

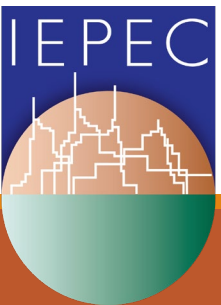
An M&V Strategy for Evaluating Level 2 Electric Vehicle Chargers (EVCs)

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Background

- When it comes to energy efficiency, Level 2 EVCs are more energy efficient than Level 1 EVCs
- Level 2 EVCs are anywhere from 2.3% to 12.8% more efficient, depending on charge duration, ambient temperature, and the model of EVC itself
- Current research suggest the most efficiency gains come from quicker charges where ambient temperature is less than 53°F or more than 70°F

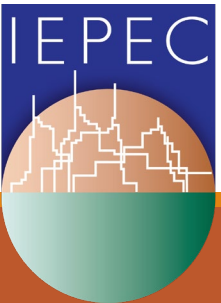
Level 1 EVC	Level 2 EVC
Uses 120V AC Connection	Uses 208-240 V AC Connection
Often plugged into a standard wall outlet	Typically requires special installation
Charge Slower	Charge Faster
Often free with the purchase of an electric vehicle	On average cost \$350



Methodology

$$EVC \text{ kWh savings} = VMT * KPM * \left(\frac{1}{EER_{base}} - \frac{1}{EER_{efficient}} \right) + ESG$$

- **VMT** is the average annual vehicle miles traveled per year for the given program population
- **KPM** is the average KPM (kWh/100 miles) of electric vehicles currently on the market
- **EER_{base}** is the energy efficiency rating of the base technology (Level 1 EVC)
- **$EER_{efficient}$** is the energy efficiency rating of the efficient technology (Level 2 EVC)
- **ESG** is the efficiency gain of an ENERGY STAR certified Level 2 EVC

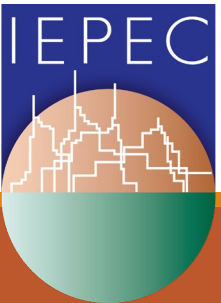


Free Ridership

- Each program year, surveys are sent to all program participants. The responses are used to determine each participant's free ridership
- All customers that say they couldn't purchase a Level 2 EVC without the rebate are given a FR score of 0. For the rest, the calculation below is applied...

$$FR = \frac{\text{Plans Score} + \text{Behavior without Discount Score}}{2} \times \text{Timing Score}$$

- **Plans Score** is 1 if respondents did have plans to install a level 2 EVC before learning about the program, 0 otherwise
- **Behavior without Discount Score** is a number from 0 to 1, with 1 being the most likely to purchase a Level 2 EVC in the absence of the program
- **Timing Score** is 0.5 if customers had plans to install a Level 2 EVC within 6 months, 0.25 if within 12 months, and 0 otherwise



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