California Department of Water Resources and California Air Resources Board

Greenhouse Gas Interim Quantification Methodology for the California Department of Water Resources Water-Energy Grant Program Greenhouse Gas Reduction Fund Fiscal Year 2013-14/2014-15

A.   Introduction

The Air Resources Board (ARB) is required to develop quantification methods for agencies receiving Greenhouse Gas Reduction Fund (GGRF) appropriations per SB 862 (Senate budget and Fiscal Review Committee, Chapter 36, statutes of 2014).

Administering agencies, receiving appropriations from the FY 2013-14 drought bill (SB 103 approved on March 1, 2014), developed interim quantification methodologies in consultation with ARB. The interim quantification methodology will also be used for appropriations from the FY 2014-15 drought bill (AB 91 approved on March 27, 2015). For FY 2015-16 and future years, ARB will continue to develop or update quantification methodologies for GGRF funded programs.

B.   Quantification Methodology

The Department of Water Resources (DWR) developed the Water-Energy Grant Program to provide financial incentives to implement residential, commercial, and institutional water efficiency projects that reduce GHG emissions and also reduce water and energy use.

DWR developed the attached interim quantification methodology for use in estimating proposed project GHG emission reductions for Water-Energy Program grants funded with FY 2013-14 GGRF monies. The interim quantification methodology is a calculator that is used to determine GHG reductions, energy savings, and water savings from projects that improve any segment of the water use cycle listed below:
- Supply and conveyance
- Water treatment and distribution
- Recycled water treatment and distribution
- Wastewater treatment and collection
- End use efficiency improvements

The calculator tool can be accessed here: http://www.water.ca.gov/waterenergygrant/docs/Attachment2_Worksheet.xlsx;

The DWR Water-Energy Grant calculator allows users to estimate water savings, energy savings, and GHG emission reductions from projects proposed in any segment of the water use cycle. The water-energy grant calculator provides fields for users to input project assumptions including pre and post project annual water consumption, useful life of project, percentage of imported water into the system, energy intensity of imported water, energy intensity of the system associated with the project's water savings, and the electricity emission rate. After the user inputs are entered, the calculator displays annual and lifetime project water savings, energy savings, and GHG emission reductions. For GHG emission reductions associated with electricity, the calculator allows the user to input the system emission rate of the electricity supplier if known, or utilizes the California specific EPA eGRID 2010 total output emission rate as the default rate. For GHG emission reductions associated with natural gas, the

calculator utilizes the Environmental Protection Agency (EPA) emission factor. The EPA GHG inventory emission factors for GHG inventories can be accessed here: http://www.epa.gov/climateleadership/documents/emission-factors.pdf

ARB reviewed the Water-Energy Grant Program interim quantification methodology for estimating water use cycle project GHG emission reductions. Based on the eligibility criteria for project funding, the project assumptions and results provided by the calculator appropriate for interim use.

C.   Next Steps

ARB will continue to evaluate and update the GHG emission reduction quantification methodologies as necessary for future FY appropriations for GGRF projects. Quantification methods are posted on ARB's auction proceeds webpage at: http://www.arb.ca.gov/cc/capandtrade/auctionproceeds/quantification.htm

Estimate of Water Savings, Energy Savings, and GHG Emissions Reduction

Project Name:
Total Project Cost:

Project Assumptions		
Step 1: Enter the baseline (pre-project) volume of water associated with the project		MG/year
Step 2: Enter the volume of water that will be delivered after the project is implemented.		MG/year
Step 3: Enter the volume of hot water saved from the project's electric water heating system (the summation of step 3 and step 4 must not exceed annual volume of water savings). If not applicable, enter "0".		MG/year
Step 4: Enter the volume of hot water saved from the project's natural gas water heating system (the summation of step 3 and step 4 must not exceed annual volume of water savings). If not applicable, enter "0".		MG/year
Step 5: Enter the useful life in years for the project		years
Step 6: Enter the percentage of water that is imported		
Step 7: Enter the Energy Intensity (EI) of the System associated with the project's water savings		kWh/MG
Step 8: Enter the total output emission rate specific to the power supplier or use the default value of 0.278		kg CO_2e/kWh
Step 9: Enter EI associated with the Supply and Conveyance segment of the imported water or enter "0" if imported water is not applicable		kWh/MG
Step 10: Enter any additional annual energy savings from energy efficiency and renewable energy (EE/RE), etc.		kWh/year

Note: on a separate sheet provide the basis for the estimates and information sources for factors entered

Note: values below are determined from the above Project Assumptions — Units

Water Savings		
1) Annual volume of water savings within System	0	MG/year
2) Annual volume of imported water savings	0	MG/year
3) Annual volume of hot water heating system savings	0	MG/year
4) Lifetime volume of water savings within System	0	MG
5) Lifetime volume of imported water savings	0	MG
6) Lifetime volume of hot water heating system savings	0	MG

Energy Savings		
1) Annual energy savings within System	0	kWh/year
2) Annual energy savings from imported water	0	kWh/year
3) Annual energy savings from electric hot water heating system	0	kWh/year
4) Annual energy savings from natural gas hot water heating system (used to calculate total energy saving)	0	kWh/year
5) Total annual energy savings from electric and natural gas hot water heating systems	0	kWh/year
6) Annual energy savings from natural gas hot water heating system (used to calculate GHG emmission)	0	therms/year
7) Lifetime energy savings within System	0	kWh
8) Lifetime energy savings from imported water	0	kWh
9) Lifetime energy savings from electric hot water heating system	0	kWh
10) Lifetime energy savings from natural gas hot water heating system	0	kWh
11) Total lifetime energy savings from electric and natural gas hot water heating systems	0	kWh
12) Lifetime energy savings from natural gas water heating system	0	therms
13) Additional lifetime energy savings from Energy Efficiency and Renewable Energy (EE/RE), etc.	0	kWh

GHG Emission Reductions		
1) Annual GHG emission reductions within System	0	kg CO_2e/year
2) Annual imported GHG emission reductions	0	kg CO_2e/year
3) Annual GHG emission reductions from electric hot water heating	0	kg CO_2e/year
4) Annual GHG emission reductions from natural gas hot water heating system	0	kg CO_2e/year
5) Total annual GHG reductions from electric and natural gas hot water heating system	0	kg CO_2e/year
6) Lifetime GHG emission reductions within System	0	kg CO_2e
7) Lifetime GHG emission reductions from imported water	0	kg CO_2e
8) Lifetime GHG emission reductions from electric heating system	0	kg CO_2e
9) Lifetime GHG emission reductions from natural gas water heating system	0	kg CO_2e
10) Total lifetime GHG emission reductions from electric and natural gas hot water heating systems	0	kg CO_2e
11) Additional annual GHG emission reductions from Energy Efficiency and Renewable Energy (EE/RE), etc.	0	kg CO_2e/year
12) Additional lifetime GHG emission reductions from Energy Efficiency and Renewable Energy (EE/RE), etc.	0	kg CO_2e

Project Summary		
Total annual water savings	0	MG/year
Total lifetime water savings	0	MG
Total annual energy savings	0	kWh/year
Total lifetime energy savings	0	kWh
Total annual GHG emission reductions	0	kg CO_2e/year
Total lifetime GHG emission reductions	0	kg CO_2e