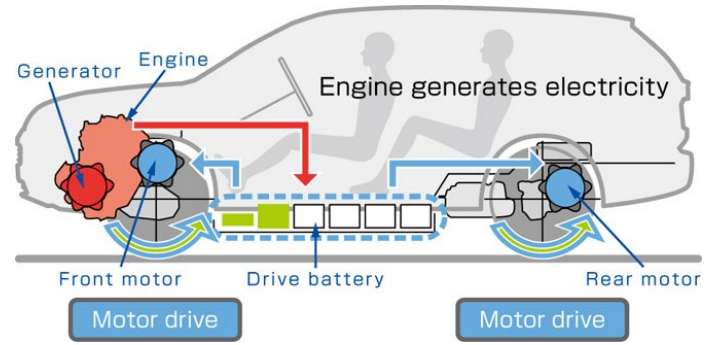


# DEALING WITH RANGE ANXIETY

## 1. *Consider a PHEV*

For people just starting to consider how to fit a plug-in in to their life, start with the simplest answer. A PHEV will automatically electrify most of their driving, but they don't have to do ANY thinking, because it is still a gas car. They can go anywhere at any time, and don't have to ever charge it anywhere other than in their own garage. Many people don't understand that a PHEV has a gas engine and operates exactly like a gas car on long trips.



## 2. *For long trips, can you fly/train/bus/rent/swap?*



For the last seven years, I have driven small two-passenger cars. Not once has somebody asked me, “What if you suddenly need to take 3 people somewhere” or “How do you make Costco trips?” There is no such thing as cargo anxiety, because everybody understands that you can use another vehicle on the rare occasion that the need arises.

Yet when it comes to long trips, it seems difficult to understand that you don't have to take a BEV if it's not the best-suited car for the trip. They can just drive their wonderful electric car around town, charge at home in the garage – and take a gas car on long trips. This is very nearly the same as the “PHEV” answer, just using a hybrid garage rather than a hybrid car. BEV owners laugh when people asked them about the “inconvenience” of electric cars, because they are the most convenient car they have ever driven.

## 3. *Are you willing to learn range factors and calculate your own range?*

A fair number of new owners are excited about their EV cars and willing to learn how they operate. The more they know, the more use they can get out of their car and the less likely they are to get in trouble. They will need to learn about the effects to speed, acceleration, elevation, wind, water and debris on the road, and temperature. Most (not all) of this is very similar to effects on mpg in gas cars; but most gas drivers don't bother to learn it.



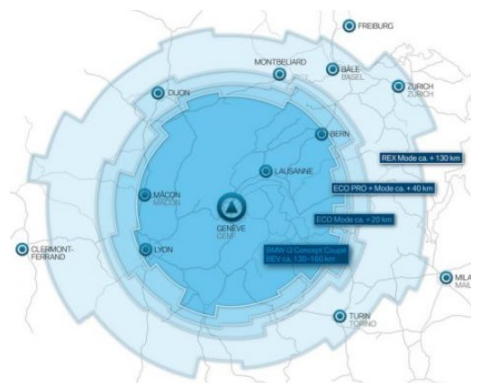
## 4. *Can you follow tips on BEV road trips?*

Some owners really don't want to learn anything new when they buy a car. They just want to get in and drive. They don't want to do any math; they just want to know how far the car will go.

A simple answer is: you can “count” on a BEV to go 2/3 of the EPA range. On good days, when driven right, they can easily exceed the EPA range, but that's a trick to save until after new owners have experience. Take another car for longer trips, or buy a PHEV if you only have one car. If 2/3 of EPA range is not enough for common trips, this BEV is not for you. If you ever do take a BEV on a road trip and stop to charge, keep charging until the car's EPA range indicator says that you have at least 150% of the miles necessary to make it to the next stop.

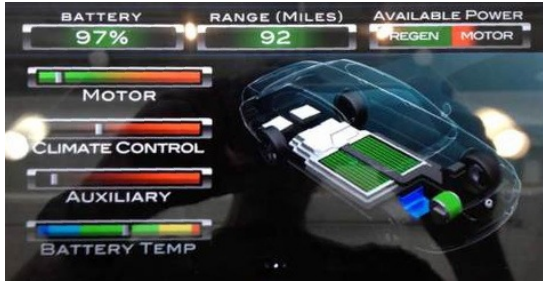
## 5. *Does your car have an always spot-on range meter?*

Most EV range meters are deliberately optimistic. It's easy to understand how this can happen; marketing departments that are used to selling gas-powered products want to tout the best possible numbers to ensure their product gets purchased instead of the competition's nearly identical vehicle; gas buyers don't really expect the numbers and are understanding



when they are not met. But this is exactly the wrong thing to do in the emerging, poorly-understood, highly differentiated BEV market. It is more important to gain a buyer who is happy after the purchase and influences other buyers. BEV manufacturers are really messing up here. Best of all, automakers could integrate range estimation in to the navigation system, and have it take into account elevation, traffic and weather conditions and tell the user how much range will be left if they travel at various speeds.

## 6. Does your car display kWh or SOC instead of miles of range?



Until the auto manufacturers have either truly accurate or at least consistently pessimistic range meters, I honestly think the best thing is to not display range at all – display a measure of remaining battery capacity instead. New BEV owners will definitely be cautious until they learn how it works! It’s certainly something drivers can easily learn; it’s exactly how most gas cars have worked for decades.

## Summing Up

Some gas drivers who obsess about range anxiety do so because they understand the social benefits of plug-in cars and feel they should get one, but they don’t want to because they assume that driving electric is an inferior experience. They are looking for an excuse to avoid a car that they think they don’t want. Take them for a ride first; the conversation is much easier once they are trying to figure out how to make it work, rather than arguing about why it can’t work.

## Action Items

### Getting past range anxiety and buying a plug-in vehicle?

- Take them for a ride. It is easier to convince them when they want one
- Point out that anybody can electrify most of their driving, but still use gas for long trips by buying a PHEV or having a hybrid garage. They never have to look for a charging station or wait for a charge

### What can BEV owners do to avoid range anxiety and communicate confidence to others?

- Always have a charging point planned within 2/3 of EPA range
- Always charge to 150% of your next destination
- Learn factors that affect range

### What can automakers do to reduce range anxiety in their BEV customers?

- Offer a range gauge that takes external factors in to account and gives real range
- Failing that, don’t display range! Sure newbies will be scared – but they will be cautious
- If you insist on displaying a non-predictive range – offer a “safe range” mode What can the press do?
- Don’t focus on BEV road trips, which are the least-likely way for the car to be used. Focus on how fun, convenient and inexpensive they are for the majority of driving; and how it is not necessary to make every future trip on electricity if you buy one
- Stop mentioning range anxiety in every article about plug-ins. It is not news; nor is it an immutable property of the vehicles – especially not the PHEVs!