

Electric Vehicles Update For Robson Technology Club

Mike Weaver March 2025

They Aren't New

First Commercial Vehicle
Circa Late 1800s

Gave Way to Gas Cars When Oil
Discovered in TX

Henry Ford Had One

Taxi Fleet NYC



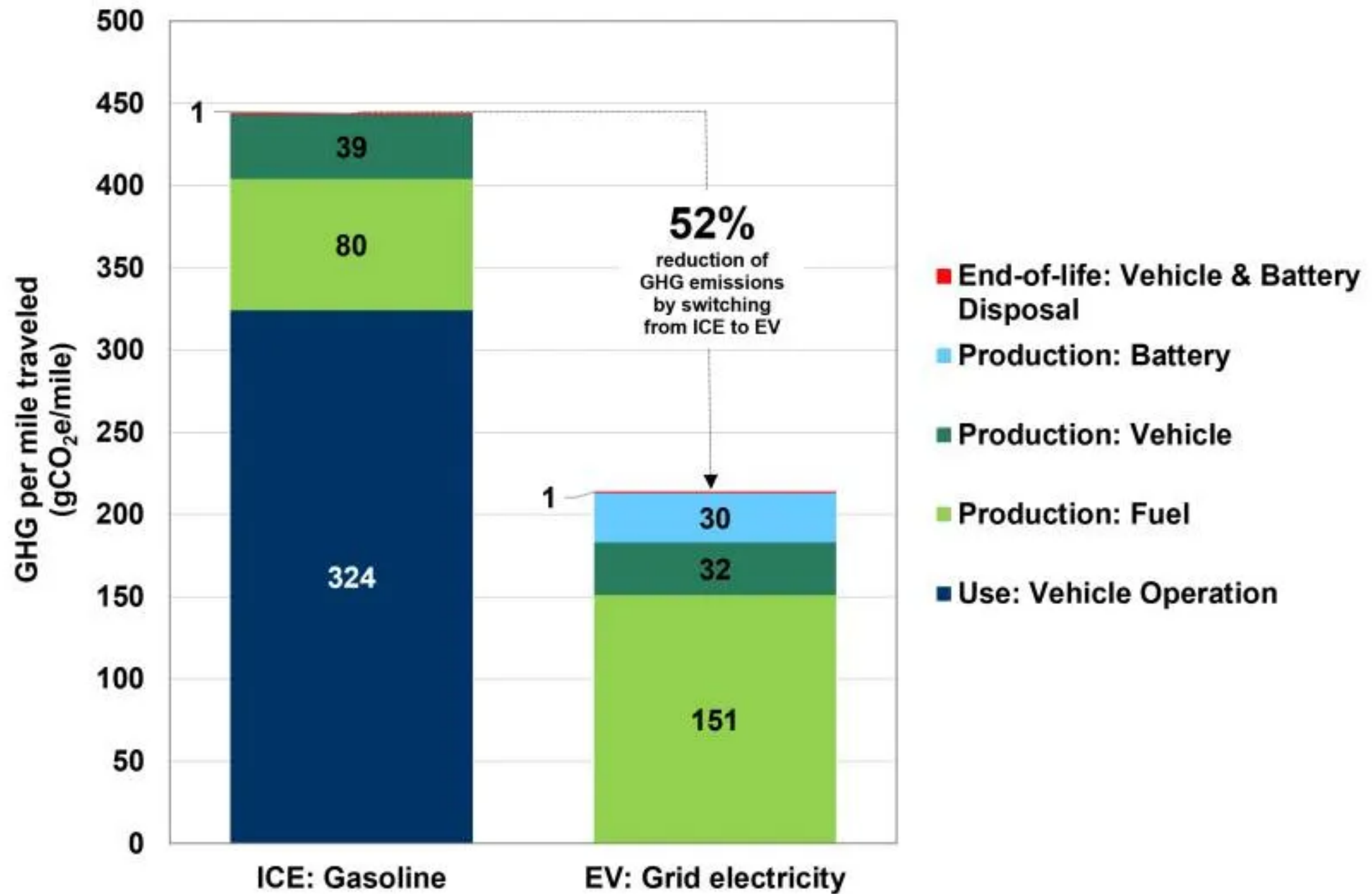
Why Are They Important Now?

- It's All About The Climate
- 29% GHG Originate From Transportation:58% Of That From Light Duty Vehicles
- Gas Cars And Diesels Are Enormous Polluters:Nitrous Oxides, Carbon Dioxide and Methane
- A Typical Passenger Vehicle Emits About 4.6 Metric Tons CO₂/Year And About 1.475 Billion Cars=6.785 Billion Metric Tons/Year!!!
- Internal Combustion Engine Vehicles Pollute For Their Entire Life. As The Grid Greens, EVs Get Cleaner

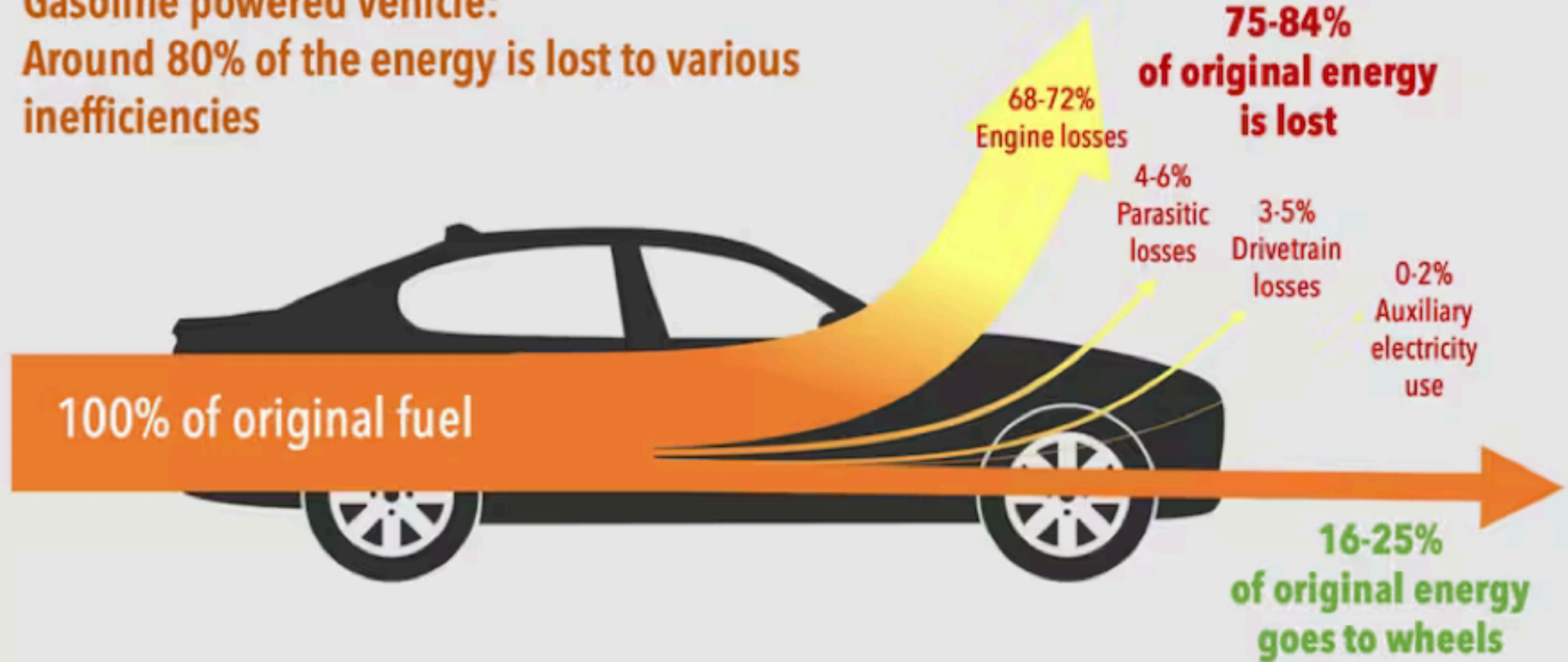
Gas Car Emission Problems

- Health Effects
 - Asthma, Heart Attacks, Lung Cancer, Stroke, Diabetes, Pregnancy Complications, School Absenteeism
- Emissions
 - NO₂, CO₂, CO, Benzene, Formaldehyde, Hydrocarbons, Particulates (Last One Especially Diesel)
 - Tailpipe Emissions Released At Ground Level And Breathed Directly Into Lungs

Comparison of Gasoline and Electric Vehicle Life Cycle GHG Emissions for a 2024 Small SUV

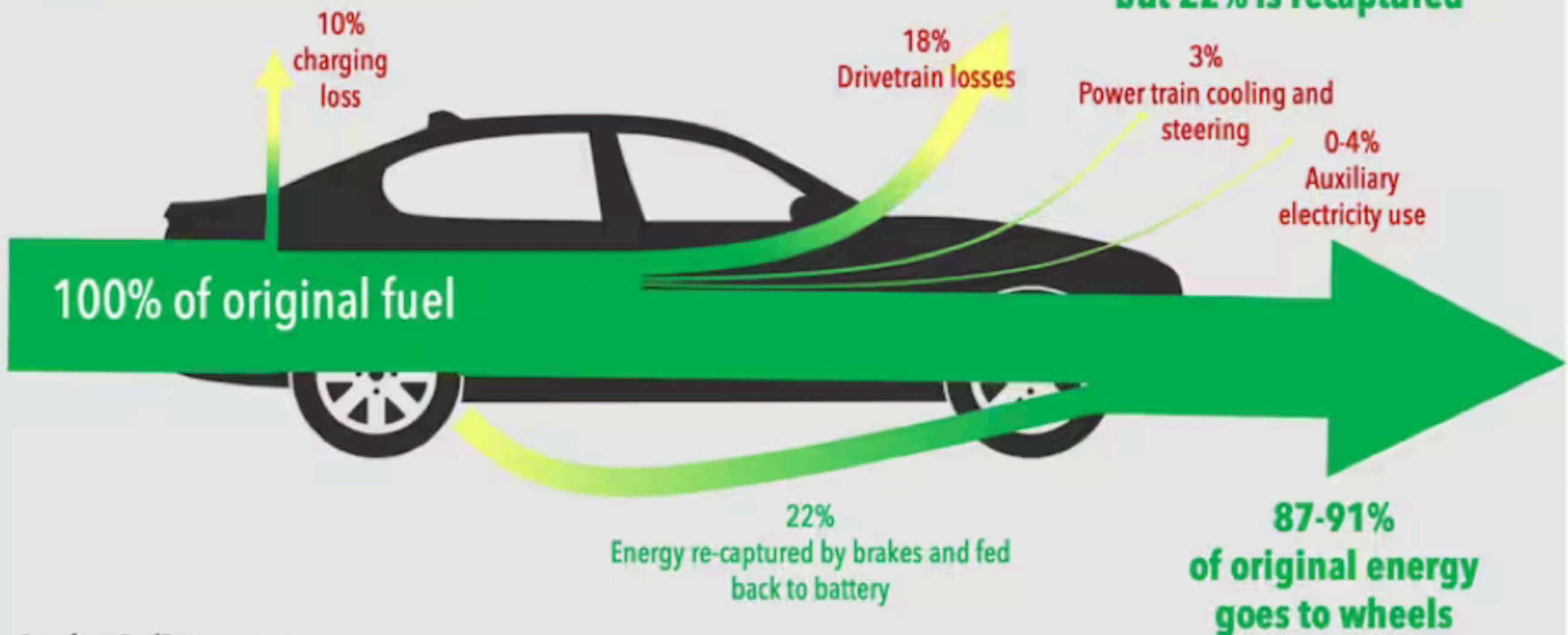


**Gasoline powered vehicle:
Around 80% of the energy is lost to various
inefficiencies**



Data from FuelEconomy.gov
Image by Karin Kirk for Yale Climate Connections

**Electric vehicle:
Around 11% of the energy is lost**



Data from FuelEconomy.gov
Image by Karin Kirk for Yale Climate Connections

Points To Ponder

- Subsidies For EVs: \$7500 Tax Credit (May Be Going Away?) Subsidies For Oil And Gas Reportedly \$3B A Year Not Including Environmental And Health Effects Born By Society And Not Producers. Globally Subsidies Are \$7 Trillion
- Gas-Environmental Effects:Energy For Drilling, Extraction, Refining, Delivering, Pipelines, Tanks At Gas Stations, Tank Farms, Manufacturing The Cars
- EVs-Mining (Direct Lithium Extraction), Refining The Metal Ore, Shipping Battery Substrates To China And Exporting Batteries To Manufacturers, Questionable Labor Practices
- Oil Finite Commodity-Lots Of Other Uses
- Global EV And Hybrid Sales Were Up 25% In 2024

What's Holding Us Back?

- Cost-Average New Car Price Is \$49k+; EV ~ \$55k. Skewed By Higher Priced Models- Luxury SUVs And Trucks
- Aggressive Discounts and Lower Priced Models. Now Average Transaction Price Is About \$44k. Federal Tax Credit of \$7500 On Some Cars. States Too.
- Median Range-Now About 283 Miles (Practical Range 80% Of This)
- Driver Unfamiliarity-A Little Intimidated. Try It You'll Like It.
- Sales Are Robust: 2024, 8.8% Of Auto Sales Were EVs, 1.3 Million vs 1.19 M 2023. Hybrids 1.6 Million. Combination=20% Of US New Car Sales.
- Tesla Sales Down 6.6% For MY; 33% For MS. Europe 40% Decline January. Juniper And Musk

Charging

- Level 1,2,3-Charging Is Painless At Home Overnight At 8-10 Hours
- Average Commute Is 28 Minutes. The Average EV Has Plenty Of Range For This
- On The Road Improving With National Electric Vehicle Infrastructure Program (NEVI). Bilateral Infrastructure Law
 - \$5B For 500,000 Chargers Along Highways
 - Every 50 Miles With 150 KW Chargers And At Least 4 Stalls And Restrooms
 - Plug And Pay
 - Standard Charging Connection (NACS VS CCS)

Charging Continued

- Q3 2024-200,000+ Stalls-Public Level 2~35 KW (35 Miles Added Per Hour) And DC Fast Chargers-500 Kw Chargers Coming.
- IONNA-BMW, General Motors, Honda, Hyundai, Mercedes-Benz, Kia and Stellantis. 30,000 Chargers By 2030. One Thousand Being Installed This Year
- Tesla Superchargers Gold Standard->99% Uptime. 67,000 Stalls Around The World. Added 30 Stalls Per Day Last Year. Opening To Many Manufacturers
- WalMart, Costco, Truck Stops, Gas Stations And Convenience Stores
- Cost For Charging 1000 Kwh Per Month@16.94 Cents Per Kwh@3 Miles Per Kwh Efficiency=\$56.47. Tesla Electric
- Iceing, Vandalism And Rolling Coal

What About Batteries

- Inflation Reduction Act Moving Battery Manufacture And Research To The US
- From 2013 To 2023 Price Of Battery Pack And Cell Per KWH Has Dropped From \$780 To \$139 And Continues To Drop
- Some Cars Can Charge From 10-80% In 18 Minutes (Kia, Hyundai, Rivian-800, Lucid 926 Volt Architecture.) Zeekr Can Charge 10-80% In Under 10 Minutes
- Tesla Battery Warranty For My Model Y is 8 Years or 120,000 Miles With No More Than 30% Range Reduction. Tesla Batteries Reportedly Will Last 300,000-500,000 Miles
- Range Decreases With Cold Weather. Heat Pump.
- Able To Endlessly Recycle Spent Batteries And Incorporate Recovered Metals Into New Ones

What About The Grid

We've Got Work To Do

- 21.4% Of US Power From Renewables. Provided 90% Of New Capacity In 2024
- TX 157,363 Thousand MWH- Renewables Supply 28.4% Of The Demand
- CA 34.4% Of Total Demand
- 60% Still Comes From Coal And Gas



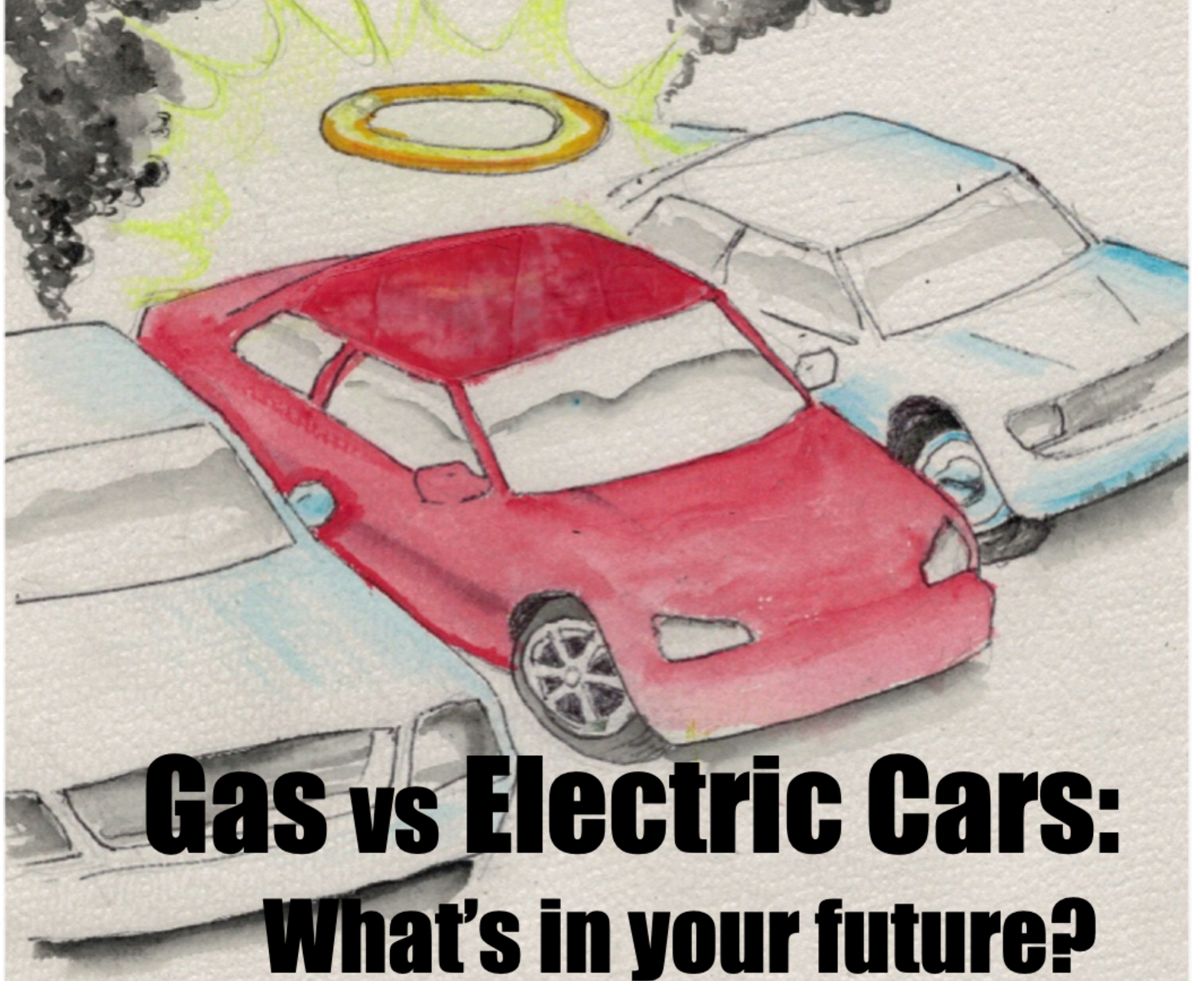
Tesla

- Full Self Driving-80% There. Actually Smart Summon. Texas And California Unsupervised This Year. Continuous Improvement
- Regular Over The Air Updates-Like Getting a New Car
- Four Car Factories-Two In Us, Berlin, Shanghai
- M3, Cybertruck, MS, MX-Cheaper Model And Cybertaxi
- Leads In Longevity-Over 20 Years Of Battery Life. Better Than Gas And Other Electrics
- MY-2023-Best Selling Vehicle Whether Gas Or Electric Worldwide. Juniper Released January-Heated And Ventilated Seats, Power Rear Seats, Acoustic Glass And Dampening For Quiet Cabin, Improved Suspension, Ambient Lighting, Frunk Drain, Front Bumper Camera, Larger Display With Better Resolution, Improved Radiant Reflection From Glass Ceiling, Marginal Range Increase

What's Good About EVs

EVs are quieter, more refined, offer better software and safety technology than most internal combustion cars. They're cheaper to operate and—if you have home or workplace charging—far easier to live with. They require almost no maintenance. Make no noise. They don't belch toxins at pedestrians, or into your garage or into the air. They're faster, too, and far smoother to drive.

According to [a survey from Consumer Reports](#), half of Americans say they would be interested in test driving an electric vehicle the next time they're at a dealership. Another 13% said they were "unsure," while 37% said they would not be interested in testing an EV. 92% Of EV Drivers Stated They Would Buy Another Electric Car.



**Gas vs Electric Cars:
What's in your future?**