Power and Energy Calculator tool

This tool is designed to help electric vehicle (EV) owners and multi-unit dwelling (MUD) property management calculate, decide and plan for EV charging infrastructure. The numbers in these calculations should not be considered definitive, but rather as planning estimates.

Most EV charging happens at home garages overnight because that is the most affordable and convenient way to power your driving. This quick calculation provides an idea of the power consumption, charging needs and energy costs.

		Your numbers	Example
1	Vehicle make and model		Tesla Model 3 (SR+)
2	Charger size (in car, contact dealer for this info if needed)	kW	11.5 kW
3	Electricity consumption (www.fueleconomy.gov)	kW/mile	0.24 kWh/mile
4	Driving range on electricity (www.fueleconomy.gov)	miles	250 miles
5	Average daily driving	miles	35 miles
6	Choose the smaller of 4 or 5	miles	35 miles
7	Average daily energy consumption: (=Row 3 x Row 6).	kWh	35 x 0.24 = **8.4 kWh**
8	Charging time using 6.6kW 240 V Level 2 station (=Row 7 / 6.6)	hours	8.4/6.6 = 1.3 hours
9	Charging time using 3.3kW 240 V Level 2 station if the power is shared between two cars (=Row 7 / 3.3)	hours	8.4/3.3 = 2.6 hours
10	How long the car is parked during the night	hours	11 hours
11	How much it costs if we assume $0.12/kWh (Row 7 x 0.12)	$	8.4 x 0.12 = $1.00

If the vehicle owner can sign up for an EV rate that provides lower electricity price during off-peak hours the energy cost can be much lower.

There is some seasonal variation to these numbers in cold climates. In the summer the power consumption will be somewhat lower and in the winter, it will be a bit higher. Variation can be expected to be +/- 20%.

Running a dedicated power circuit to each parking spot for charging in multi-unit dwellings requires very high-power capacity and sizable service from the electric utility. Usually this is cost prohibitive, so instead the power is shared between two to four parking spots. This can be done either by staggering the charging times between the charging stations or by sharing power so that each charging station gets lower power when multiple cars are connected to the same circuit.

It is also important to make sure that majority of charging doesn't happen during the peak hours: late afternoon and early evening. If everyone starts charging their cars right after they get home from work, that would add a high-power peak to the building load profile and trigger expensive demand charges. To mitigate this, EV owners should use charging timers in their cars to start their charging during the off-peak hours late in the evening and during the night. Utilities can provide rate structures to incentivize this behavior.

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