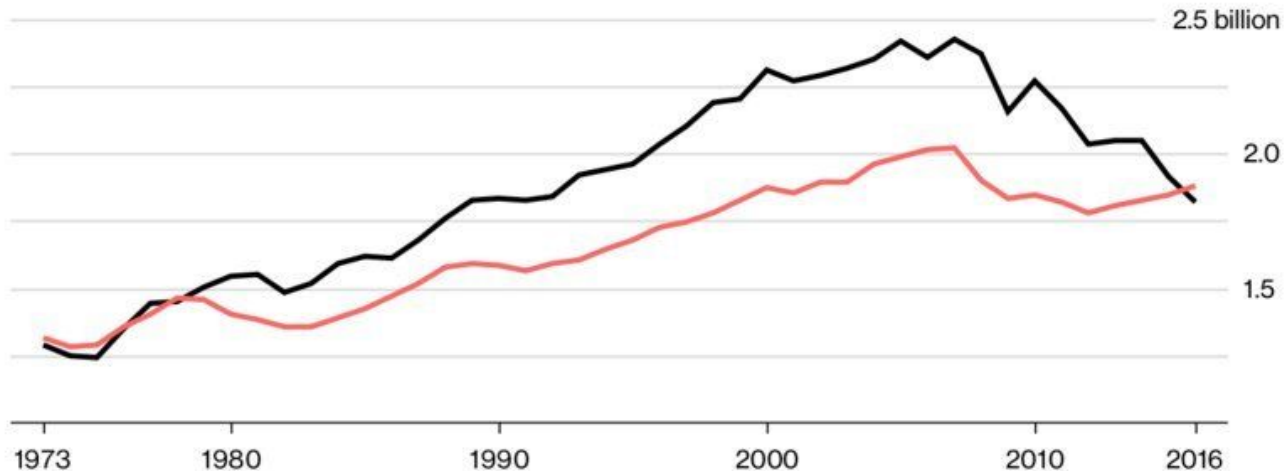


# GHG emissions from the transportation sector

## America's New Pollution King

Transportation emissions have surpassed electricity emissions for the first time since 1978

■ Electricity emissions (metric tons of CO<sub>2</sub>) ■ Transportation emissions



U.S. Energy Information Administration

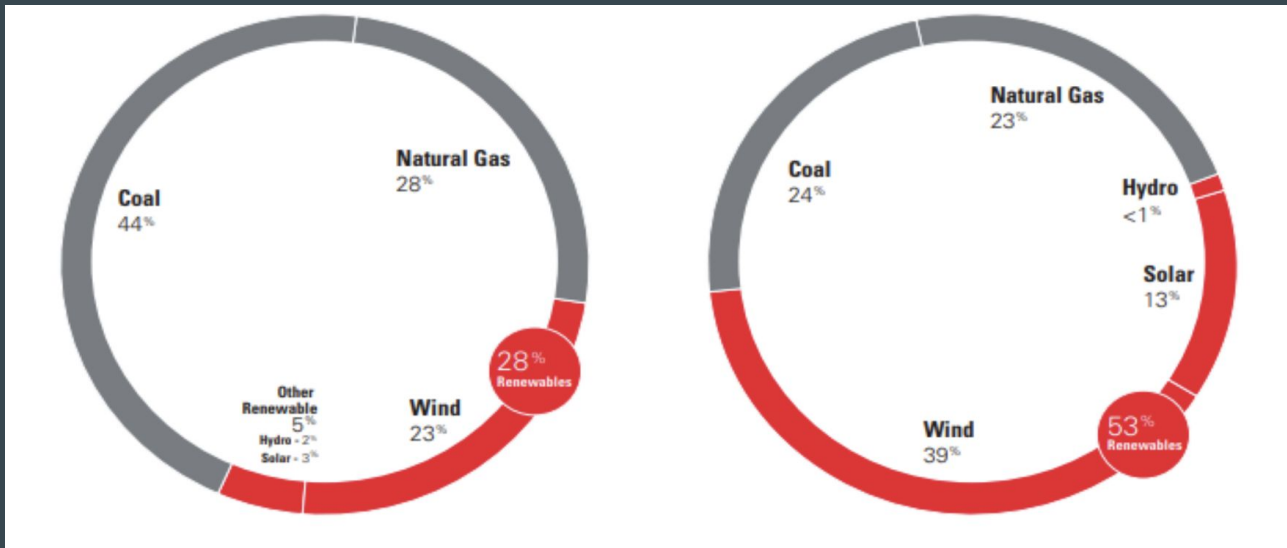
**Bloomberg**

# How clean are EVs?

2017 Xcel Energy Mix



2026 Xcel Energy Mix



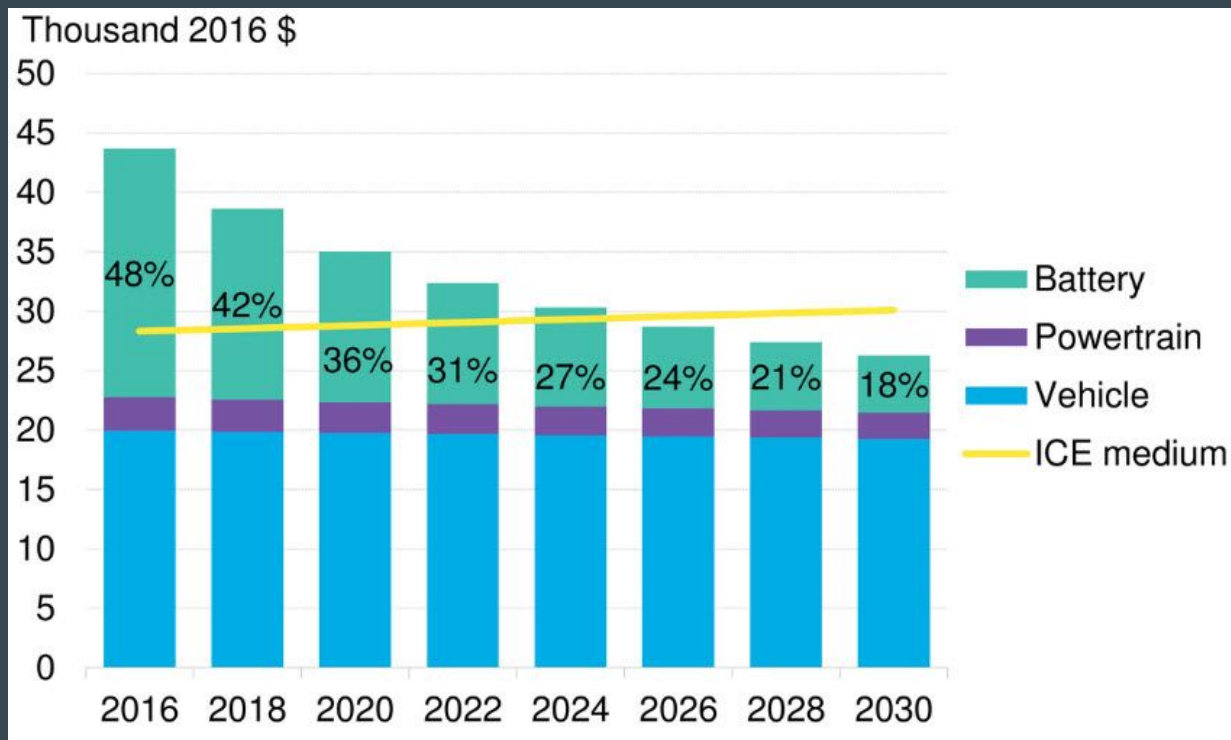
52 mpgE



105 mpgE

2030: GHG emissions from an EV will be equivalent of 150 mpg gas car.

# Electric vehicles to reach price parity by 2025



Bloomberg New Energy Finance

# Electric Vehicle Definitions:

1. **Battery Electric Vehicles (BEV)**: electric motor
2. **Plug-in Hybrid Electric Vehicles (PHEV)**: electric motor + gasoline engine



**2020 Nissan LEAF (BEV)**

151 - 226 miles electric range

\$29,990 - \$36,550

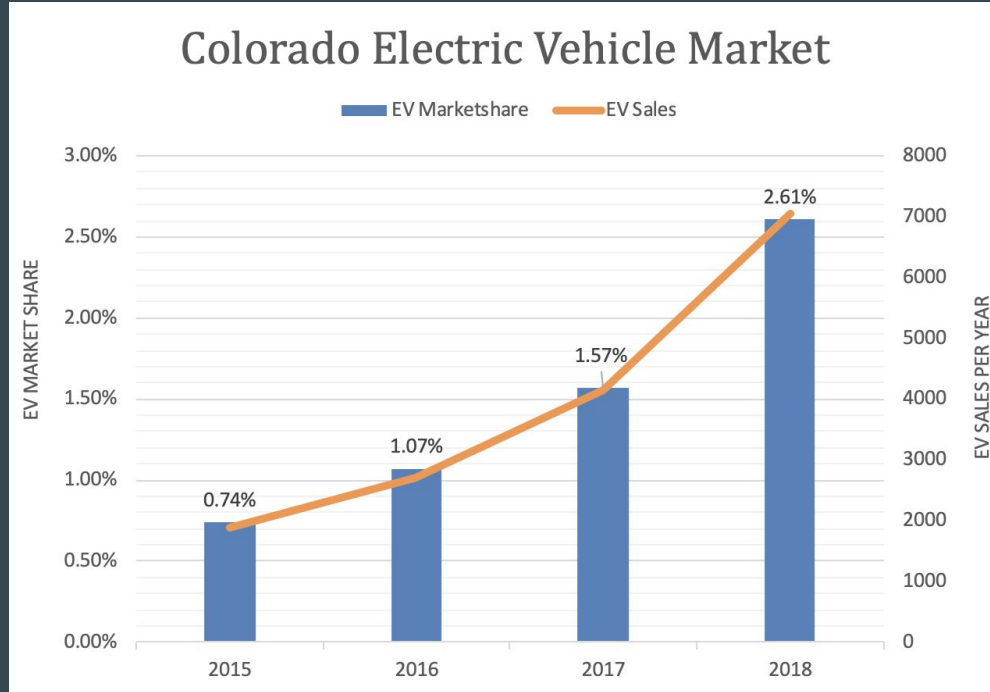


**2020 Toyota Prius Prime (PHEV)**

25 miles electric range, 54 mpg gasoline

\$27,350

# Where are we with EV sales?



Colorado State goal: 940,000 EVs on our roads by 2030 (17% of all vehicles)

# Barriers to EV adoption

1. High price point
2. EV model availability
3. Charging infrastructure
4. Dealership preparation
5. Public awareness



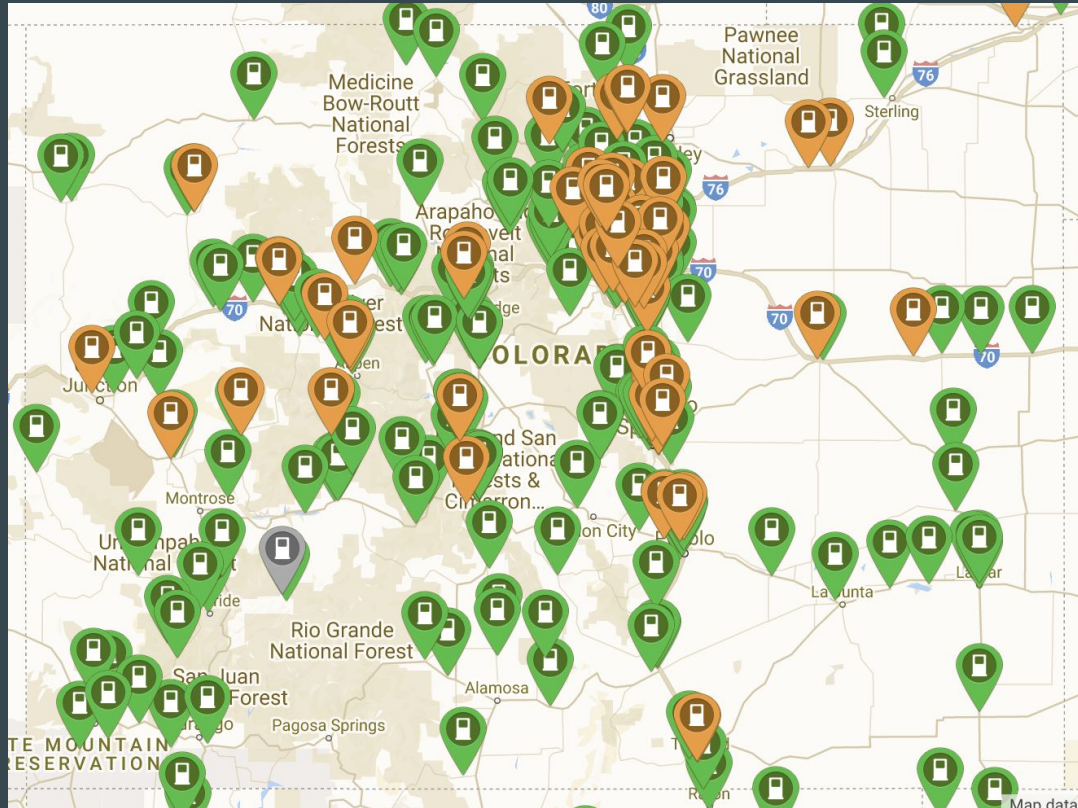
# Federal & State EV Incentives



1. Federal EV tax credit: \$7,500 (non-refundable, phasing out now)
2. Colorado State EV tax credit: \$4,000 (refundable, 2025 phase-out)
3. Zero Emissions Vehicle Standards: Ramp up to 10% EV market share by 2025
4. Charge Ahead Colorado Grant program: Level 2 & DCFC station incentives

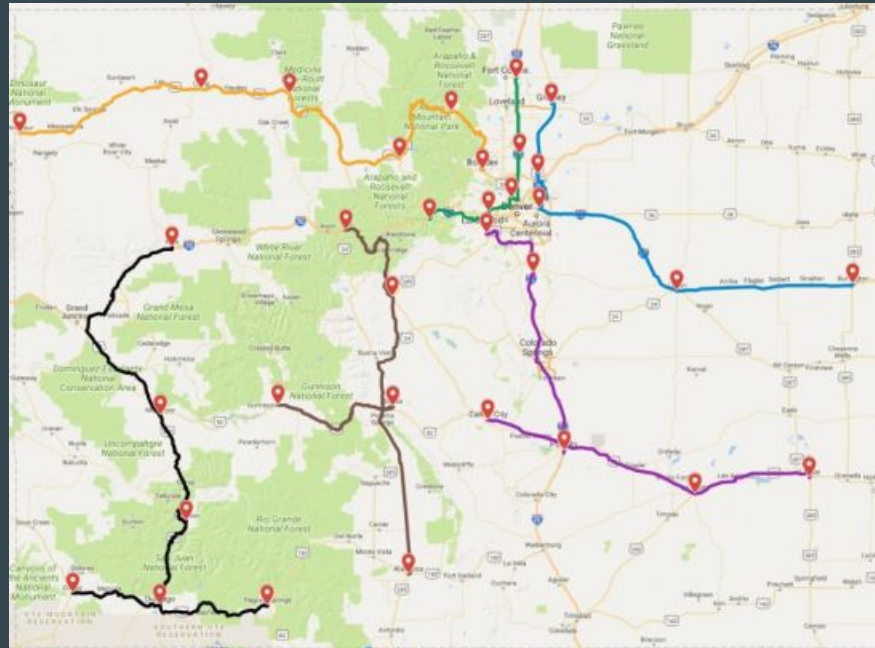


# EV charging infrastructure



# VW settlement: EV charging infrastructure

Colorado is building a network of 33 Fast Charging stations  
(Phase 1 to be completed by June, 2020)



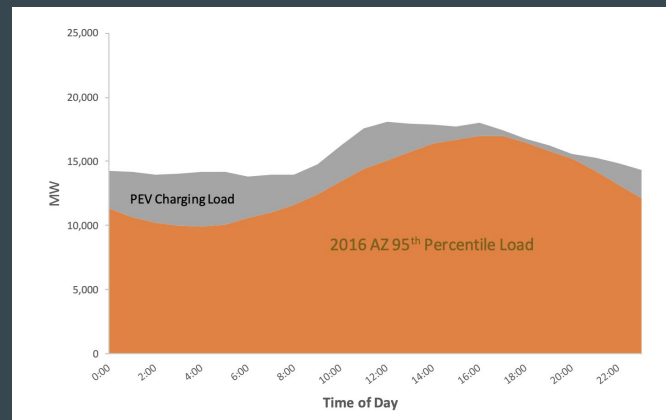
# Getting EVs on the road benefits all utility customers



1. Enough spare capacity to power all cars off-peak.
2. Charging is flexible and can be managed to absorb variable renewable generation.
3. Greater grid efficiency puts downward pressure on electric rates leads to reduced electric bills and savings for all electricity customers.

# Utility EV Programs

- TOU rates/ EV tariffs
- Commercial tariff / demand charge optimization
- Utility rebates for charging infrastructure
- Investment in charging infrastructure where market is not providing
- Investment to support electrification of public transit and of ridesharing
- Utility rebates for vehicles; midstream incentives for dealers
- Customer education & outreach



# GoEV City Campaign

- Local governments can drive change.
- Ready for 100 Campaign has 75 local governments committed to 100% renewables
- Communities adopt a GoEV Resolution: commit to Electrify:
  1. City Fleet
  2. Transit and School Buses
  3. Taxis and TNCs (Uber & Lyft)
  4. All vehicles in the community



# GoEV City: Electric Vehicle Goals

GoEV City Electrification Goals	<u>Denver</u>	<u>Fort Collins</u>
Municipal Fleet	<ul style="list-style-type: none"><li>● 2020: 200 EVs in the City fleet</li><li>● 2050: 100% of light duty vehicles are EV</li></ul>	<ul style="list-style-type: none"><li>● 100% of light-duty vehicle purchases plug-in electric by 2025</li></ul>
Transit & School buses	<ul style="list-style-type: none"><li>● 2050: 100% of public transportation will be carbon free</li></ul>	<ul style="list-style-type: none"><li>● Incorporate electric transit buses, subject to the availability</li></ul>
Taxis & TNCs	<ul style="list-style-type: none"><li>● 2050: 100% of taxis and transportation network vehicles are electric</li></ul>	<ul style="list-style-type: none"><li>● Encourage EV ride-hailing and car sharing</li></ul>
Community-wide EVs	<ul style="list-style-type: none"><li>● 2025: 15% of vehicle are electric</li><li>● 2030: 30% of vehicle are electric</li><li>● 2050: 100% of vehicle are electric</li></ul>	<ul style="list-style-type: none"><li>● 50% of new vehicle sales being electric by 2030</li></ul>



# Electrify City Fleet

- 100% of new light-duty vehicles when possible
  - Sedans in 2020
  - SUVs in 2023
  - Pickup trucks in 2026
- Build EV charging to support new electric fleet.
- Future purchasing decisions to consider total cost of ownership, including fuel and maintenance.
- City of Denver: 200 EVs by 2020 (expecting to save \$800,000 over lifetime of those vehicles)



# EV Fuel & Maintenance Cost Savings

## NYC Fleet Saving Maintenance Costs with Electric Vehicles

Vehicle Model	System	Number	2018 Maintenance Cost
Bolt	All electric BEV	93	\$204.86
Focus	Gas	11	\$1,805.24
Focus Electric	All electric BEV	7	\$386.31
Fusion	Gas	62	\$1,621.34
Fusion Energi	Hybrid Gas/Electric Plug in	154	\$496.73
Fusion hybrid	Hybrid Gas/Electric	205	\$1,310.89
Leaf	All electric BEV	149	\$344.14
Prius	Hybrid Gas/Electric	1,131	\$893.31
Taurus	Gas	38	\$922.67
Volt	Hybrid Gas/Electric Plug in	43	\$1,210.40

Find out how much it costs to  
fuel an electric vehicle in your  
state

Colorado

regular  
gasoline

2.61

electric  
eGallon

1.09

## Average annual maintenance cost by fuel technology:

BEV (All-electric)	PHEV (Plug-in Hybrid)	Hybrid	Gas
\$311	\$853	\$1,100	\$1,450



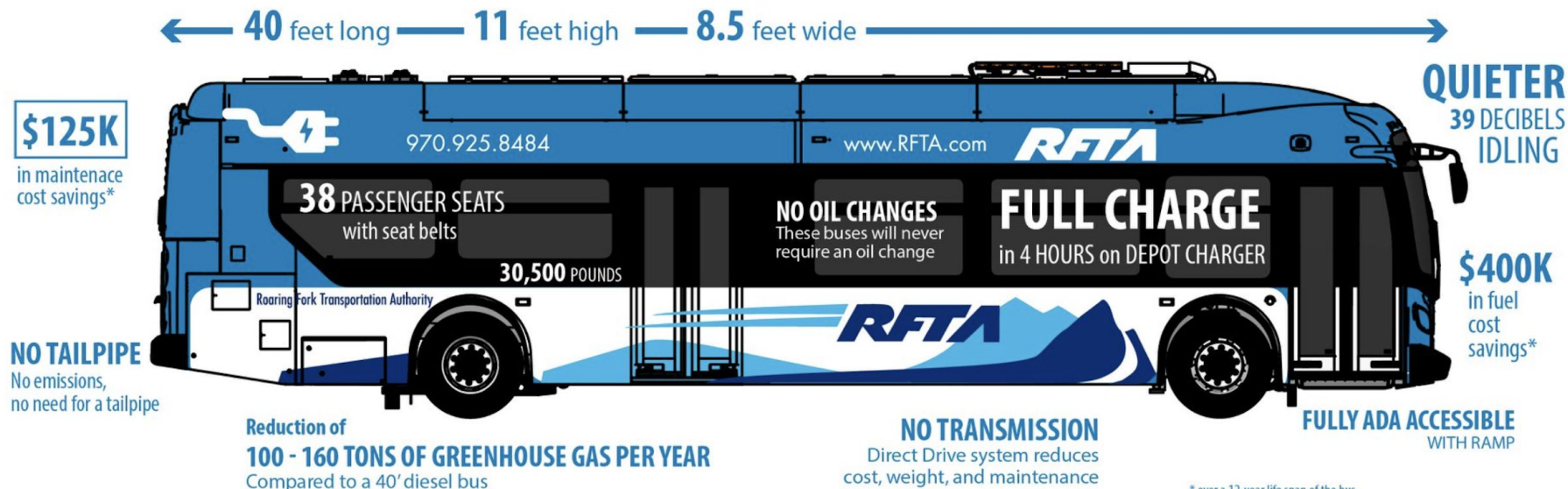
# GoEV City Policy: Electrify Transit & School Buses

- Collaborate with transit agency, CDOT, school districts
- Secure electric bus grants through VW plan:
  - Alt Fuels Colorado: 110% of incremental cost + 100% of charging costs
- Currently approx. 50 electric transit buses in operation (RTD, RFTA, Breckenridge)
- 5 or 6 electric school buses on order



# GoEV City Policy: Electrify Transit & School Buses

## MEET YOUR NEW ZERO-EMISSIONS RFTA BUS



# Electrify all vehicles in the community

- Consumer Education and Outreach
  - Ride & Drive, EV Group Buy Programs
- EV-Ready Building Codes
- Build charging infrastructure:
  - Build charging stations on city-owned property
  - Streamline permitting process
- Advocate for state clean energy & climate policy
- Coordinate with utilities on EV programs



# EV-Ready Building Codes

- Adopt EV-ready infrastructure requirements for new residential and commercial buildings
- 240V/40A circuit for future installation of Level 2 charging stations
- EV infrastructure costs are up to 10 times higher during retrofit than new construction
- Examples: Denver, Aspen, Boulder, Golden, 2021 IECC model energy code





# GoEV CITY

Accelerate the transition to electric vehicles

## Leading the charge on electric transportation

Colorado cities have a unique opportunity to lead on climate. Many cities have taken action on emission reductions and led the way to cleaner energy in the electricity sector with ambitious renewable energy

[www.goevcity.org](http://www.goevcity.org)

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