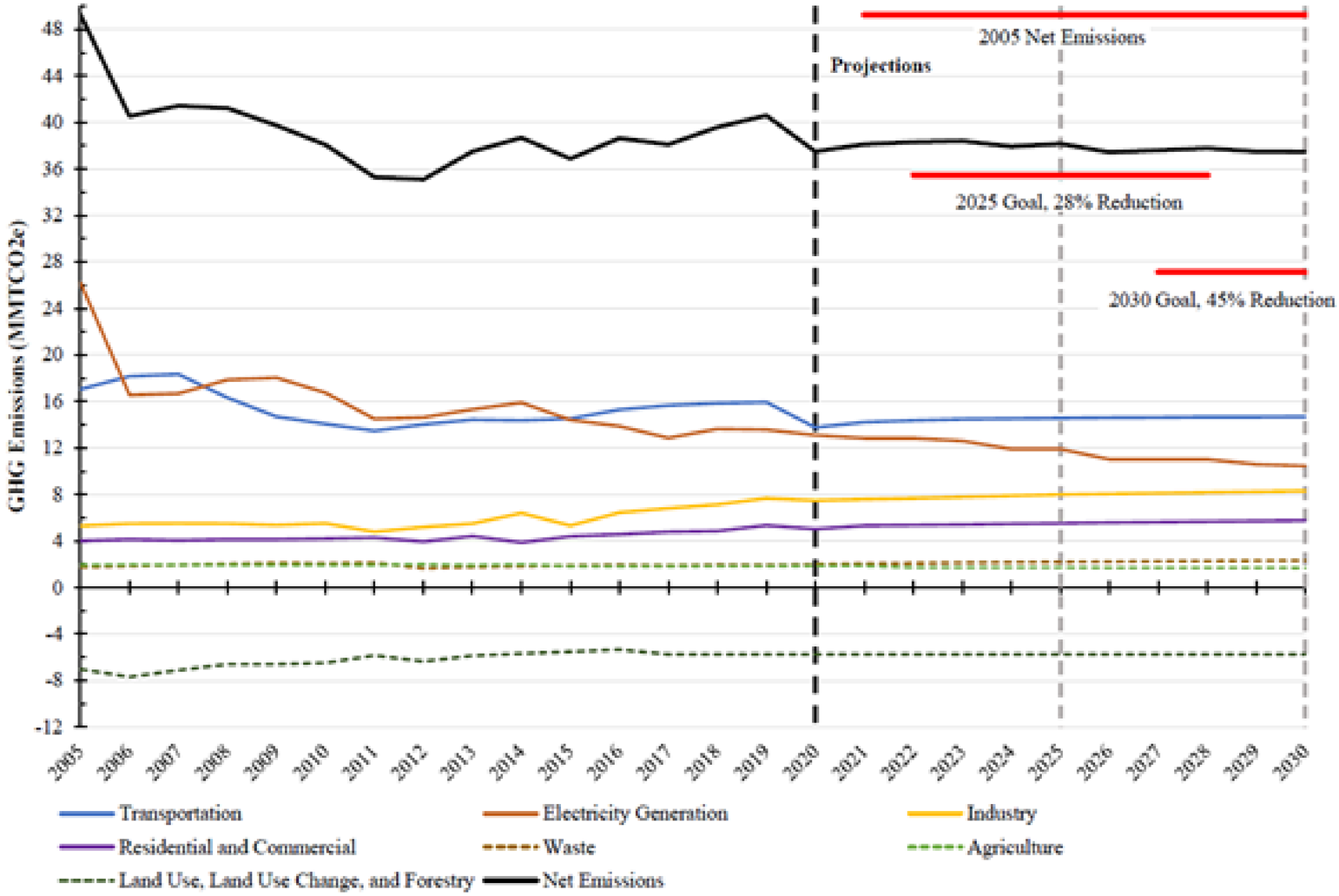
From ICE to EV

Nevada Transportation Conference
May 17, 2022

Climate Goals & Electrification of Transportation

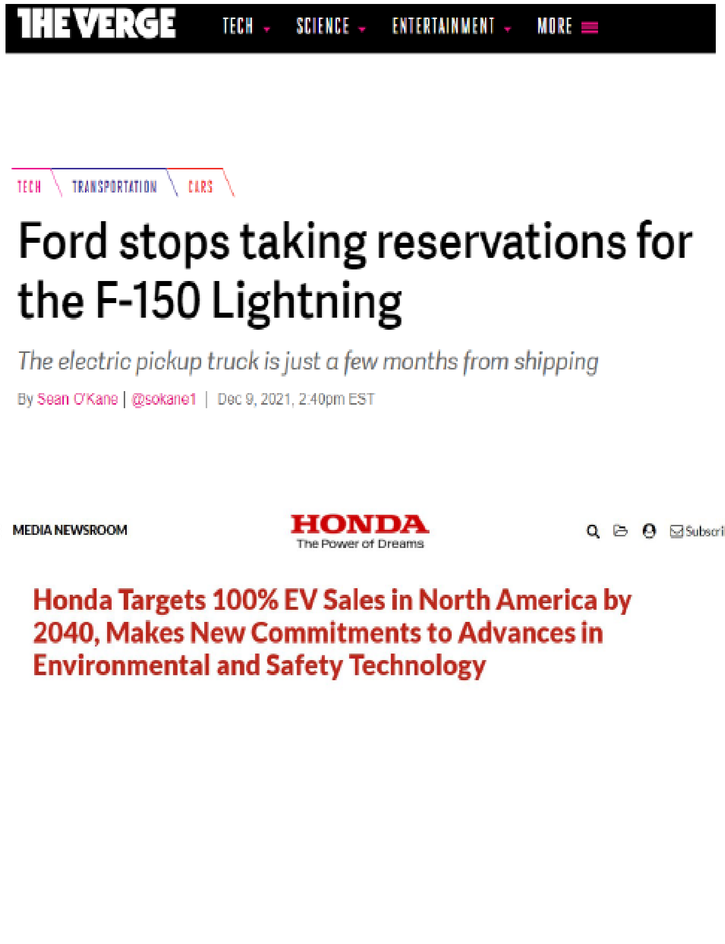
Electricity Generation Emissions Improving While Transportation Stagnates



Source: Nevada Statewide Greenhouse Gas Emissions Inventory and Projections, 1990-2041

Automaker Commitments

Over $515B Committed Globally



Source: NRDC

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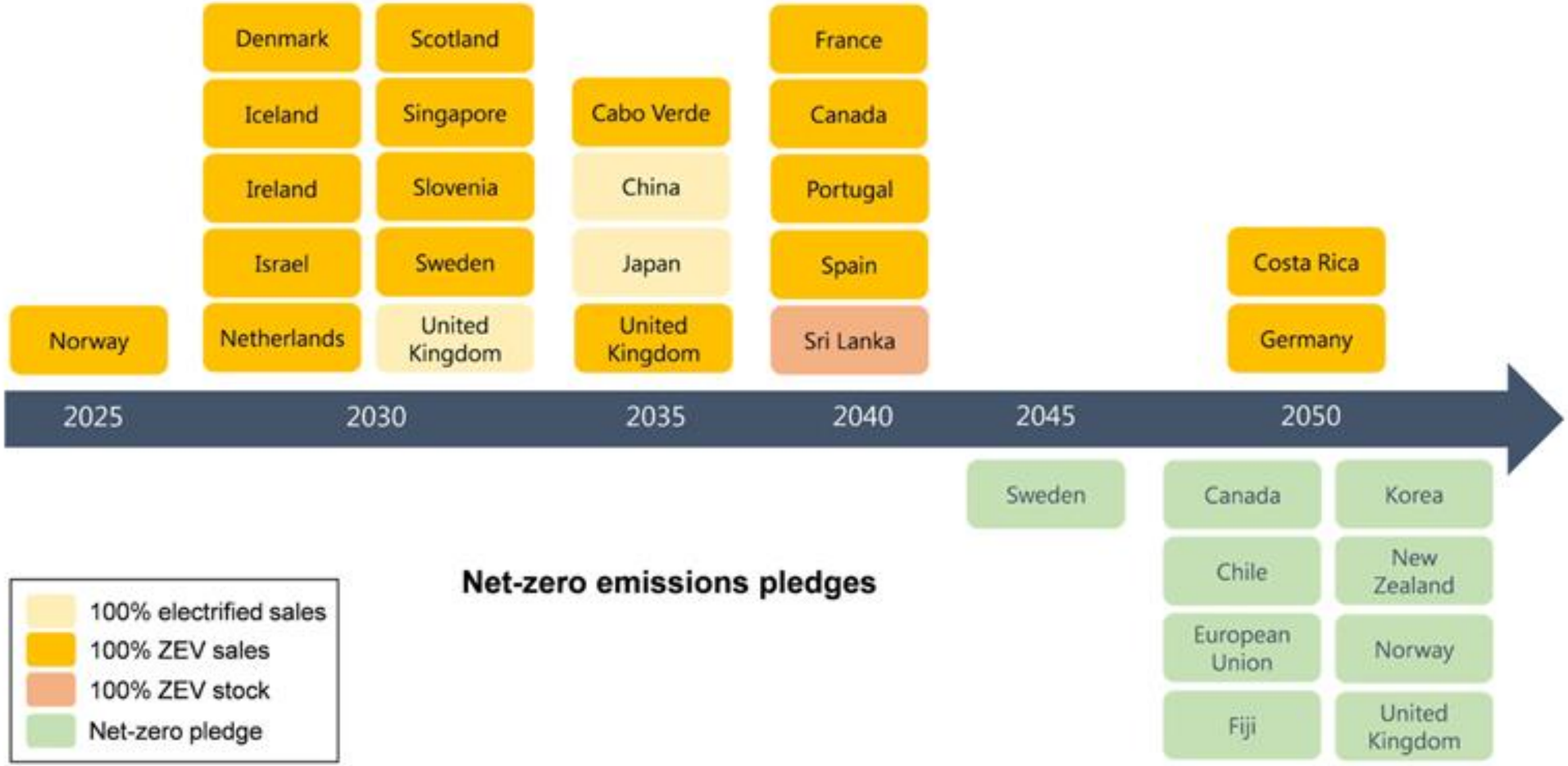
Electrification Outlook: Light Duty Vehicles

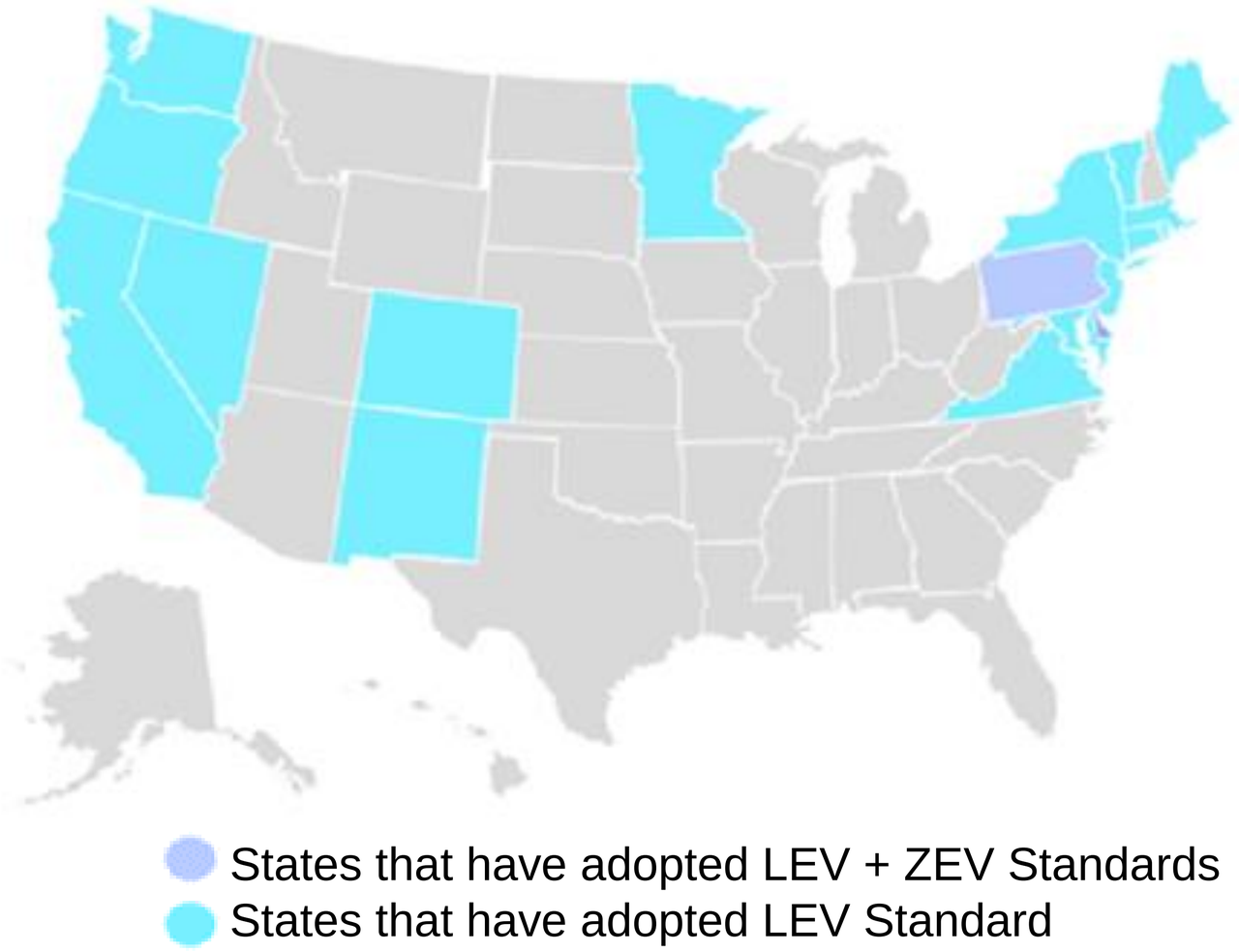
Global Electrification Targets



Source: https://www.iea.org/reports/global-ev-outlook-2021/policies-to-promote-electric-vehicle-deployment

Electrification Outlook: Light Duty Vehicles

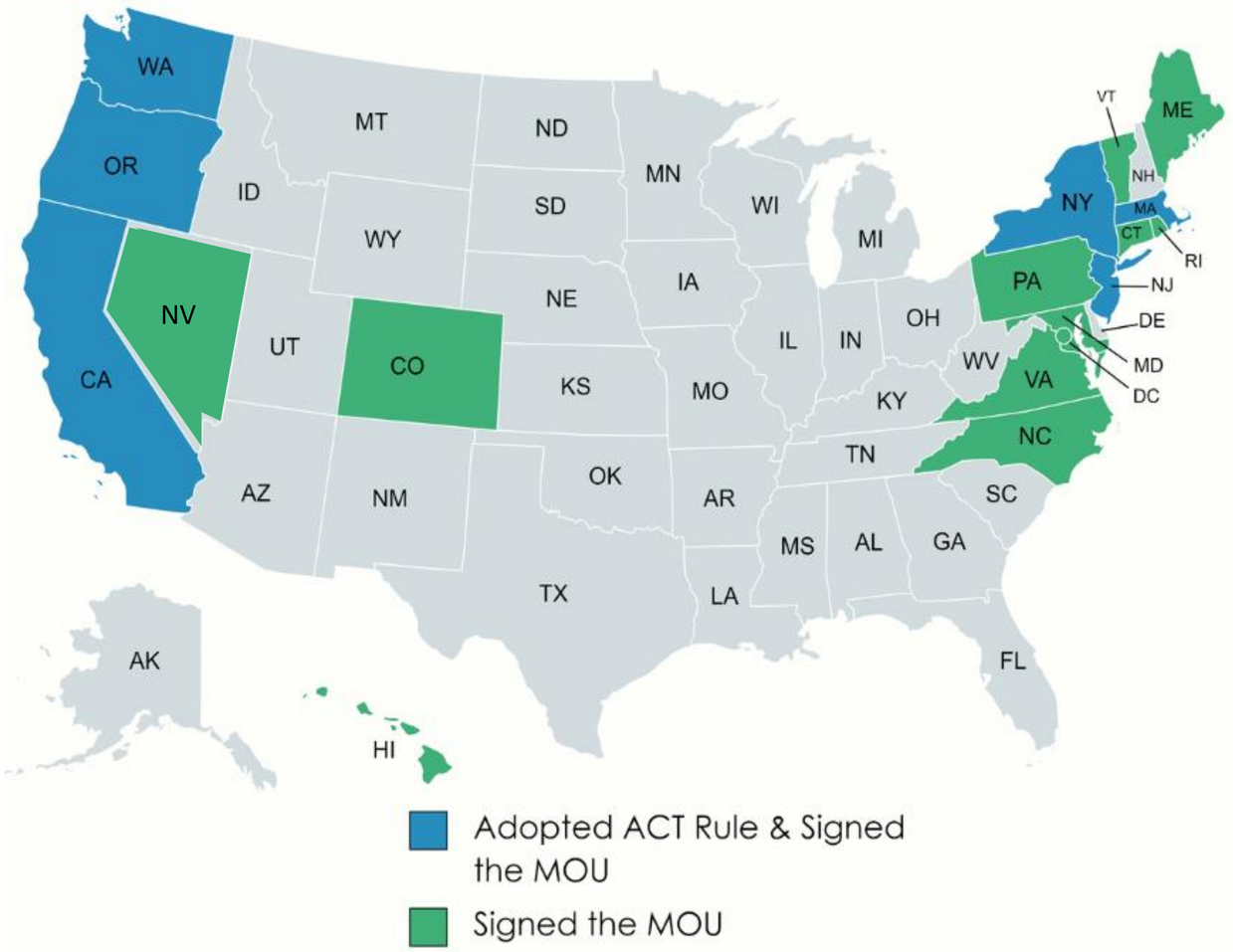
Opportunity: Adoption of Advanced Clean Cars II (ACCII) in 2023



Source: https://cleantechnica.com/2022/05/06/new-mexico-hits-the-gas-on-cleaner-cars/

Electrification Outlook: Advanced Clean Truck (ACT)

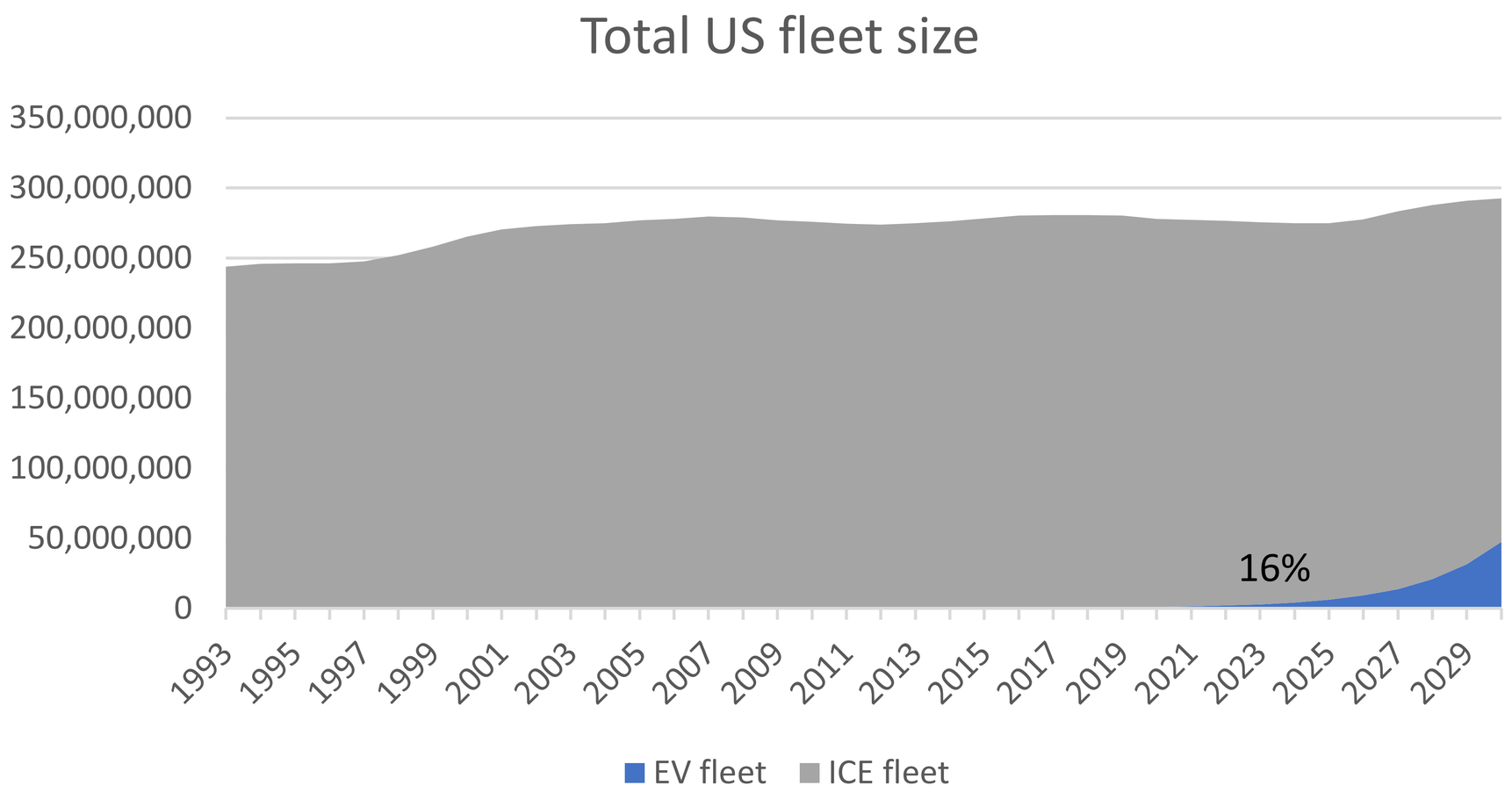
Opportunity: State Commitments to 100% ZEVs in Medium and Heavy Duty Fleets by 2050



Source: https://www.nrdc.org/experts/patricio-portillo/epa-its-time-act-we-need-clean-trucks-now

Total Light Duty Vehicle Fleet Size in the US

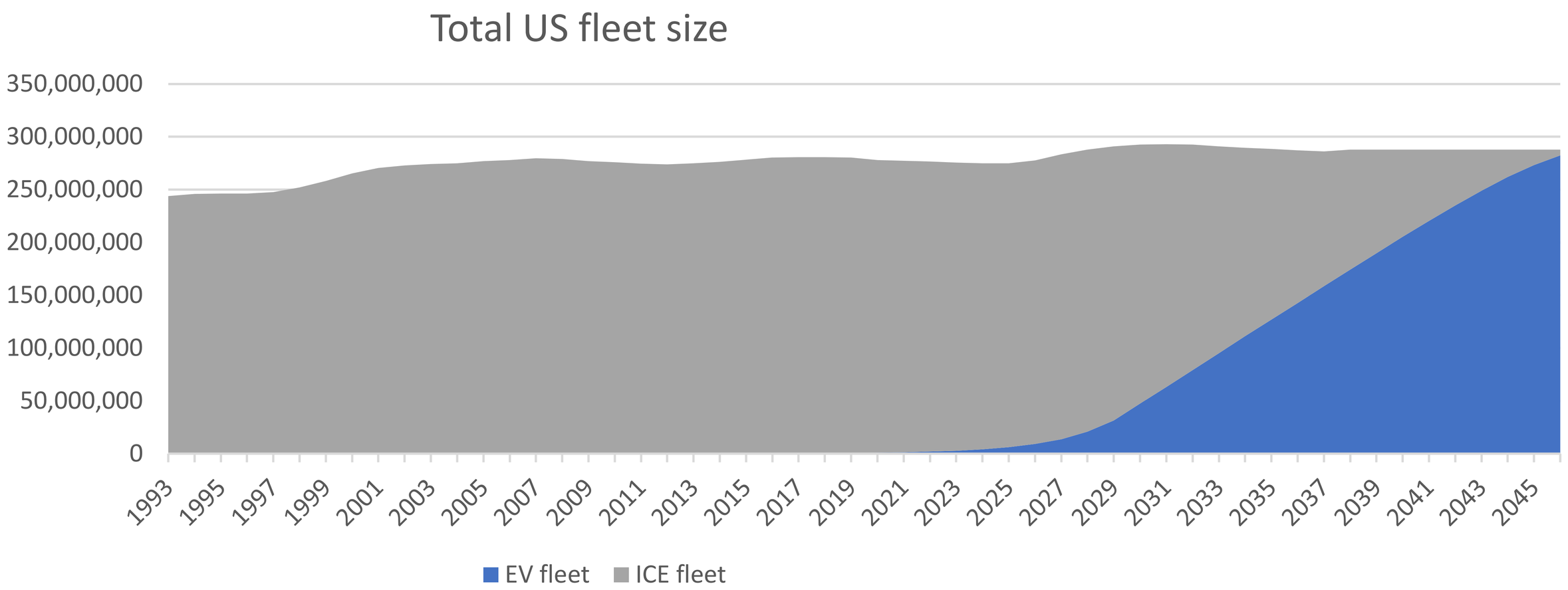
Requirement: 100% New Light Duty EV Sales



Even then, only 16% of the total fleet of ~280 million vehicles would be electric

Total vehicle Fleet Size in the US

Requirement: 100% New Light Duty EV Sales

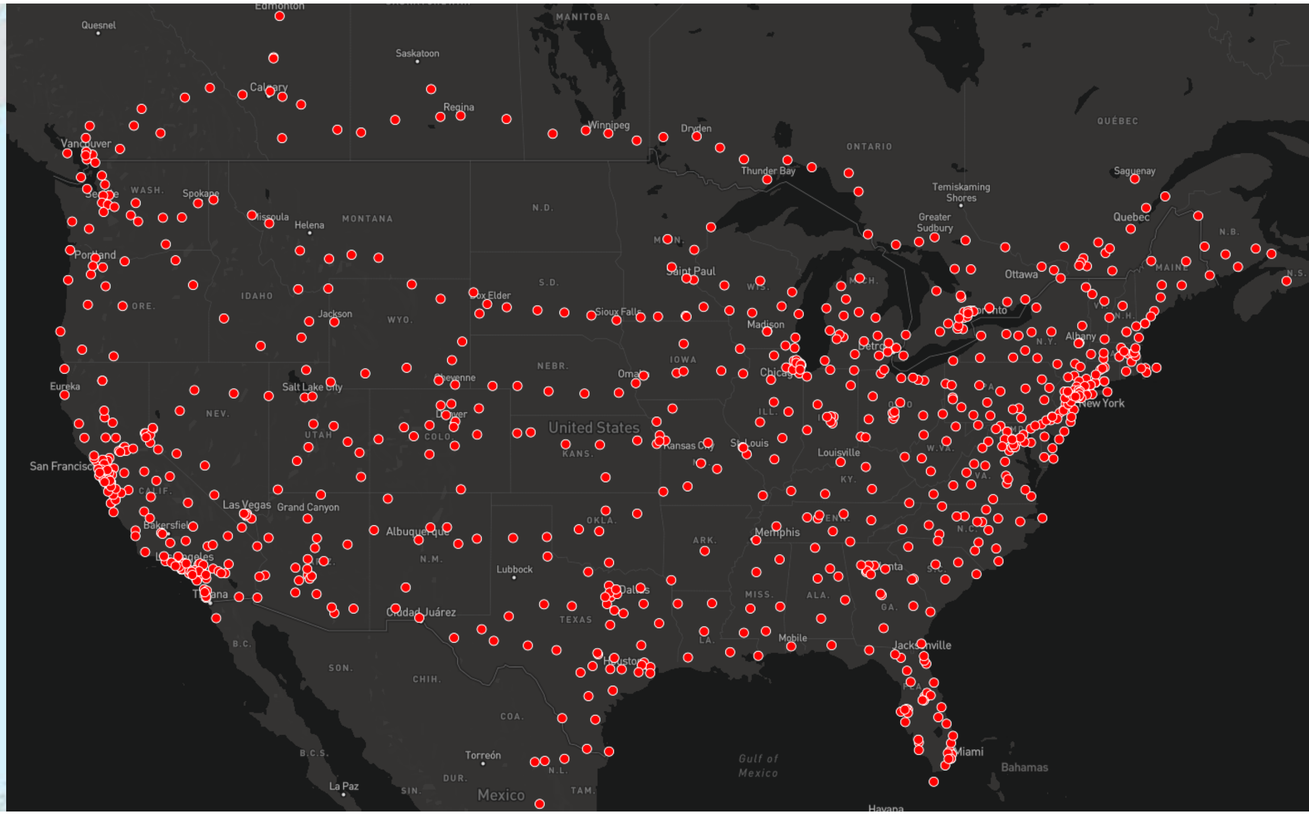


It would take another 17 years (till 2047) of 100% EV sales for the total fleet to become electric

EV Charging

Opportunity: Permit Streamlining and EV Ready Code Adoption

US Major Corridor Funding



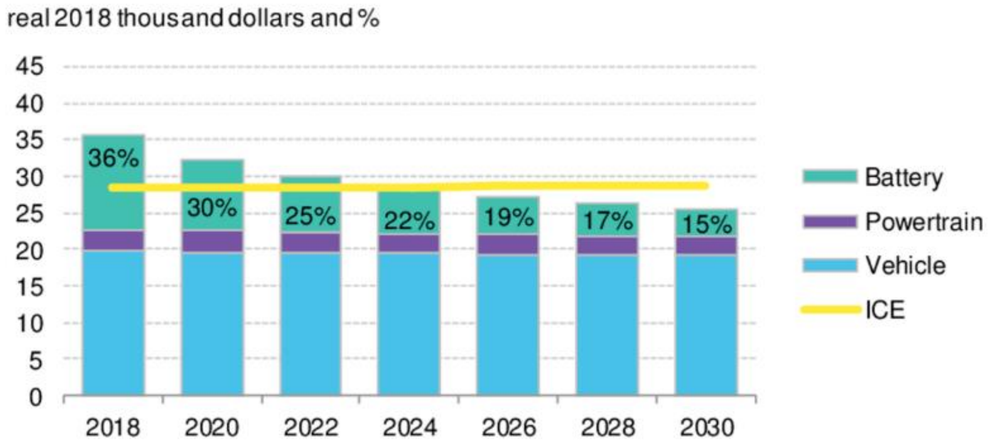
Tesla Supercharger Network

Battery Costs as Driver towards Price Parity

Volatility in Battery Metal Prices Limits threatens Target Costs

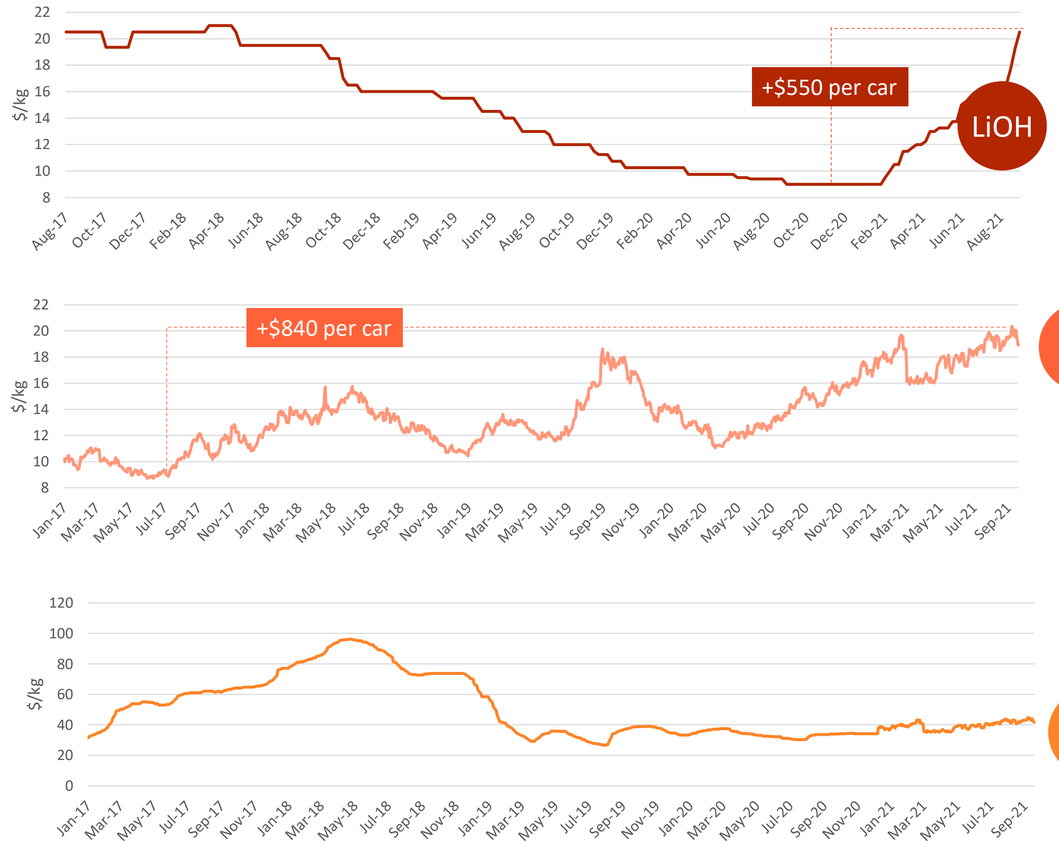
EV projected to reach price parity with ICE by mid-2020s …

Forecast of the pre-tax price breakdown for a medium segment EV and ICE in the U.S.



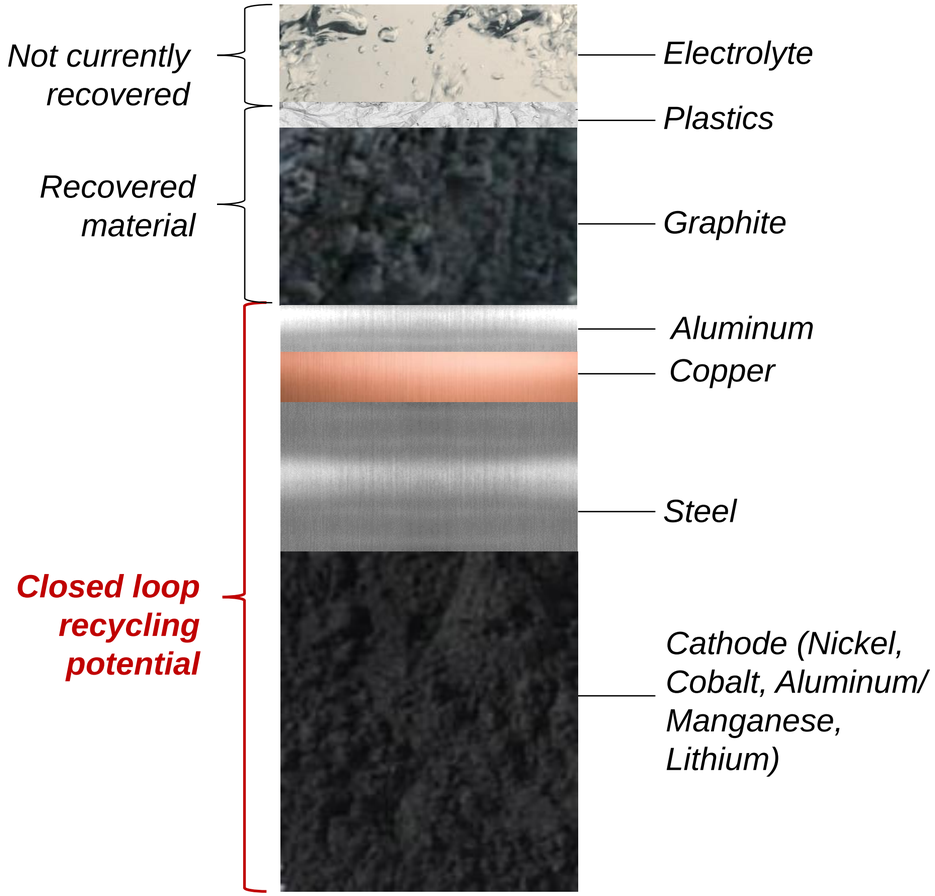
Source: BNEF

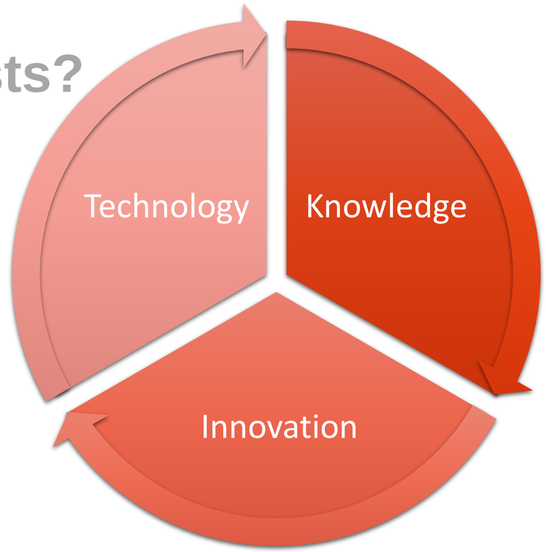
… However price volatility over last 4 years in LiOH, Ni and Co is threatening ability to further reduce costs



Battery Metals Recycling

Opportunity: Enough to Sustain Demand and Manage Costs?





- **100% of original battery materials** remain at end of life
- Metals have **infinite closed loop recycling potential**
- Recycling technology will enhance knowledge in battery materials processing further **fueling innovation**
- **Continuous iteration of R&D loop** will result in reduced costs and improved sustainability of battery life cycle thus reducing mining requirements for resources
- Combines principle of **industrial ecology** in our factory design

Battery Recycling

Economics Support Reuse or Second Life

Electric vehicles are exported to non-original markets to a higher degree than ICE vehicles

Circular Energy Storage
Research and Consulting

Top 5 EVs sold in Ukraine
August 2021 (89% used import)

Nissan Leaf
207 units from EU and the US

Tesla Model 3
71 units from EU and NA

Renault Zoe
40 units from EU

Tesla Model S
38 units from EU

Chevy Bolt
37 units from NA

Imported 18650/2170 cells:

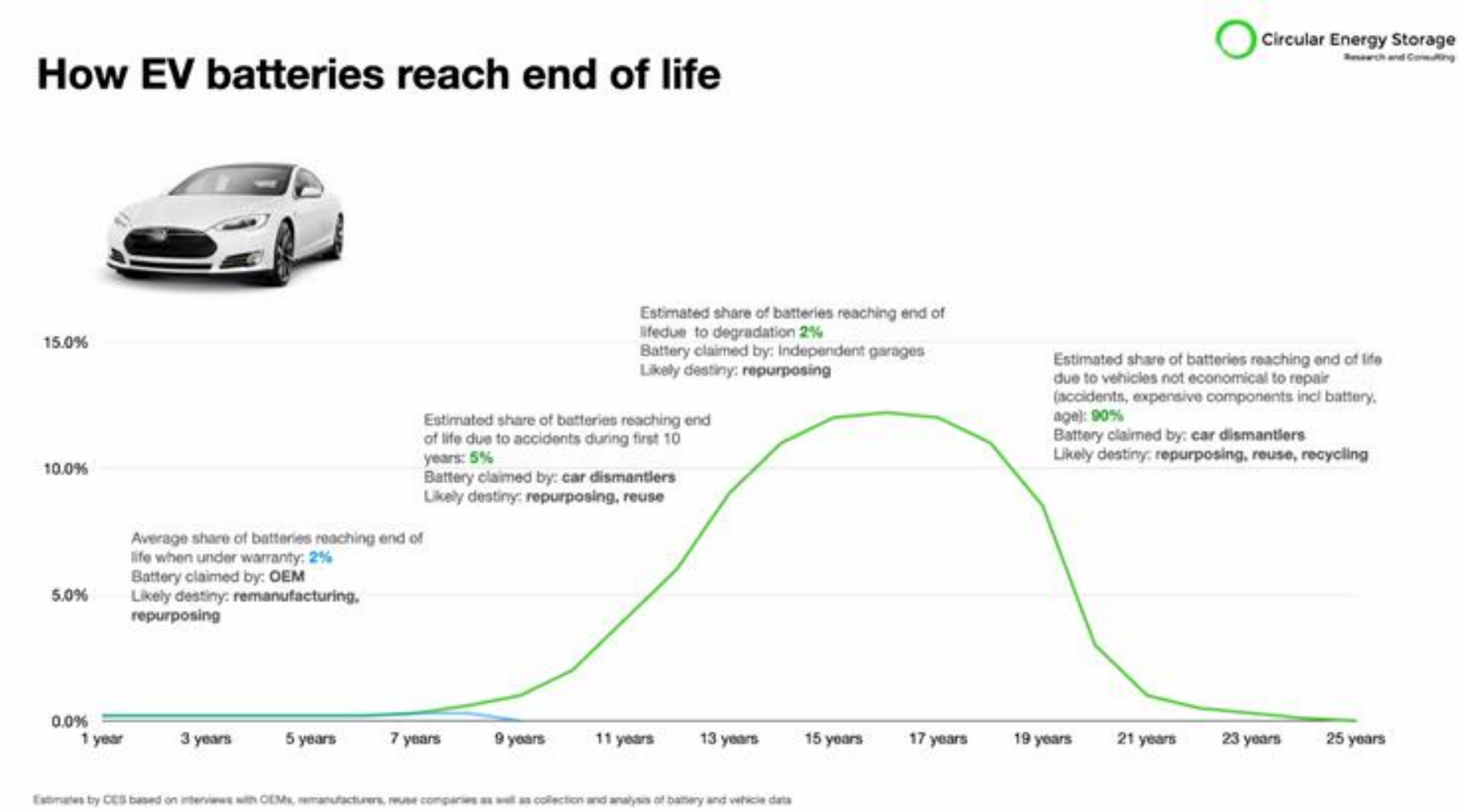
$80-$200/kWh

Salvaged EV modules:

$80-$250/kWh

Source: Circular Energy Storage – Hans Eric Melin

Battery Recycling
Critical But Not Enough



Source: Circular Energy Storage – Hans Eric Melin

Environmentally and Social Responsible Metals Sourcing

Opportunity: Metals Supply

Cathode costs driven by lithium, nickel and cobalt

Processing

Cobalt

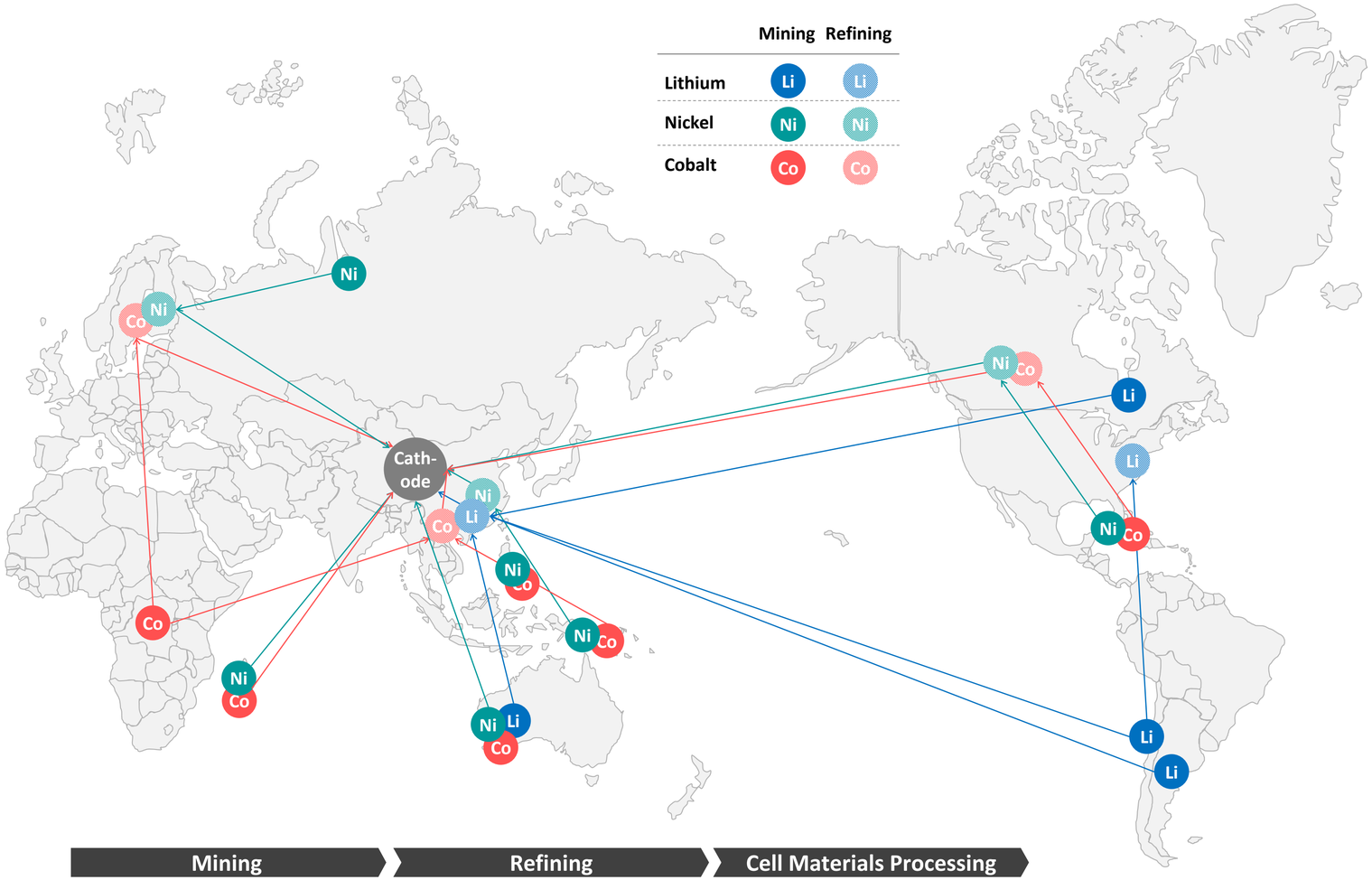
Maintains **stability** during charge/discharge and improves battery **safety**

Nickel

Enables higher energy density and **longer range**

Lithium

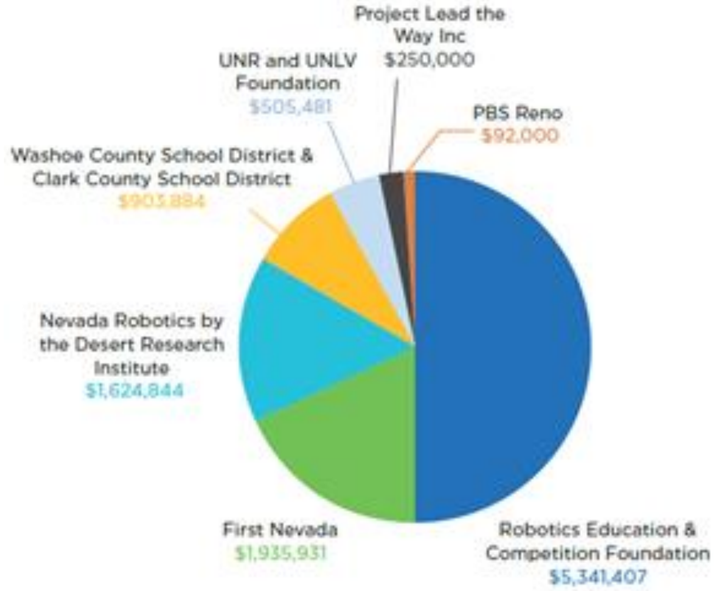
Carries the charge between the anode and cathode

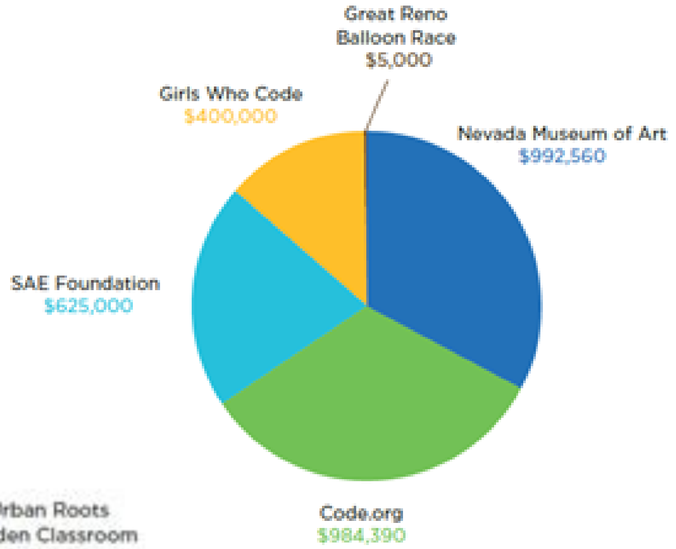


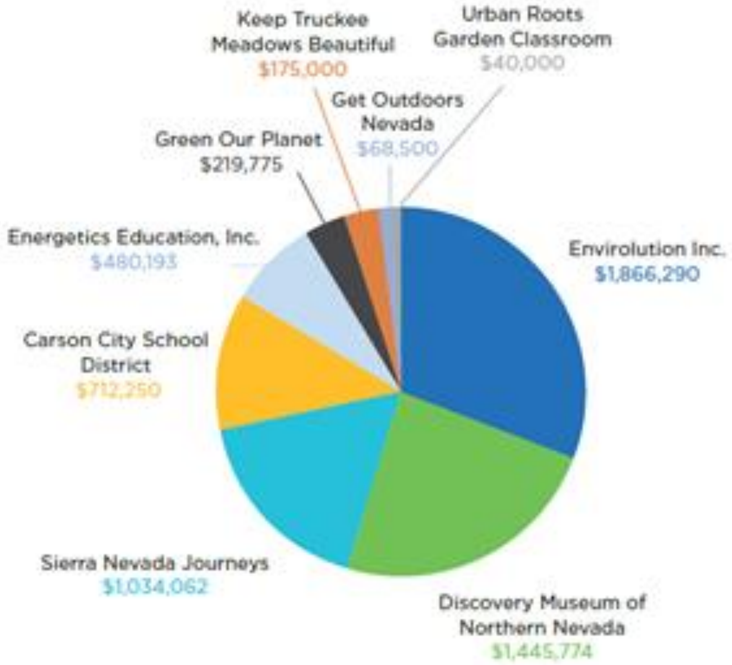
Mining	Refining	Cell Materials Processing
Ore is mined and processed into an intermediate product or pure metallic product	Intermediate or metal is processed into battery-grade chemicals	Chemicals are processed to make active cathode material

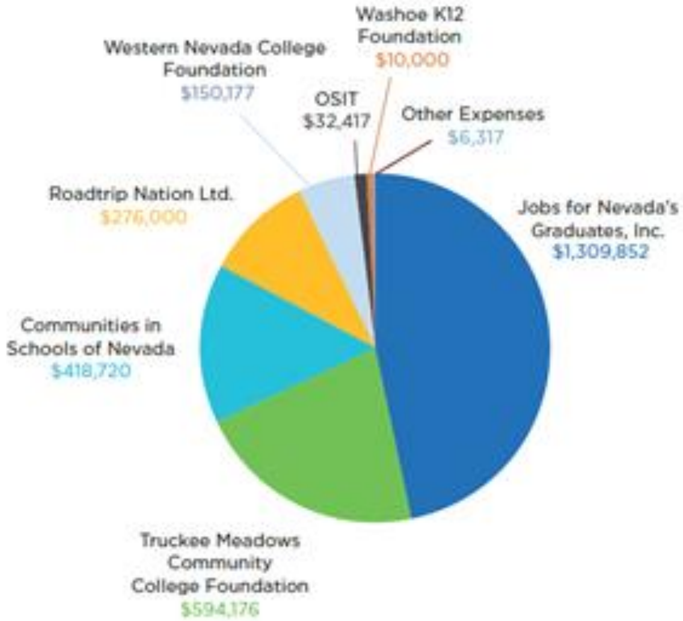
Preparing Workers for the Future

Opportunity: Additional Investment









Tesla's K-12 Investment in Nevada- $22.5M 2018-2021

https://goed.nv.gov/wp-content/uploads/2022/04/Tesla-Nevada-K12-Investment-Update9835.pdf

Roadway Funding

Sustainable and Fair Policy

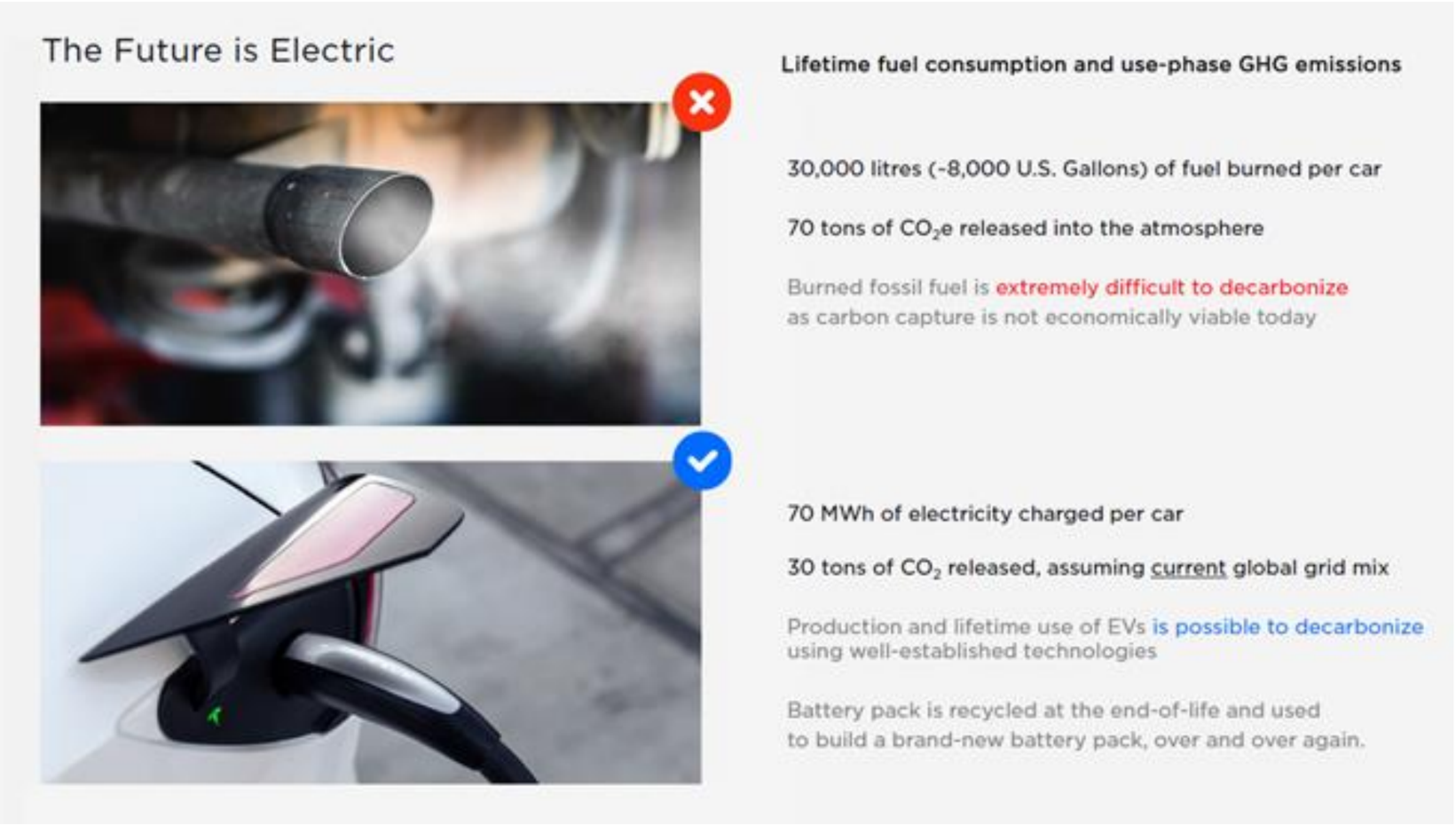
Suggestions for a Fair Vehicle Miles Travelled (VMT) or Road Use Charge (RUC) Program:

- Must be an all-inclusive and fuel-neutral program – not just for EVs.
- Must take into account the dual policy aims of the gas tax and include the efficiency of the vehicle in determining what the per mile fee should be, with each model paying a different per mile fee based on the MPG or MPGe of the vehicle.
  - The formula would take the state gas tax divided by the US EPA's miles per gallon or miles per gallon equivalent rating of the vehicle in question to determine the per mile fee.
- Theoretically, a VMT Program is more aligned with the gas tax concept because you are paying for your usage. A flat fee forces all EV owners to contribute the same amount regardless of their actual road usage.
- Tesla supports efforts that can raise revenue while continuing to encourage efficiency.

Summary: Opportunities for Nevada Leadership

The Future is Electric

- Advanced Clean Cars II adoption
- Advanced Clean Truck Rules
- Clean Fuels Standard Adoption
- Streamline permitting processes for charging, renewable interconnection
- EV code improvements
- Sustainable and ethical metals sourcing
- Education and workforce training throughout the EV value chain
- Fair roadway funding



Source: https://www.tesla.com/ns_videos/2021-tesla-impact-report.pdf