

Chapter 4:

Efficiency Planner and EV Towing Tips



When planning a trip, towing or not, it can be beneficial to calculate the amount of consumption you need in order to make it to your destination. Miles per kilowatt (mi/kWh) can be the easiest way to gauge your energy usage and help you determine how much you need to charge while on a road trip. Here's how to calculate it.

What size battery pack do you have in your EV?	kWh
What are the usable kWh in your battery pack?*	Usable kWh

You can find this information in your owner's manual or with a Google search.

***We recommend doing calculations with the USABLE kWh instead of the battery pack size to get a more accurate calculation.**

Determining consumption (mi/kWh)
$\text{Usable kWh} \times \text{Battery Percentage} = \text{kWh Available}$ <p><i>Example: 125 kWh \times 90% = 113 kWh available</i></p>
$\text{Miles to Travel} \div \text{Available kWh} = \text{mi/kWh Needed}$ <p><i>Example: 120 miles \div 113 available kWh = 1.06 mi/kWh needed to reach your destination</i></p>

Determining the charge you need
$\text{Miles to Destination} \div \text{Expected mi/kWh} = \text{Total kWh Needed}$ <p><i>Example: 120 miles \div 1.06 mi/kWh consumption = 113 kWh needed</i></p>
$\text{Total kWh Needed} \div \text{Usable kWh} = \% \text{ Needed}$ <p><i>Example: 113 kWh \div 125 kWh = 90% charge needed</i></p>

mi/kWh expected will be determined by your specific car. Look at previous trips to determine your mi/kWh. When towing, this number is typically cut in half. To be safe, calculate a 60 percent loss in range when towing.

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How can you make sure you get the consumption you need?

Plan for conditions and the ability of your vehicle. Elevation changes, wind, and temperatures can decrease consumption. If conditions aren't favorable, plan on driving slower or charging more often if chargers are available. Use A Better Routeplanner if you're unsure what effect conditions will have on your car.

What should you do if you're not getting the consumption you need?

- Slow down. Speed plays a big factor in consumption.
- Check your head winds. If there's a big head wind you'll need to adjust speed.
- Locate extra chargers.
- Check tire pressure.
- Don't panic. All you need to do is slow down until you can get to a charger.

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| Picking an RV for your EV

Always leave a buffer. Charge longer or aim for a consumption slightly higher than what's needed to keep some extra energy for the unknown.

Determine the most important factors to you:

- Extending your range as much as possible
- Comfort at your destination, but less range
- Ease of use at charging stops

For getting the most range

- Aerodynamics are the most important—pick something built for efficiency, such as an Airstream or pop-up trailer.
- Shorter is better, in length and height. Any added height or length is going to decrease aerodynamics, and therefore decrease your driving range.
- Lighter weight trailers are more efficient, but weight isn't as important as aerodynamics as long as you're within the rated weight range of your vehicle.
- A single-axle trailer has less road resistance and therefore better efficiency.

For comfort at your destination

- Keep your trailer within the towing, payload, and tongue weight capacity of your vehicle.
- If you don't have long distances to travel, or don't mind charging more often, your vehicle can tow any trailer within its towing capacities.
- Remember that you'll need to charge your car and have your trailer plugged in at campsites. An option with solar panels or a large battery bank can be beneficial so you can allow your car to charge on 50-amp service more often.

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For ease of use at charging stops

- Look for a trailer without slide-outs or pop-ups so you can easily access all areas at charging stops without having to open slides, etc.
- Find a trailer with solar power or a large battery bank so you can use all of your trailer's features while at a charger.
- Smaller may be better so you don't have to unhitch as often while charging. The larger the trailer, the more likely it is that you'll need to unhitch.

Other considerations

- Inevitably you'll have to unhitch at a charger, so find a hitch that's easy to hitch up and unhook.
- A power tongue jack is also recommended for ease of use at charging stops.
- Use a hitch lock to secure your trailer when you have to unhook at charging stops.

