



Measuring and Reporting Electricity Use in Electric Vehicles

Federal agencies are responsible for the accurate measurement and reporting of electricity used in electric vehicles (EVs). The U.S. Department of Energy's Federal Energy Management Program (FEMP) offers four best practices for measuring EV electricity use at agency facilities and off-site locations.

1 Meter at On-Site EV Charging Station

Independent metering is considered a best practice for measuring EV electricity use at federal facilities.

Generally, one best practice for measuring EV electricity consumption (in kilowatt-hours) is to meter independently (similar to measuring fuel transactions for conventional vehicles). This can be done using electric vehicle supply equipment (EVSE)—also referred to as EV charging infrastructure—with built-in data management or metering capability. Access for charging at these EVSE typically requires authorization using a key (such as an RFID) or credit card; electricity use data is normally captured for each EV charging transaction. In some cases, the added cost of EV charging station data management capabilities may be unreasonable and other EV electricity measurement methods may be used.

2 Use Vehicle Telematics Data

EVs with telematics installed provide simple and accurate tracking and reporting of electricity use.

When available and appropriate, vehicle telematics provide another best practice for measuring EV electricity consumption. Some vehicles have telematics installed and complementary data services that are capable of tracking vehicle electricity consumption (in kilowatt-hours). Telematics can account for each kilowatt-hour used to charge each vehicle. Charging sessions for a vehicle may be recorded, including the EVSE location, charging time, and the beginning and ending state of charge (SOC). This provides simple and accurate tracking and reporting of the total electricity consumption of EVs with telematics installed.

3 Estimate Using FEMP M&V Standards

When EV transaction data is not available, use protocols established through FEMP's M&V standards to estimate EV electricity use.

If EVSE does not exist at a particular facility or there is no separate metering capability, electricity consumption may be monitored using methods and procedures consistent with FEMP's energy measurement and verification (M&V) guidelines. This includes use of vehicle mileage in conjunction with a calibrated vendor-provided vehicle efficiency factor to calculate consumption. For example, the 2020 Nissan Leaf base model, a battery electric vehicle available from GSA, has a vehicle efficiency factor (provided by EPA) of 30 kilowatt-hours per 100 miles (see [fueleconomy.gov](https://www.fueleconomy.gov)). Therefore, the estimated electricity consumed during an annual use of 12,000 miles would be 3,600 kilowatt-hours. Some EVs also store electricity consumption data in their on-board computers.

4 Collect Transaction Receipts at Off-Site EV Charging Station

Fleet card data systems may capture electricity use for EVs using fleet cards at off-site charging stations.

Since the EV charging industry is in its infancy, it is unclear what data may be captured on payments for electricity use at commercial or public charging stations. Some public charging stations may report the kilowatt-hours used on the transaction receipt. In these cases, the transaction data will be sufficient to measure the electricity used to charge EVs. When EVs use charging stations off-site that do not report electricity consumption on transaction receipts, electricity consumption may be monitored using methods and procedures consistent with FEMP's energy M&V guidelines in Section 3.