

W-7. Adopt a Water Conservation Strategy



GHG Mitigation Potential



Variable reduction in GHG emissions from water use

Co-Benefits (icon key on pg. 34)



Climate Resilience

Conserving water reduces the strain on water resources, which is expected to increase under climate change.

Health and Equity Considerations

Ensure strategy includes enough water for outdoor use to maintain and enhance urban tree canopy as much as possible. Water conservation can also help to lower utility costs for project residents.

Measure Description

This measure will establish a water conservation strategy to achieve a reduction in water consumption. The water reduction performance standard is flexible to the users' needs, and in this measure is set as a percent reduction in water consumption relative to a reference condition (e.g., existing conditions, historic year).

Scale of Application

Project/Site and Plan/Community

Implementation Requirements

The strategy should clearly identify the actions that will be undertaken to achieve the performance standard. These actions could include any of the measures presented in this Handbook (Measures W-1 through W-6) or others developed by the user; for example, low-impact development practices to enhance onsite water infiltration and improve stormwater management.

Cost Considerations

A water conservation strategy is a low-cost way to encourage using less water and energy, which in turns saves money. Costs from developing and implementing the strategy are primarily related to staff time and document production. Costs and savings achieved by actions undertaken because of the strategy would vary depending on the action.

Expanded Mitigation Options

Non-applicable





GHG Reduction Formula

$$A = (B \times C) \times D \times E \times F \times G$$

GHG Calculation Variables

ID	Variable	Value	Unit	Source
Output				
A	GHG reduction from strategy	[]	MT CO ₂ e	calculated
User Inputs				
B	Water consumption for the reference year	[]	AF	user input
C	Performance standard for conservation strategy	[]	%	user input
Constants, Assumptions, and Available Defaults				
D	Electricity required for municipally provided water	Table W-1.1	kWh per AF	CPUC 2016
E	Conversion from kWh to MWh	0.001	MWh per kWh	conversion
F	Carbon intensity of local electricity provider	Tables E-4.3 and E-4.4	lb CO ₂ e per MWh	CA Utilities 2021
G	Conversion from lb to MT	0.000454	MT per lb	conversion

Further explanation of key variables:

- (B) – Water consumption for the project or community for the reference year must be defined by the user.
- (C) – The percent reduction in water consumption relative to the reference condition.
- (D) – The water energy-intensity factors are derived from the most recent version of the CPUC Water Energy Calculator and are provided in Table W-1.1 in Appendix C (CPUC 2016). The energy intensity factors rely on region-wide average values for DWR's 10 hydrologic regions.
- (F) – GHG intensity factors for major utilities in California are provided in Tables E-4.3 and E-4.4 in Appendix C. If the project study area is not serviced by the listed electricity provider, or the user is able to provide a project-specific value, the user should replace these defaults in the electricity consumption GHG calculation formula.

GHG Calculation Caps or Maximums

None.



Example GHG Reduction Quantification

The user reduces GHG emissions by adopting and implementing a water conservation strategy. In this example, the performance standard for the strategy is a 10 percent reduction in existing (2020) water consumption by 2030. Existing water consumption is 1,000 AF, and the project is in the Sacramento River hydrologic region (D) and SMUD service territory. The carbon intensity of electricity is, therefore, 224 lb CO_{2e} per MWh (F).

$$A = \left(1,000 \frac{\text{AF}}{\text{yr}} \times 10\% \right) \times 207 \frac{\text{kWh}}{\text{AF}} \times 0.001 \frac{\text{MWh}}{\text{kWh}} \times 224 \frac{\text{lb CO}_2\text{e}}{\text{MWh}} \times 0.000454 \frac{\text{MT}}{\text{lb}} = 2.11 \frac{\text{MT CO}_2\text{e}}{\text{yr}}$$

Quantified Co-Benefits

The co-benefits that are quantifiable (energy and fuel savings, water conservation) are calculated as part of the GHG reduction formula. The abbreviated formulas are also shown below.



Energy and Fuel Savings Formula

$$\frac{\text{MWh}}{\text{year}} = (\text{B} \times \text{C}) \times \text{D} \times \text{E}$$



Water Conservation Formula

$$\frac{\text{AF}}{\text{year}} = \text{B} \times \text{C}$$

Sources

- California Public Utilities Commission (CPUC). 2016. Water-Energy Calculator–Draft Version 1.05. https://www.cpuc.ca.gov/nexus_calculator/. Accessed: January 2021.
- 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.