



ESC Market Transformation Conference

Christian Williss
Colorado Energy Office
August 23, 2019



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Executive Order B 2019 002

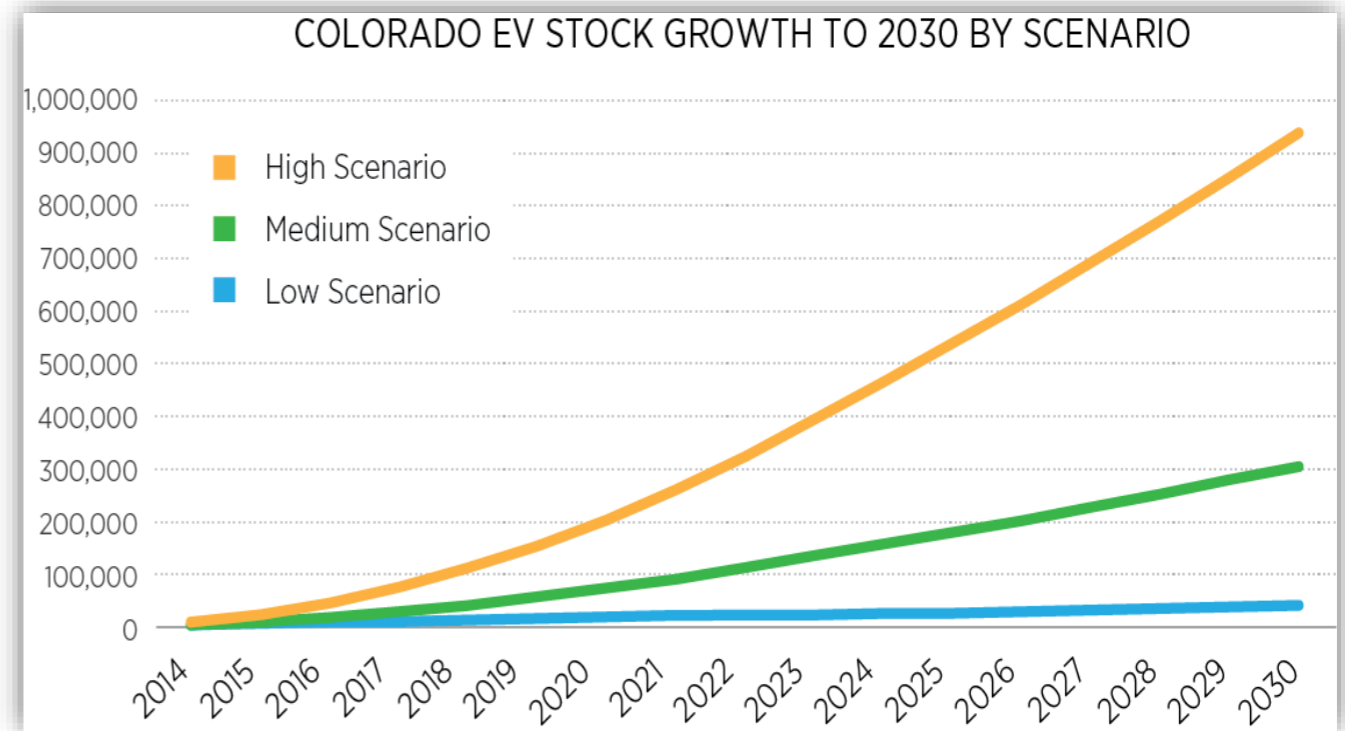
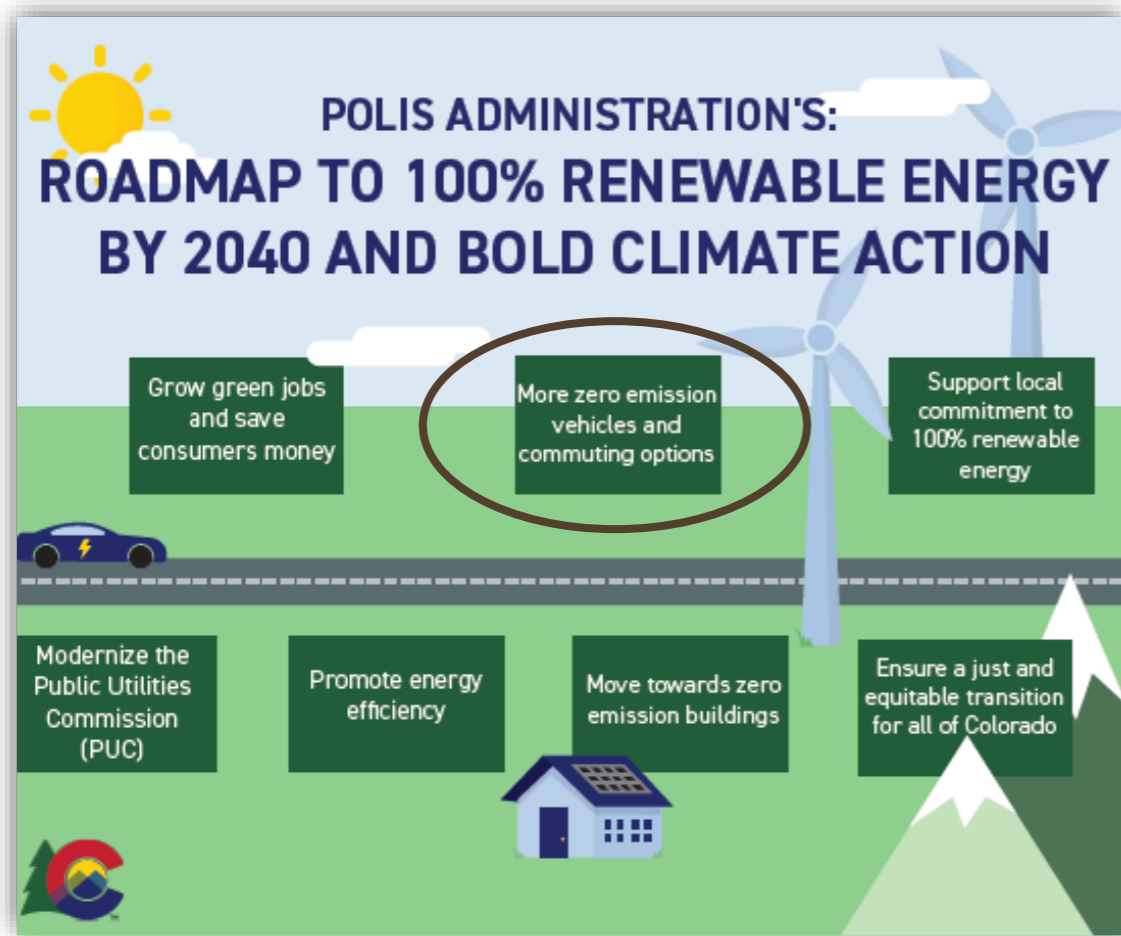
Supporting a Transition to Zero Emission Vehicles

1. Creates an interdepartmental electrification workgroup to support widespread electrification across the state.
2. Directs CO Dept. of Public Health and Environment (CDPHE) to develop a rule to establish a Colorado Zero Emission Vehicle program and propose to the Air Quality Control Commission no later than May 2019 for possible adoption before October 30, 2019.
3. Directs CDPHE to revise the VW Beneficiary Mitigation Plan to focus all remaining eligible investments on supporting electrification of transit and school buses and trucks.
4. Directs CO Dept. of Transportation to develop a zero emission vehicle and clean transportation plan.



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Roadmap to 100% Renewable Energy

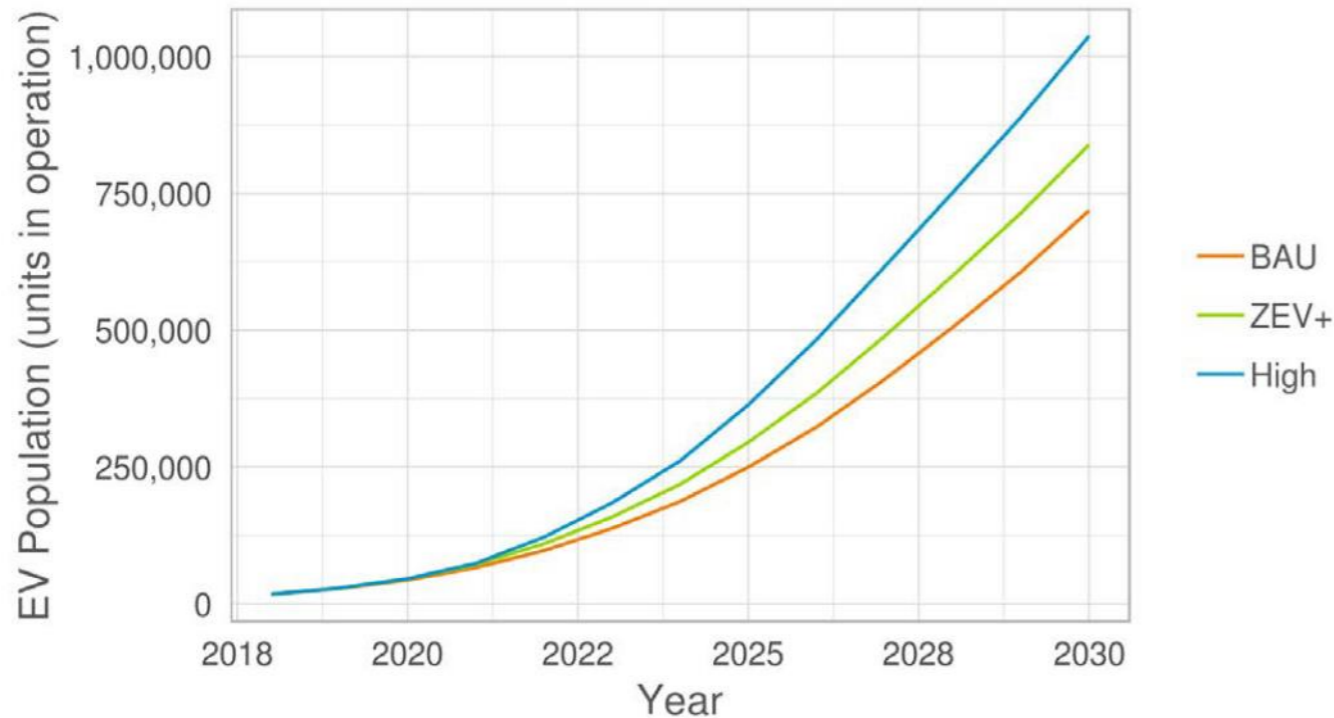


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EV Market Growth Scenarios

To meet the Colorado EV Plan goal of 940,000 light duty EVs in Colorado by 2030, a series of policy and market strategies must be adopted including the ZEV rule, increases in model availability and EV marketing, and continued investments in charging infrastructure.

Colorado EV Sales Over Time By Scenario
Includes BEV and PHEV



PEV Population – Units in Operation
Percentage of Total Population

Scenario	2020	2025	2030
BAU	43,346 0.8%	249,683 4.1%	718,787 10.2%
ZEV+	45,701 0.8%	295,223 4.8%	838,997 11.9%
High	45,701 0.8%	363,692 5.9%	1,037,586 14.8%

Source: Navigant



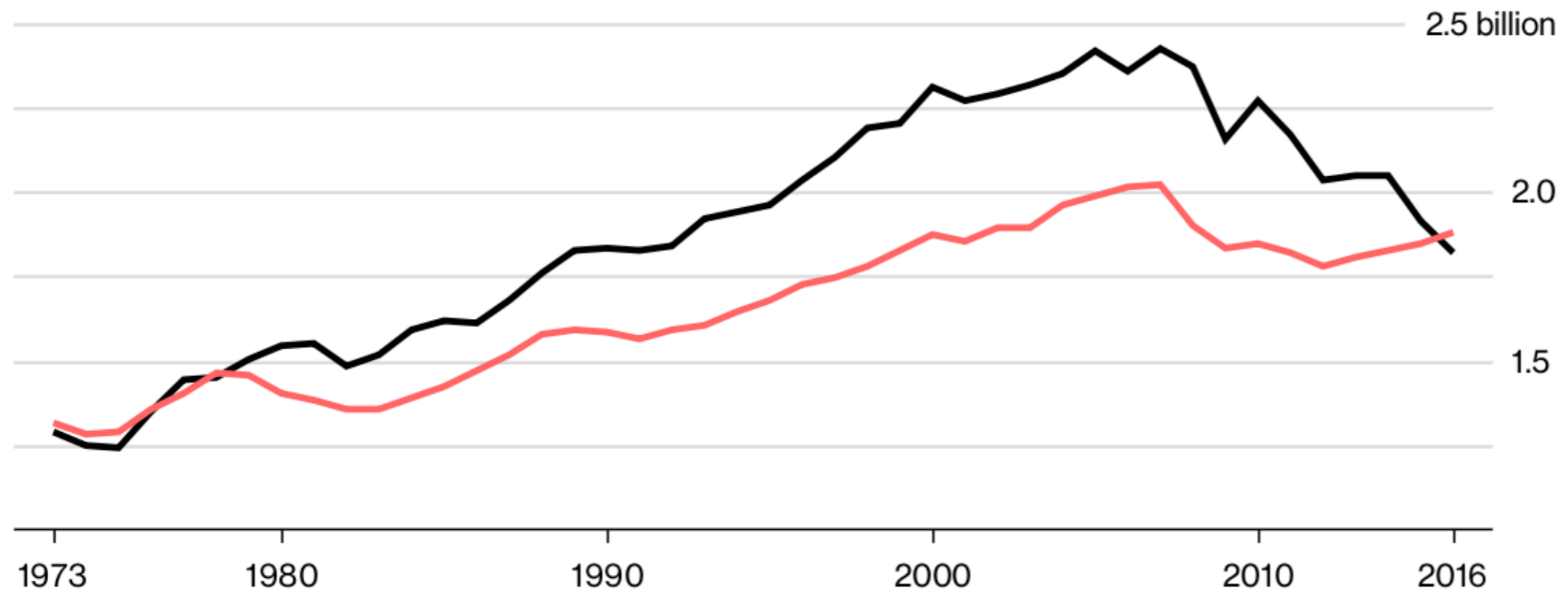
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Transportation Emissions

America's New Pollution King

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

■ Electricity emissions (metric tons of CO₂) ■ Transportation emissions



U.S. Energy Information Administration

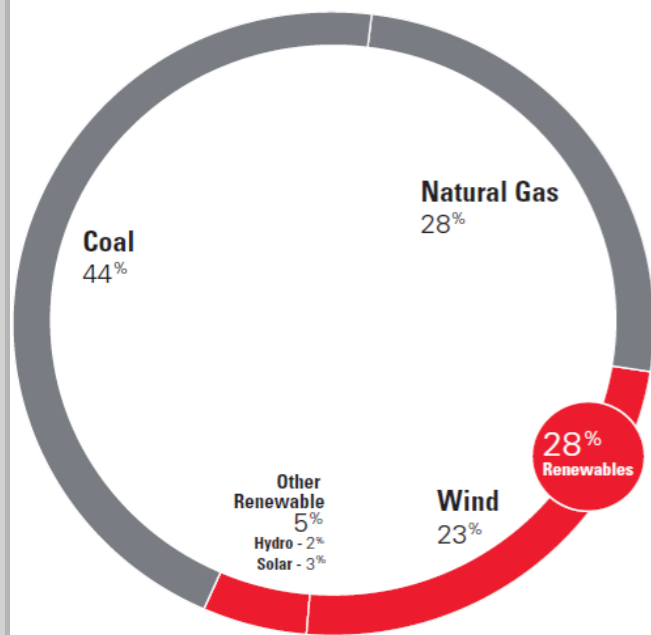
Bloomberg



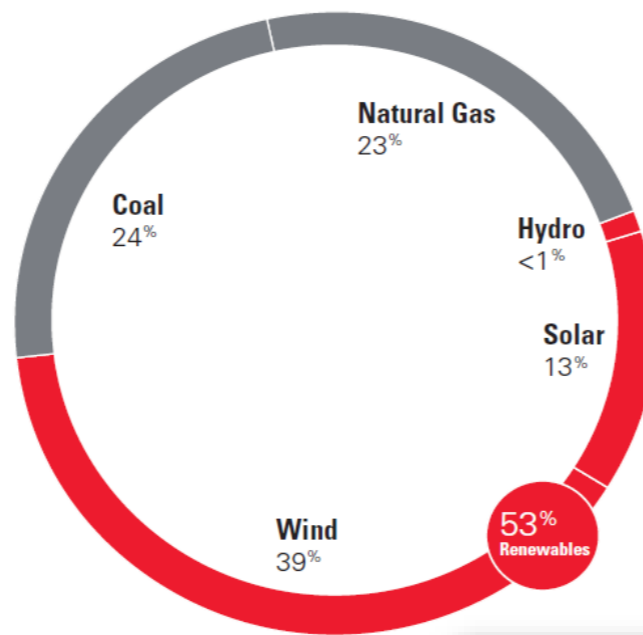
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Air Quality Benefits

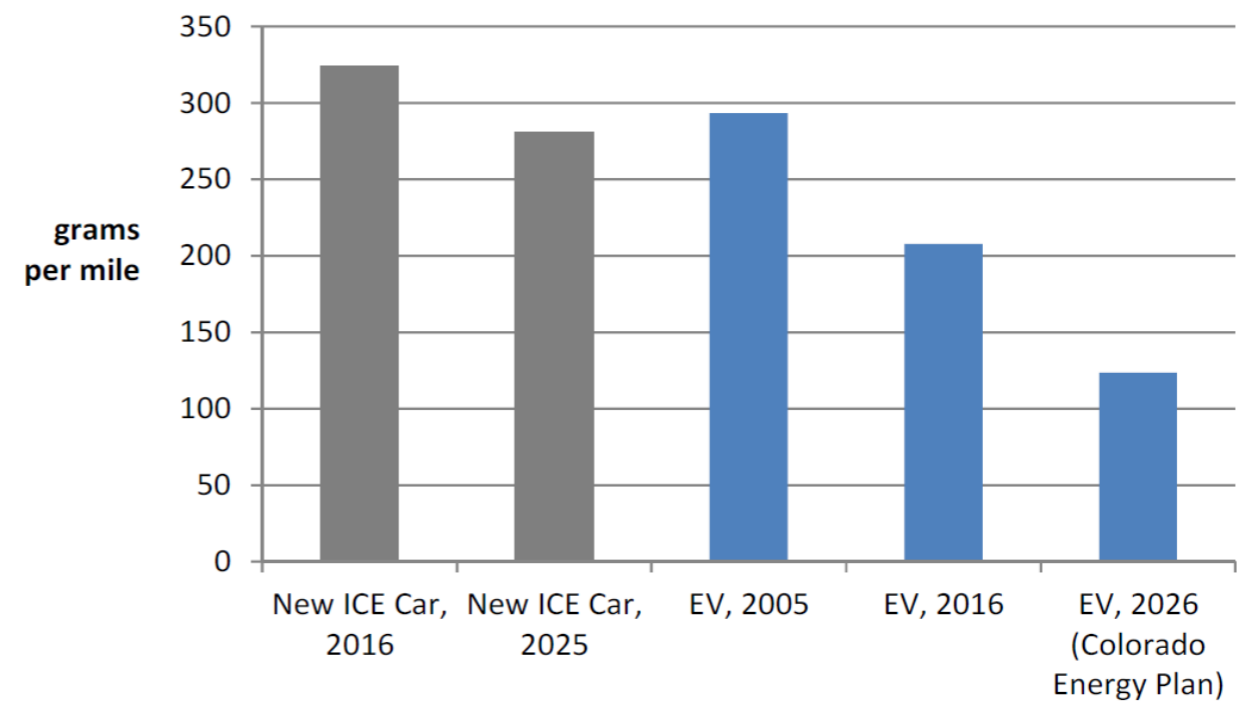
2017 Colorado Energy Mix



2026 Estimated Energy Mix Under The Colorado Energy Plan



CO₂ emissions per mile traveled



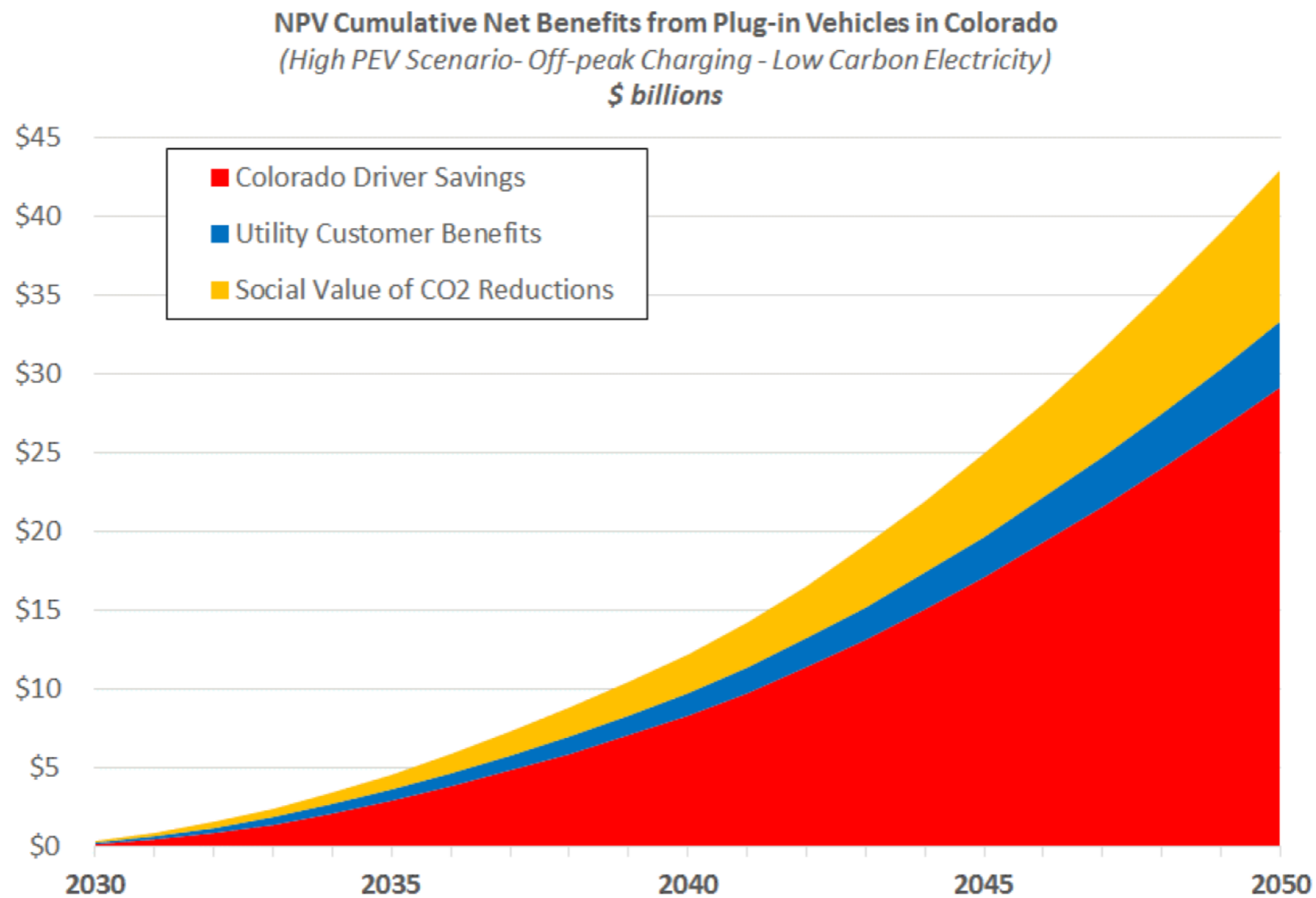
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Source: Xcel Energy

Benefits of Electric Vehicles

Figure 3

NPV Cumulative Societal Net Benefits from CO PEVs – High PEV scenario

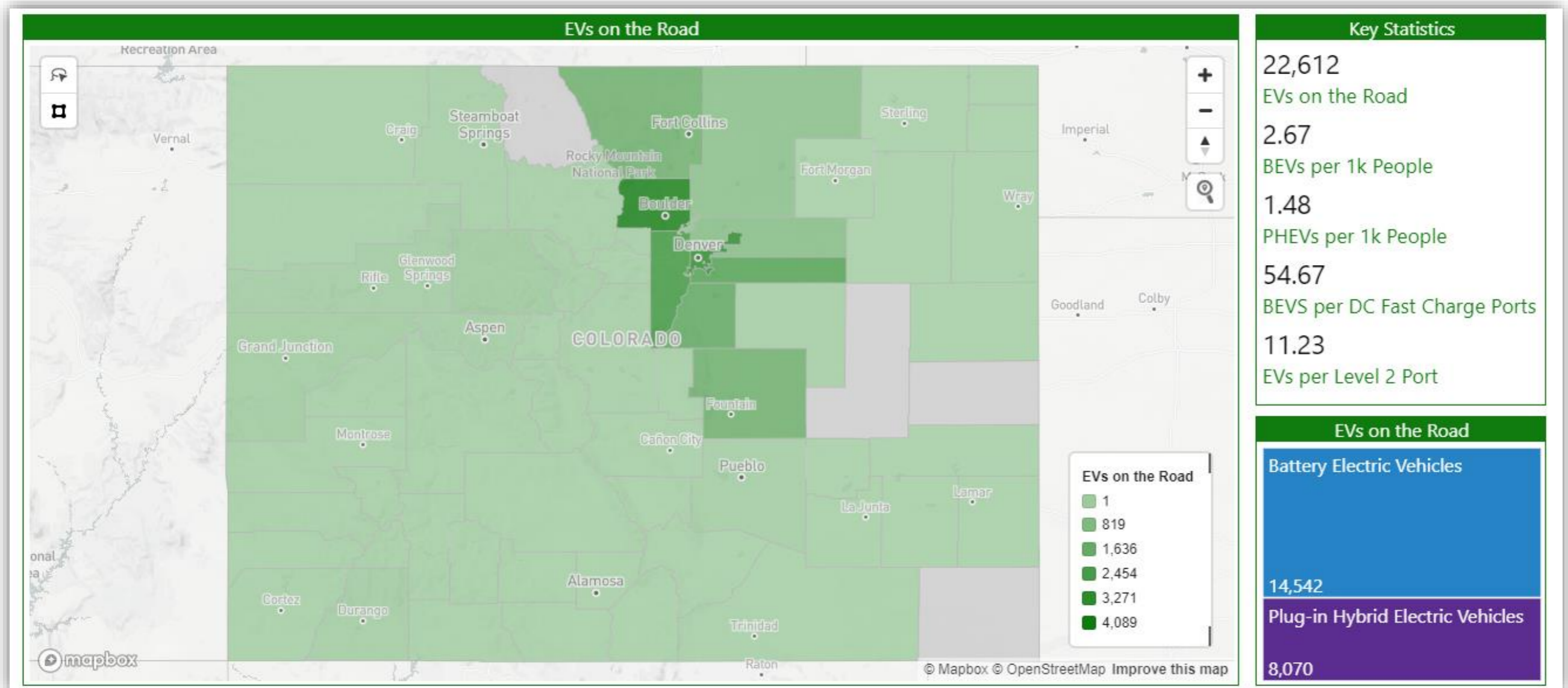


Source: MJ Bradley & Associates



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Colorado's EV Market - August 2018



Source: Atlas Public Policy



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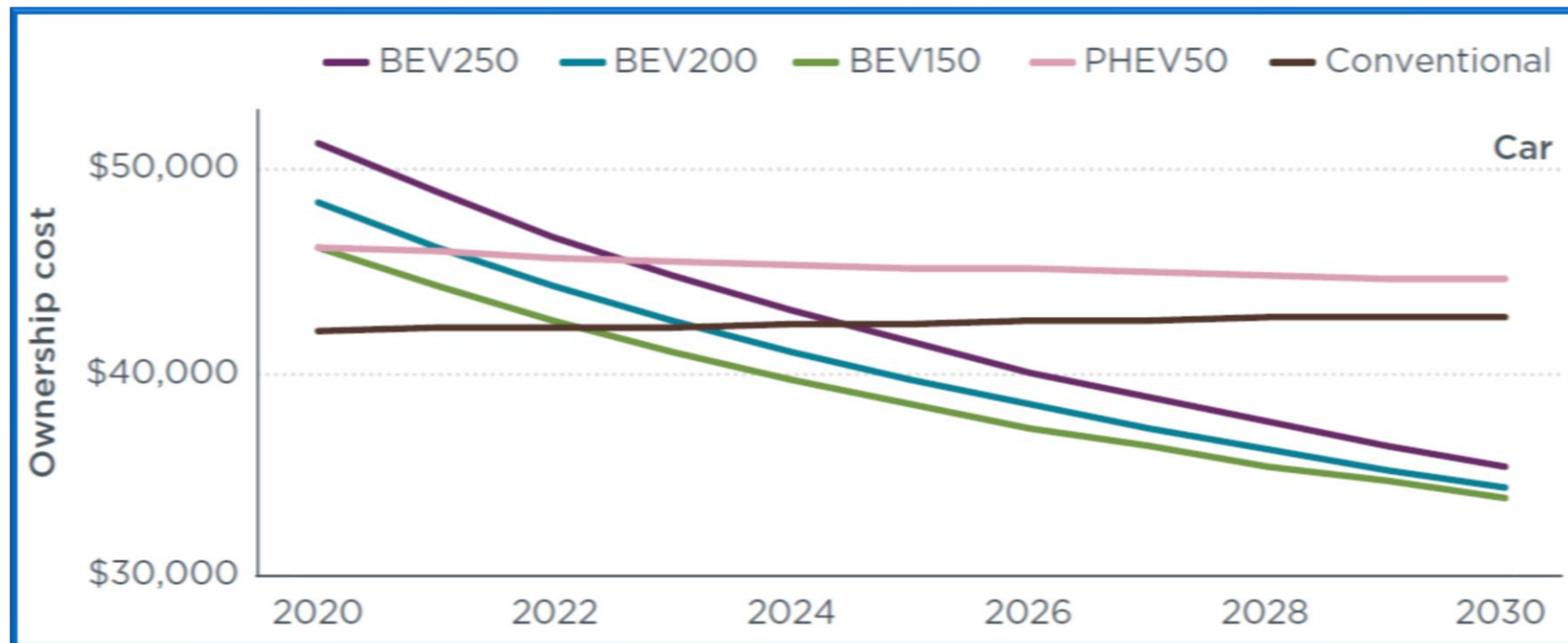
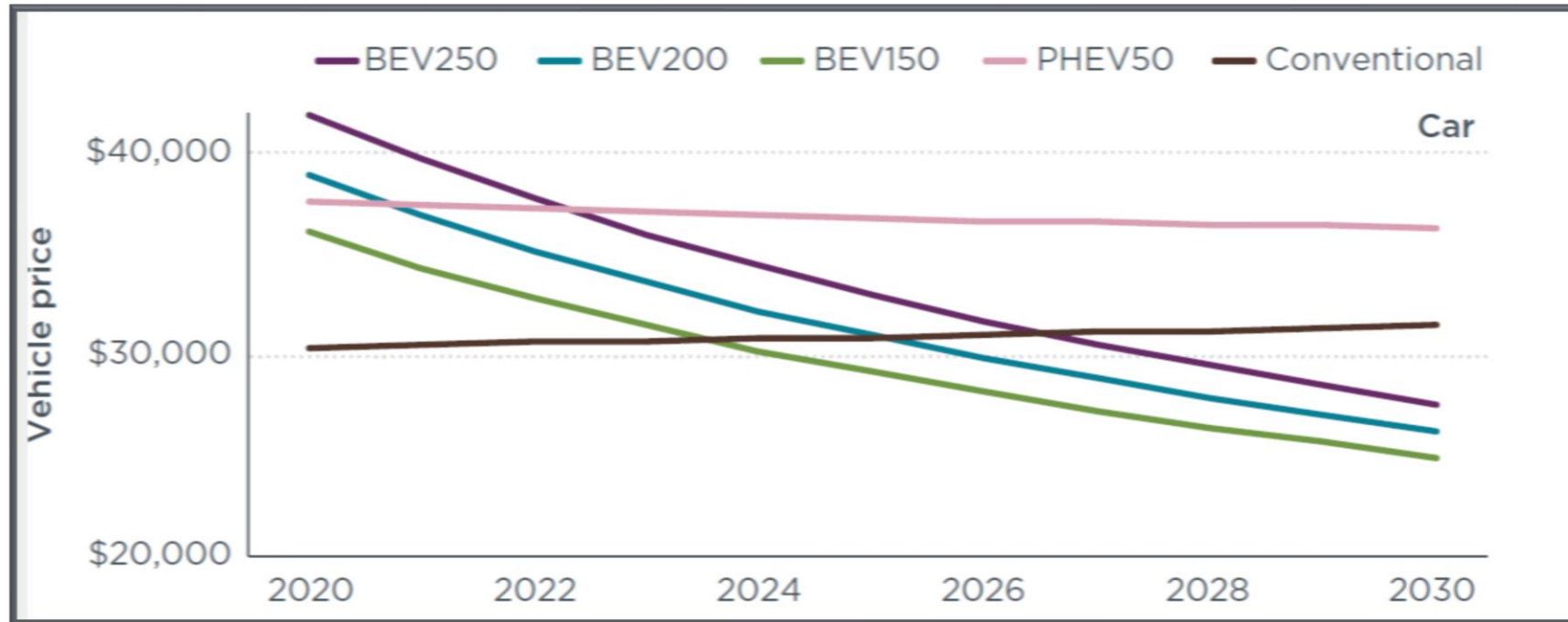
Barriers to Electric Vehicle Adoption

1. High upfront cost
2. Lack of publicly-accessible charging infrastructure
3. Lack of awareness about EVs including costs and benefits
4. Limited model availability

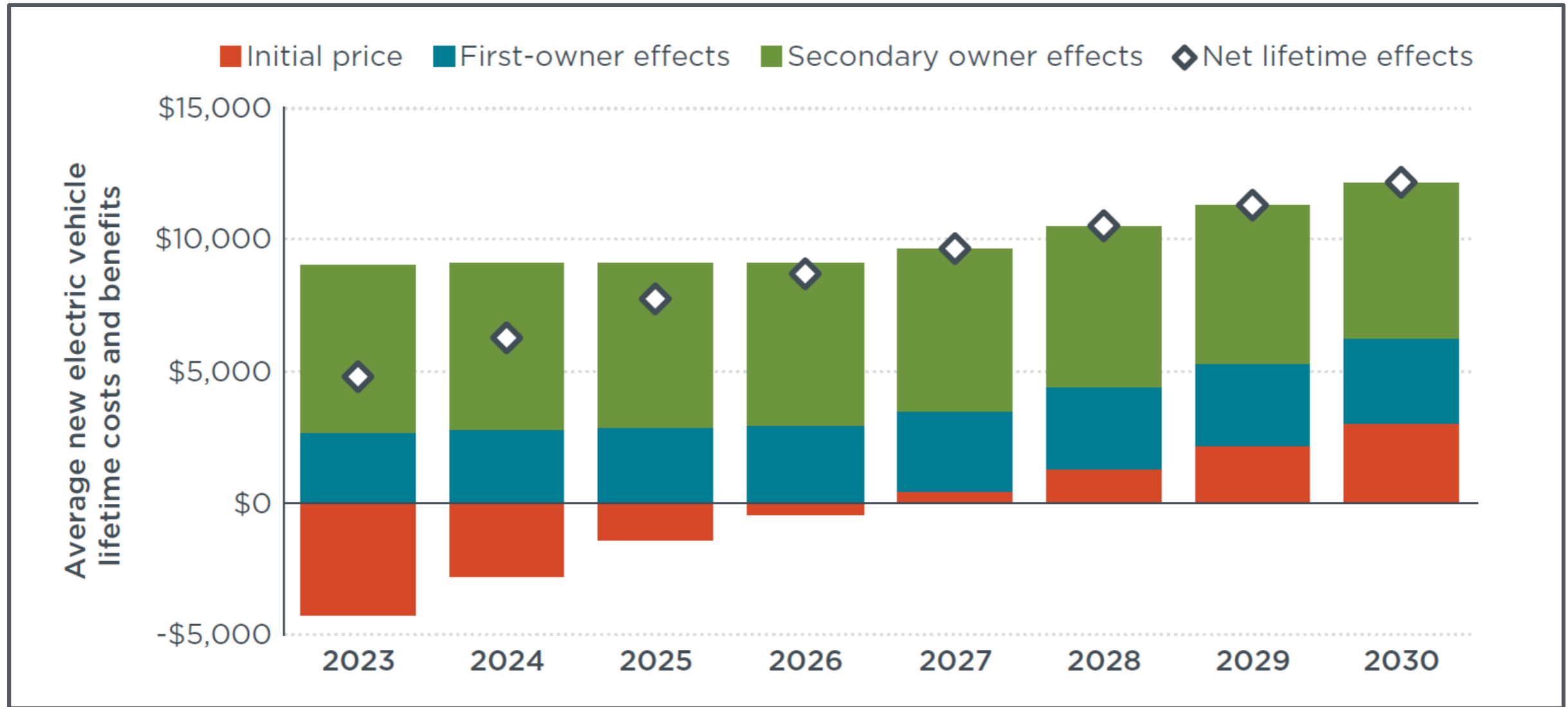


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First and Total Cost of EV Ownership



EVs - Total Cost of Ownership



Source: ICCT

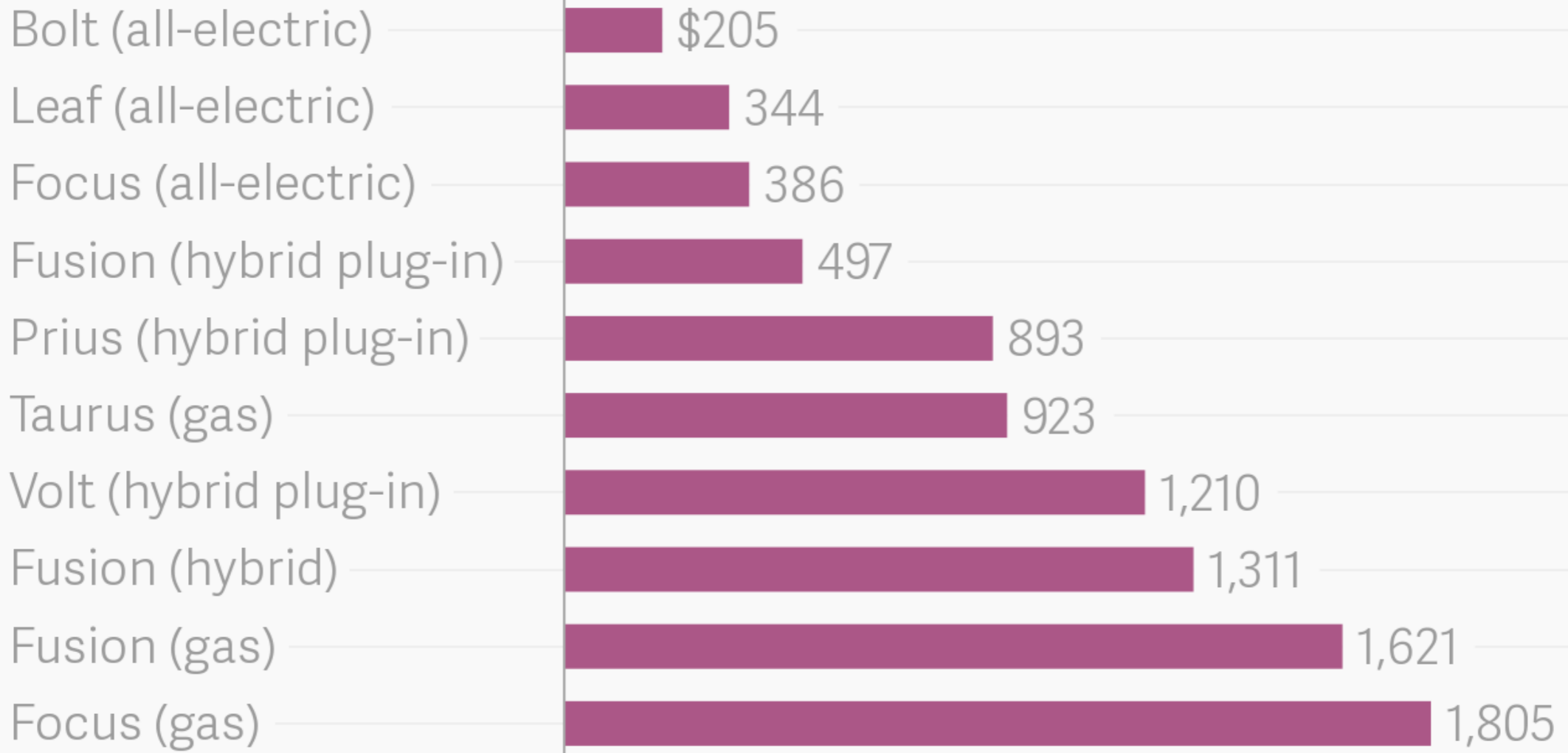


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EV Maintenance Costs

Electric vehicles are saving New York big money on maintenance

maintenance costs (2018)



△ T L △ S | Data: NYC

Source: EPRI



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House Bill 1159 - EV Tax Credit Extension

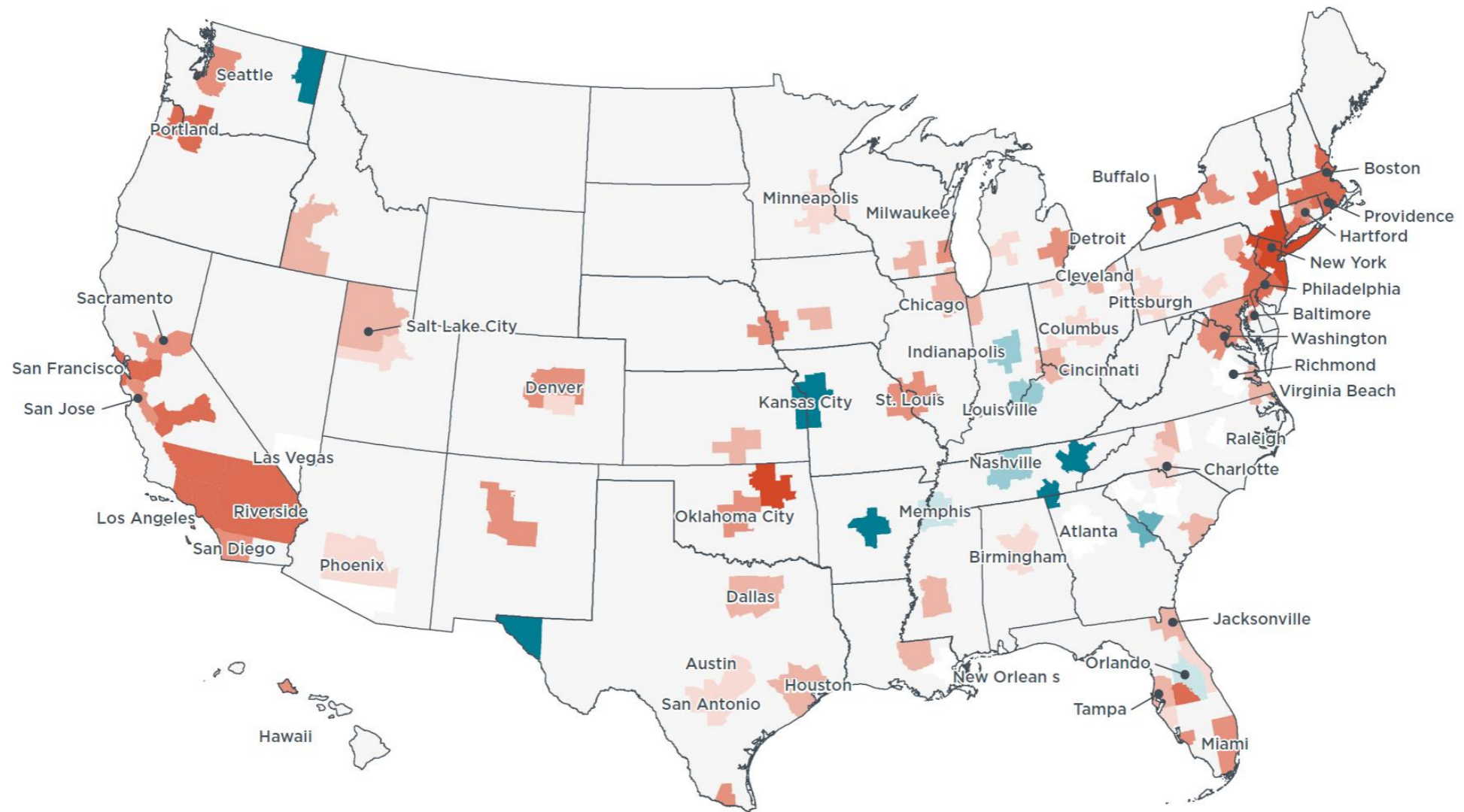
- Modifies the amounts of and extends the number of years of the existing income tax credits for the purchase or lease of an electric or fuel cell vehicle.
- Ratchets down the value of the tax credit starting in 2020 and phases it out at the end of 2025.
- Allows TNCs to claim full tax credit if vehicles are provided to drivers under short-term rental programs.

Year	Plug-in Electric, Electric Passenger, Fuel Cell Vehicles	Light Duty Electric, Fuel Cell Trucks	Medium Duty Electric, Fuel Cell	Heavy Duty Electric, Fuel Cell Trucks
2019	\$5,000	\$7,000	\$10,000	\$20,00
2020	\$4,000	\$5,500	\$8,000	\$16,000
2021 - 2022	\$2,500	\$3,500	\$5,000	\$10,000
2023 - 2025	\$2,000	\$2,800	\$4,000	\$8,000



Infrastructure Gaps

Charging infrastructure in place in 2017 as a percentage of infrastructure needed by 2025 to support electric vehicle market by metropolitan area



Charging infrastructure in 2017 as a percentage of that needed by 2025

■ 1%-10% ■ 11%-20% ■ 21%-30% ■ 31%-40% ■ 41%-50% □ 51%-60% ■ 61%-70% ■ 61%-70% ■ 81%-90% ■ 91%-100%

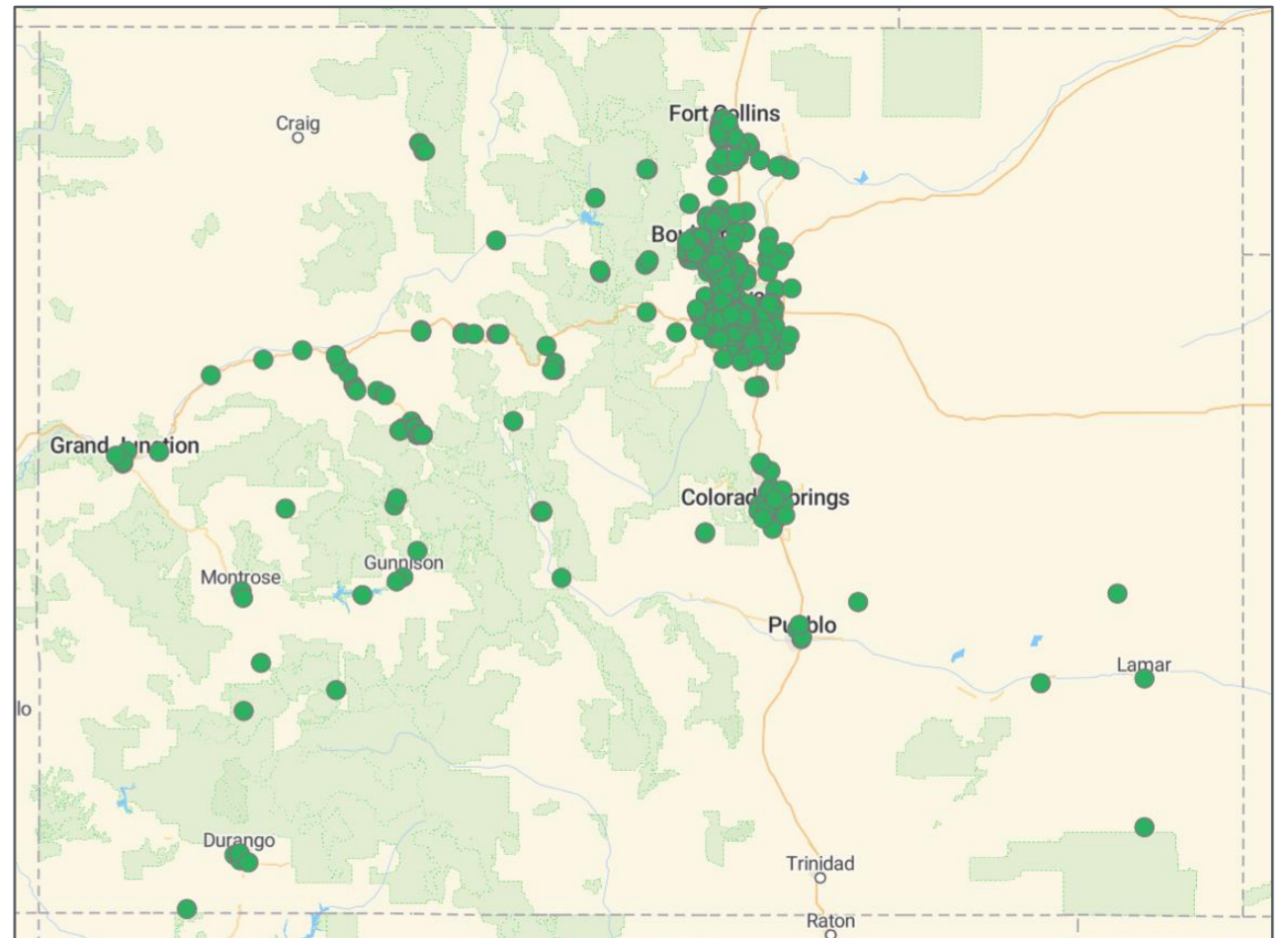
Source: ICCT



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Charge Ahead Colorado

- Partnership between CEO and Regional Air Quality Council.
- Grants for community-based Level II and DC fast-charging stations across the state.
- Grants for more than 900 stations awarded to date.



Source: Alternative Fuels Data Center



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Charge Ahead Colorado

- Competitive application process 3X per year
- Eligible applicants include local governments, school districts, State agencies, and non-profits
- Apartment/condo complexes and private businesses are also eligible

Charge Ahead Colorado					
	RAQC			CEO	
Funding Source	Federal Highway Administration - CMAQ and Volkswagen settlement			EV Fund and Volkswagen settlement	
Geographic Area	7 County Denver Metro Area			Outside the 7 County Denver Metro Area	
Eligible Equipment	Level 2, DC fast-chargers, Electric Vehicles			Level 2 and DC fast-chargers	
Funding Level	Level 2	DC Fast-Chargers	EV	Level 2	DC Fast-Chargers
80% up to:	\$9,000	\$30,000	\$8,260	\$9,000	\$30,000



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 Matt Mines (RAQC): mmines@raqc.org or 303-629-5450, ext. 210

EV Fast-Charging Corridors

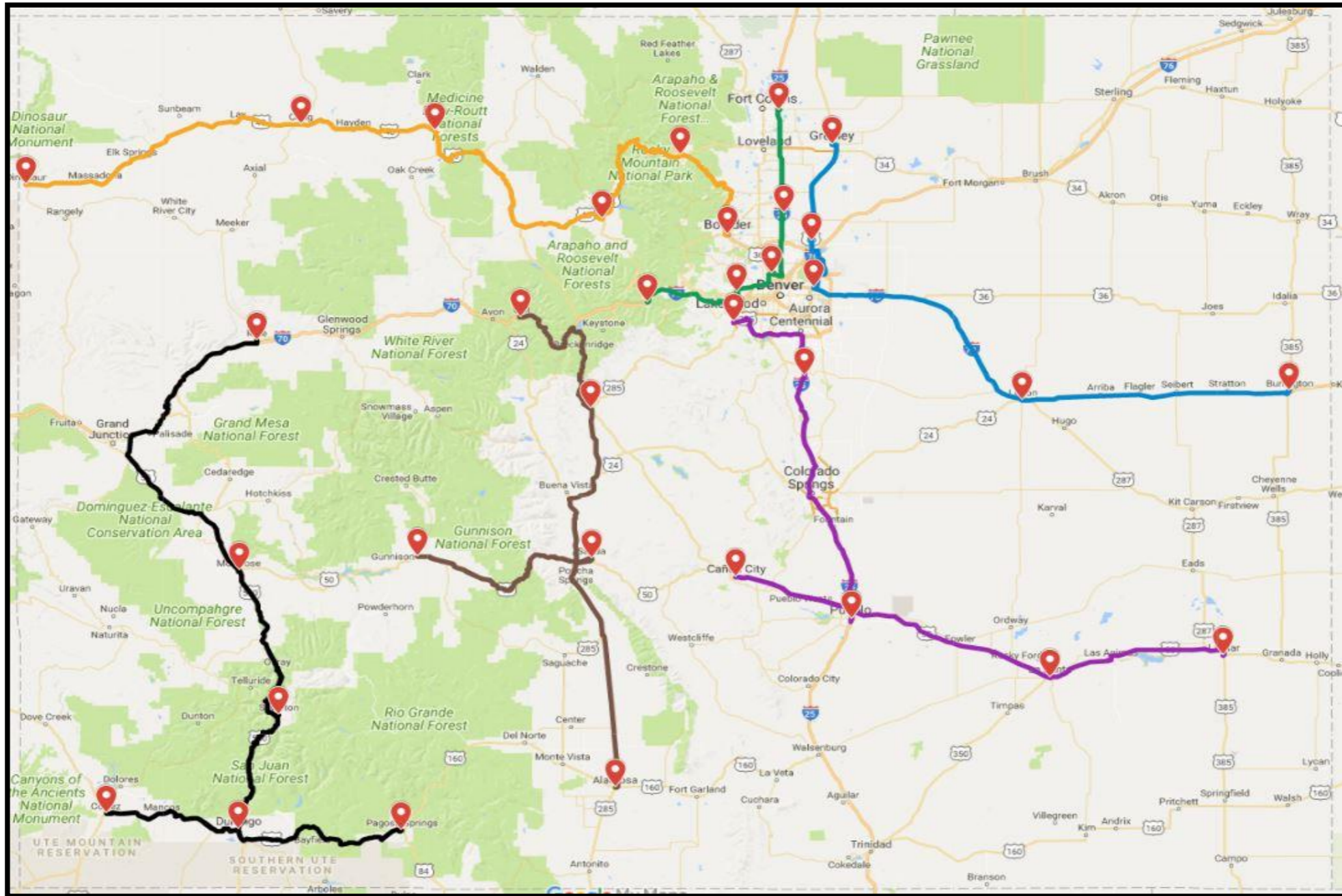
- \$10.3 million award made to ChargePoint to build 33 DCFC across six corridors.
- 2-4 chargers at each site; capable of providing at least 50 kW and up to 150 kW charging.
- Statewide network ensures a consistent driver experience at every station.
- Committed site hosts: retail, grocery, c-store, and local governments.
- Modular technology allows for expansion.
- Full build-out by June 2020.



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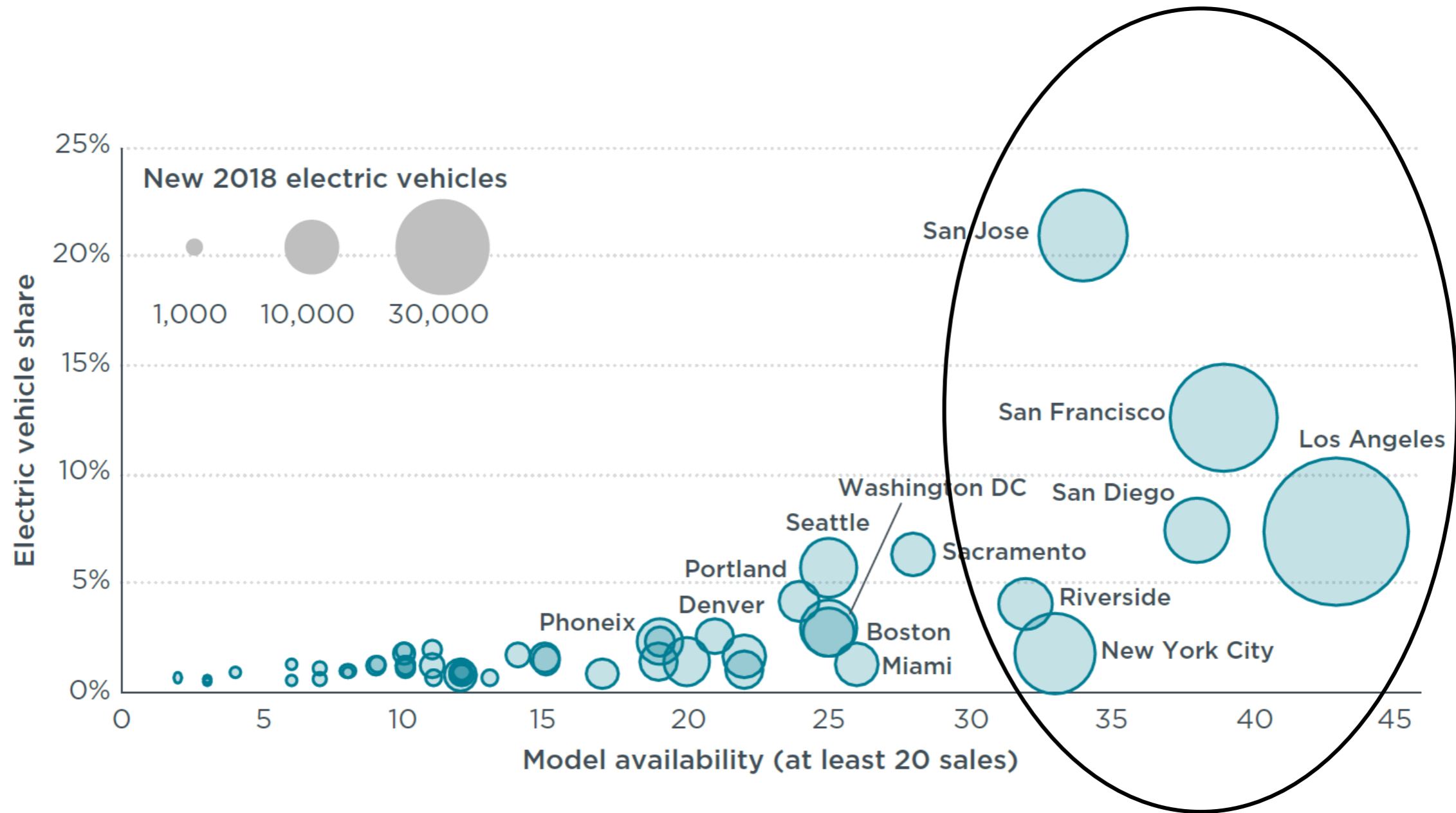
EV Fast-Charging Corridors

Colorado Electric Vehicle DCFC Corridor Program



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Model Availability



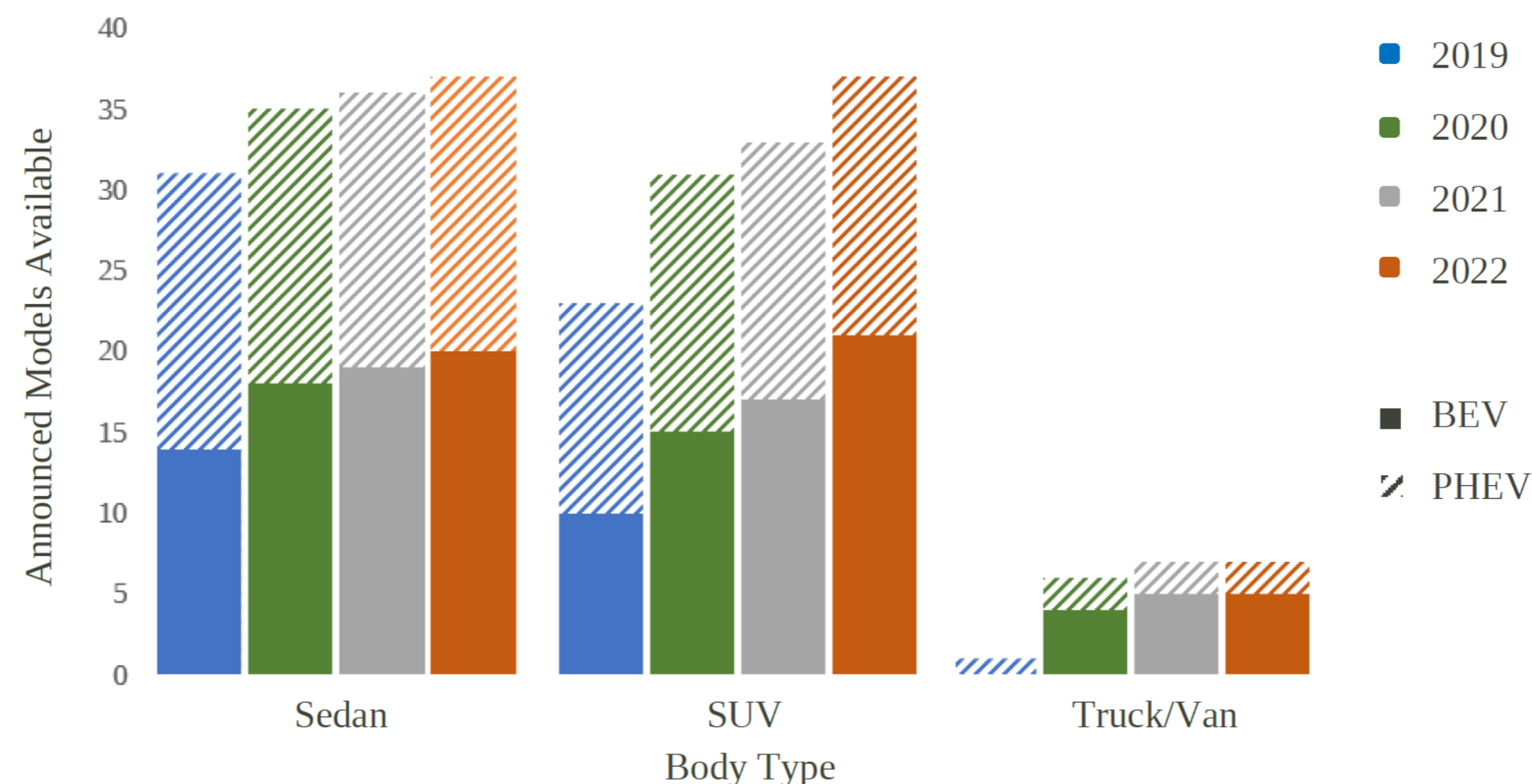
Source: ICCT



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Manufacturer Announcements

Figure 4 Cumulative Announced U.S. BEV and PHEV Models 2019-2022 by Body Type



Source: MJB&A



Zero Emission Vehicle Program

- The ZEV program requires automakers to sell a certain number of EVs in California and 10 other states.
- Number of EVs is related to the total number of vehicles sold and the type and the range of each EV sold.
- Many electric models are made available in ZEV states before being made available in others – increases the number models available, helping to increase consumer choices.

Option 1: 36% proportional cap, no early ZEV credits

- Cannot meet more than 36% of combined MY 2023-25 ZEV credit obligation using proportional credits
- Will not receive any early action credits for ZEVs produced and delivered for sale in Colorado prior to MY 2023

Option 2: 23% proportional cap, early ZEV credits MY 2021-22

- Cannot meet more than 23% of combined 2023-25 ZEV credit obligation using proportional credits
- Will receive credits for ZEV vehicles delivered for sale in Colorado in MY 2021-22, placing electric vehicles in Colorado in advance of the ZEV requirements
- Although the proportional credit cap is lower, requiring more ZEV sales, this path creates an incentive for automakers to deliver more ZEVs earlier and earn additional banked credits to use toward future compliance



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ESPC + Fleet Electrification

- EVs offer significant benefits to government fleets
- Fleet EVs require dedicated, reliable charging infrastructure
- Government agencies are often capital-constrained
- Unable to take advantage of state/federal tax credits
- Is ESPC a viable tool for advancing fleet electrification?



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ESPC + Fleet Electrification

- Standalone fleet project or integrated into a building efficiency project?
- Pass along state/federal tax credits?
- Vehicles – full value or incremental cost?
- How to ensure appropriate technology/placement (rightsizing, battery range)?
- How to reconcile vehicle life, charger life, and rapid technological evolution vs longer contract term?
- Fleet electrification will increase electricity use – does it matter?



ELECTRIC VEHICLES ARE COMING



RESISTANCE IS FUTILE



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