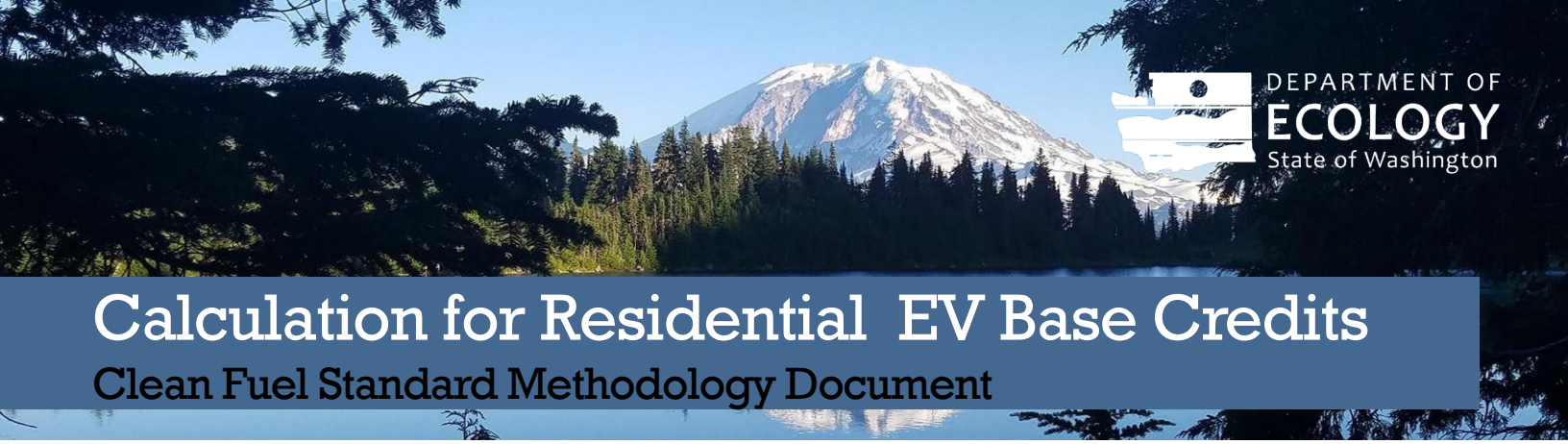

Calculation for Residential EV Base Credits

Clean Fuel Standard Methodology Document

Background

Under WAC 173-424-220(11), electric utilities are eligible to generate CFS credits for residential electric vehicle charging. Credits generated for supplying electricity with a utility specific carbon intensity for residential plug-in electric vehicle (PEV) charging are referred to as base credits.

Each utility must notify Ecology by October 1st of the current year whether it will generate base credits for the upcoming year. If the utility does not register or designate an aggregator, then the backstop aggregator is eligible to claim any base credits that the utility could have generated. If the backstop aggregator does not register, then the electric vehicle manufacturer is eligible to claim the base credits associated with vehicles that the backstop aggregator could have generated credits for.

Non-metered base credits are calculated and issued twice per year pursuant to WAC 173-424-540(3).

Under WAC 173-424-420(7), all electric utilities that receive credits must annually report on total revenue from CFS Credits along with a description of spending as directed by RCW 70A.535.080. Ecology is developing guidance that will be posted on the CFS guidance document library.

a. Base Credit Formula

$$\text{Credits}^{\text{gasoline}}_{\text{electricity}} = \left(\text{CI}^{\text{gasoline}}_{\text{Standard}} - \text{CI}^{\text{electricity}}_{\text{adjusted}}\right) \times \text{E}^{\text{gasoline}}_{\text{displaced}} \times \text{C}$$

Where:

$Credits^{gasoline}_{electricity}$ is the number of CFS credits generated, in metric tons, by electricity for PEV charging as compared to the gasoline standard;

$CI^{gasoline}_{Standard}$ is the gasoline standard (in gCO_2e/MJ) for the year as described in Table 1 of the CFS rule[1];

$$CI^{electricity}_{adjusted} = \frac{CI_{utility}}{EER^{utility}}$$

Where:

$CI_{utility}$ is the utility-specific electricity carbon intensity which is calculated annually under WAC 173-424-630 and posted on Ecology's website[2];

$$EER^{utility} = \frac{\sum EER^{PEV} \times E_{kWh}}{\sum E_{kWh}}$$

Where:

E_{kWh} is the estimated amount of electricity consumption, in kWh, for EV charging the PEVs in each utility service area according to the methods described under heading b below;

[1] https://app.leg.wa.gov/WAC/default.aspx?cite=173-424-900
[2] https://apps.ecology.wa.gov/publications/SummaryPages/2302040.html

$$EER^{PEV} = \frac{MPGe^{PEV}}{MPG^{LDV}}$$

Where:

$MPGe^{PEV}$ is the average miles per gallon equivalent of PEVs in a given utility service territory based on combined city and highway MPGe by PEV type as published by the U.S. Department of Energy[3];

MPG^{LDV} is the 2022[4] national average miles traveled per gallon of fuel consumed by light duty vehicles as published by the U.S. Department of Transportation Federal Highway Administration[5];

$$E_{displaced}^{gasoline} = E_{kWh} \times 3.6 \times EER^{utility}$$

Where:

$E_{displaced}^{gasoline}$ is the EER-adjusted energy for PEVs in displacing gasoline vehicles;

E_{kWh} is the estimated amount of electricity consumption, in kWh, for EV charging the PEVs in each utility service area according to the methods described under heading b below;

3.6 is the conversion factor (from kWh to MJ) specified in Table 3 of the CFS rule[6];

$EER^{utility}$ is the weighted average EER of all PEVs in each utility service area as described above.

C is a factor used to convert credits to units of metric tons from gCO_2e and has the value of: $C = 1.0 \times 10^{-6} \frac{(MT)}{gCO_2e}$

b. Estimating the Average Energy Consumption Used for Charging PEV

The electric energy consumed in each utility service area, E_{kWh}, is estimated as the sum of electric energy consumed by each PEV in the utility service area in a month. The electricity used by PEVs in a given utility service territory during a reporting period is estimated using the average kWh per 100 miles of each PEV in a utility service territory and the latest average miles traveled per vehicle (VMT) as published by the U.S. Department of Transportation Federal Highway Administration.

The combined (city and highway) average kWh per 100 miles of each EV type is published by the U.S. Department of Energy[7]. The average kWh per 100 miles of PEV models within a utility service territory will be calculated by Ecology based on the list of vehicle model information that the Washington Department of Licensing publishes every month.

The following formula is used to estimate the electric energy consumed by each PEV in a utility service area:

$$E_{kWh} = \sum \frac{kWh_{100} \times T_{month}^{days} \times VMT_a}{365 \times 100}$$

[3] https://www.fueleconomy.gov/feg/epadata/vehicles.csv
[4] 2021 is the most recent available data. This value will be updated each year with the most up to date value.
[5] https://www.fhwa.dot.gov/policyinformation/statistics/2022/vm1.cfm
[6] https://app.leg.wa.gov/WAC/default.aspx?cite=173-424-900
[7] https://www.fueleconomy.gov/feg/ws/index.shtml#ft2

Where:

E_{kWh} is the total amount of electricity consumption, in kWh, for charging the PEVs registered in each utility service area.

kWh_{100} is the average electric energy, in kWh, consumed by a vehicle type to travel 100 miles, as published by the US Department of Energy.[8]

$T^{days}_{reporting\ period}$ is the total number of days during the calculation period that the vehicle had an active registration. This is determined as the product of the number of months each vehicle had an active registration and the number of days in each month.

VMT_a is the average annual miles traveled by a vehicle. In 2022, the average annual VMT is 10,917 as published by the U.S. Department of Transportation Federal Highway Administration[9].

This calculation will be performed every 6 months based on vehicle registration data received from the DOL

c. Determining the Number of PEVs in Each Utility Service Territory

CFS Staff have worked with electric utilities to create a map of utility service territories. The map maintained by CFS staff defaults to a map of utility service territories previously published by the Washington Utilities and Transportation Commission boundaries in any areas of the state where Utilities have not been able to submit updated data on their service territories.

This map will be continually maintained and updated as more utilities provide improved data. Utilities may resubmit or update these boundaries on an ongoing basis. This map will be posted on the Ecology GIS Portal. Utilities who wish to provide updated data should reach out to WFRSAdmin@ecy.wa.gov.

PEVs are registered with the Washington Department of Licensing (DOL). CFS Staff work with DOL to securely match registration address information with the map of electric utility service territory boundaries. This data also allows CFS Staff to determine the length of time each EV is registered at each address in order to determine the total number days each quarter a PEV is active in each utility service territory.

In the event that a PEV is located within multiple utility service territories, based on the map, the number of active days in the crediting period will be calculated first, and then divided evenly between the overlapping utilities.

d. Removal of non-residential electricity consumption

The calculated electric energy consumed by PEVs in (b) estimates the total energy consumed by the vehicles based on the energy efficiency of the vehicle and the average annual vehicle miles travelled. However, these vehicles may not get their charging energy at their residences. Sometimes these vehicles are charged at non-residential chargers, such as offices or public charging stations.

Owners of non-residential chargers are eligible to register equipment and report electricity consumption each quarter. In order to avoid double counting, the non-residential charging already credited under the CFS program needs to be removed from the total estimated electricity consumption for each EV. The remaining electricity is assumed be residential charging.

$$Electricity^{EV}_{Non-metered} = E_{kWh} \times Electricity^{Ratio}_{Residential}$$

[8] https://www.fueleconomy.gov/feg/epadata/vehicles.csv
[9] https://www.fhwa.dot.gov/policyinformation/statistics/2022/pdf/vm1.pdf

Where:

$Electricity_{Non-metered}^{EV}$ is the total estimated electricity use in kWh for non-metered residential PEVs assigned to the electric utility for the reporting period;

E_{kWh} is the total amount of electricity consumption, in kWh, for charging the PEVs that are registered in each utility service area.

$Electricity_{Residential}^{Ratio}$ is determined by comparing the total estimated electricity consumed by residential EVs to the total electricity consumption reported for non-residential chargers registered in the CFS program.

Example: In Q1, 2023 this methodology was used to estimate 109,691,800 kWh consumed by EVs statewide. The total reported electricity dispensed by non-residential chargers was 12,794,870 kWh or 12% of total electricity consumption. The 88% of electricity not used in non-residential charging will be eligible for residential credits.

The proposed method for accounting for non-residential charging is to remove the average percentage of non-residential charging from each energy consumption estimation for utility service territory, i.e. for Q2, 2023 87% of the total electricity calculated for each EV service territory will be eligible for CFS credits. This value will be updated based on the total electricity reported for non-residential charging each quarter, and incorporated into the calculation of residential base EV charging credits that Ecology will make twice a year.

ADA Accessibility

To request an ADA accommodation, contact Ecology by phone at 360-407-6831 or email at ecyADAcoordinator@ecy.way.gov, or visit https://ecology.wa.gov/accessibility. For Relay Service or TTY call 711 or 877-833-634