CDM Smith 75th

Joint Transportation Committee
Encouraging High Consumption Fuel Users (HCFU) to Use Electric Vehicles

Presentation to Washington State Transportation Commission

February 15, 2024

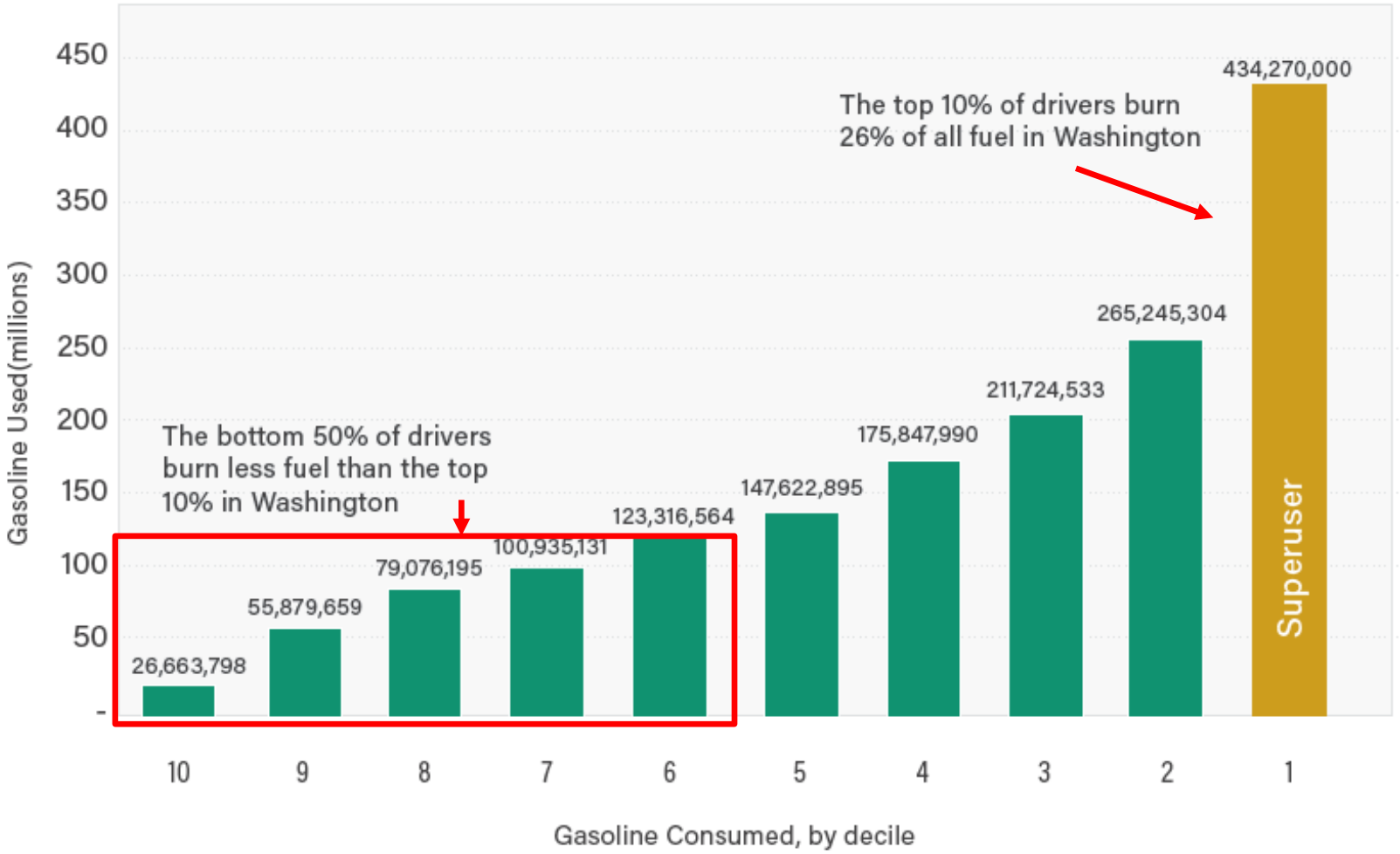
Direction from Washington legislature (ESSB 5689, 2021-23 supp. trans budget):

"The legislature intends for the study to result in the collection of data to determine, at a minimum, the following:

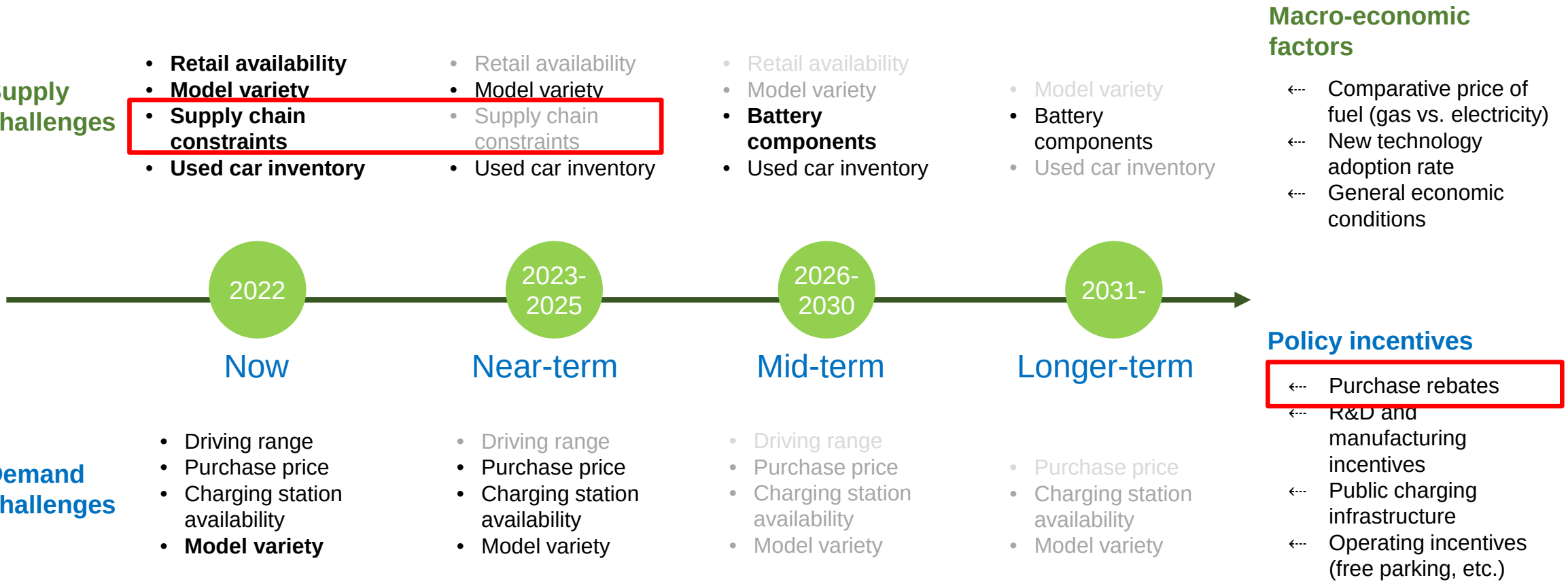
(a) Which high-consumption users of fuel can switch to electric vehicles for a high percentage of their driving needs;
(b) How much money can high-consumption fuel users save by switching to electric vehicles;
(c) How many gallons of fuel are displaced by high-consumption fuel users switching to electric vehicles;
(d) What policies, including related to electric vehicle charging infrastructure, would encourage high-consumption fuel users to make the switch to electric vehicles;
(e) What high-consumption fuel users' attitudes and perceptions about electric vehicles are;
(f) What barriers, concerns, and viewpoints are held by high consumption fuel users in relation to electric vehicles; and
(g) What messages are most effective for transitioning high consumption fuel users to electric vehicles.

The top 10% of all Washington drivers consume 26% of all fuel in the state

Figure 26: Fuel Consumption among Washington Drivers by Decile



Recap of Task 1: the EV adoption ecosphere



Main findings:

HCFUs and their preferred vehicles:

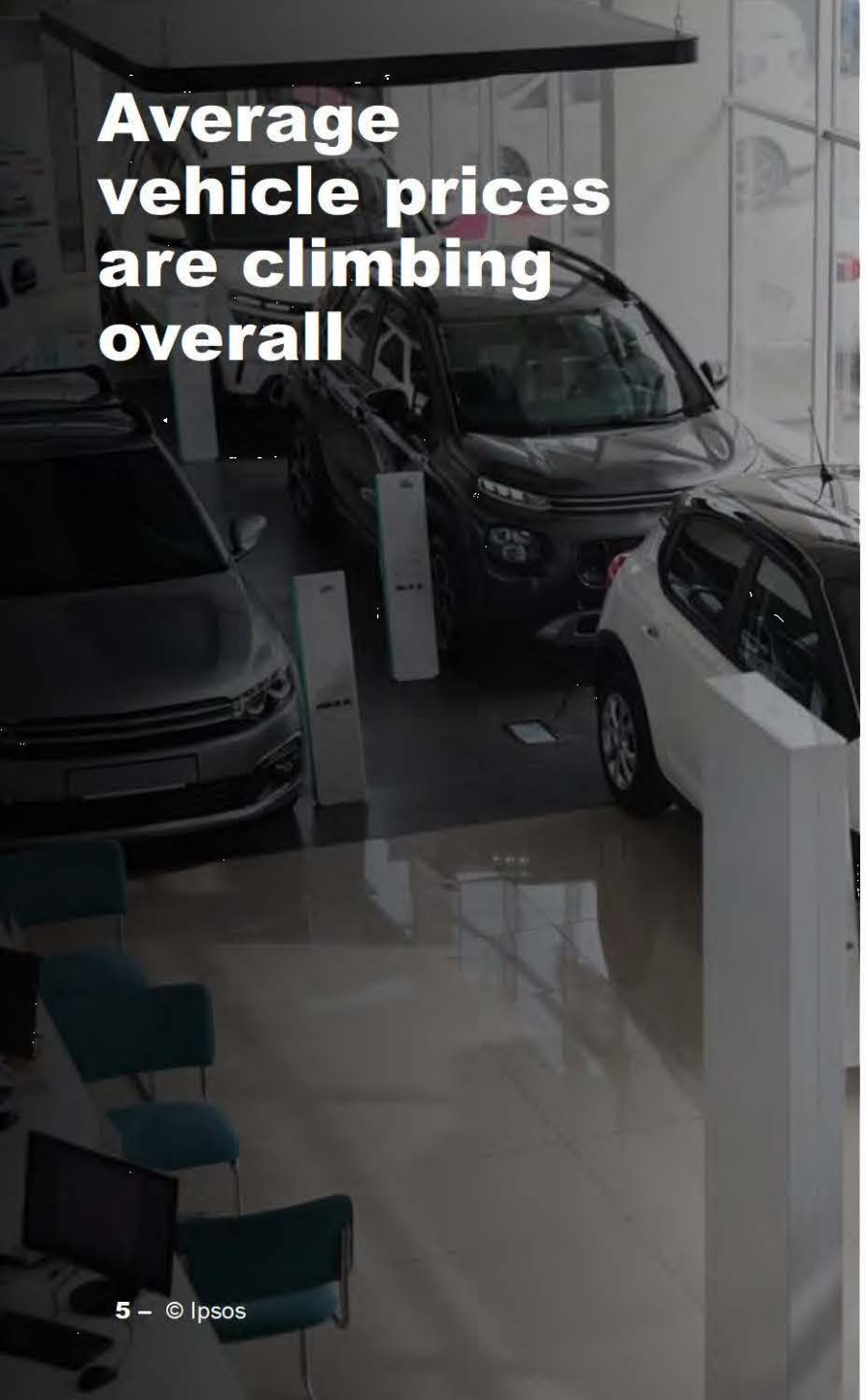
- HCFUs: Washington drivers burn 1,000 gallons or more of fuel per year (approximately 6.3% of drivers)
- About 86% of all HCFUs in Washington drive SUVs, pickup trucks, or vans.
- Passenger cars and “crossover” (smaller) SUVs currently have the most favorable prices and model availability in EVs. However, these vehicles are driven by less than 20% of HCFUs.

HCFUs willingness to transition to EVs:

- While purchase price is still a concern, it is not the *top* concern for HCFUs; they are willing to pay more for an EV than the average Washington driver (77% are willing to pay at least 10% more for an EV).
- HCFUs are as knowledgeable about EVs as other Washington drivers but have concerns about vehicle performance – especially hauling and towing capabilities of EVs.

Policies and messaging to encourage HCFUs to buy EVs:

- Overall, the same policies that were most effective with the average Washington driver were also persuasive with HCFUs: more charging stations (community-based and corridor charging), EV purchase incentives, Level 2 (“medium-speed”) charging
- Four policy options specifically tailored to HCFUs include: (1) an “electric miles” lease incentive; (2) HCFU vehicle trade-in incentive; (3) vehicle loaner program that allows occasional use of a gas-powered vehicle; and (4) rebates for home chargers and installation.



Important updates since November 2022:

"The average new car in America sold for a record high $49,507 in December [2022] – almost **5%** higher than one year before"

– KBB

"47 percent of shoppers in December paid sticker price for a vehicle, **while 34 percent paid more** and 19 percent paid less. More recent figures…indicate 29 percent of vehicle shoppers were still paying more than sticker in February."

– AutoNews

Sources: Kelly Blue Book, Automotive News

EV prices are declining. Perhaps a result of IRA, at a min setting the stage for a competitive marketplace

"The **average price paid** for a new EV decreased in December [2022] by $3,594… and ended the year lower by **0.6%**. The average new EV sold for $61,448"

– KBB

CNBC

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AUTOS

Tesla cuts U.S. prices for sixth time this year ahead of first-quarter results

PUBLISHED WED, APR 19

Ford Follows Tesla in Cutting Electric Vehicle Prices

The automaker reduced the price of the Mustang Mach-E by up to $5,900 after Tesla slashed prices of its cars by as much as 20 percent.

  Sources: CNBC, Kelly Blue Book

Inflation Reduction Act intends to make EVs more accessible

- ✓ Renewal of $7,500 tax credit for new EV/PHEV vehicles
- ✓ New credit of $4,000 for used vehicles
- ✓ $370 billion in spending and tax credits in low-emission forms of energy to fight climate change
- ✓ Price limits on eligible models could make several models more affordable

The reality of the IRA may muddy its initial intention

- Vehicle cost thresholds may lower prices in the short-term, but may stifle consumer choice/confuse shoppers
- Income limits remove incentive for high-income purchasers (most likely to consider BEVs)
- Additional restrictions surrounding automaker supply chains further complicate eligibility

HCFUs and their preferred vehicles

HCFUs = Washington drivers that burn 1,000 gallons or more of fuel per year (approximately 6.3% of drivers).

Washington High Consumption Fuel Users by Region

Region	Vehicles	HCFUs	Percentage of Regional Fleet that is HCFU	Percentage of Total HCFUs	Average Annual VMT	Mean MPG
Central Puget Sound	3,544,629	174,589	4.9%	40.2%	25,672	19.4
Central Washington	973,091	85,646	8.8%	19.8%	25,341	18.7
Eastern Washington	669,208	48,499	7.2%	11.1%	24,822	18.5
Northwest Washington	601,458	39,875	6.6%	9.1%	24,768	18.7
Southwest Washington	1,153,341	85,662	7.4%	19.8%	25,371	19.1
Washington	**6,941,727**	**434,270**	**6.3%**	**100%**	**25,375**	**19.1**

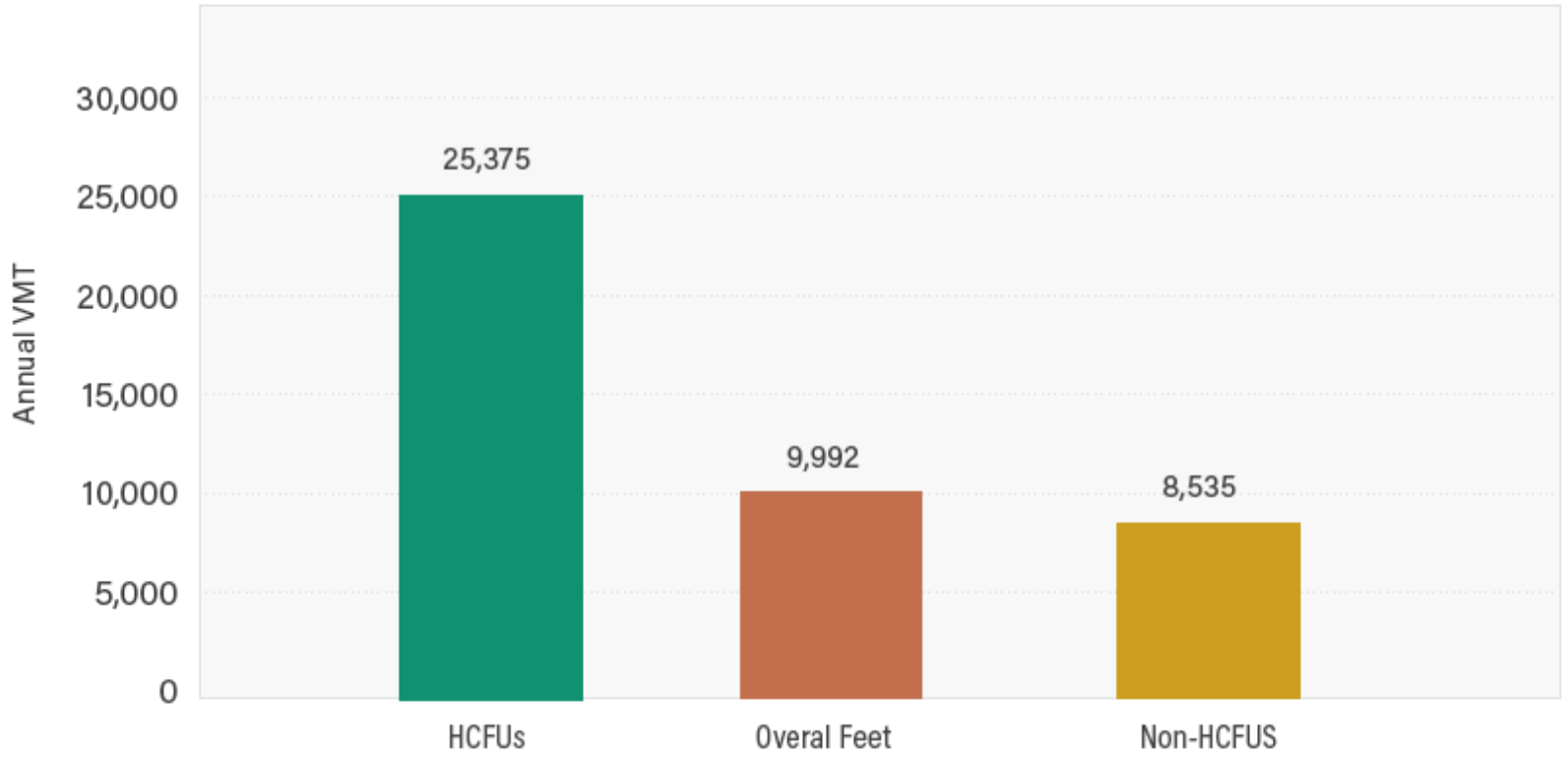
HCFU vehicles are defined as vehicles that burn 1,000 gallons of fuel or more per year.

23.4 Fleetwide MPG (All Vehicles)

HCFUs and their preferred vehicles

In Washington, HCFUs drive about three times as many miles as non-HCFUs.

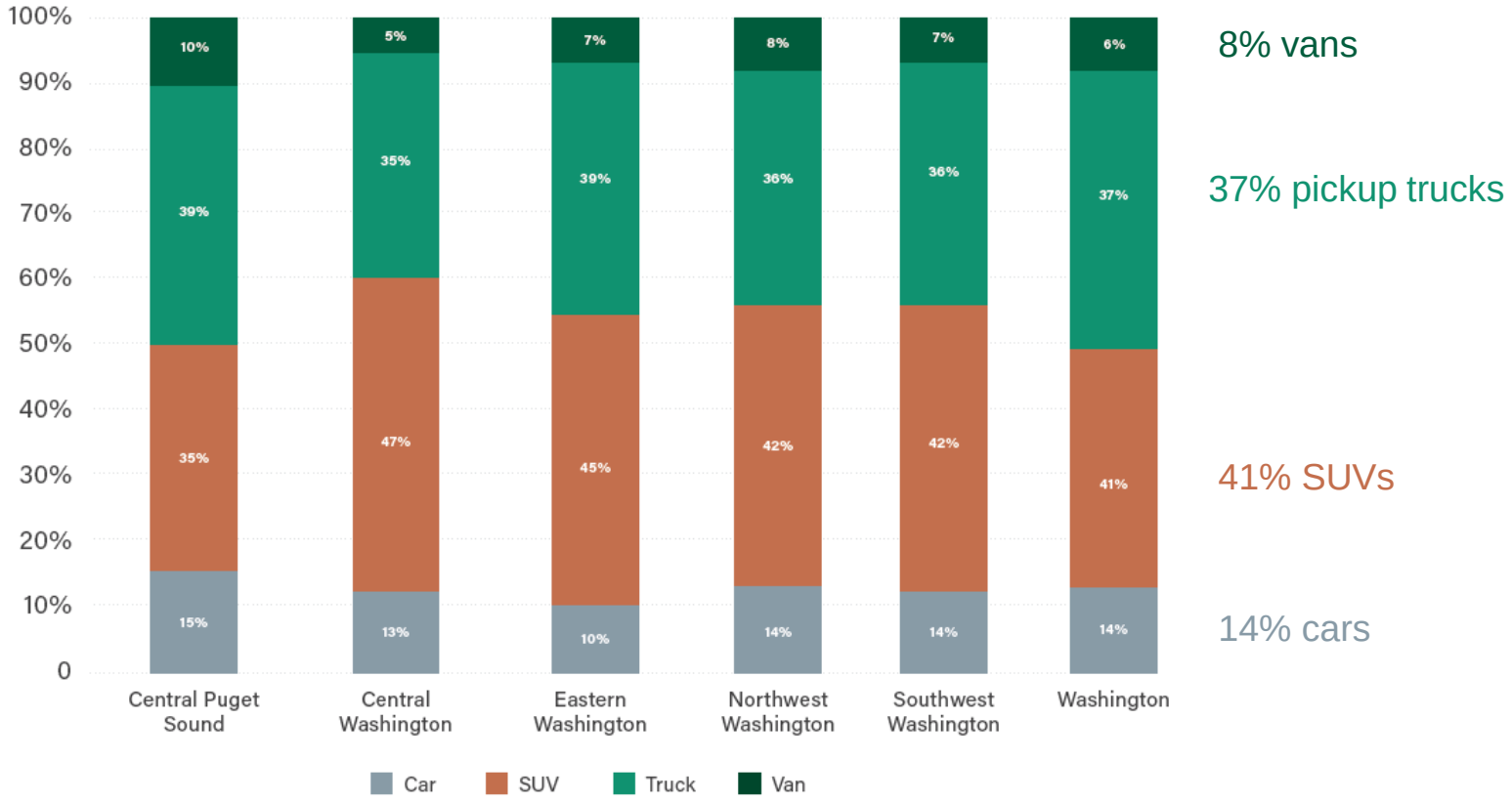
Figure 28: Annual VMT of Washington HCFUs, Overall Fleet, and Non-HCFUs



HCFUs and their preferred vehicles

About 86% of all HCFUs in Washington drive SUVs, pickup trucks, or vans.

Figure 29: HCFU Vehicle Types by Region



8% vans

37% pickup trucks

41% SUVs

14% cars

HCFUs and their preferred vehicles

The Top 10 HCFU vehicle models in Washington are pickup trucks (7) and SUVs (3).

Make	Model	Percentage of HCFUs Driving Models	Percentage of Model Drivers that are HCFUs
Ford	F-150	8.2%	16.9%
Chevrolet	Silverado	7.8%	17.7%
Dodge/Ram	Ram/1500	6.6%	17.8%
Toyota	Tundra	3.5%	17.8%
Toyota	Tacoma	3.3%	9.6%
GMC	Sierra	3.2%	17.5%
Toyota	4Runner	2.6%	12.9%
Ford	F-250	2.5%	15.8%
Jeep	Grand Cherokee	1.8%	11.5%
Chevrolet	Tahoe	1.7%	15.7%

Top ten models = 41.2% of HCFUs

Annual VMT Required to Qualify as HCFU at EPA Combined City/Highway MPG

Toyota Prius	56,000
Ford F-150 (V6 EcoBoost)	21,000
Ford F-150 (V8)	19,000

HCFUs and their preferred vehicles

EV passenger cars and “crossover” (smaller) SUVs currently have the most favorable prices and model availability.

Table 12: Total Cost of Ownership Vehicle Profiles

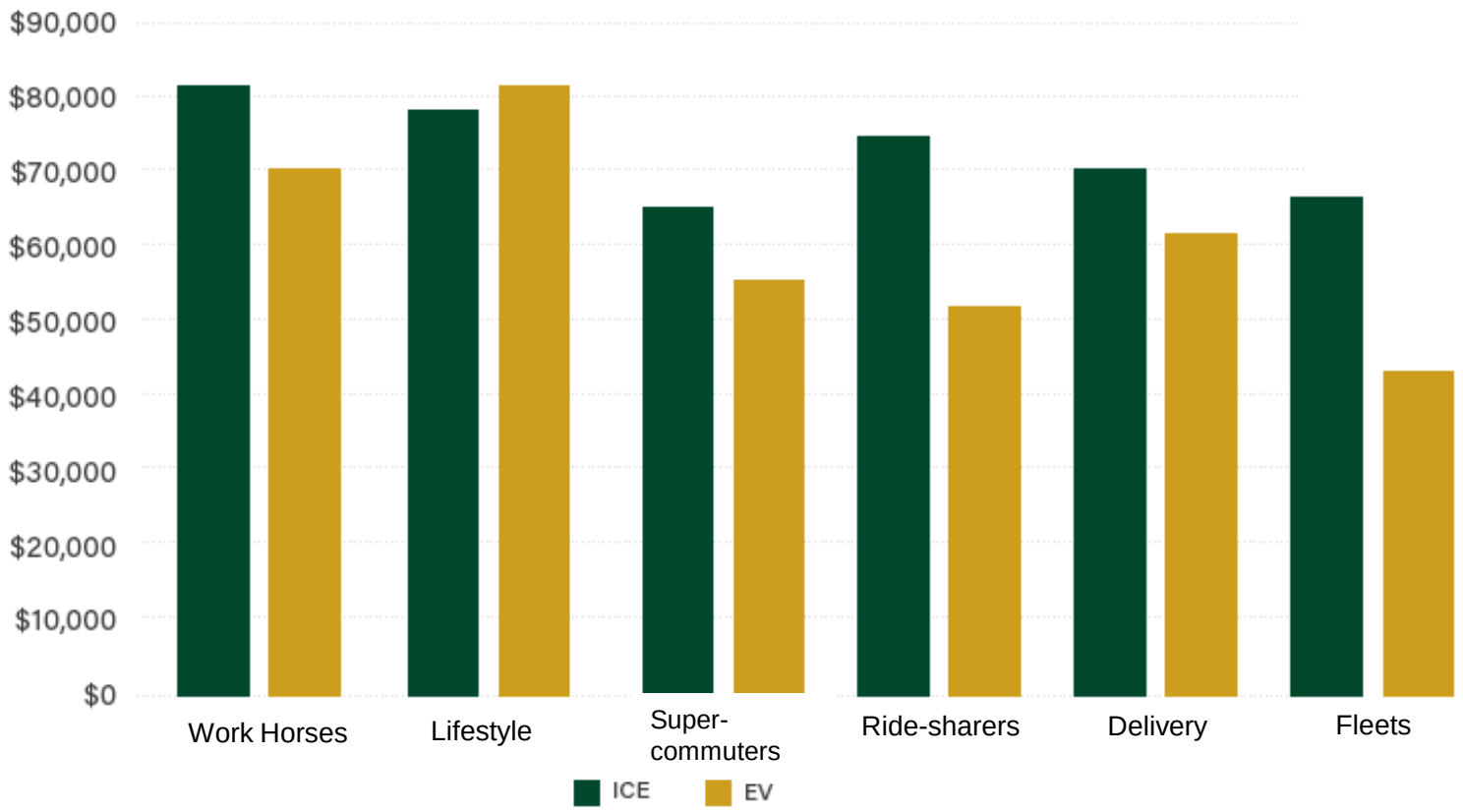
Profile	Description	HCFU Make/Model	EV Replacement
Work Horses	Larger/heavier personal vehicles are used on jobsites to haul materials, tools, and a small crew.	Ford F-150 XLT SuperCrew (EcoBoost 3.5L Turbo V6)	Ford F-150 Lightning XLT (Standard Battery)
Lifestyle	Larger/heavier “lifestyle” vehicles support leisure activities (towing recreational vehicles [RVs], off-roading, hauling people or gear, etc.).	Toyota 4Runner (SR5) Toyota 4Runner (Limited)	Rivian R1S (Dual-Motor, Standard Range)
Super-commuters	Vehicles relied on for regular, high-mileage driving, either for commuting or within a large region (e.g., persons that cover a “territory”).	Toyota Camry (LE)	Tesla Model 3 (RWD)
Ride-sharers	Newer-model vehicles with comfortable passenger seating, which spend 30 to 40 hours per week or more “in service.” These vehicles also may be used for local food delivery.	Toyota Prius (LE)	Chevrolet Bolt (1TL)
Delivery	Vehicles that accommodate small- and medium-sized parcel delivery.	Ford Transit	Ford E-Transit
Fleet	Organizational vehicles driven frequently by multiple drivers, resulting in above-average VMT.	Ford Escape	Chevrolet Bolt Electric Utility Vehicle (EUV)

Total Cost of Ownership comparisons were conducted for a representative vehicle from each HCFU profile (or market segment)

HCFUs and their preferred vehicles

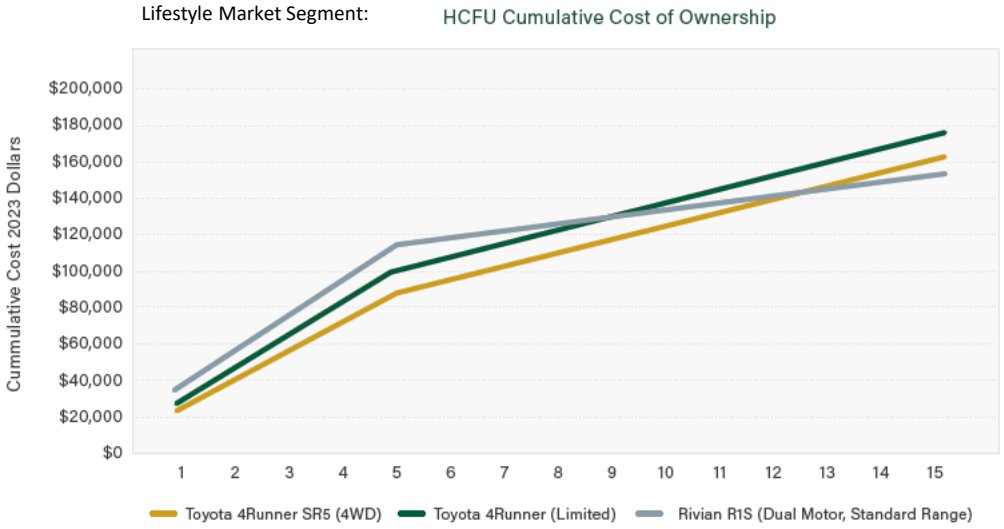
Comparably-equipped EVs had better (lower) TCO than gas models, except for the HCFU “Lifestyle” profile, due to the preponderance of larger/heavier SUVs in that market segment.

Figure 32: TCO by Market Segment (5 Year)



Lifestyle profile TCO: Toyota 4-Runner versus Rivian R1S

Lifestyle Market Segment:



Profile	Toyota 4Runner SR5 (4WD)	Toyota 4Runner Limited (4WD)	Rivian R1S (Dual Motor, Standard Range)
MSRP + Delivery Fees	$42,265	$51,160	$79,895
5-Year TCO including Resale Value of Trade-In (2023 dollars)	$69,108	$78,252	$82,136
MPG/MPGe(City/ Highway)	16/19	16/19	73/65
Federal Tax Credits	N/A	N/A	Partial Tax Credit ($3,750)
Washington Sales Tax Exemption	N/A	N/A	Does Not Qualify (MSRP >$45,000)
Home Charger Installation Incentives	N/A	N/A	Federal Tax Credit: 30% of Charger and Installation Cost (up to $1,000) Washington Utility Incentives: $350
Annual VMT Required to Use 1,000 gallons of Fuel		**17,500 miles**	

Super-Commuter TCO: Toyota Camry (LE) versus Tesla Model 3 (RWD)

Figure 35: Super-Commuter HCFU Cumulative Cost of Ownership by Year

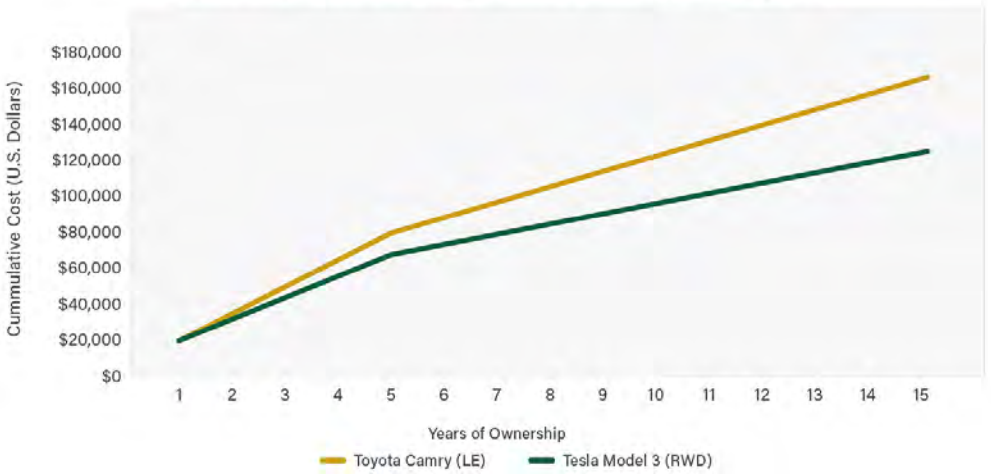


Table 15: Super-Commuter Total Cost of Ownership: Toyota Camry (LE) versus Tesla Model 3 (RWD)

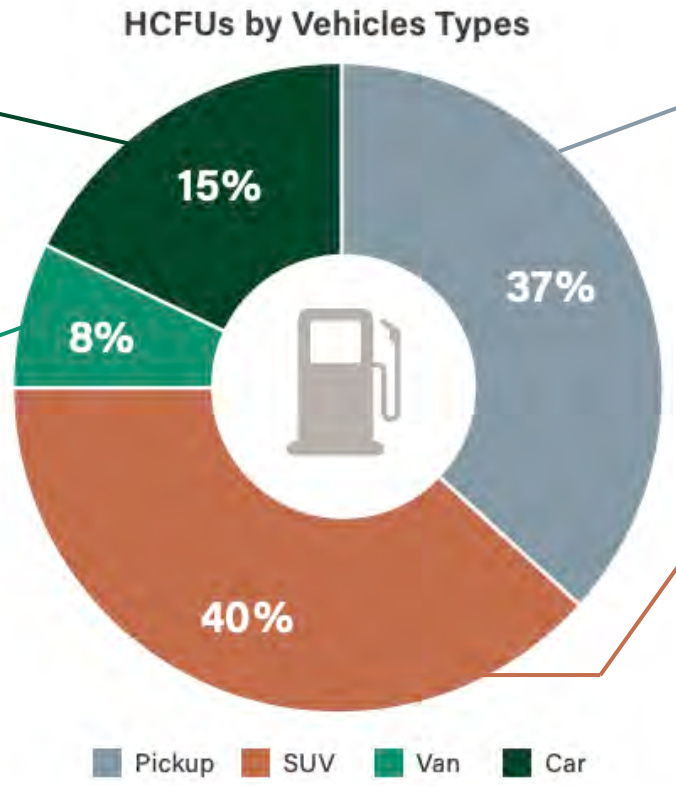
Profile	Toyota Camry (LE)	Tesla Model 3 (RWD)
MSRP + Delivery Fees	$27,315	$41,630
5-Year TCO including Resale Value of Trade-In (2023 dollars)	$65,834	$55,768
MPG/MPGe(City/Highway)	28/39	138/126
Federal Tax Credits	N/A	Partial Tax Credit ($3,750)
Washington Sales Tax Exemption	N/A	$1,020
Home Charger Installation Incentives	N/A	Federal Tax Credit: 30% of Charger and Installation Cost (up to $1,000) Washington Utility Incentives: $350
Annual VMT Required to Use 1,000 gallons of Fuel	**33,500 miles**	

HCFUs and their preferred vehicles

As of June 2023: there is limited EV model variety, and constrained EV retail availability, for the most common vehicle types for HCFUs – pickup trucks, SUVs, and vans (86% of all HCFUs).

Cars:
- 138 gas models / 25 EV models in production
- Good retail availability
- Very favorable TCO

Vans:
- 23 gas models / 1 EV model in production
- Limited retail availability
- Very favorable TCO



Pickup trucks:
- 34 gas models / 4 EV models in production
- Very limited retail availability
- Favorable TCO

SUVs:
- 174 gas models / 22 EV models in production
- Good retail availability of *crossovers*
- Limited retail availability of larger SUVs
- Favorable TCO for *crossovers*
- Unfavorable TCO for larger SUVs

HCFUs willingness to transition to EVs:

While purchase price is still a concern, it is not the top concern for HCFUs; they are willing to pay more for an EV than the average Washington driver (77% are willing to pay at least 10% more for an EV).

Figure 43: Mean Household Income

	Sample Size	Mean Income
Total	n=450	$96,660†
Non-HCFUs (Under 1k/gallons per year)	n=290	$90,310†
HCFUs (1,000 to 1,499 gallons per year)	n=91	$104,400†
HCFUs (1,500+ gallons per year)	n=69	$111,780†

$90,310

$107,583

HCFUs willingness to transition to EVs

While purchase price is still a concern, it is not the top concern for HCFUs; they are willing to pay more for an EV than the average Washington driver (77% are willing to pay at least 10% more for an EV).

Figure 46: Percentage of Washington Drivers that Cited Affordability as a Barrier to EV Adoption

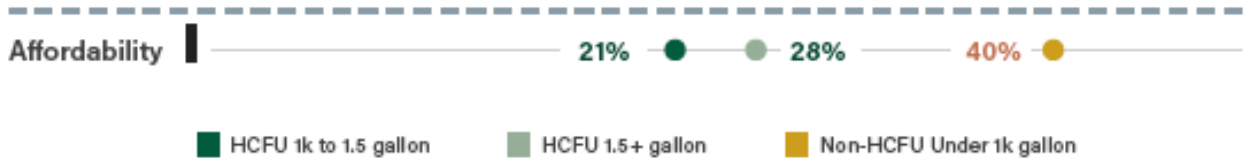
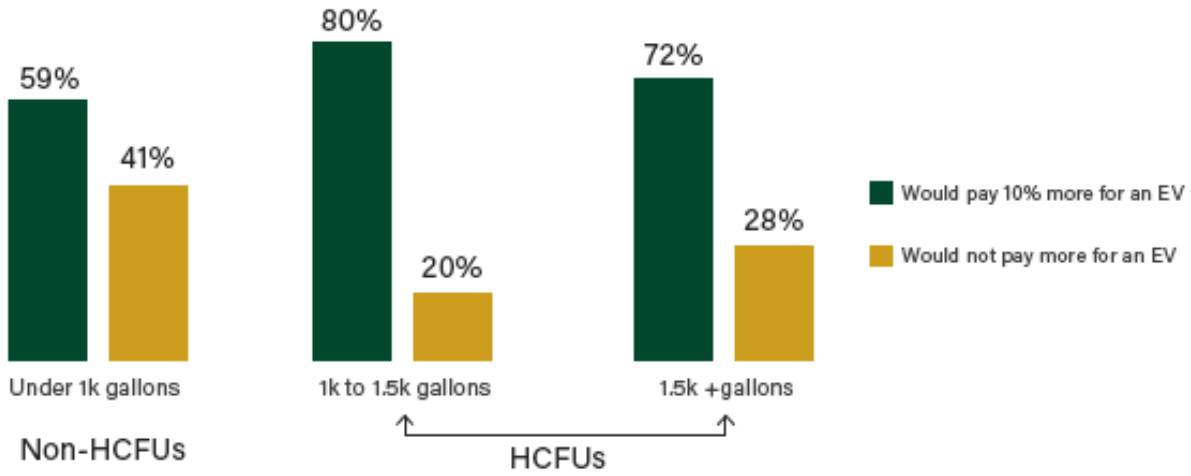


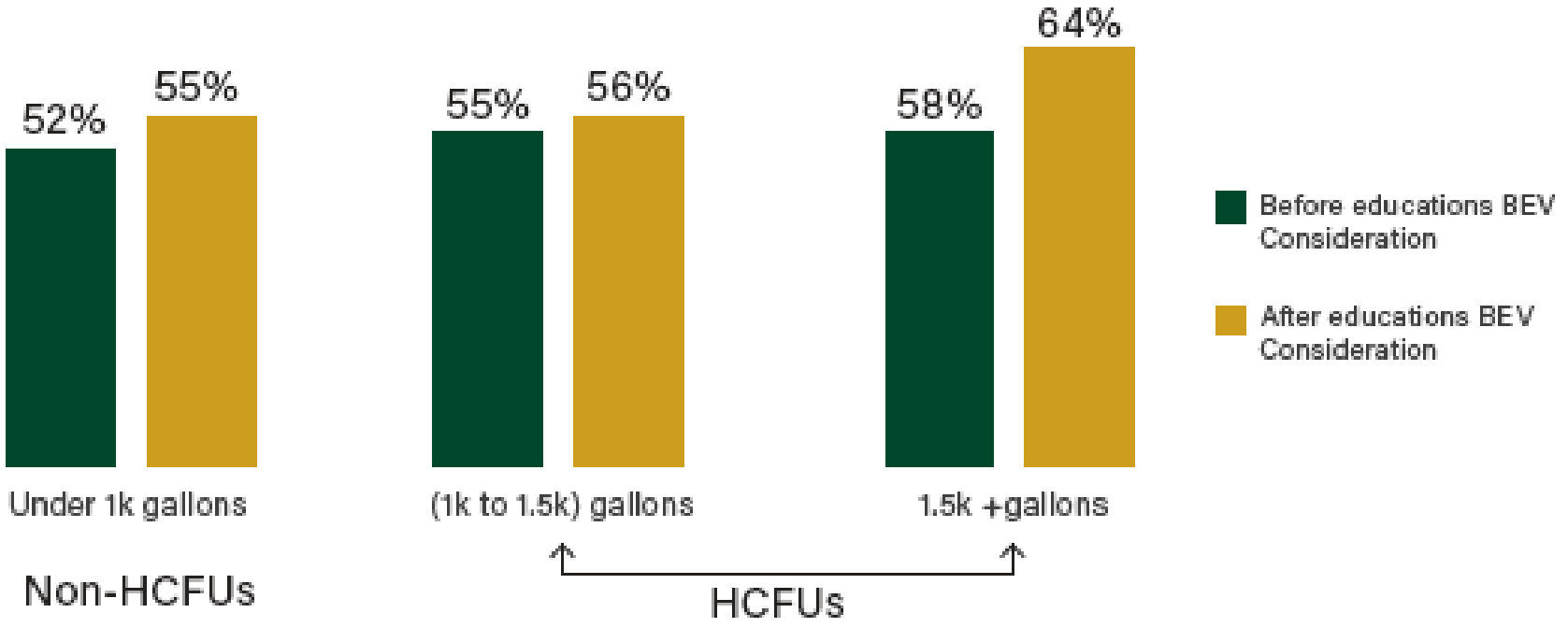
Figure 47: Percentage of Washington drivers willing to pay at least 10% more for an EV



HCFUs willingness to transition to EVs

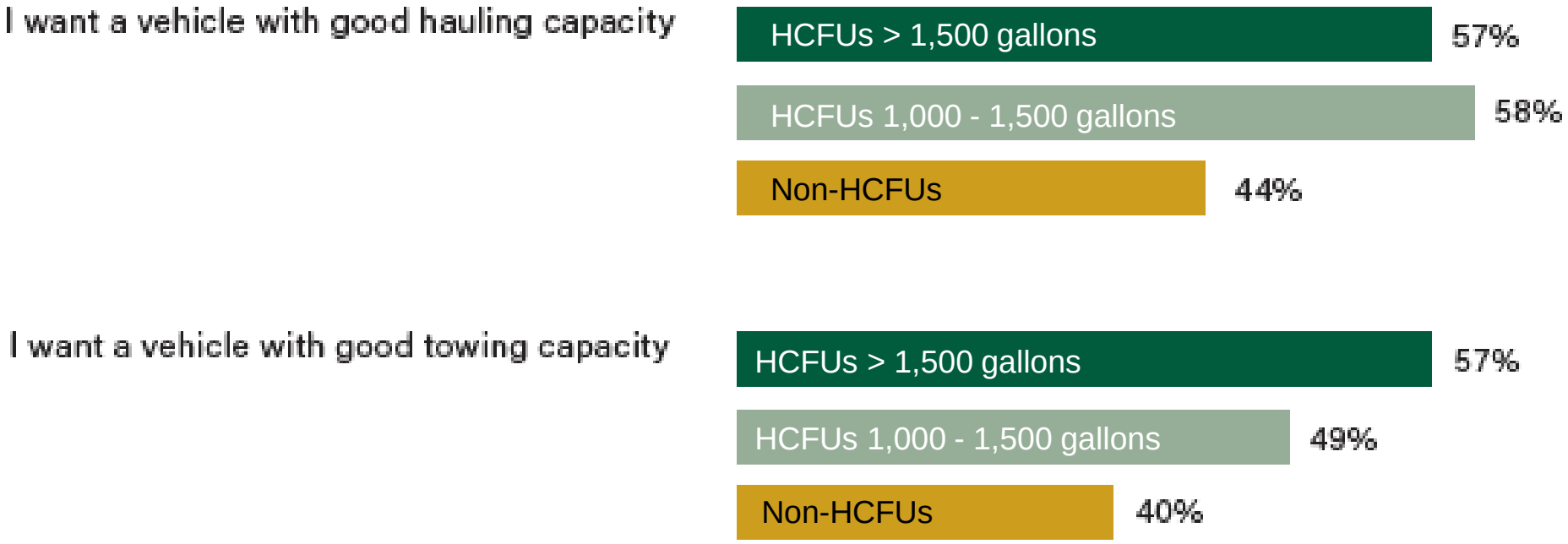
For the highest fuel users, additional information helped improve EV consideration.

Figure 45: Additional Information Improves EV Acceptance only for Highest Consumption Fuel Users.



HCFUs willingness to transition to EVs

Among the EV adoption barriers cited by HCFUs, concerns about vehicle performance – specifically, the *ability to haul and tow* – were prominent.



Policies and messaging to encourage HCFUs to buy EVs

Overall, the same policies that were most effective with the average Washington driver *were also persuasive with HCFUs*:

- more charging stations (community-based and corridor charging)
- EV purchase incentives
- Level 2 ("medium-speed") charging

Table 19: Relative Value of Electric Vehicle Policies and Incentives to Consumers in Washington

Policy/Incentive	Non-HCFU (less than 1,000 gallons)	HCFU (1,000 gallons – 1,499 gallons)	HCFU (1,500 gallons or more)
Fast chargers available at existing gas stations (i.e., charge to gain 200 miles of range within 30 minutes of charging time)	158	136	143
Up to $1,470 sales tax exemption for purchase of a new EV	163	137	137
Free charging at public Level 2 (medium-speed) charging stations	150	127	132
Free Level 2 (medium-speed) home charging equipment, with 20% installation costs	153	127	129
5 cents per mile for every mile driven in an EV (capped at $3,000 per year maximum incentive)	157	144	121
Public DC fast charging stations along key highway corridors	148	138	116
"Loaner program" that allows monthly free use of any gas vehicle when needed (e.g., pickup truck)	66	87	104
Free toll road use for EVs	59	80	104
Free or discounted pickup, van, or sport utility vehicle (SUV) rental upon purchase of a new EV	58	72	98

Relative Value Index

163 Highest value

80 and above: Valued by drivers

31 Lowest value

Policies and messaging to encourage HCFUs to buy EVs

Policies with scores below 80 were less enticing to Washington drivers

Policy/Incentive	Non-HCFU (less than 1,000 gallons)	HCFU (1,000 gallons – 1,499 gallons)	HCFU (1,500 gallons or more)
Free emergency towing or recharging services (e.g., American Automobile Association [AAA] towing/recharging assistance)	103	109	90
Discounted electricity rates for charging an EV during off-peak hours	122	89	85
Free public parking for EV owners between 7:00 a.m. to 6:00 p.m.	75	73	84
Free Level 2 (medium-speed) charging at work places	72	89	76
Preferred parking spots for EVs	48	62	63
Free coffee and/or discounted food at businesses that provide EV charging stations	31	71	62
Discounted or free rideshare credits	37	59	55

Relative Value Index

163 Highest value

80 and above: Valued by drivers

31 Lowest value

Policies and messaging to encourage HCFUs to buy EVs

Four policy options *specifically tailored to HCFUs* include:

1. an "electric miles" lease incentive
2. HCFU vehicle trade-in incentive
3. vehicle loaner program that allows occasional use of a gas-powered vehicle
4. rebates for home chargers and installation

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	Free charging at public Level 2 (medium-speed) charging stations	150	127	132
4	Free Level 2 (medium-speed) home charging equipment, with 20% installation costs	153	127	129
1	5 cents per mile for every mile driven in an EV (capped at $3,000 per year maximum incentive)	157	144	121
	Public DC fast charging stations along key highway corridors	148	138	116
3	"Loaner program" that allows monthly free use of any gas vehicle when needed (e.g., pickup truck)	66	87	104
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3	Free or discounted pickup, van, or sport utility vehicle (SUV) rental upon purchase of a new EV	58	72	98

1 Electric vehicle lease incentives for HCFUs

Figure 54: Intention to lease versus purchase a new vehicle

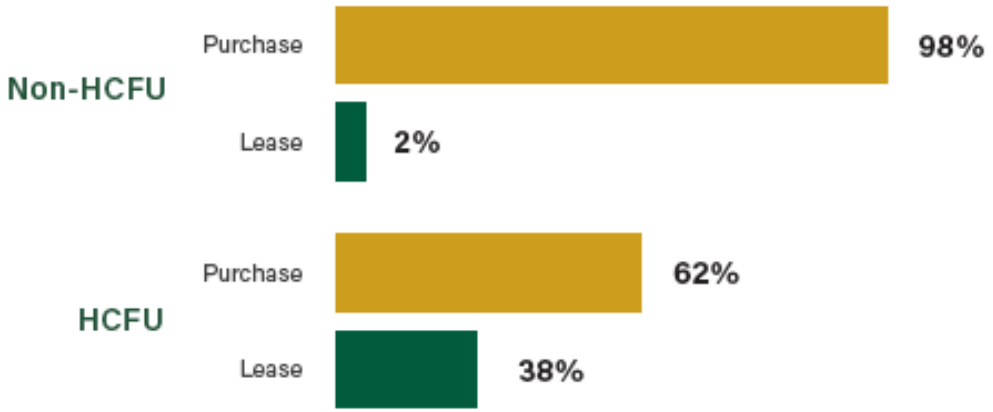

Figure 56: Example of an High-Consumption Fuel User Electric Miles Lease Incentive

Assumptions

Average miles driven per year by Washington:	**25,000 miles/year***
Standard mileage allowance for 36-month vehicle leases:	**- 12,000 miles/year***

HFCU Electric Miles Lease Incentive Rebate from State of Washington = 13,000 miles/year

HFCU Electric Miles Lease Rebate, per mile	15 cents mileage rebate

Total 36-month HCFU Electric Miles Lease Rebate(15cents x 13,000 miles x 3 years) = $5,580 total rebate

(Option) Dealer incentive for leasing to HCFUs:

+ $1,000 for each 36-month lease return with mileage in excess of 36,000 miles

*Rounded. Actual average mileage for HCFUs in Washington is 25,375.

2 Electric vehicle purchase incentives for HCFUs

Key feature: a scaled incentive for trading in a high-mileage/low-mpg vehicle

At least two different concepts for providing financial incentives:

- **Concept A**: dealer incentives for “selling” EV miles to HCFUs.
  Drawback: requires purchasers to report miles at end of the year.

- **Concept B:** tiered rebates to EV purchasers that trade in a qualifying vehicle (high-mileage/low mpg). *Amount of the rebate scales based on estimated fuel displacement* resulting from switching from a high-mile/low-mpg vehicle to an EV.

3 Loaner program allowing HCFUs limited use of gas-powered towing/hauling vehicle

- 37% of HCFUs drive pickup trucks; 41% drive SUVs (at least half of which have towing capacity)
- A voucher or refund program that allows HCFUs to “rent” a gas-powered vehicle a few times per year might help overcome their concerns about EV performance characteristics
- As more EV pickups and heavier SUVs become available, the need for a loaner program is expected to diminish

4 Rebate program providing free home charger and discounted installation services to HCFUs

- Policy option scored well with both HCFUs and non-HCFUs, but was particularly important to the highest fuel users (1,500+ gallons)
- California has a state-level similar program. Some local power utilities in Washington offer rebates on home chargers.
- State of Washington's current policy offers a sales tax exemption on home charging equipment. The current exemption is worth about $192 (9.6% of estimated $2,000 cost).

Recap of Main findings:

HCFUs and their preferred vehicles:

- ✓ HCFUs: Washington drivers burn 1,000 gallons or more of fuel per year (approximately 6.3% of drivers)
- ✓ About 86% of all HCFUs in Washington drive SUVs, pickup trucks, or vans.
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For more information: Washington State Joint Transportation Committee
https://leg.wa.gov/JTC/Pages/default.aspx

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