E-11. Procure Electricity from Lower Carbon Intensity Power Supply

GHG Mitigation Potential

Up to 100% of GHG emissions from electricity use

Co-Benefits (icon key on pg. 34)

Climate Resilience

Procuring electricity from lower carbon intensity power supplies can reduce sensitivity to fuel price shocks or scarcity.

Health and Equity Considerations

Reducing demand for electricity from fossil-fuel sources will help to improve air quality at electrical plants currently using fossil fuels.

Measure Description

This measure will commit the project to procuring electricity with a lower carbon intensity than the primary product offered by the local provider (often an investor-owned utility). This would displace the electricity demand that would ordinarily be supplied by the local electricity provider's energy mix. Electricity provided by local electricity providers have varying carbon intensities based on the portfolio of energy sources. Procurement of electricity of a lower carbon intensity would displace the emissions that would have been produced had the electricity been supplied by the default energy mix and thus results in a reduction in GHG emissions. Green power supply options include utility green power products, community choice aggregation, shared renewables (e.g., community solar), and power purchase agreements.

Subsector

Renewable Energy Generation

Scale of Application

Project/Site and Plan/Community

Implementation Requirements

Purchase electricity from a green power supplier, including utility green power products, community choice aggregation, shared renewables (e.g., community solar), and power purchase agreements.

Cost Considerations

The least carbon-intensive fuels are renewable fuels; however, even switching from high carbon-intensity fossil fuels, like coal and petroleum, to lower intensity fossil fuels, like natural gas, represents a cost savings. The costs associated with building renewable energy generating capacity up to a utility scale are high and require constructing large-scale renewable energy plants and power storage facilities. However, the cost of building new carbon intensive power generation plants is similar, if not higher. Renewable energy plants can usually be completed more quickly than a fossil-fueled energy plant, saving construction costs. Renewable energy facilities may also have a significant operational cost savings, as many, like solar and wind, do not require fuel inputs.

Expanded Mitigation Options

Procure electricity from a zero-carbon power supply to eliminate all emissions from building electricity.

GHG Reduction Formula

$$A = \frac{B}{C} - 1$$

GHG Calculation Variables

ID	Variable	Value	Unit	Source
Output				
A	Percent reduction in GHG emissions from electricity	0–100	%	calculated
User Inputs				
B	Average carbon intensity of power supply with green power	[ ]	lb CO_2e per MWh	user input
Constants, Assumptions, and Available Defaults				
C	Carbon intensity of local electricity provider without measure	Tables E-4.3 and E-4.4	lb CO_2e per MWh	CA Utilities 2021

Further explanation of key variables:

- (B) – The carbon intensity of the green power supply may be available online directly from the power provider and/or indirectly from the relevant state agencies (e.g., CEC, CARB). If publicly unavailable, the user should request this information from the power provider for the year(s) of interest.
- (C) – GHG intensity factors for major California electricity providers are provided in Tables E-4.3 and E-4.4 in Appendix C. If the project study area is not serviced by a listed electricity provider, or the user is able to provide a project-specific value (i.e., for the future year not referenced in Tables E-4.3 and E-4.4), the user should use that specific value in the GHG calculation formula. If the electricity provider is not known, users may elect to use the statewide grid average carbon intensity.

GHG Calculation Caps or Maximums

It is assumed that the electricity demand of the user's project is currently being met by grid energy that requires some amount of fossil fuel-based energy generation, which emits GHGs from fuel combustion. In other words, the local electricity provider has an energy intensity factor (lb of CO_2e per kilowatt-hour) greater than zero. For projects that are served by electricity providers already with a renewable portfolio standard of 100 percent, this measure would effectively have no reduction on GHG emissions.

Example GHG Reduction Quantification

The user displaces indirect emissions from electricity by committing the project to procuring power with a lower carbon intensity than the primary local provider. In this example, the green power supply has a carbon intensity of zero (B) because 100 percent of the electricity is from zero-emission energy sources. The project is in the SMUD service territory and

would be operational in 2030. The electricity provider's carbon intensity factor is 224 lb CO_2e per MWh (C). The user would reduce GHG emissions from electricity by 100 percent.

$$A = \frac{0 \ \frac{\text{lb } CO_2e}{\text{MWh}}}{224 \ \frac{\text{lb } CO_2e}{\text{MWh}}} - 1 = -100\%$$

Quantified Co-Benefits

Successful implementation of this measure would reduce grid electricity, and a portion of this electricity is supplied by statewide fossil-fueled power plants, which generates criteria pollutants. However, because these power plants are located throughout the state, the reduction in electricity use from this measure will not reduce localized criteria pollutant emissions and are, therefore, not discussed.

Sources

- California Utilities. 2021. Excel database of GHG emission factors for delivered electricity, provided to the Sacramento Metropolitan Air Quality Management District and ICF. January through March 2021.