Joint Transportation Committee
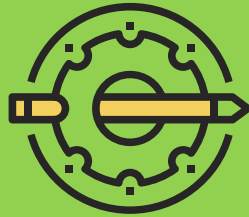Encouraging High Consumption Fuel Users (HCFU) to Use Electric Vehicles
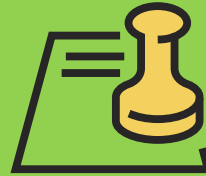
November 15, 2022

CDM Smith + Ipsos Team

Expert Practitioners in Energy and Public Sector

Analysis, Guidance, and Implementation

Experience with DOLs DRIVE system

Unique Approach; IPSOS Consumer Research

Understanding of Washington state legislature and policy
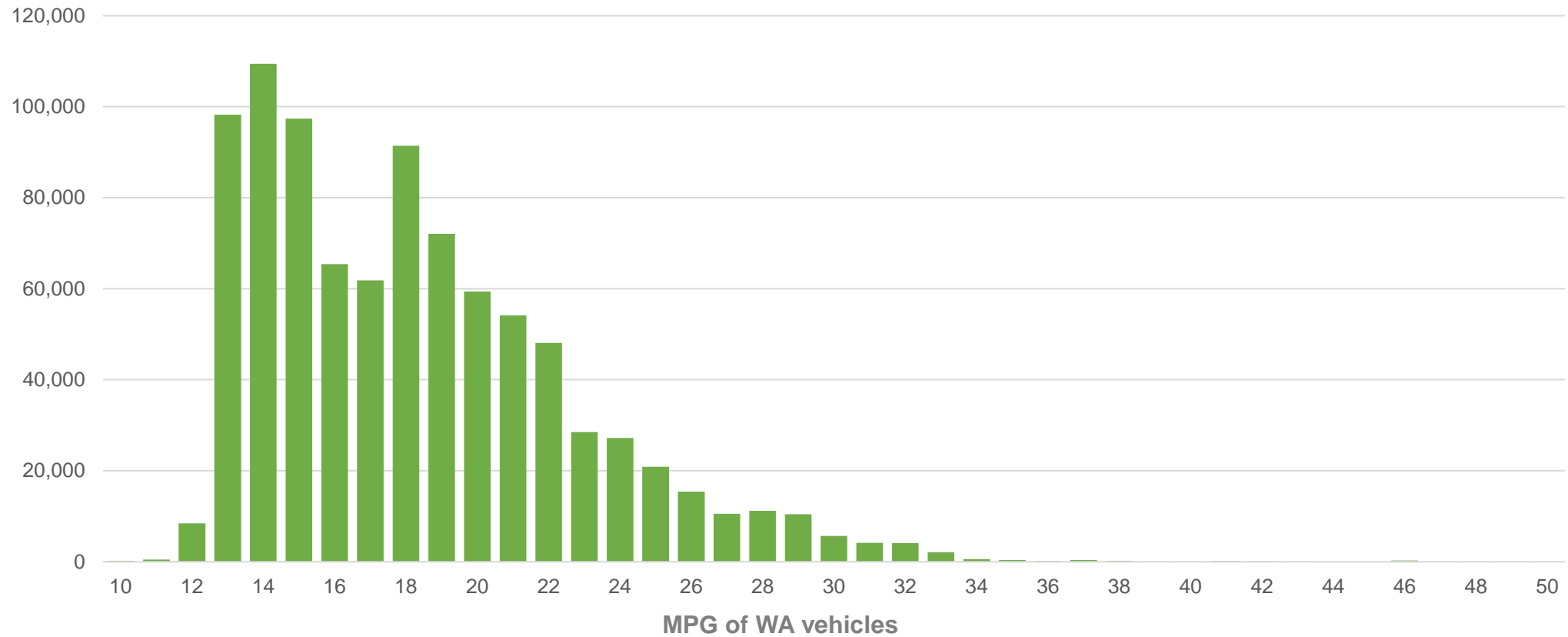
CDM Smith

Topics for today's meeting

- Context for this study
- Main Task Areas
- Preview of Task 1: issues and trends related to EV adoption
- Study deliverables and schedule

Study context: What policies might be effective in persuading drivers who use a disproportionate amount of gasoline to switch to electric vehicles?

Estimated Number of Washington HCFUs* by MPG rating
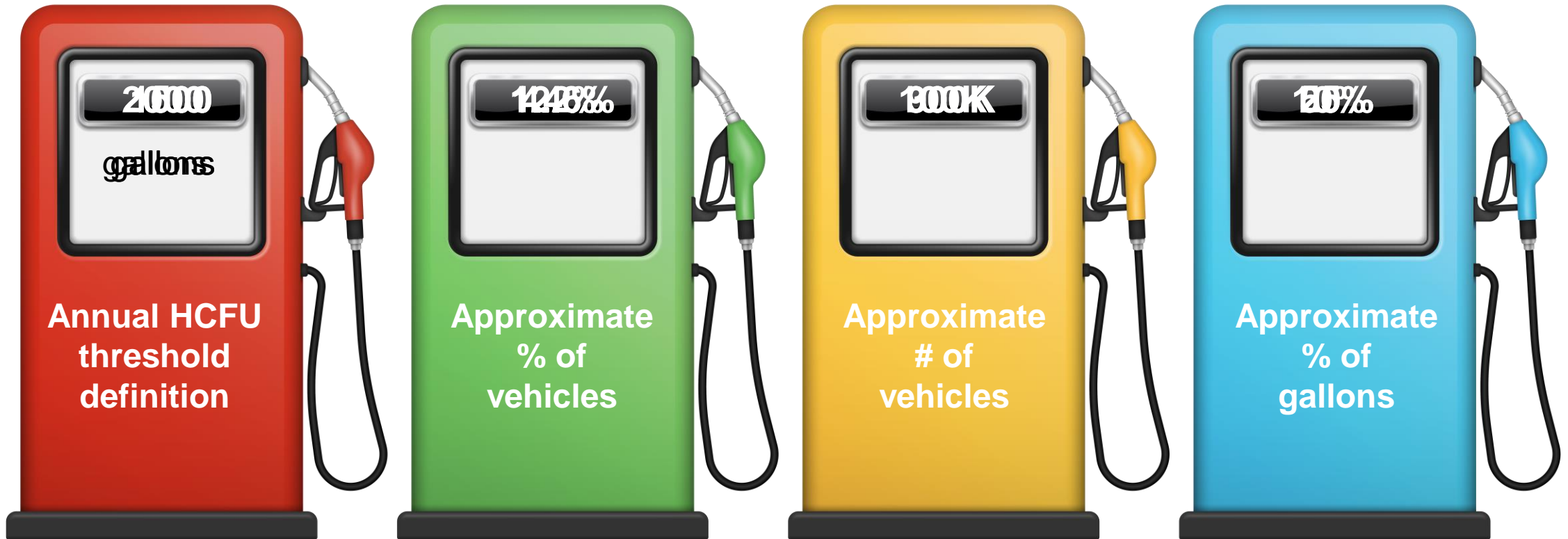*Assumes a threshold of 1,000 gallons; Equates to 12.6% of fleet (~900k vehicles) and ~50% of gallons*

Estimates are based on counts of Washington vehicles by MPG from decoded DOL registry data, with a distribution of miles driven applied based on NHTS data

Study context: What policies might be effective in persuading drivers who use a disproportionate amount of gasoline to switch to electric vehicles?

Annual HCFU threshold definition

Approximate % of vehicles

Approximate # of vehicles

Approximate % of gallons

Estimates are based on counts of Washington vehicles by MPG from decoded DOL registry data, with a distribution of miles driven applied based on NHTS data

Study context:
A relatively small percentage of drivers (4.2%) burn a disproportionate amount of gasoline.

Annual HCFU threshold definition	Approximate % of vehicles	Approximate # of vehicles	Approximate % of gallons
2,000 gallons	1.4%	100k	10%
1,500 gallons	**4.2%**	**300k**	**25%**
1,000 gallons	12.6%	900k	50%

*Estimates are based on counts of Washington vehicles by MPG from decoded DOL registry data, with a distribution of miles driven applied based on NHTS data

Project goals and objectives

"Study and assess strategies to encourage high consumption fuel users (HCFU) to switch to electric vehicles."

Study tasks fall into two broad categories:

Background data:
- Identify which HCFUs can switch to EVs
- Calculate how much money would those users save
- Calculate how many gallons of fuel would be displaced

Consumer choice data and analysis by conducting market analysis
- HCFUs attitudes and perception of EVs
- Perceived barriers to HCFU adoption of EVs
- Identifying effective messages to encourage the transition
- Identifying policies to encourage the transition.

How tasks fit together to identify effective policies

Task 1

Understand broader issues and trends

Task 2

Apply data analytics to understand ability of HCFUs to convert to EVs

Task 3

Probing decision-factors of HCFUs and testing draft policies and messages

Task 4

Develop strategies to encourage HCFU to switch to EV

Task 1: Understanding broader issues and trends affecting EV adoption

Light duty vehicles weigh less than 10,000 lbs. GVW

Ford F250

Ford Explorer

Ford Transit Connect

Electric Vehicles (RCW 46.17.323)

Nissan Leaf
Battery Electric Vehicle

Kia Sorrento
Plug-in Hybrid Electric Vehicle

Zero-Emission Vehicles (RCW 46.17.323)

Nissan Leaf
Battery Electric Vehicle

Kia Sorrento
Plug-in Hybrid Electric Vehicle
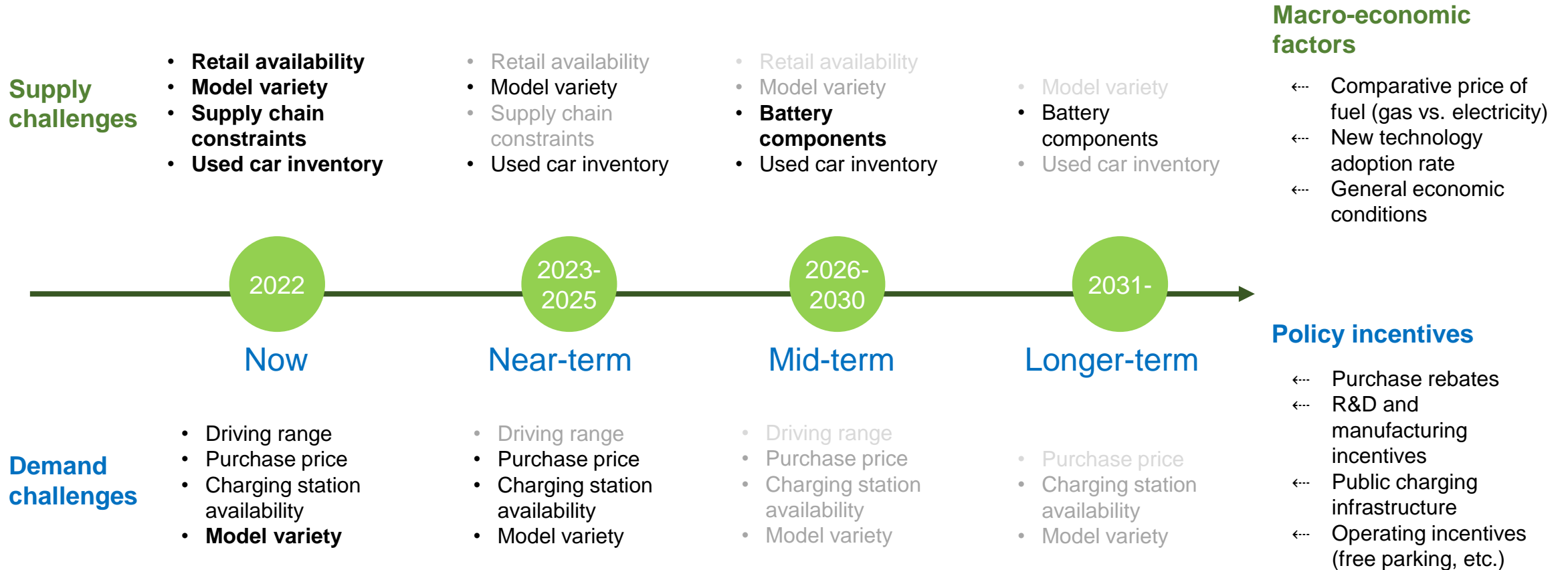
Hyundai NEXO
Hydrogen Fuel Cell Vehicle

Hydrogen Fuel Cell Electric Vehicles:
Currently only available in California, where limited hydrogen fueling stations exist.

2022 Toyota Mirai
Hydrogen Fuel Cell Vehicle

Time horizons: current conditions, near-term, mid-term, and longer-term

Macro-economic factors

Supply challenges

2022	2023-2025	2026-2030	2031-

- **Retail availability**
- **Model variety**
- **Supply chain constraints**
- **Used car inventory**

- Retail availability
- Model variety
- Supply chain constraints
- Used car inventory

- Retail availability
- Model variety
- **Battery components**
- Used car inventory

- Model variety
- Battery components
- Used car inventory

←— Comparative price of fuel (gas vs. electricity)
←— New technology adoption rate
←— General economic conditions

Now   **Near-term**   **Mid-term**   **Longer-term**

Demand challenges

- Driving range
- Purchase price
- Charging station availability
- **Model variety**

- Driving range
- Purchase price
- Charging station availability
- Model variety

- Driving range
- Purchase price
- Charging station availability
- Model variety

- Purchase price
- Charging station availability
- Model variety

Policy incentives

←— Purchase rebates
←— R&D and manufacturing incentives
←— Public charging infrastructure
←— Operating incentives (free parking, etc.)

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Supply side challenges: Retail availability is currently constrained.

Component Part Shortages

Manufacturing Factory Ramp-up

War

Supply Chain Disruptions

Strong Consumer Demand

COVID

Supply side challenges: Retail availability is currently constrained.

Current causes: component part shortages (e.g., computer chips), manufacturing plant ramp-up, supply chain disruptions (COVID, war, etc.)…and strong consumer demand.

Wait time examples	
Tesla Model Y – Long Range	4 months (down from 1 year)
Tesla Model X	June 2023
Volkswagen ID 4	
Audi E-Tron	SOLD OUT FOR 2022
Porsche Taycan	
Ford Mach-E SUV	
Ford F-150 Lightening	By reservation only – wait time up to 3 years

Volkswagen announced being sold out in June of 2022.

Supply side challenges: when demand exceeds supply, prices increase.

Ford dealers are taking advantage of strong demand for F-150 Lightning, marking it up by $30,000
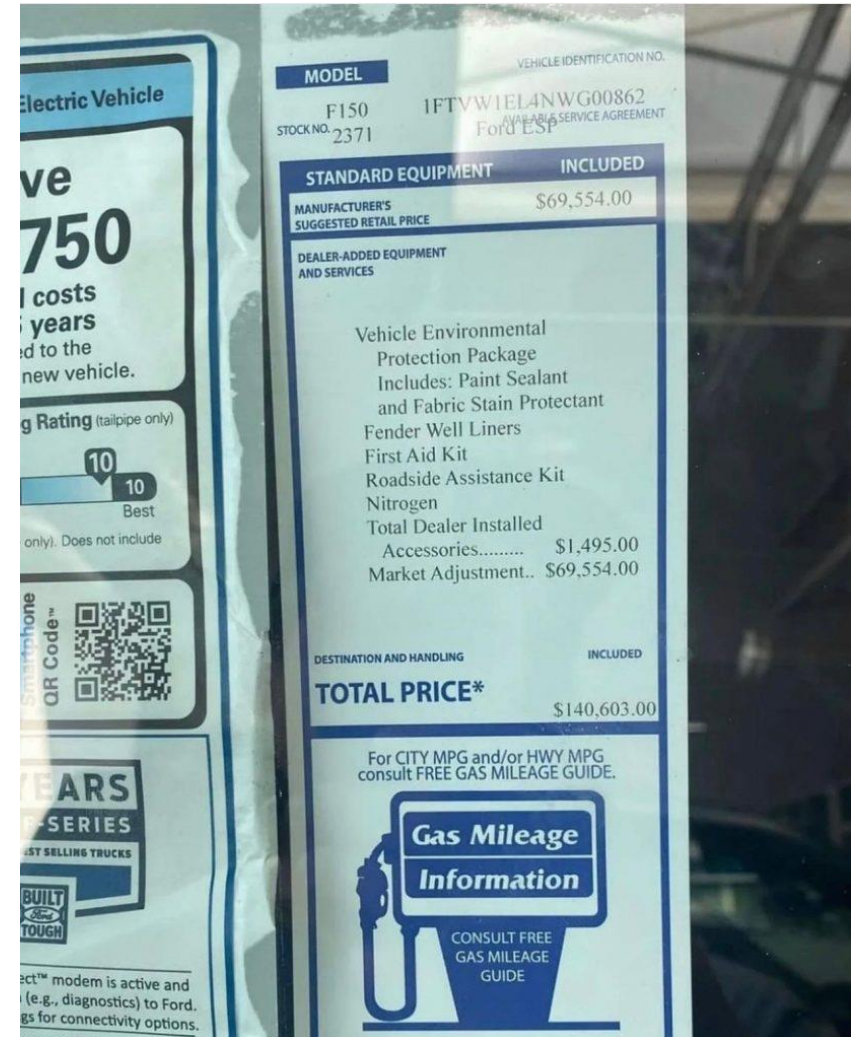
Fred Lambert | Dec 30 2021 — 11:33 am PT

STANDARD EQUIPMENT   INCLUDED

$69,554.00

MANUFACTURER'S SUGGESTED RETAIL PRICE

Total Dealer Installed
Accessories......... $1,495.00
Market Adjustment.. $69,554.00

DESTINATION AND HANDLING   INCLUDED

TOTAL PRICE* $140,603.00
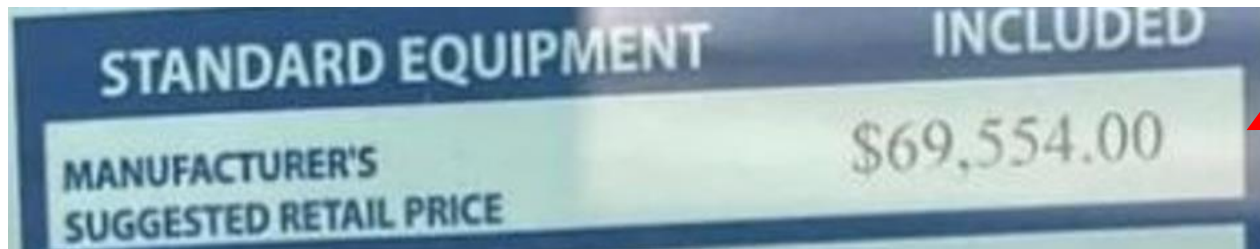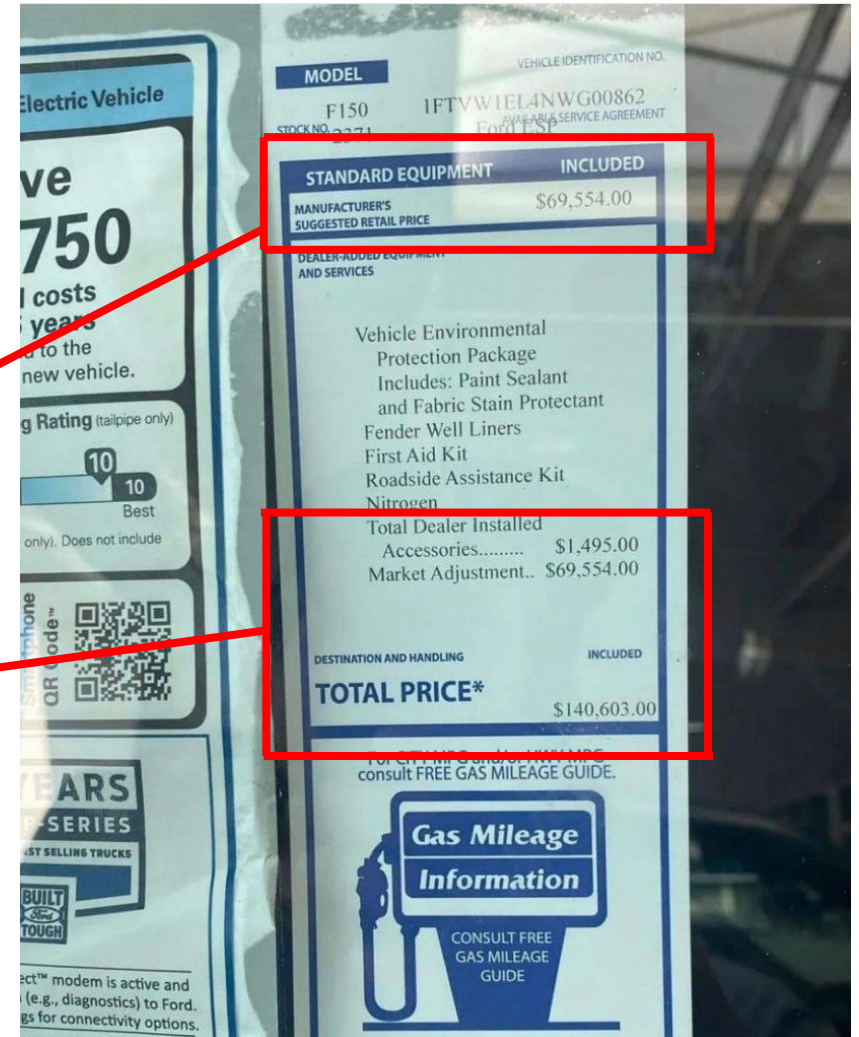
Supply side challenges: when demand exceeds supply, prices increase.

The Most Marked-Up Electric Vehicles

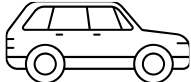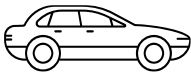These six models had the highest difference between MSRP and transaction price in January.

🟩 MSRP   ⬛ Average Transaction Price

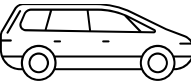| Model	MSRP	Average Transaction Price
Mercedes-Benz EQS	$114.0K	118.6K
Hyundai Ioniq 5	49.5K	52.4K
Audi e-tron	75.8K	77.5K
Porsche Taycan	120.1K	121.7K
Kia Niro EV	43.5K	45.1K
Ford Mustang Mach-E	54.2K	55.7K
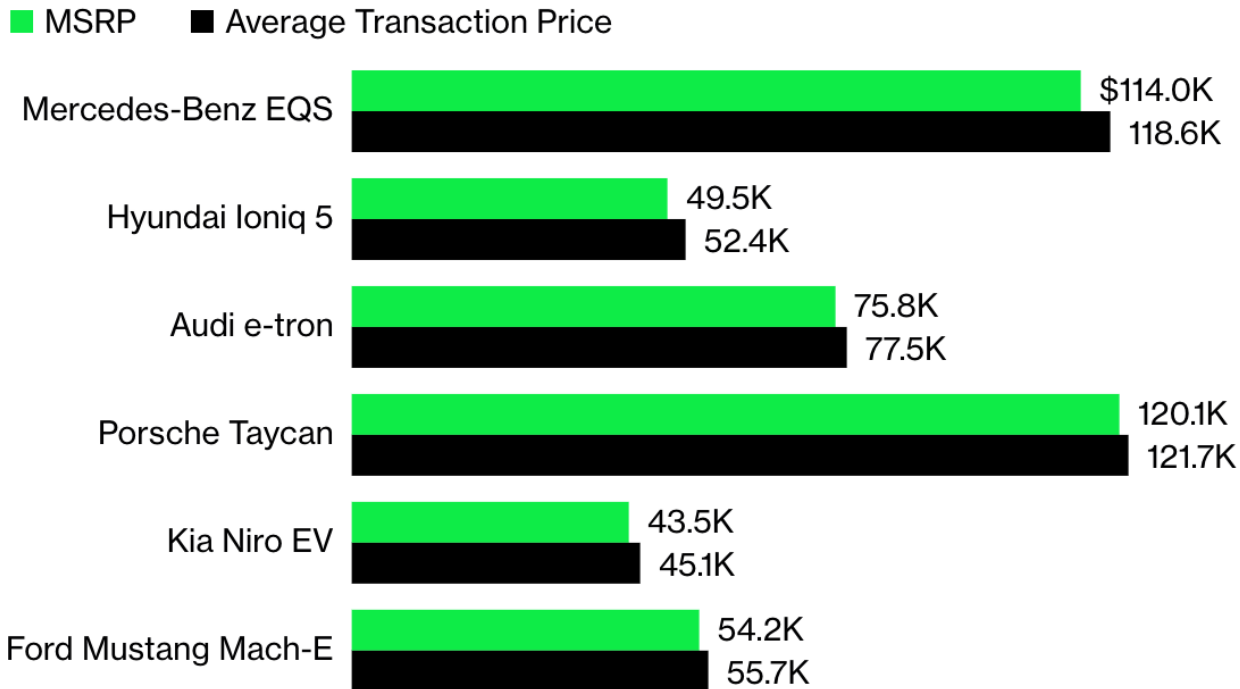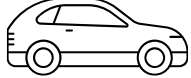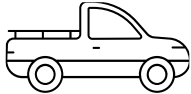
Source: Edmunds

Supply side challenges: EV model diversity has been lacking, but is catching up

2022 US new car purchases (models available)

Crossovers (33)	**45.1%**
Pickup Trucks (34)	**19.3%**
Sport Utility Vehicles (67)	**10.3%**
Midsize cars	8.1%
Small Cars	7.1%
Luxury Cars	5.3%
Vans	4.2%
Large Cars	0.7%

75% of new vehicle purchases in U.S.

EV model availability (2022)

Pickup Trucks	3 models
Sport Utility Vehicles*	41 models
Small Cars	36 models
Vans	4 models

*includes both crossovers and SUVs
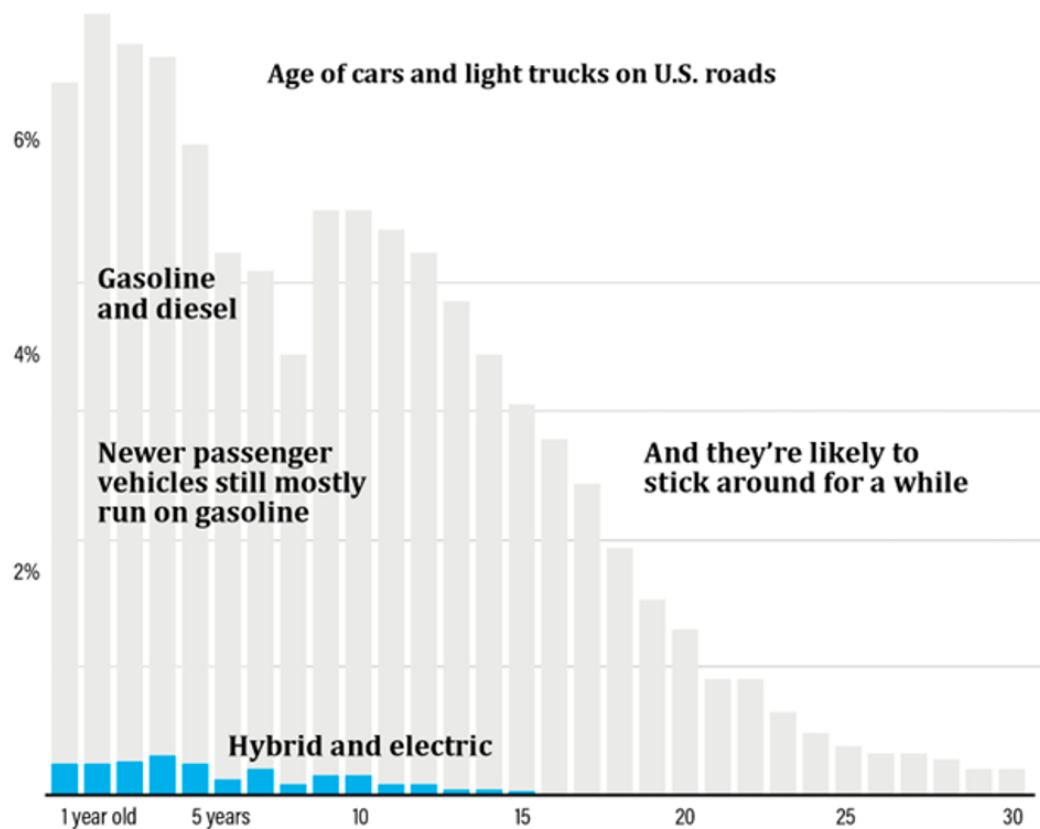
134 models **400+ total U.S models**

44 models **84 total U.S models**

16
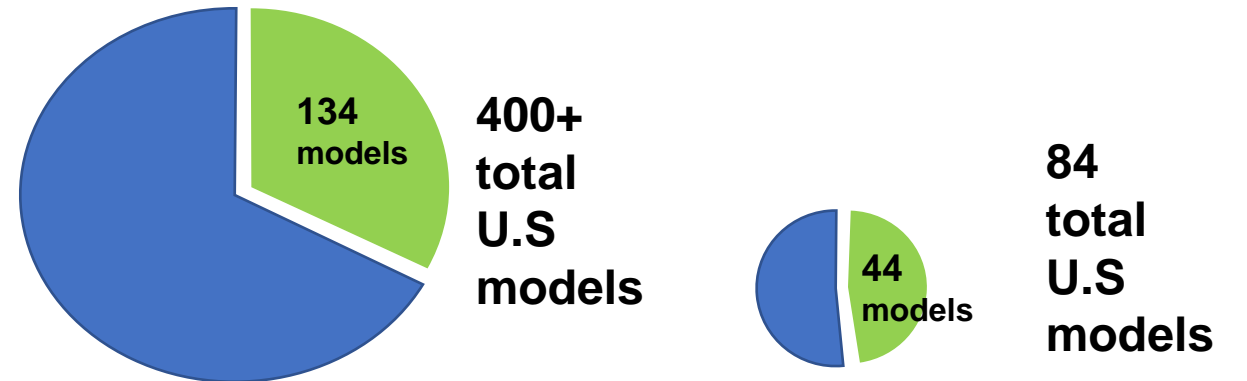
Supply side challenges: 74% of vehicle purchases are <u>used</u> vehicles.

43.1 million used vehicles sold in US in 2021 (compared to 15.3 million new vehicles).

Age of cars and light trucks on U.S. roads

Gasoline and diesel

Newer passenger vehicles still mostly run on gasoline

And they're likely to stick around for a while

Hybrid and electric

Source: National Household Travel Survey (NHTS) via New York Times. Graphic from New York Times.

- Market availability of more affordable, <u>used</u> electric vehicles is **highly constrained**.

- 2021 Recurrent survey: **50%** of EV buyers interested in a used EV. 2022: closer to **80% interested in used EV**.

- The average resale age of an EV is four years old (compared to used gas vehicles – 6 years old)…

  - ⤳ A large percentage of new EVs are leased (36 months or less)

  - ⤳ Recent fad: EV "flipping"…seller captures tax incentives and financing deals, then resells the barely-driven EV for profit within a few weeks to months.

Supply side challenges: when supply is tight, prices go up.

Average price for a used gas car: **$33,957.**

Average price for a used EV: **$42,700.**

Credit: Recurrent © 2022
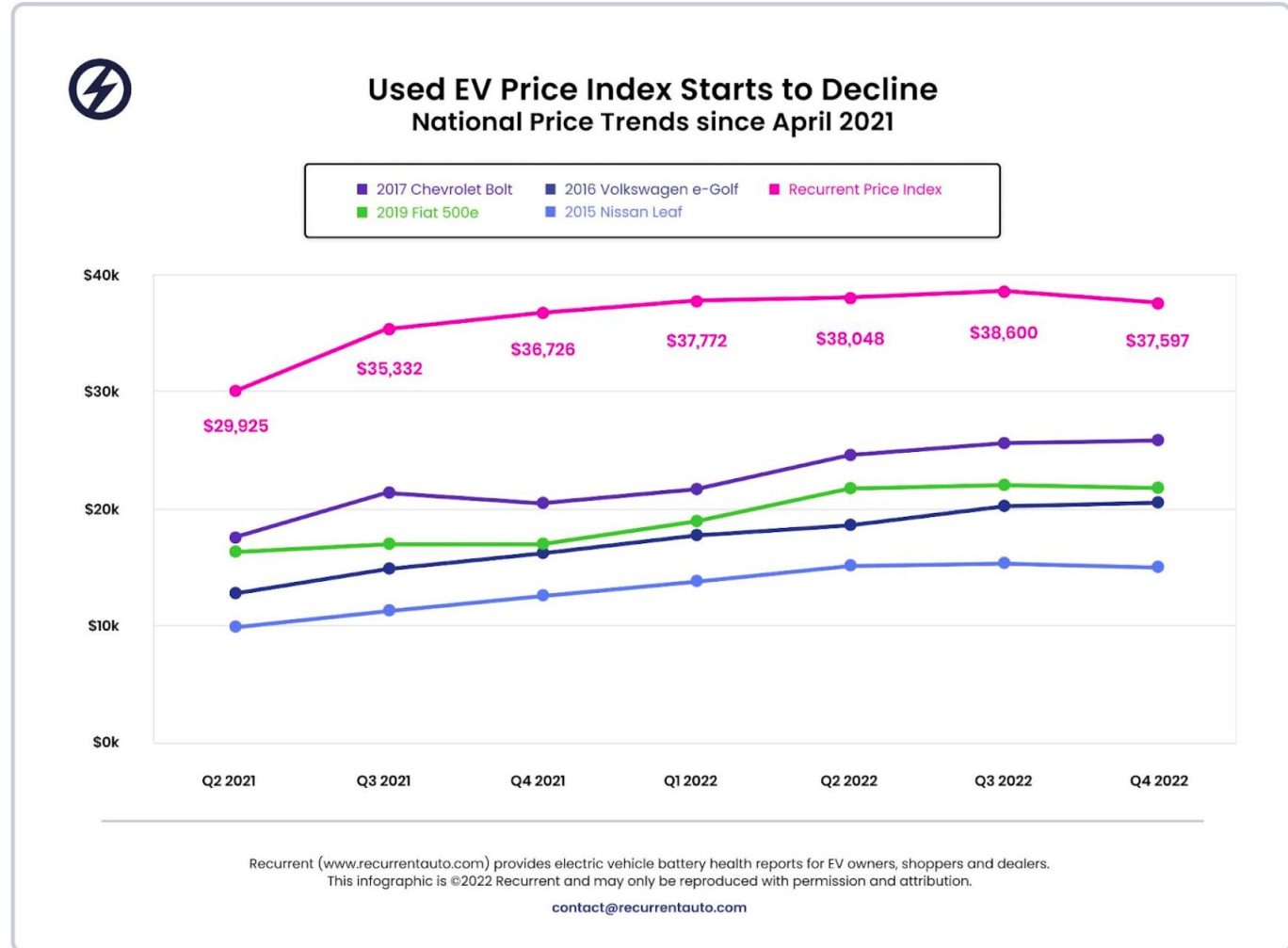
Supply side challenges: New federal incentives for <u>used</u> EV purchases will help, but current supply constraints may limit its near-term impact on EV adoption.
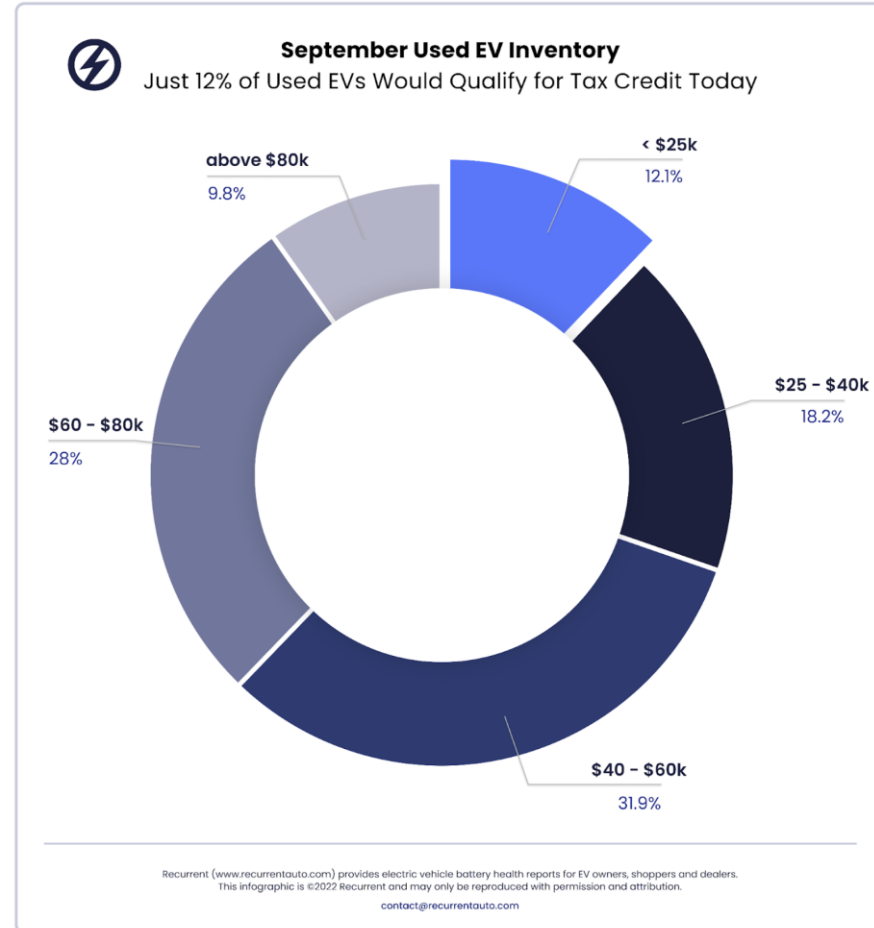
New federal tax credit of up to $4,000 on used EVs priced $25,000 or less…

…but only 17% of used EV sales from Q3 2022 were under $25,000.

…and **only 12% of used EV would qualify for the tax credit today**.

The federal tax credit is only available if the used vehicle is purchased from a licensed dealership…

…but 50% of all used sales in the U.S. are between private parties.

September Used EV Inventory
Just 12% of Used EVs Would Qualify for Tax Credit Today

above $80k
9.8%

< $25k
12.1%

$25 - $40k
18.2%

$60 - $80k
28%

$40 - $60k
31.9%

Recurrent (www.recurrentauto.com) provides electric vehicle battery health reports for EV owners, shoppers and dealers.
This infographic is ©2022 Recurrent and may only be reproduced with permission and attribution.
contact@recurrentauto.com

Credit: Recurrent © 2022

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Demand side challenges: running out of power is the top concern among potential EV buyers – purchase price concerns have eased as EVs approach price-parity

Total Drivers		EV Drivers	Total Drivers		EV Drivers
58%		**38%**	**22%**		**22%**
	Running out of power			Not enough variety in models	
49%		**30%**	**20%**		**22%**
	Low availability of charging stations			Not enough performance capability	
47%		**40%**	**14%**		**17%**
	Initial vehicle costs			Risk of overwhelming electric grid	
37%		**29%**			
	Cost to services and repair the engine				

EV drivers say they had range anxiety when they first purchased an EV, but it went away after a few months — **65%**
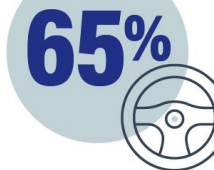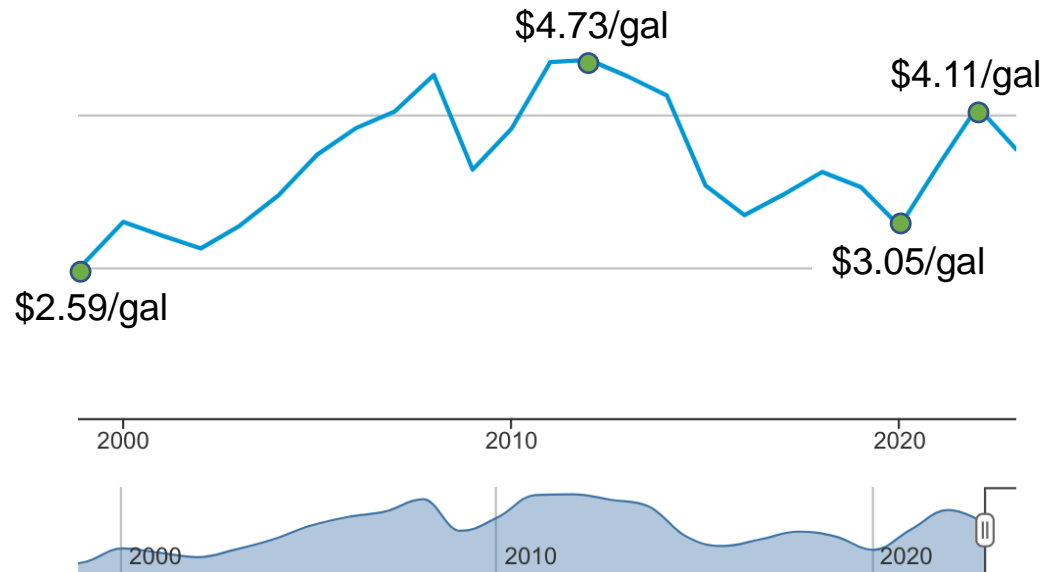
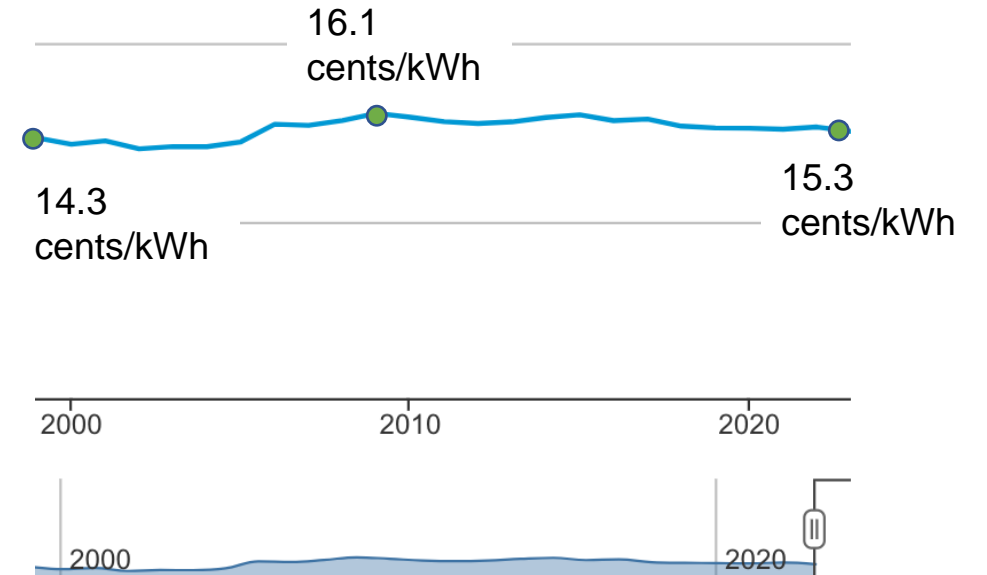# **Macro-economic factors:** price volatility of fuels (gasoline vs. electric)

As a motor fuel, electricity in Washington costs significantly less than gasoline – about **4 cents per mile compared to about 14 cents per mile** for gasoline.

Macro-economic factors: price volatility of fuels (gasoline vs. electric)

Electricity prices are relatively stable and predictable, whereas gasoline prices can fluctuate greatly – causing *economic displacement.*
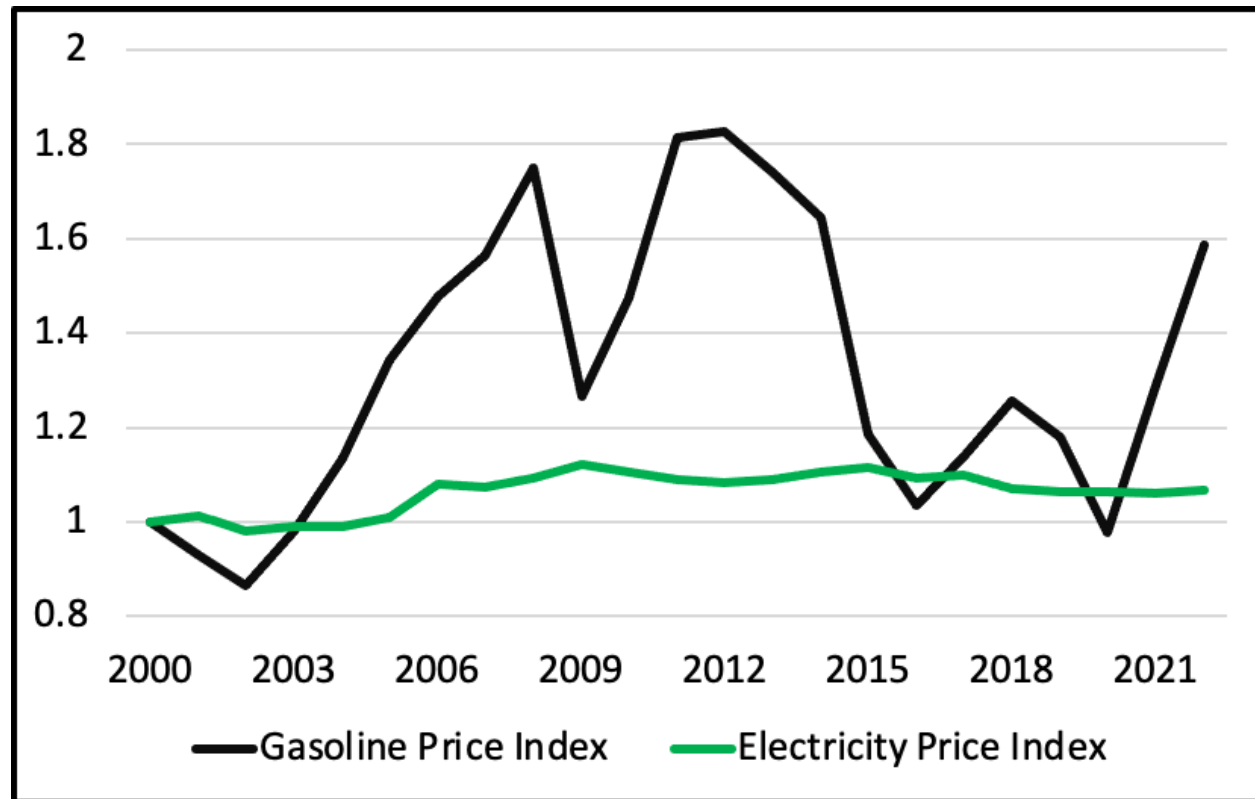

Retail gasoline price volatility

Retail electricity price volatility

Macro-economic factors: price volatility of fuels (gasoline vs. electric)

Electricity prices are relatively stable and predictable, whereas gasoline prices can fluctuate greatly – causing *economic displacement.*

Policy incentives: will be examined in greater detail in forthcoming work, but Washington has been among the leading states in EV adoption incentives.

TAX CREDIT

Up to $7,500

Federal Tax Credit

Due to recent passage of the Inflation Reduction Act of 2022, many EVs and PHEVs no longer qualify for a federal tax incentive. This incentive may return in 2023 for select vehicles.

TAX EXEMPTION

Washington Fuel Cell Electric Vehicle Tax Exemption

Beginning July 1, 2022, 50% of the retail sales and state use tax does not apply to the sale or lease of the first 650 purchases of new passenger vehicles, light-duty trucks, and medium-duty passenger vehicles powered by fuel cells. The maximum value amount eligible for the tax exemption is the less of

TAX EXEMPTION

Washington State EV Infrastructure Tax Exemption

Washington sales and use taxes do not apply to the labor and services for purchasing and installing EV infrastructure, including home charging stations.

TAX EXEMPTION

Up to $1,300

Washington State EV Tax Exemption

New passenger cars, light-duty trucks, and medium-duty passenger vehicles that are dedicated AFVs and under $45,000 are exempt from state motor vehicle sales and use taxes. For used vehicles, the price must be below $30,000. Conditions and limitations apply.

Source: Puget Sound Energy: ev.pse.com/incentives

Policy incentives: will be examined in greater detail in forthcoming work, but Washington has been among the leading states in EV adoption incentives.

EV incentive	Washington	Oregon	California
Tax Credits/Rebates for vehicle purchase	X	X	X
Tax Credits/Rebates for EVSE Installation	X	X	X
Financing Programs (low interest/interest-free)			X
Grants for EVSE Installation	X		
TOU Rates		X	X
Tax Credits/Rebates for purchase/lease of medium- and heavy-duty vehicles	X		X
Commercial Tax Credits/Rebates for EVSE Installation	X		X
Emissions Inspections Exemptions	X		
Grant funding to support planning and deployment of transportation electrification projects		X	

Note: *incentives do not include new federally-funded programs created by the Bipartisan Infrastructure Law of 2022*

Task Schedule

Tasks to be Completed in Study	2022						2023						
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
TASK 1: REPORT ON CURRENT AND PROJECTED ENVIRONMENT FOR HCFU TO EV CONVERSION					◆							◆	
TASK 2: HCVU EV CONVERSION ANALYSIS													
TASK 3: RESEARCHING HCFU'S ATTITUDES AND PREFERENCES													
TASK 4: DEVELOPING STRATEGIES ENCOURAGING HCFU SWITCH TO EV													
TASK 5: COORDINATE WITH JTC PM STAFF WORKGROUP													
TASK 6: PRESENTATIONS													
TASK 7: DRAFT AND FINAL REPORTS												◆	

Thank you.