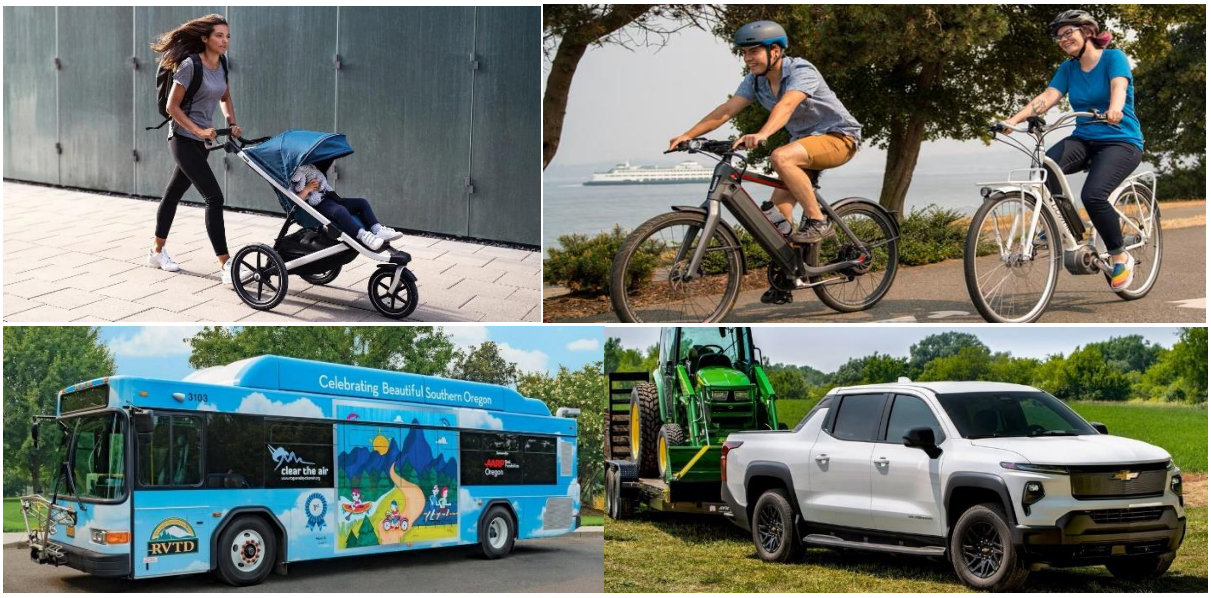
Getting There Green

A Guide to Climate-friendly Transportation in the Rogue Valley



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Electric Mobility in the Klamath-Siskiyou Bioregion

A Chapter of the Electric Vehicle Association

Electric Vehicle
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“I’ve starred in a lot of science fiction movies and, let me tell you something, climate change is not science fiction. This is a battle in the real world, and it is impacting us right now.”

 **Arnold “The Terminator” Schwarzenegger**

Transportation Modes on Cover with GHG Emissions

Jogging stroller: 0 grams per mile

RVTD bus: 0 <u>additional</u> grams per mile (see text following)

e-bikes: about 1 gram per mile

Chevrolet Silverado EV AWD pickup: 161 grams per mile (charging from NW grid)

Average for all US personal vehicles on road today: 475 grams per mile

Note: This edition was prepared on a tight deadline for Earth Day. There are likely some glitches and omissions. A revised version will be available by September.

New in This Version

My "Rogue Valley Green Car Guide" has been around in one form or another since 2017. This time around I'm introducing a few changes.

- For context, I'm opening with other forms of personal transportation to give you an idea of how your choices will have an impact on your total GHG emissions.
- The last three guides listed plug-in vehicles only. For this edition I'm re-introducing standard hybrids and a few "honorable mention" high-mileage conventional gasoline cars. This affords more flexibility for two-car households as well as for those who drive relatively few miles annually and/or have no access to home charging.
- To keep a local focus, only vehicles available through Rogue Valley dealerships are included in the listings. Vehicles that are purchased exclusively over the internet, delivered remotely and have no local service facilities will not be listed. All in this group are battery electric vehicles and all will be rated highly in terms of GHG emissions. Ample information on all of these vehicles is available in the resources listed in Part X. Also, personal experience has shown that buyers who want the most advanced digital/automotive technologies will accept nothing other than Tesla anyway, whereas others upset by the antics of Tesla's CEO will never buy a Tesla. Decision made.

Introduction

If you're reading this document, I assume you are concerned about the potentially cataclysmic effects of climate change. What's more, I expect you feel an ethical obligation to minimize your personal contribution to this looming calamity.

As you are likely aware, personal transportation is a major contributor to your carbon footprint. In fact, if you live in an all-electric home (good for you!) but still drive a conventional gasoline vehicle, transportation is likely the single largest contributor to your total carbon footprint.

Fortunately, personal transportation is relatively easy to change in terms of both costs and lifestyle disruption. Don't listen to the naysayers who insist that electric cars are unreliable and impractical, and that they are really worse for the environment. (We'll deal with this in Part X.)

Also, please ignore the gloomy doomsayers who proclaim that it's already too late to forestall an impending catastrophe. Okay, they *could* be right. However, if we don't all do something now, they *will* be right!

In Part I of this guide, we'll look at the options you have for personal transportation in the Rogue Valley, ranked from best to …well, barely acceptable. In Part II we will focus on multi-passenger personal vehicles since choices here are complex and relatively costly. Finally, in the appendices, we'll look at various related matters such as EV charging infrastructure, details on

tax credits and rebates, and a balanced evaluation of the upsides and downsides of electrifying personal transportation.

This guide will help to cut those emissions, we hope in a way that is affordable and imposes only minimal changes to your daily routines and lifestyle.

Part I: Transportation Modes and GHG Emissions

A Basic Concept: Greenhouse Gas Emissions per Passenger Mile

You are at point A. You want to go to point B. How do you get there with the least impact on global climate change?

Understanding this concept is key to everything that follows. We want to know how many grams of greenhouse gases we are emitting for every mile we travel using our chosen mode of transport. Ideally, of course, that number would be zero, but in the real world we will have some emissions when traveling beyond our immediate neighborhood. We just want to keep them as low as possible.

In the following discussion, I will use the abbreviation "gpm" for the emissions of the vehicle regardless of how many passengers are on board. The gpm figures I use are taken from the EPA fueleconomy.gov web site, and I use the total of tailpipe and upstream emissions. (Upstream emissions are generated by the extraction, refining and transport of fossil fuels for gas cars, and electricity generation for plug-ins.)

The grams per passenger mile (gppm) gives the share of the gpm for each passenger on board. This is the gpm of the vehicle divided by the typical load factor (average passengers per vehicle) as defined by the EPA. A private car, for example, would be 1.7 passengers; a transit bus 12 passengers; and an e-bike 1 passenger.

In Part I we will look at the following modes, ranked from best to barely acceptable, ranked by typical gppm:

- Walking and (Human-powered) Cycling
- *Public Transit*
- E-bikes and E-scooters
- Battery Electric Vehicles (BEV)
- Plug-in Hybrid Electric Vehicles (PHEV)
- Hybrid Vehicles
- High-mileage Gasoline-only Vehicles

Public transit is shown in italics for reasons explained in the next section. The last category, which will list some of the best from a generally bad lot of gasoline-powered only cars, gives options for one-car households with limited annual mileage or for two (or more) vehicle households where the other vehicle is an EV or PHEV.

Transportation Modes Ranked by GPPM

Walking or Human-powered Cycling: 0 gppm

Sure, if we wanted to get really picky, we could say that we humans exhale more CO^2 when walking or biking than we do when we are sitting in a car or bus. But those extra breath emissions are negligible when compared to the noxious tailpipe emissions of an SUV. Plus, walking and cycling are good for your health.

Public Transit – 0 added gppm

We're in italics here because public transit is a special case that does not neatly fit with the others. Public mass transit is like the little girl with the curl on her forehead. "When it's good it's very, very good, and when it's bad…."

At its best, public transit can be very efficient in terms of straight gppm, but unfortunately the best transit systems in this regard are the electric rail systems like BART and The Max. Although they incur a high initial "upstream" penalty during construction, over time electric rail transit systems more than make up for it with extremely low operating emissions per passenger mile.

Here in the Rogue Valley, alas, we have only RVTD buses. All vehicles in the RVTD fleet are fossil-fuel powered: diesel, CNG (compressed natural gas) or diesel hybrid. Exact emissions per bus (gpm) will vary widely with type of propulsion, and also with what is called "duty cycle" (how many stops and starts and average speed). The gppm will be determined by the load factor (how many passengers on board).

We should note here that all transit buses suffer from a very poor passenger-to-vehicle weight ratio. With the US average of 12 passengers on board at 150 pounds each, we have 1,800 pounds of passengers on a bus weighing about 20,000 pounds, for a ratio of about 1:14. So for every pound of passenger we have to move 14 pounds of bus. Also, frequent stopping and starting further hampers fuel efficiency.

In the final analysis, if we average the propulsion types and duty cycles, an RVTD bus will generate about 2,500 gpm, or about 208 gppm with 12 passengers on board. That's about the same as one person driving alone in a Prius. Good, but not great. A fully loaded bus (40 or more) edges out an EV, but with only four riders the gppm for a bus is worse than that of a gas-powered SUV.

However, we must keep in mind one important reality: THAT BUS IS GOING TO RUN WHETHER OR NOT YOU GET ON IT!

In light of this inescapable fact, the additional emissions for your trip will be negligible. With any other form of motorized transport you might choose, assuming that vehicle would have remained stationary otherwise, you would generate some amount of GHG emissions.

That said, the planet will benefit if we push for more climate-friendly transit systems, both through electrification of transit vehicles and, when feasible, scaling of vehicle size in response to changes in passenger demand.

E-bikes and e-scooters: 0.5 to 1.5 gppm

Small, personal electric vehicles are a smart option for getting around town speedily while leaving only a tiny carbon footprint. The batteries are small and take very little electricity to recharge. E-bikes and e-scooters benefit from two important factors: First, electricity here in the Rogue Valley is largely renewable – primarily hydroelectric but with increasing contributions from wind and solar. Secondly, they enjoy a highly favorable passenger-to-vehicle weight ratio. E-scooters generally weigh under 30 pounds and even the heavier cargo e-bikes weigh less than 80 pounds. That translates into a passenger-to-vehicle weight ratio of anywhere from about 6:1 to, at worst, around 2:1. A far cry from what we saw with transit buses!

Full-size, Multi-passenger Personal Vehicles ("Cars")

This topic will claim the lion's share of this document, and how to rank them relative to the other modes of transportation is a bit complicated. That's because the grams of emissions per passenger mile (gppm) will vary – as with buses – on how many passengers are on board.

So, in the following summaries of each type, I will give three figures: the vehicle emissions with driver only, the average based on the EPA estimate of 1.7 passengers, and the minimum based on all seats occupied. The summary figures are based the "best in class" gpm for vehicles. Details for specific vehicles are found in the tables.

All emissions are calculated using the vehicle's combined tailpipe and upstream emissions, using the EPA figures for the Northwest power grid for electric vehicle upstream emissions.

<u>Battery Electric Vehicles</u>

A battery electric vehicle, commonly referred to simply as an EV, runs solely on electricity. As a general rule of thumb, when charged from the local grid, an EV will produce only one-fifth the GHG emissions on a comparably sized conventional gasoline-powered vehicle. This is due to two factors: the high percentage of renewable power on our local grid, and the inherent greater efficiency of electric drive trains. With internal combustion engines, much of the energy is wasted as heat.

Battery electric vehicles have vehicle emissions as low as 75 grams per mile, or about 44 gppm with an average passenger load. EVs with seven passenger capacity have potential emissions of less than 19 grams per passenger mile (gppm).

<u>Plug-in Hybrid Electric Vehicles (PHEV)</u>

A plug-in hybrid vehicle is exactly what the name implies: a hybrid that you can plug into charger, allowing you to run only on electric power until you reach the limit of your battery

range. Then the gasoline engine kicks in. Theoretically, you could run on the battery all the time, giving the PHEV the same gppm rating as an EV. The EPA uses a complicated formula to determine the gpm of each vehicle, based on battery range and mpg when running on gasoline. Your own results will depend on your driving habits, and you can get a better idea of your own results using this calculator.

PHEVs have vehicle emissions as low as 140 gpm, or 82 gppm with an average load. A loaded 7-passenger PHEV minivan drops that figure to 30 gppm.

Standard Hybrid Vehicles

Standard hybrid vehicles extract all their original energy from gasoline, but recapture much of it through what is called "regenerative braking." Basically, you get back energy when going downhill and stopping.

The best hybrids will post vehicle emissions of 187 gppm with driver only, down to 110 gppm with average passenger load. A full-up hybrid minivan comes in at around 42 gppm.

High-mileage Conventional Gasoline Vehicles

I'm re-introducing this category to allow extra flexibility for individuals who drive relatively little (under 5,000 miles annually), or for two-car/two-driver households where one car is an EV or a PHEV. I have arbitrarily limited my listings, in their respective categories, to small cars with combined EPA mileage ratings of 35 mpg or better, and to AWD SUVs rated at 30 mpg or better.

At 35 mpg, a car emits 305 gpm. With 1.7 on board, that's 179 gppm, and with all five seats filled it's 61 gpm. At 30 mpg, an AWD SUV translates to 355 gpm for the vehicle, 208 gppm for an average load, and 71 gppm with all five seats filled.

So, those are your options. If you are planning a solo run to the store a mile away, consider the differences. It's basically zero emissions for walking, biking or *taking the bus.* The round trip in an EV is about 200 grams, and around 400 in a hybrid. All are tolerable…more or less. But if you are you still driving that vintage 2015 Subaru Outback V6, you are spewing out more than a kilogram of GHG just to grab that quart of milk. Not sustainable. Please, read on…

Part II

Selecting and Purchasing a Full-size Personal Vehicle

First…What About eBikes and eScooters?

I'm not addressing the particulars of small, personal electric vehicles for three reasons. First, both the benefits and drawbacks are self-evident. Second, costs are relatively low in comparison to full-size vehicles. And third, the tradeoffs among vehicle types are not as

complex as when considering four different drivetrain types: BEVs, PHEVs, hybrids and high-mileage gasoline vehicles.

The Deciding Factors

Before you begin the decision process, you need to have a number of facts, figures and personal commitments clearly in mind. This could involve some soul-searching as well as researching your own driving habits and gasoline purchases.

How committed are you to reducing your carbon footprint? For most folks, this is the most important consideration. If your driving habits put you at or above the US average of 12,000 annual miles, you certainly want to put all – or at least most – of those miles on electric power. If your miles are substantially less, or if you are in a two-car household, you have more options.

A one-car or two-car household? Unless both vehicles are used regularly for simultaneous long-distance road trips, you have a lot of flexibility in a two-car household. And you can avoid nearly all the downsides of EV ownership.

How many miles do you drive annually? Go back to your records and get the numbers. Usually, service documents will have the mileage for the service date.

How do these miles break down into local (within about 30 miles round trip), regional (within about 400 miles round trip) and long-distance trips (more than 400 miles round trip)? This may require some memory searching and computation, but it's an important figure.

What is your budget for a new or replacement used car? You don't want to overspend, but remember that reducing emissions also reduces fuel costs, and EVs have dramatically lower maintenance costs. Also, many EVs and PHEVs have enticing rebates and tax credits, and current used EV prices are at record lows.

Do you have reasonable access to home charging? This is important because charging at home is not only wonderfully convenient but also cuts fuel costs in half compared to commercial fast charging. (Note: You may not need to add wiring or install a 220V charger. See Part X.)

Step I: Determining Best Type of Vehicle for Your Needs

Our Benchmark Trade-in Vehicles

In the following discussions, we'll be looking at what advantages, both to the planet and your finances, will be realized by upgrading your vehicle(s). And the benefits will vary, of course, not only according to your new vehicle but also with what you are NOT going to be driving anymore.

So, for purposes of comparison, I've chosen three vehicles that will afford useful comparison:

2015 Toyota Prius, 52 mpg combined, 205 gpm
2015 Honda Civic: 33 mpg; 325 gpm

2015 Subaru Outback 6 cyl: 22 mpg combined, 533 gpm
The average for US vehicles on the road today is about 475 gpm.

A Handy Yardstick: 100 Gallons per Driver/vehicle per Year

It would be great if all of us could completely eliminate the use of all fossil fuel products for our personal transportation. But for many of us, seeking such perfection imposes a number of difficulties. As Voltaire once said, we shouldn't let the perfect be the enemy of the good.

So, for the purposes of evaluation, I've set an arbitrary limit of 100 gallons per driver/vehicle per year. The average for all vehicles on American roads today is about 540 gallons per year, so this is better than an 80% reduction. If we all can meet this goal, we will take a giant step toward reducing GHG emissions. How you can meet this goal in affordable manner will depend on a number of variables. Here we go…

BEV Best – When all or most of the following apply:

1. Near average or higher annual mileage (12,000 miles or more)
2. Two-car household
3. Strong commitment to GHG reduction
4. Access to home charging
5. At least half of total miles are local or regional and you are patient and good at planning ahead for longer trips; OR you are okay with buying a Tesla.

PHEV Worth Considering – When all or most of the following apply:

1. Near average or higher annual mileage
2. One car household
3. Access to home charging
4. At least half of your total annual miles are within electric-only range (a 30-mile minimum recommended)
5. For two-car households where a larger and/or AWD vehicle is mandatory

Standard Hybrid Perhaps Best Choice - When all or most of the following apply:

1. Two-car household with one BEV or PHEV, or
2. One-car household with annual mileage well below average (less than 5500)
3. No reasonable access to home charging

High Mileage Conventional Gasoline Considered - When all or most of the following apply:

1. Two car households when the other car is a BEV or at least a PHEV
2. Single car households with very low annual mileage (under 4,000)
3. No access to home charging and…
4. Highly restricted budget

With those criteria in mind, let's take a look at your options with each type of vehicle. I'm breaking listings into four categories that correspond to what most folks look for when buying a car: sedans and hatchbacks, minivans, AWD SUVs, and pickup trucks. In each category, vehicles will be ranked, best to worst, in order of vehicle GHG emissions (tailpipe and upstream.)

When emissions are the same, vehicles will be listed alphabetically by manufacturer.

The Charts: Personal Vehicles Ranked by GHG Emissions

IMPOTANT NOTE 1: Many – if not most – of the car models listed here will have multiple entries in the EPA database, usually because of variants in battery size . Other variables can include tire size or even extra weight from added features like third row seating. However, these discrepancies are minimal, rarely more than 3% of total emissions. Therefore, for the purposes of simplicity, I have listed only the specific model variant with the lowest GHG emissions. If that model strikes your fancy, check the EPA database for possible variations in mpg or GHG emissions.

IMPORTANT NOTE 2: Actual emissions from PHEVs will vary considerably depending on your particular mix of travel on battery power versus gasoline power. The EPA number is based on a formula that considers typical driving patterns and the electric range of that vehicle. You can get a closer approximation of your own case by using this PHEV calculator. PHEVs have two numbers for range in the following tables: first is electric only, second is total electric and gas combined.

Note that only new vehicles (2023 and 2024 model years) currently listed on the EPA fueleconomy.gov website are included here.

MSRP is for lowest cost base trim and are good for relative comparisons; most actual MSRPs will be somewhat higher, though a good deal can get it back down.

Sedans and Hatchbacks

For the lowest emissions using their respective technologies, regular cars are the star performers. That's mainly because, as a group, they are smaller, lighter and more aerodynamic than SUVs and pickups. Most listed are two-wheel drive only, but AWD is available on many as noted. Again, there is a penalty in GHG emissions for AWD, but it is much smaller with EVs than with gas-powered cars.

But…where is the popular Chevy Bolt? Production halted at the end of 2023, and the new ones are basically sold out. Fortunately, availability is good for late model used Bolts.

Make	Model	Type	GHG g/mi	Range	AWD	MSRP $k	Tax credit	Notes
Hyundai	Ioniq 6	BEV	75	361	Avail	42		Long range RWD
BMW	i4	BEV	95	256	Avail	51		
Nissan	Leaf	BEV	98	212	No	36	$3750	

BMW	i5	BEV	102	295	Avail	70		
Mercedes-Benz	EQE 500	BEV	110	298	Avail	86		AWD over $100K
Mazda	MX-30	BEV	117	100	No	34		
Mercedes-Benz	EQE 350	BEV	118	280	Std	78		
Toyota	Prius Prime	PHEV	121	45/600	No	33		
Mercedes-Benz	AMG EQE	BEV	146	230	Std	75		
Toyota	Prius	Hyb	187	644	Avail	27		
Hyundai	Elantra Blue	Hyb	197	594	No	25		
Toyota	Camry	Hyb	205	686	Avail	28		
Hyundai	Sonata Blue	Hyb	205	686	?	28		
Toyota	*Prius (2016)*	*Hyb*	*205*	*571*	*No*	*24*		"Trade-in" ?
Toyota	Corolla	Hyb	214	565	Avail	24		
Honda	Accord	Hyb	222	614	No	34		
Toyota	Crown	Hyb	260	594	Std	40		
Hyundai	Elantra	Conv.	296	459	No	21		
Honda	Civic	Conv.	296	446	No	24		
Kia	Rio	Conv	296	428	No	17		
Toyota	Corolla	Conv	304	462	No	22		
Nissan	Versa	Conv	304	378	No	17		
Volkswagen	Jetta	Conv	304	462	No	21		
Honda	*Civic (2015)*	*Conv*	*325*	*571*	*No*	*16*		"Trade-in"?

All-Wheel Drive (AWD) SUVs

All-wheel drive SUVs are extremely popular in the Rogue Valley -- to the point where many local dealers no longer bother to keep the 2-wheel drive variants in inventory! For that reason, the SUVs listed here are the AWD versions, which will have slightly higher GHG emissions than the 2WD variants. Listings are limited to models with GHG emissions of less than 355 gpm, equivalent to 30 mpg combined city and highway.

Note that if you are open to a 2WD option, in addition to those shown in the notes following Kia offers the Kona and Niro EVs as FWD only. Also, the 2WD drive versions on the following conventional gasoline models achieve better than 30 mpg combined: Nissan Kicks, Hyundai Seltos and Venue, Chevrolet Trailblazer and Trax, Volkswagen Taos , Buick Encore GX and Envista, and Ford Escape.

Make	Model	Type	GHG grams/mile	Range (miles)	Cost $k	Tax credit	Notes
Kia	EV6 Long Range	BEV	99	282	50		RWD only avail
Subaru	Solterra	BEV	102	227	45		
Toyota	bZ4X	BEV	105	222	49		FWD only avail
Volkswagen	ID.4	BEV	105	263	49	$7500	RWD only avail
Hyundai	Ioniq 5	BEV	108	260	44		RWD only avail
Ford	Mustang Mach E	BEV	109	312	58		RWD only avail
Chevrolet	Blazer EV	BEV	112	279	52		
Nissan	Ariya	BEV	117	272	44		
Cadillac	Lyriq	BEV	121	307	64	$7500	RWD only avail
BMW	iX xDrive 50	BEV	124	324	87		

BMW	iX xDrive40	BEV	125	217	84		
Kia	EV9 Long Range	BEV	130	280	70		Option 7 seats; RWD only avail
Toyota	RAV-4 Prime	PHEV	168	42/600	44		
Kia	Sportage	PHEV	198	34/430	36		
GMC	Hummer	BEV	202	314	97		
Hyundai	Tucson	PHEV	204	33/420	39		
Kia	Sorento	PHEV	210	32/460	50		
Hyundai	Santa Fe	PHEV	221	31/440	42		
Lincoln	Corsair	PHEV	226	27/430	54	$3750	
Subaru	Crosstrek	PHEV	234	17/480	37		
Dodge	Hornet	PHEV	235	33/360	42		
Toyota	Corolla Cross	Hyb	254	554	28		
Toyota	RAV-4	Hyb	266	580	32		
Ford	Escape	Hyb	273	558	35		FWD only avail
Toyota	Venza	Hyb	273	566	35		
Hyundai	Tucson Blue	Hyb	280	521	33		
Kia	Sportage	Hyb	280	521	31		FWD only avail
Honda	CR-V	Hyb	288	518	34		FWD only avail
Below this line recommended only for low annual mileage or for two-car households with other car a plug-in.							
Toyota	Highlander	Hyb	304	598	43		Option 7 seats; FWD only avail
Kia	Sorento	Hyb	313	602	39		Option 7 seats ;FWD only avail
Hyundai	Santa Fe	Hyb	313	602	36		Option 7 seats
Nissan	Rogue	Conv.	344	450	28		FWD only avail
Lincoln	Nautilus	Hyb	355	468	54		
Toyota	Corolla Cross	Conv.	355	372	25		FWD only avail
Hyundai	Kona	Conv.	355	396	24		FWD only avail
Subaru	Crosstrek	Conv	355	498	24		
Subaru	*Outback 2016*	*Conv*	*533*	*407*	*24*		*"Trade-in"?*

Minivans

If you regularly need to carry 7 or 8 passengers (driver included), then these two minivans are an acceptable solution.

Make	Model	Type	GHG grams/mile	Range	Cost $k	Tax credit	Notes
Chrysler	Pacifica	PHEV	227	32/550	53	$7500	Seats 7
Toyota	Sienna	Hyb	296	648	38		Seats 7 or 8; AWD available

Pickup Trucks

Pickup trucks are also extraordinarily popular for personal transportation…and that's a problem. Because of their size and weight, conventional gasoline pickups typically generate

very high amounts of GHG emissions, usually in the range of 500 to 700 gpm. That means switching to an electric powered pickup reaps greater net reductions than with cars, usually more than 350 gpm. In comparison, switching from a newer gas sedan to an equivalent EV will reduce GHG emissions by only about 200 gpm. Also included here is Ford's nifty Maverick, which is basically a FWD Escape hybrid SUV with a short pickup bed.

Make	Model	Type	GHG grams/mile	Range	Cost $k	Tax credit	Notes
Ford	F-150 Lightning	BEV	152	320	57	$7500	
Chevrolet	Silverado EV	BEV	161	393	75		
GMC	Hummer pickup	BEV	202	314	97		
Ford	Maverick	PHEV	288	511	23		

Buying Used

Buying a used EV, PHEV or hybrid is a great alternative for many folks on a tighter budget. As of this writing (April 2024), used EV prices are dropping in parallel with new EV prices, and with some exceptions PHEV and hybrid prices are following suit.

Many of the EVs listed above have been around for two or three years, some more, so the data shown above will be largely valid for used models. But, of course, all can be found on fueleconomy.gov if you need the exact details.

And another good reason to buy used: essentially all used EVs and PHEVs qualify for the federal tax credit, regardless of country of assembly or battery contents. So, you can take your choice. More info on this in the next section.

Two good resources for a used car search of newer models are Autotrader **and** Cargurus . With both you can adjust your search for distance from your location, type of powering (EV/plug-in, hybrid) and price. Both sites also will show a number of EV and PHEV options if you search at least as far as Eugene, with a range of prices . Note that Autotrader and Car Gurus listings, though exhaustive, are not definitive; many more cars are available than are listed.

Platt Auto Group is a highly regarded Portland used EV specialist worth checking at this link. Although Platt usually lists their cars on the search sites above, this link gives you all their cars in one place.

Note that for both the Oregon rebates and the federal tax credit, you must purchase your plug-in from a licensed dealer. Private party purchases do not qualify.

Tax Credits and Rebates

Federal Tax Credits on New EVs and PHEVs

Here we have good news and bad news. We'll start with the bad news.

When the Inflation Reduction Act was passed, the tax credits were structured in a way designed to bring jobs back to North America and to reduce dependence on "unfriendly" countries, mainly China. So, to qualify, final vehicle assembly must be in North America. Also, effective in January of 2024, strict new rules went into place regarding where battery components could be made and where battery minerals could be sourced.

The result is that now only a handful of new EVs and PHEVs qualify for either the full ($7500) or partial ($3750) tax credit.

The good news is now you can claim your credit when you buy the qualifying vehicle and assign it to the dealer. The amount is deducted from the purchase price, so you don't have to wait to save on your taxes. And more good news: Although technically non-refundable, the credit is not subject to recapture. That means that, if you do not have tax liability for the purchase year of $7500, the IRS will not make you or the dealer pay back the difference. Also, there are restrictions on income. For once, billionaires don't qualify. Details on recapture exemption at this link and, in general, at this link.

Federal Tax Credits on Used EVs and PHEVs

As noted before, essentially all EVs and PHEVs more than two model years back will qualify for a credit of up to $4,000 or 25% of the purchase price, whichever is less. Again, there are limits on your income and vehicle purchase price. Complete details at this link.

Oregon Rebates

On again, off again, on again…. It's been frustrating for many buyers because the Oregon rebate program is funded by a tax on new vehicle sales, and when plug-in sales are brisk – as they were in 2023 – then the pot of money is drained and all rebates are suspended.

As of this writing (April 2024) the rebates are back on, but are scheduled to shut down again on June 3, so only cars purchased in a 60-day window will be eligible. Pretty crazy, but the rebates are generous and apply to nearly all PHEVs and EVs. Full details, including a big yellow box to let you know if it's all meaningless at the moment, can be found at this link.

Ashland Rebate – If you live in Ashland and are a customer of the city's electric utility, you are eligible for an additional rebate of $1000 on a new or used EV (BEV only, no PHEVs) that is currently listed as eligible for the Oregon rebate. Some restrictions apply. More information at this link.

Should I buy now or wait?

Reasons to Buy Now – Prices are falling, mainly because of lower demand for a variety of economic and socio-political factors. (According to a recent Gallup poll, 71% of registered Republicans say they would never buy an EV.) And compared to a year ago, inventories are up and selections are good.

And, of course, the sooner you move to a greener vehicle, the sooner you can reduce your carbon footprint. (Not to mention it will likely be more fun to drive…unless you're trading in a Porsche.)

Reasons to Wait – More new models will be coming soon, so you will have more choices. Also, most EVs starting in the 2025 model year will adopt the new NACS charging standard, which is the Tesla standard that Elon generously made available to all makers with no license fee. Of course, that means these cars will be compatible with the Tesla Supercharger network, and charging there will NOT be free. However, if you buy now, adapters will be available to use the chargers with the new standard, and the existing CCS standard connectors will be around for many years to come.

Part III: Shopping Resources

Fuel Economy.Gov – This web site is a treasure trove of information, with relevant details on all cars sold in America plus helpful background information on a variety of topics related to GHG emissions. It also has complete details on federal tax credits. If you can't find it here, you probably don't need to know it.

Ashland City EV Pages - A first-rate overview on EVs and PHEVs, containing nearly all the general information here and presenting a great tutorial on the basics of the technology. It includes a nifty calculator for comparing your current gasoline vehicle's operating costs to battery-only EVs (not PHEVs), but has no further information relating performance and features of specific makes or models. Note that for a fair, apples-to-apples comparison, you need to make sure all taxes for both gasoline and electricity are included. Taxes are included in the pump price but are separate on your Ashland utility bill.

SOHEVA - SOHEVA is the electric vehicle organization for the Klamath – Siskiyou ecoregion, and its website has resources for local advice along with a wealth of recent news – and even more links to EV-related sites.

Consumer Reports – A reliable and comprehensive guide. Emphasis here is on bread-and-butter issues like safety, economy and reliability. It remains independent and trustworthy. But you do have to pay to access the details. ($39 annually for digital access.)

Car and Driver – The magazine and web site are geared toward automotive enthusiasts who are interested in technology and driving pleasure as well as the basics. You'll find more of an emphasis on performance – acceleration, handling and driver involvement – in their reviews and rankings.

Edmunds – A comprehensive free resource for detailed information, specifications, expert reviews and user reviews (including a couple of mine). Particularly useful is their comparison feature which lets you do detailed, side-by-side comparison of pricing and specifications on up to four cars.

GreenCars is a project of Medford-based Lithia Motors, and it offers a wealth of information on plug-ins as well as conventional hybrids. Information is objective and unbiased (Tesla is included in proper perspective), but if you click on the "Shop" button you will see only cars at Lithia dealerships nationwide. You can sort to find local inventory.

Green Car Reports – This web site covers all green cars, including hybrids. It is wide-ranging and comprehensive on every topic and includes exhaustive staff and user reviews. It is independent in the sense that it is not tied to any maker, but it obviously promotes the green vehicle industry as a whole.

Plug-in America – The focus here is exclusively on EVs and PHEVs. But it offers a wealth of information within that category. The same holds for a similar site, PluginCars.

Part IV: Charging EVs and PHEVs

Home Charging

Charging at home is ridiculously fast and cheap. How fast?

A full plug-unplug cycle in my driveway takes less than 30 seconds. I charge our Bolt, on average, no more than twice a week. That's less than four minutes a month. How long does it take to detour to the gas station and stand by the pump in the heat or cold? Would you put up with that hassle to charge your cell phone?

Also, there is absolutely no question that the cheapest way to charge your EV is at home. For example, I pay the equivalent of about $1.70 "a gallon" to fuel my Bolt from the Ashland grid. How do I figure? The Bolt is comparable in size, quality and cost to a 2021 Toyota Corolla hatchback, which is EPA rated at an excellent 38 mpg combined. However, driving my Bolt 38 miles costs only about $1.70, all taxes included, when I charge at home. (Maintenance costs follow suit. After nearly three years and 14,000 miles, total costs are $20 for a tire rotation.)

Another piece of good news is that you probably DO NOT need to rewire your house and install an expensive Level 2 (220V) charger. Most of us can do just fine with the small Level 1 (110V) charger that comes free with the car.

Here's why. All you need is a standard 110V outlet either in your garage (where the car can be parked) or within 20 feet or so of where you park in the driveway. You will need to have 12 amps of headroom on that circuit, but unless you have a space heater or large freezer on that same circuit you probably do.

With most EVs and PHEVs, charging overnight (5 pm to 8 am) at 12 amps will give you 50 – 60 miles of range. This basically means that, unless you drive more than 50 miles a day EVERY DAY, you do not need Level 2 charging. For example, if you commute from Ashland to Grants Pass every day, and you do not have access to charging at work, then yes, you need Level 2.

Otherwise, you simply do what we do. When the "gas gauge" gets down below 100 miles, we plug in overnight. If we have a longer trip planned, we plug in two or three nights in a row to "top off the tank." We have never left for a road trip with less than a "full tank."

Local and Regional Charging for Non-Tesla Vehicles

On the road is another matter. Costs can vary widely, and DC fast charging will cost more than Level 2 charging per kWh, except of course in the very rare cases where DC fast charging is free. The more expensive DC fast chargers, at 50 cents or more a kWh, will cost you close to the $3.50 to $4.00 gasoline equivalent. If you have a free hour or two – as I once did for a leisurely stroll around Trinidad, California – a Level 2 charge will cost around 25 cents a kWh.

The good news is that there are plenty of chargers out there right now throughout Southern Oregon and Northern California, both DC fast charge and Level 2. If you have an EV with more than 200 miles of range, and you are willing to do minimal preparation before your trip and you have some patience and flexibility, you WILL be able to charge your car. Yet, to be safe, you need to always have two options within your remaining range, preferably three.

That's because the charger you expected to use might not be working, or it might be in use, or the space occupied by somebody who is finished with charging but left their car in the space. You need to take such circumstances into account, just to be safe.

To know your options, you need to know which charging networks have the most chargers in our region. Then you need to check their reliability and find out how you can access them.

One way to do this is on the PlugShare web site. (I don't think this can be done on the phone app.)

1. Zoom the map in or out until it shows most of Oregon and Northern California.
2. Click on the Menu icon in the upper left-hand corner under the PlugShare logo.
3. Scroll down to Networks and click on Toggle All. (All will disappear.)
4. Click on each of the following in turn to see how many chargers the network has in the region, and of what type. DC fast charge will be yellow and Level 2 green. Broken or not yet in service will show a wrench. After you click on the network and check it, click to toggle it off before clicking the next one.

   Blink
   ChargePoint
   EVCS
   EVgo
   SemaConnect

These are the major players in our region, though SemaConnect and Blink are questionable as they show no DC fast chargers. Electrify America, on the other hand, has fewer charge stations

but all are DC fast charge and all have multiple plugs, usually six or more. EVGo is strong in Central and Southern California.

I personally would recommend ChargePoint as a foundation. I've been using the ChargePoint card for five years and never found a charger *shown on their app* that didn't work. Or you can use the Charge Point app if your phone has NFC (nearly all newer ones do). Side note: The ChargePoint chargers at the Ashland Safeway are permanently disabled and do not show on the ChargePoint app.

The other nice feature of PlugShare is the rating system, which shows reliability based on user check-ins. It shows when you hover your mouse over the station icon. A 9 or a 10 means that most drivers charged up successfully. Below 8, problems might be expected. For example, Ashland Safeway chargers still show on PlugShare (why?!) but are rated the lowest-possible 1.

Another good option is Electrify America as all are DC fast charge and you can use a credit card. But I did encounter one card reader that didn't function and I had to go across town to a ChargePoint location.

EVCS is growing fast on the West Coast and might be worth checking out.

The bottom line, for now, is this: Make sure you can access at least two charge stations within planned remaining range for that leg of your trip, with at least one charger rated 8 or above on PlugShare. If both are below 8, have a third option ready.

Good news on the horizon! First, Tesla is gradually opening up its extensive and reliable Supercharger network to non-Tesla vehicles. We expect this will accelerate in coming years as all vehicles switch over to the common NACS (Tesla) standard.

Another hopeful sign is the recent partnership announced by EVGo, GM and Pilot to install 2,000 chargers at 500 Pilot Travel Centers nationwide. This is a step forward for several reasons. Locations are brightly lit and staffed 24/7. Restrooms, food, travel necessities – and even showers! – are always available. And, presumably since they are full partners, Pilot management will take some responsibility for monitoring and maintaining the chargers. This is NOT the case in nearly all other situations (including Tesla), where nobody at the location has any direct responsibility for the chargers. Obviously, this has been a big part of the current problems.

Part V: What About Common Criticisms?

If you buy a plug-in, you may run into nay-sayers who will tell you that you wasted your money, or even that EVs are worse for the environment than gas cars. You may hear the following:

Electric cars won't make a significant difference in greenhouse gas emissions.

EVs produce zero tailpipe emissions. As for upstream emissions from charging, in Oregon (and all along the West Coast) mile for mile you will be responsible for about FIVE TIMES LOWER

GHG emissions compared to a conventional gasoline car of equivalent size. And if you charge from your own home solar, your EV is infinitely better!

Manufacturing an EV produces more greenhouse gases than making a similar fossil fuel car.

This is true, mainly because of the battery. However, a 2015 cradle-to-grave study by the Union of Concerned Scientists determined that the "manufacturing penalty" will be offset by the lower GHG emissions in use. How long this takes depends on the size of the battery and the relative cleanliness of the grid used for charging. With a small, first-generation EV (range under 100 miles), the penalty could be offset in as little as 3,700 miles. A large, 250+ mile EV on the dirtiest grids could take as much as 39,000 miles, says the study, but this last figure is likely outdated as all US grids have "cleaned up their act" considerably in the past nine years. Also, because most of the additional GHG emissions in the battery penalty are from generation of electricity used in manufacturing, this differential will shrink even more in the years to come.

C***harging an EV from the local grid only ends up burning more coal.***

This is a myth that just won't die. Yes, the western power grid is interconnected, and yes there remain a few large coal-fired plants in Montana and Wyoming, some owned by Pacific Power. But to avoid transmission losses, electricity grids draw power from distant sources only when closer sources are tapped out. That means all the renewable (hydro, solar, wind) and natural gas (marginally better than coal!) resources between here and the distant coal plants have to be pushed to near capacity first. So no, plugging your EV into the local grid here does not automatically "pour on the coal" in Montana. Regardless, electricity in the Northwest is far greener than across the nation as a whole. Even when factoring in the remaining coal plants across our region (some closing soon to be replaced by cheaper wind), charging an EV from the Northwest grid yields the equivalent of better than 96 mpg in a conventional car, according to the latest comparison by the Union of Concerned Scientists.

EV batteries can't be recycled, and mining for the metals used for them is bad for the environment and for the workers.

The first part is false. Batteries can be recycled in two stages. First, once they can't hold enough charge for long enough to be useful on the road, they can be put to use for stationary power storage, with large numbers hooked together to store energy from solar through the night or from wind during calm days. When no longer suited for this application, most heavy metals in the battery can be extracted and recycled. Admittedly, this process is difficult and not yet cost-competitive to mining new ore.

The part regarding mining is, alas, true in many instances. But EVs are not entirely at fault. Remember, lithium-ion batteries are everywhere, from cell phones to lawn mowers. All contribute to the problem. Yes, the labor practices and local environmental conditions at some third-world mining sites are deplorable, but pressure can and should be applied to both the companies responsible and the local governments using any and all "carrots and sticks" to

ensure compliance with best mining practices. Continuing to drive fossil fuel vehicles will not solve this problem. And, if we don't drastically cut greenhouse gas emissions, environmental conditions will be much worse in years to come for everybody, mine workers included.

Part V: Local Dealers and Vehicle Availability

Following are links to local dealer websites for vehicles qualifying for inclusion here. You can search for the EV or PHEV of interest and see if any are available in inventory. Be aware that some (or all) cars showing in inventory may be in transit and already sold. However, if you see several cars "in the pipeline" it may mean that particular dealer is serious about serving the EV/ PHEV market.

Ordering times from different dealers may vary widely because of an entrenched and somewhat arcane system of allocation, where dealers have access to production based on prior sales, customer satisfaction, market conditions and other mysterious factors. In general, dealers in major metro areas will have larger allocations, but likely will have more customers in line so your wait may be just as long for in-demand models. Dealers with a past history of high EV and/or PHEV sales may be given higher allocations of those models, even if overall sales were modest.

BMW - Medford BMW

Cadillac – GMC

Airport Chevrolet – Cadillac - GMC

Chevrolet

Airport Chevrolet
Grants Pass Automotive
TC Chevy

Chrysler - Dodge

Lithia Chrysler Medford
Lithia Chrysler Grants Pass

Ford

Butler Ford
Crater Lake Ford

Mocks Ford

Honda

Grants Pass Automotive
Lithia Honda

Hyundai – Hyundai Medford

Kia – Kia Medford

Lincoln – Crater Lake Lincoln

Mazda – Crater Lake Mazda

Mercedes – Benz – Mercedes-Benz of Medford

Nissan

Medford Nissan
Grants Pass Automotive

Subaru – Southern Oregon Subaru

Toyota

Lithia Toyota of Medford
Grants Pass Toyota

Volkswagen – Medford Volkswagen

About the Author

Recently retired from a long career as a writer and consultant for the professional audio industry, Bruce Borgerson has lived in Ashland since 1989. He has been driving plug-in vehicles since 2017. He started tracking gasoline use in 2019, and since then his two-driver/two-car household has limited gasoline consumption to an average of 162 gallons a year, rental car fuel included. Current household vehicles are a 2021 Chevy Bolt and a 2023 Nissan Rogue AWD.