

# Electric Vehicle Charging Station Economics Calculator Manual

## Results Dashboard

This upper left box reports high-level operating costs and income of the charging station. It reports the following outputs:

- **Electrical Cost:** The cost incurred by the station from the electric utility based on charging power level and consumption.
- **Fixed Cost:** Costs of owning and operating the station that are not proportional to net electrical consumption, such as maintenance costs, insurance, and payback on capital investment.
- **Income:** The revenue generated by payments from charging station customers.
- **Net Profit:** The difference between all costs and station income.

The middle box reports the estimated number of charging sessions completed daily. It also shows the dollars per mile and dollars per gallon equivalent paid to the charging station operator.

## User Inputs

The lowest box provides tabs where users can change inputs that impact electric vehicle charging station economics.

### CHARGER TAB

**Charging Sessions / Day:** The number of estimated daily charging sessions at the station.

**Station Power Level (kW):** The electrical power or wattage of charging the station provides to electric vehicles. The station power level significantly impacts the utility demand charge incurred by the station. The default is 150 kilowatts (kW), a typical power level for direct current fast chargers. The average power level for Level 2 stations is 7 kW.

**kWh / Session:** The total amount of energy or battery charge delivered to each vehicle on average for each charging session. The kilowatt-hours (kWh) per session impacts the total costs of electricity consumed by the station.

### ELECTRICAL COSTS TAB

This tab allows the user to modify electricity rates, including energy charges, demand charges, and fixed charges.

**Summer kWh Rate:** The rate charged for electric consumption (\$/kWh) during the summer.

**Summer kW Rate:** The summer rate is the demand charge based on the highest electric load at the charging station (\$/kW) during the summer months. Total costs for demand charges are calculated using the Station Power Level (kW) input on the Charger tab.

**Summer Months:** The number of months each year that fall under the electric utility's summer rates.

**Winter kWh Rate:** The rate charged for electric consumption (\$/kWh) during the winter.

**Winter kW Rate:** The winter rate is the demand charge based on the highest electric load at the charging station (\$/kW) during winter months. Total costs for demand charges are calculated using the Station Power Level (kW) input on the Charger tab.

**Winter Months:** The number of months each year that fall under the electric utility's winter rates.

**Fixed Charges:** The monthly fixed amount charged by the electric utility.

## FIXED COSTS

**Maintenance:** Estimated annual maintenance costs for electrical, mechanical, electronic, and custodial maintenance of the charging station location and equipment.

**Insurance:** Annual cost of insurance on charging station equipment and facilities.

**Connectivity:** Annual cost of communication services such as cellular, radio, satellite, or internet data reporting, transaction accounts, and payment services.

**Capital Cost:** The original capital investment in the station now being paid off through financing. The capital cost is used along with the interest rate and years of payment to determine an annual amortized cost.

**Interest Rate:** The interest rate paid on capital financing.

**Years:** The financing term over which the principal on station capital investment is paid off.

**Amortized:** The annual payments made based on initial capital cost, interest rate, and loan term years. Adjusting this input will change the capital cost.

## INCOME

This section of inputs determines the structure of payment and prices seen by charging station customers, thus determining the income generated by station use.

The user selects whether charging customers will provide payment on a per-minute or per-kWh basis. Clicking on one option will turn off the other option.

**Connection Fee:** A per-session fee the customer pays regardless of the session's total energy or duration.

**Per-Min Charge:** The per-minute cost charged to the station customer throughout their charging session period (\$/minute). If this mode is selected, then the per-kWh charge mode is disabled.

**Connection Length:** The total time in minutes that the customer will be charged during a session.

**Customer Per-kWh Charge:** The per-kilowatt-hour cost charged to the station customer for electricity consumed during their charging session. If this mode is selected, then the per-minute charge mode is disabled.

**Sales Per Visit:** Users can estimate secondary benefit revenue provided at the location of the charging station, such as additional sales at a gas station, convenience store, or restaurant.

## Results Graphs

The box in the upper right provides a series of graphs showing the results from the calculator inputs.

**Income and Costs:** Positive income (in green) compared to electrical costs (red) and fixed cost (light red) calculated over the potential number of charges per day. This graph allows the user to see the results of increased station use as greater adoption of electric vehicles occurs, from 1 charge per day to 10 charges per day. Station operators may receive less optimal economics and revenue in the early years of station operation. However, they can structure customer fees to achieve improved revenue and profit with higher station utilization.

**Cost Components:** This bar chart breaks down expected station costs by utility demand charge, electrical utility charges (energy charge), and station fixed costs. This graph allows the user to identify and assess the significant drivers of station costs to break even and profit with time and higher station utilization.

**Rates:** This chart illustrates a break-even line based on utility demand charges and electric rates. The blue dot represents the station's operating point based on costs and revenue. If the blue dot is below or to the left of the black line, the station will likely break even and generate net-positive revenue. If the dot is above or to the right of the line, the combination of station fixed costs, revenue, utility demand charges, and energy charges may prevent the station from breaking even and achieving net-positive revenue.