

PUBLIC UTILITIES COMMISSION

505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3298



September 28, 2016

Advice Letter 5014-G

Ronald van der Leeden
Director, Regulatory Affairs
Southern California Gas
555 W. Fifth Street, GT14D6
Los Angeles, CA 90013-1011

**SUBJECT: SoCalGas Program Implementation Plan Filing for Water Energy Nexus
Advanced Meter Infrastructure (AMI) Pilot with California American
Water**

Dear Mr. van der Leeden:

Advice Letter 5014-G is effective as of September 16, 2016.

Sincerely,

A handwritten signature in cursive script that reads "Edward Randolph".

Edward Randolph
Director, Energy Division



Ronald van der Leeden
Director
Regulatory Affairs

555 W. Fifth Street, GT14D6
Los Angeles, CA 90013-1011
Tel: 213.244.2009
Fax: 213.244.4957
RvanderLeeden@semprautilities.com

August 17, 2016

Advice No. 5014
(U 904 G)

Public Utilities Commission of the State of California

Subject: SoCalGas Program Implementation Plan Filing for Water Energy Nexus Advanced Meter Infrastructure (AMI) Pilot with California American Water

Southern California Gas Company (SoCalGas) hereby submits for approval by the California Public Utilities Commission (Commission) the Program Implementation Plan (PIP) for SoCalGas' approved Water Energy Nexus AMI Pilot with California American Water (CalAm), as shown in Attachment A.

Purpose

In compliance with Decision (D.) 16-06-010 Ordering Paragraph (OP) 7, this filing provides, for review by Energy Division, the PIP for SoCalGas' approved Water Energy Nexus AMI Pilot.

Background

On June 9, 2016, the Commission issued D.16-06-010, which approved the Investor-Owned Utilities' (IOUs) AMI Pilot proposals to "test the impact of joint delivery of energy and water data to customers on energy and water savings behaviors."¹ Further, D.16-06-010 directed the IOUs to file and serve, by Tier 2 Advice Letter, PIPs for their approved pilots, and Energy Division to review the Advice Letters for consistency with standard energy efficiency review protocols.²

¹ D.16-06-010, p. 2.

² D.16-06-010, p.19.

SoCalGas' Water Energy Nexus AMI Pilot

D.16-06-010 authorized SoCalGas to implement a pilot by partnering with CalAm and Valor Water Analytics to gather data from water meters, transmit that data over SoCalGas' existing AMI network, and transport that data to the participating water agency. The pilot also includes an analytics component for: 1) the identification and evaluation of potential hot water leaks based on analysis of both gas and combined gas and water usage data; 2) joint water-gas analytics for hot water leak detection and quantification of water, embedded energy, and greenhouse gas (GHG) benefits associated with hot water leak detection and resolution; and 3) trend analytics to identify where water loss reduction has resulted in a change in gas consumption.

As required in D.16-06-010,³ the PIP herein contains details of the following for SoCalGas' Water Energy Nexus AMI Pilot with CalAm: 1) detailed schedules for implementation; 2) proposed budgets; 3) projected savings and cost-effectiveness using the Water Energy calculator as applicable; 4) marketing, education, and outreach guidelines; 5) data requirements; 6) measurement and evaluation plan; 7) control group size; and 8) the Pilot criteria set forth in the Energy Efficiency Manual v.5.

Protests

Anyone may protest this Advice Letter to the Commission. The protest must state the grounds upon which it is based, including such items as financial and service impact, and should be submitted expeditiously. The protest must be made in writing and received within 20 days of this Advice Letter, which is September 6, 2016. There is no restriction on who may file a protest. The address for mailing or delivering a protest to the Commission is:

CPUC Energy Division
Attn: Tariff Unit
505 Van Ness Avenue
San Francisco, CA 94102

Copies of the protest should also be sent via e-mail to the Energy Division Tariff Unit (EDTariffUnit@cpuc.ca.gov). A copy of the protest should also be sent via both e-mail and facsimile to the address shown below on the same date it is mailed or delivered to the Commission.

³ D.16-06-010, p.27.

Attn: Sid Newsom
Tariff Manager – GT14D6
555 West Fifth Street
Los Angeles, CA 90013-1011
Facsimile No. (213) 244-4957
E-mail: snewsom@semprautilities.com

Attn: Elizabeth Baires
Regulatory Case Manager – GT14D6
555 West Fifth Street
Los Angeles, CA 90013-1011
Facsimile No. (213) 244-4957
E-mail: ebaires@semprautilities.com

Effective Date

This Advice Letter is subject to Commission staff disposition and is classified as Tier 2 (effective after staff approval) pursuant to General Order (GO) 96-B and D.16-06-010, OP 7. Therefore, SoCalGas respectfully requests that this Advice Letter become effective on September 16, 2016, which is 30 days from the date filed.

Notice

A copy of this Advice Letter is being sent to SoCalGas' GO 96-B service list and the Commission's service list in R.13-12-011. Address change requests to the GO 96-B should be directed by electronic mail to tariffs@socalgas.com or call 213-244-3387. For changes to all other service lists, please contact the Commission's Process Office at 415-703-2021 or by electronic mail at Process_Office@cpuc.ca.gov.

Ronald van der Leeden
Director - Regulatory Affairs

Attachments

CALIFORNIA PUBLIC UTILITIES COMMISSION

ADVICE LETTER FILING SUMMARY ENERGY UTILITY

MUST BE COMPLETED BY UTILITY (Attach additional pages as needed)

Company name/CPUC Utility No. **SOUTHERN CALIFORNIA GAS COMPANY (U 904G)**

Utility type:

ELC GAS
 PLC HEAT WATER

Contact Person: Sid Newsom

Phone #: (213) 244-2846

E-mail: SNewsom@semprautilities.com

EXPLANATION OF UTILITY TYPE

ELC = Electric GAS = Gas
PLC = Pipeline HEAT = Heat WATER = Water

(Date Filed/ Received Stamp by CPUC)

Advice Letter (AL) #: 5014

Subject of AL: SoCalGas Program Implementation Plan Filing for Water Energy Nexus Advanced Meter Infrastructure (AMI) Pilot with California American Water

Keywords (choose from CPUC listing): Energy Efficiency

AL filing type: Monthly Quarterly Annual One-Time Other _____

If AL filed in compliance with a Commission order, indicate relevant Decision/Resolution #:

D.16-06-010

Does AL replace a withdrawn or rejected AL? If so, identify the prior AL No

Summarize differences between the AL and the prior withdrawn or rejected AL¹: N/A

Does AL request confidential treatment? If so, provide explanation: No

Resolution Required? Yes No

Tier Designation: 1 2 3

Requested effective date: 9/16/16

No. of tariff sheets: 0

Estimated system annual revenue effect (%): N/A

Estimated system average rate effect (%): N/A

When rates are affected by AL, include attachment in AL showing average rate effects on customer classes (residential, small commercial, large C/I, agricultural, lighting).

Tariff schedules affected: N/A

Service affected and changes proposed¹: N/A

Pending advice letters that revise the same tariff sheets: N/A

Protests and all other correspondence regarding this AL are due no later than 20 days after the date of this filing, unless otherwise authorized by the Commission, and shall be sent to:

**CPUC, Energy Division
Attention: Tariff Unit
505 Van Ness Ave.,
San Francisco, CA 94102
mas@cpuc.ca.gov and jnj@cpuc.ca.gov**

**Southern California Gas Company
Attention: Sid Newsom
555 West 5th Street, GT14D6
Los Angeles, CA 90013-1011
SNewsom@semprautilities.com**

¹ Discuss in AL if more space is needed.

ATTACHMENT A

Advice No. 5014

**Program Implementation Plan (PIP) for SoCalGas' approved
Water Energy Nexus AMI Pilot with California American Water**

Program Implementation Plan Template

Program Overview Template¹

1) Program Name

SoCalGas Water Energy Nexus Shared Network AMI Pilot

2) Program Description (general)

This is a Commission approved pilot program for which Southern California Gas Company (SoCalGas) has partnered with California American Water (CalAm) and Valor Water Analytics. The Pilot will leverage the existing SoCalGas Advanced Meter Infrastructure (AMI) network to allow for the water utility meters to ‘piggyback’ on the SoCalGas AMI network and includes an analytics component for identification and evaluation of potential hot water leaks based on analysis of both gas and combined gas and water usage data. Valor Water Analytics will perform joint water-gas analytics for hot water leak detection, and quantification of water, embedded energy, and greenhouse gas (GHG) benefits associated with hot water leak detection and resolution. Valor will also conduct trend analytics, to identify where water loss reduction has resulted in a change in gas consumption. Analysis will be performed on AMI (treatment) vs. control; pre and post.

California American Water is looking forward to working with SoCalGas on this effort. California American goals are:

1. Successfully receive our customer’s water data using SoCalGas Data Collection Units (DCUs).
2. Test use of a different vendor (Aclara in this pilot) as our Head End (receiver of data from DCU’s) provider and to transmit data to our customer portal vendor.
3. Provide customers with a portal and mobile application they can use to monitor their water usage.
4. Gather and review results from Valor Water Analytics as a required part of the Water Energy Nexus.

3) Total Projected Program Budget and Savings

SoCalGas’ estimated costs incurred to conduct its pilot with CalAm using Valor Water Analytics as the collaborative analytics vendor is \$133,500. SoCalGas has

¹ This cover page “Program Overview Template” shall be completed consistently by all IOUs for statewide programs.

received approval for a budget of up to \$175,000 per water utility participant, with a not to exceed budget of \$300,000 across all water utility participants. CalAm submitted and received approval to establish a memorandum account in March 2016². The costs known at the start of the pilot are detailed in Section 11e. Projected savings are not applicable for this pilot, as this is new development and there is no basis for estimation of savings. SoCalGas will not be claiming any savings as part of this pilot.

4) Table 1: Total Projected Program Budget & Savings by Subprogram

Subprogram	SCG (\$)	Total (\$)	Kwh	KW	Therms
A – SoCalGas WEN AMI Pilot with CalAm	\$133,500	\$133,500	-	-	-
Total	\$133,500	\$133,500			

5) Table 2: Total Projected Program Savings by IOU

The pilot program is non-resource. No savings will be claimed.

Subprogram	SCG Therms	Total
SoCalGas WEN AMI Pilot with CalAm	0	N/A
Total	0	N/A

6) Short description of each subprogram (suggested word limit- 50 words/subprogram).

SoCalGas has partnered with CalAm and Valor Water Analytics. The Pilot will leverage the existing SoCalGas AMI network to allow for the water utility meters to ‘piggyback’ on the SoCalGas AMI network and includes an analytics component for identification and evaluation of potential hot water leaks based on analysis of both gas and combined gas and water usage data. Valor Water Analytics will perform joint water-gas analytics for hot water leak detection, and quantification of water, embedded energy, and GHG benefits associated with hot water leak detection and resolution. Valor will also conduct trend analytics, to identify where water loss reduction has resulted in a change in gas consumption. Analysis will be performed on AMI (treatment) vs. control; pre and post.

² CalAm’s Advice Letter No. 1113, filed on February 10, 2016, was approved on March 7, 2016 in accordance with D. 15-09-023.

CalAm's Pilot will consist of approximately 1301 water AMI customers (who also have gas AMI equipment) within CalAm's Ventura County District. The final number of endpoints to be included in this pilot will depend on selection process which is still underway at the time of submission of this document. In addition, an equal amount Control Group participants who are not water AMI customers (but have gas AMI equipment) will be selected from the same service area.

**Sub-Program
Program Implementation Template^{3,4}**

- 1) Sub-Program Name:

SoCalGas Water-Energy Nexus Shared Network AMI Pilot
- 2) Sub-Program ID number: SCG3806
- 3) Type of Sub-Program: Core Third Party Partnership
- 4) Market sector or segment that this sub-program is designed to serve⁵: This is a limited pilot that will be conducted within CalAm's Ventura County District.
 - a. Residential
 - i. Including Low Income? Yes No
 - ii. Including Moderate Income? Yes No
 - iii. Including or specifically Multifamily buildings? Yes No
 - iv. Including or specifically Rental units? Yes No
 - b. Commercial (List applicable NAIC codes: various)
 - c. Industrial (List applicable NAIC codes: various)
 - d. Agricultural (List applicable NAIC codes: _____)
- 5) Is this sub-program primarily a:
 - a. Non-resource program Yes No
 - b. Resource acquisition program Yes No
 - c. Market Transformation Program Yes No
- 6) Indicate the primary intervention strategies:
 - a. Upstream Yes No
 - b. Midstream Yes No
 - c. Downstream Yes No
 - d. Direct Install Yes No
 - e. Non Resource Yes No

³ Subprogram descriptions shall be provided for all subprograms, by all IOUs implementing the subprogram. Narrative text shall in general be identical across these submissions. For any unique IOU- specific deviations from the agreed statewide subprogram, each IOU shall indicate narrative text unique to their IOU by bolding or underscoring the relevant text. Unless otherwise indicated, budget and other tables may be unique to each IOU.

⁴ Suggested page limit for subprogram PIPs: 15 pages for each resource acquisition and non-resource sub- program, and 20 pages for each market transformation-oriented subprogram. A “sub-program” of a statewide program has: a specific name; targets a specific market sub-segment or uses a unique delivery or marketing approach not used across the entire program; has a specific budget; and, for resource programs, has specific estimated savings and demand impacts.

⁵ Check all that apply.

7) Projected Sub-program Total Resource Cost (TRC) and Program Administrator Cost (PAC) TRC N/A PAC N/A

8) Projected Sub-Program Budget

The SoCalGas projected budget for this pilot with CalAm is \$133,500.

The Administrative cost includes Project Management, split between 2016 and 2017 as the pilot term is one year starting mid/late 2016.

General overhead costs is allocated for administrative costs including but not limited to accounting support, energy efficiency reporting, and pilot oversight.

Direct Implementation non-incentives include our fee to the analytics vendor, as well as the projected cost of SoCalGas field visits.

CalAm’s projected budget for its pilot project is \$279,181, as described in Section 11e.

Table 1: Projected Sub-Program Budget, by Calendar Year⁶

SoCalGas WEN AMI Pilot with CalAm	Program Year		
	2016	2017	Total
Admin (\$)	\$20,000	\$20,000	\$40,000
General overhead (\$)	\$10,000	\$10,000	\$20,000
Incentives (\$)	N/A	N/A	N/A
Direct Implementation Non-Incentives (\$)	\$30,000	\$43,500	\$73,500
Marketing & Outreach (\$)	N/A	N/A	N/A
Education & Training	N/A	N/A	N/A
Total Budget	\$ 60,000	\$73,500	\$133,500

9) Sub-Program Description, Objectives and Theory

⁶ Individual utility specific information to be provided in this table.

- a) Sub-Program Description and Theory: Clearly describe the goals of the sub-program and the sub-program theory. As part of this, describe the market barriers, specific areas of concern and/or gaps that the sub-program is designed to address. Then, describe the way the sub-program will seek to address each barrier, area of concern or gap⁷ (suggested work limit: 600 words per subprogram).

Advanced Metering is a technology that allows utilities to gather data automatically and wirelessly from their meters. This technology is used by all major energy utilities in California, and the benefits are being recognized as being effective for water utilities as well. The focus on Advanced Metering for water has increased in recent years due to the widespread drought conditions our state is currently facing.

There are several objectives for this pilot program, which leverage AMI technology.

Goal 1: Network Piggybacking

Advanced Metering can be deployed in several ways; however one of the most common has been a “fixed network” deployment, where a utility will install data collectors throughout their service area in order to receive radio frequency data transmissions from the meter measurement devices. Given the deployment cost, length of time to deploy, and maintenance requirements of implementing a fixed network AMI solution, such solutions may not always be feasible for water utilities. This pilot program seeks to address this by allowing water utilities to share in the network infrastructure already deployed for SoCalGas Advanced Metering, hence removing the burden of deploying and maintaining a network infrastructure for the water utilities. Bringing separately owned and operated utilities together under the same AMI infrastructure is a novel solution not yet readily available in the AMI industry.

The objective for Goal 1 of this Pilot is to demonstrate the feasibility of a water utility “piggybacking” meter data on the SoCalGas AMI Network. SoCalGas already has several non-commission regulated water utilities utilizing the SoCalGas network to transmit their water data as part of a separate pilot effort.

⁷ Through marketing, delivery mechanisms, information, incentives, etc. If barriers vary by market sub-sector, provide this information. As part of this, succinctly describe the role of any market actors upstream from the customer such as installers, vendors, architects, etc.; indicate if and why the program approach constitutes “best practice,” is “innovative” or reflects “lessons learned” in market strategies, program design and/or implementation techniques.

Goal 2: Combined utility data analytics for water leak detection

SoCalGas has identified that approximately 30% of the anomalous gas consumption investigations based on exploratory enhanced data analytics performed in 2015 were the result of a hot water leak at the customer premise.⁸

This pilot will use hourly water data for the identification and evaluation of potential water leaks, and hourly gas data for the identification and evaluation of potential hot water leaks. Leveraging joint water and gas utility data for the detection of hot water leaks is a novel concept in the analytics industry and the ability to identify a water leak specifically as a hot water leak is expected to help utility providers as well as customers to better understand and identify the source of the leak, which may lead to reduced time to correct the issue and increased water and energy savings.

Goal 3: Determine the embedded energy savings from reduced water loss

Hot water leaks that are identified by leveraging joint water and gas utility data and verified by field technicians are expected to be resolved by the treatment group in a timelier manner than the control group. Integrated water and gas analysis will be used to measure the water savings due to timely determination of hot water leaks, gas savings due to timely determination of hot water leaks, and the embedded energy in the water saved. An aggregation of the water, gas, and electricity savings will provide a measure of associated GHG emissions reductions.

This pilot and the three goals targeted represent industry leading efforts in identifying the benefits of combined water and gas analytics - to a greater extent than can be done with data analytics from just one AMI utility source.

- b) Sub-Program Energy and Demand Objectives- If this sub-program has energy and demand objective, please complete Table 2.

Not applicable since no savings will be claimed.

⁸ Reply Comments of SoCalGas on Final AMI Pilot Proposals, Page 9.

Table 2: Projected Sub-Program Net Energy and Demand Impacts, by Calendar Year⁹

	Program Years		Total
	2016	2017	
SoCalGas WEN AMI Pilot with CalAm			
GWh	-	-	N/A
Peak MW	-	-	N/A
Therms (millions)	-	-	N/A

c) Program Non-Energy Objectives:

The pilot is informational and will seek to establish baselines for future program performance metrics.

Objective of this Pilot is to determine the viability of performing joint energy-water analytics and measure the scope of the associated benefits.

- Determining how leveraging both water and gas data for the detection of hot water leaks can help utility providers understand and identify the source of the leak more quickly and measure the energy savings associated with identification and subsequent customer correction of the hot water leak.
- Quantifying the benefits of using combined water and gas AMI data to identify and calculate the embedded energy savings based on water loss reductions, and subsequent reductions in GHG emissions.

Quantitative metric targets for this pilot are as follows:

- Approximately 1301 participants in the pilot treatment group with both water and gas AMI meters.
- Approximately 1301 participants in the pilot control group with only gas AMI meters (no water AMI).

It is estimated 1% of participants will have leaks identified based on anomalous gas consumption.¹⁰

Metrics will be measured based on the one year pilot duration.

⁹ Individual utility specific information to be provided in this table.

¹⁰ SoCalGas Final Advanced Meter Infrastructure Pilot Proposal, page 10.

Table 3: Quantitative Program Targets (PPMs)

Target	2016	2017
Approximately 1301 participants in the Pilot treatment group with both water and gas advanced meters	-	-
Approximately 1301 participants in the Pilot Control Group with only gas advanced meters	-	-

- d) Cost Effectiveness/Market Need: What methods will be or have been used to determine whether this program is cost-effective?¹¹ If this is a non-resource program, describe the literature, market assessments or other sources that indicate a need for this program.

This pilot is classified as a non-resource program.

“The use of water and the use of energy are intricately intertwined. The extraction, treatment, distribution, and use of water followed by the collection and treatment of wastewater require a lot of energy; likewise, the production of energy—particularly hydroelectric and thermometric power generation—requires a lot of water. For the past decade, this Commission and other state and federal agencies have been exploring how to ensure that both the direct and indirect impacts of this interdependency are taken into consideration when making investment decisions in both energy and water resources.”¹²

“In its comments on the proposed decision that ultimately became D.15-09-023, California Water Association (CWA) asked that the commission add approval of advanced meter infrastructure (AMI) installations to the scope of the water-energy nexus proceeding,”¹³ and that there is “an immediate need to provide customers with real-time information on their water consumption, which in turn created an accompanying potential for water and related energy savings.”¹⁴ Smart water meter data may offer significant water (and therefore direct and indirect energy) savings by, among other things, providing real time feedback on water use. A smart meter can, under some circumstances, indicate immediately if there is a leak at a customer premises.¹⁵

¹¹ If the program has energy and demand objectives, simply state that the methods contained in the Standard Practice Manual will be used. If the program does not have energy and demand objective, propose an approach to assess cost-effectiveness.

¹² D.16-06-010, Page 3.

¹³ D.16-06-010, Pages 3-4.

¹⁴ D.16-06-010, Page 4.

¹⁵ D.16-06-010, Pages 6-7.

To this end, the Commission has directed Energy Utilities to propose pilot programs, with the goal of identifying “technical issues with a water corporation utilizing the existing electric corporation and/or gas corporation AMI infrastructure to transmit water usage data.”¹⁶ “Each utility filed a unique pilot proposal designed to probe the technical issues associated with shared use of existing energy utility advanced metering infrastructure to obtain water smart meter data and advance water conservation programs that complements existing efforts to test shared infrastructure options.”¹⁷ Pilot proposals were approved by the Commission in D.16-06-010.

e) Measure Savings/Work Papers:

- a. Indicate data source for savings estimates for program measures (DEER, custom measures, etc.).

Not applicable because no savings will be claimed by the pilot. Savings may be identified to inform future programs.

- b. Indicate work paper status for program measures:

Not applicable.

Table 4: Work paper Status

#	Work paper Number/Measure Name	Approve	Pending Approval	Submitted but Awaiting
1	N/A			

10) Program Implementation Details

- a) Timelines: List the key program milestones and dates. An example is included below.

¹⁶ D.16-06-010, Page 7.

¹⁷ Id, Page 7.

Table 5: Sub-Program Milestones and Timeline

Milestone	Expected Date
AMI Pilot Workshop	1/19/16
CPUC Decision Issued	6/09/16
Final Pilot Selection Set	Aug 2016
CalAm Installations	Aug 2016 – Dec 2016
SoCalGas -> Valor: Interfaces and Dashboard	December 2016
Start of Analytics Period	January 2017
Monthly Progress Reports	Jan 2017 – Dec 2017

Conclude Pilot Program	Jan 2018
SoCalGas 2017 EE Annual Report	May 2017
Valor Final Report (to SoCalGas)	March 2018
SoCalGas WEN AMI Pilot Final Report	May 2018
SoCalGas 2018 EE Annual Report	May 2018

- b) Geographic Scope: List the geographic regions (e.g., CEC weather zones) where the program will operate.

This program will be conducted in the CalAm's Ventura County District

Table 6: Geographic Regions Where the Program Will Operate

The service areas that will be targeted for this pilot are shown in the images below:

Image 1 – California American Water Ventura County District – Thousand Oaks

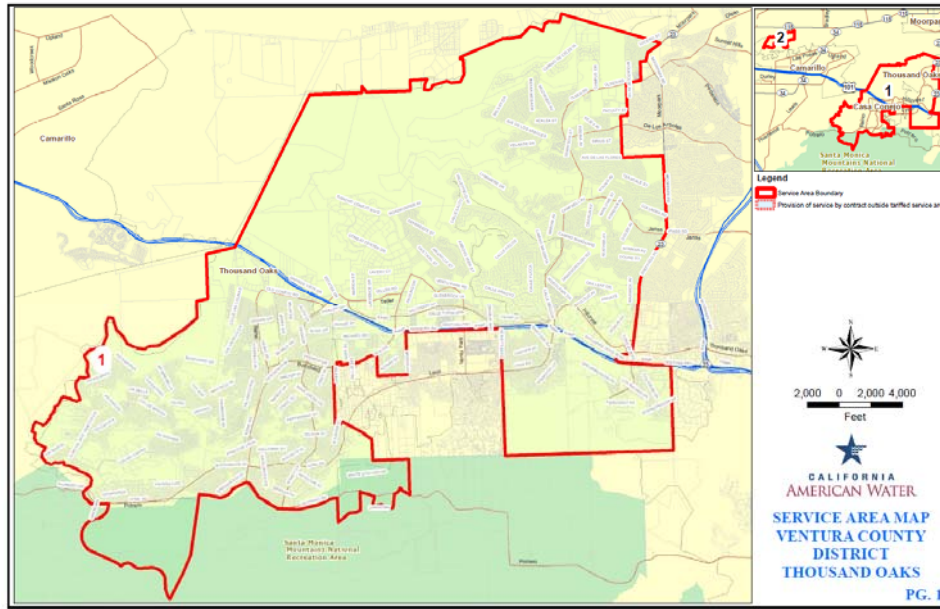
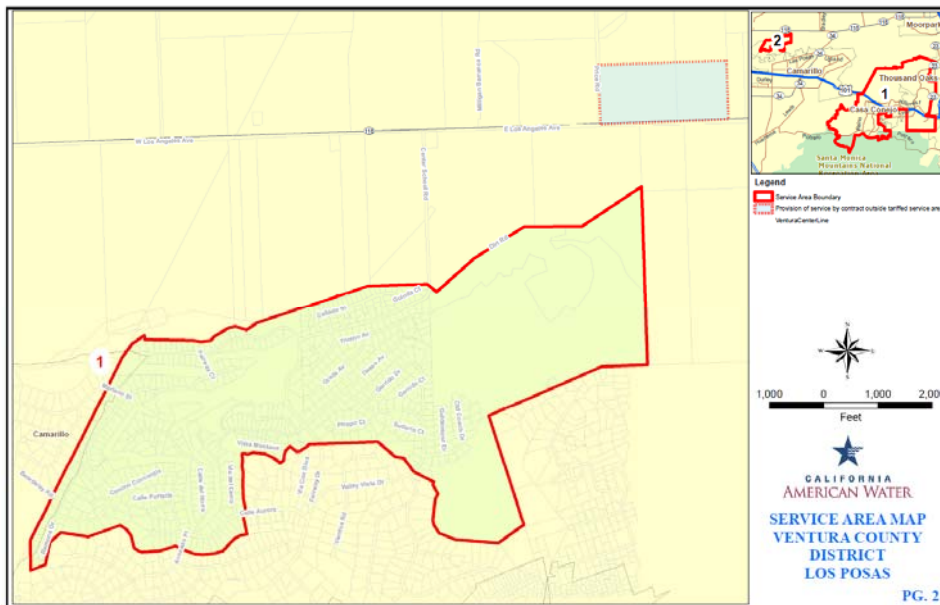


Image 2 – California American Water Ventura County District – Los Posas



Geographic Regions- CEC Climate Zones

Geographic Region	SoCalGas Water Energy Nexus AMI Pilot
CEC Climate Zone 1	
CEC Climate Zone 2	
CEC Climate Zone 3	
CEC Climate Zone 4	
CEC Climate Zone 5	
CEC Climate Zone 6	X - Las Posas, Thousand Oaks
CEC Climate Zone 7	
CEC Climate Zone 8	
CEC Climate Zone 9	X - Thousand Oaks
CEC Climate Zone 10	
CEC Climate Zone 11	
CEC Climate Zone 12	
CEC Climate Zone 13	
CEC Climate Zone 14	
CEC Climate Zone 15	
CEC Climate Zone 16	

c) Program Administration

Table 7: Program Administration of Program Components

Program Name	Program Component	Implemented by [energy] IOU Staff? (X = Yes)	Implemented by contractors to be selected by competitive bid process (if Yes then enter type of contractor/ other market)	Implemented by contractors NOT selected by competitive bid process (list prime contractor and sub-contractor)	Implemented by local government or other entity (X = Yes)
SoCalGas Water Energy Nexus AMI Pilot – California American Water	Network Infrastructure Provider, Gas Analytics & field validation of potential hot water leaks based on anomalous gas consumption	X			
	Joint water/gas hot water leak and integrated trend analytics, WEN Calculator Results, Reports, Whitepapers			Valor Water Analytics	
	Water AMI deployment				California American Water

	AMI technology provider & support			Aclara	
--	-----------------------------------	--	--	--------	--

d) Program Eligibility Requirements:

- i. Customers: List any customer eligibility requirements (e.g., annual energy use, peak kW demand):

Approximately 1301 customers from the California American Water Ventura County District in Thousand Oaks and Los Posas have been selected for this Pilot. The CalAm Pilot customers have been selected for inclusion in the pilot based on a planned meter upgrade schedule based on GO 103 A meter replacement schedule.

In addition, customer selection shall also include the requirement of having an advanced gas meter installed and fully operational and the availability of suitable controls for the test group selected by CalAm.

Where controls are not available, the water utility may choose to monitor those customers and any additional customers using AM technology outside the pilot test and control group; this additional group will not be included in program results.

Table 8: Customer Eligibility Requirements (Joint Utility Table)

Customer Eligibility Requirement (list of requirements)	SCG
Must have gas MTU installed and fully operational	X

- ii. Contractors/Participants: List any contractor (and/or developer, manufacturer, retailer or other “participant”) eligibility requirements (e.g., specific IOU required trainings; specific contractor accreditations; and/or, specific technician certifications required).

Contractors/Participants included in this Pilot were not subject to eligibility requirements.

Aclara is the AMI vendor for this pilot, as they provide the AMI solution for SoCalGas. In order to utilize the SoCalGas AMI network infrastructure, the water utility must also use Aclara technology for their AMI solution.

Valor Water Analytics was already in place as an analytics partner for the WEN AMI pilot with San Gabriel Valley Water Company and as such SoCalGas utilized them for the joint analytics components of this pilot.

All contractors must comply with all applicable federal, state and local governmental statutes, acts, ordinances, regulations, and codes and standards.

Table 9: Contractor/Participant Eligibility Requirements (Joint Utility Table)

Contractor Eligibility Requirement (list of requirements)	SCG
N/A	N/A

e) Program Partners:

- a. Manufacturer/Retailer/Distributor partners: For upstream or midstream incentive and/or buy down programs indicate¹⁸:

Not applicable

¹⁸ Provide in a consistent format for all IOUs. Indicate program partners across all IOU territories in one table or spreadsheet. Append to end of PIP.

Table 10: Manufacturer/Retailer/Distributor Partners

Manufacturer/Retailer/Distributor Partner Information	SCG
Manufacturers enrolled in program	N/A
Manufacturers targeted for enrollment in program	N/A
Retailers enrolled in program	N/A
Retailers targeted for enrollment in program	N/A
Distributors enrolled in program	N/A
Distributors targeted for enrollment in program	N/A

b. Other key program partners: Indicate any research or other key program partners:

CalAm is the Water Utility partner for this pilot. CalAm will deploy water MTUs to approximately 1301 customers in their Ventura County District. The CalAm MTUs will communicate over the SoCalGas Advanced Meter network. In addition to activities related to the CalAm’s own goals and objectives for conducting an Advanced Meter pilot, CalAm will provide hourly water data from the approximately 1301 customers to Valor Water Analytics for use in joint water/gas hot water leak and integrated trend analytics.

Aclara is the AMI technology provider for this pilot. Aclara will be responsible for providing the following to CalAm: MTUs and associated equipment; a hosted HeadEnd; associated training; integration to interfacing systems; professional services; and technical support.

Valor Water Analytics – In addition to activities performed specifically for CalAm, Valor will be responsible for conducting joint water/gas hot water leak detection for the customers they select for the pilot, updating dashboards for SoCalGas, and performing the evaluation, water and energy savings calculations, reports, and whitepapers on the results of joint analytics.

f) Measures and incentive levels: E3 calculators will provide the list of measures and incentive levels to be provided via the program. In this section the utilities should provide a summary table of measures and incentive levels.

This is not applicable in a non-resource program.

Table 11: Summary Table of Measures, Incentive Levels, and Verification Rates

Measure Group	Market Actor Receiving Incentive or Rebate	SCG	
		Incentive Level	Installation Sampling Rate
N/A	N/A	N/A	N/A

- g) Additional Services: List additional services that the sub-program will provide, to which market actors.
- a. For each service provided, indicate any expected charges to market actors of the services, and/or the level at which any such services will be incented or funded.

Not applicable.

Table 12: Additional Services

Additional Services that the Sub- Program Will Provide	To Which Market Actors	SCG
N/A	N/A	N/A

- h) Sub-Program Specific Marketing and Outreach: Please describe, providing timelines (suggested word limit: 300 words):

SoCalGas will not be marketing this program.

SoCalGas will perform a field visit in the event that hot water leak flags (from joint water and gas data) and/or anomalous gas usage is detected at the customer premise. The purpose of this visit would be to validate the source of the gas consumption and inform the customer accordingly. This would take place on an as-needed basis.

CalAm sent letters to the 1301 customers advising plans to upgrade the customer's meters to an AMI meter and included information regarding the benefits and instructions should the customer choose to a process to Opt Out. The communication included several ways the customer could receive more information about the meter upgrade program; through a

specific website, call or write. Once the CalAm customer portal process is finalized, additional information will be emailed or mailed to the water customers on how to establish portal access.

- i) Sub-Program Specific Training: Please describe, providing timelines (suggested word limit: 300 words):

Not applicable – no customer training will be conducted for this pilot.

- j) Sub-Program Software and/or Additional Tools:

- a. List all eligible software or similar tools required for sub-program participation.

SoCalGas is not providing any software to customers as part of this pilot.

- b. Indicate if pre and/or post implementation audits will be required for the sub-program.

Not required.

Pre-implementation audit required Yes No

Post-implementation audit required Yes No

- c. As applicable, indicate levels at which such audits shall be rebated or funded, and to whom such rebates/funding will be provided (i.e. to customer or contractor).

Table 13: Post-implementation Audits

Levels at Which Program Related Audits Are Rebated or Funded	Who Receives the Rebate/Funding (Customer or Contractor)
N/A	N/A

- k) Sub-Program Quality Assurance Provisions: Please list quality assurance, quality control, including accreditations/certification or other credentials.

A SoCalGas field technician will perform a field visit to the customer premise for any customers participating in the pilot for whom hot water leak flags (from joint water and gas data) and anomalous gas usage is

identified. The field visit is intended to identify the source of anomalous gas consumption. In the event that the source is considered to be a hot water heater (as can occur when a hot water leak causes the hot water heater to be in constant demand), the information will be passed to the water utility and analytics vendor. Negative results will also be shared with the analytics vendor. Feedback from these field validations will help to improve the quality and accuracy of the analytics performed.

Table 14: Quality Assurance Provisions

QA Requirements	QA Sampling Rate (Indicate Pre/Post Sample)	QA Personnel Certification Requirement
N/A	N/A	N/A

l) Sub-program Delivery Method and Measure Installation/Marketing or Training: Briefly describe any additional sub-program delivery and measure installation and/or marketing & outreach, training and/or other services provided, if not yet described above.

Not applicable.

m) Sub-program Process Flow Chart: Provide a sub-program process flow chart that describes the administrative and procedural components of the sub-program. For example, the flow chart might describe a customer’s submittal of an application, the screening of the application, the approval/disapproval of an application, verification of purchase or installation, the processing and payment of incentives, and any quality control activities.

Please refer to Appendix D for the Process Flow Chart.

n) Cross-cutting Sub-program and Non-IOU Partner Coordination: Indicate other IOU EE, DR or DG sub-programs with which this sub-program will regularly coordinate. Indicate also key non-IOU ordination partners. Indicate expected coordination mechanisms¹⁹ and frequency²⁰:

¹⁹ “Mechanisms” refers to communication methods (i.e. quarterly meetings; internal list serves; monthly calls, etc.) and/or any cross-program review methods (i.e., feedback on program plans; sign off on policies, etc.) or harmonization techniques (i.e. consistent certification requirements across programs, program participant required cross trainings, etc.).

²⁰ This does not assume mutual understanding of the on the mechanism or a known frequency of coordination; rather, this is intended to provide information that a coordinated effort is taking place.

Regular coordination will take place between SoCalGas, CalAm, Aclara, and Valor Water Analytics throughout the pilot. This will be in the form of conference calls on a monthly basis unless greater frequency is warranted.

Table 15: Cross-cutting Sub-program and Non-IOU Partner Coordination

SoCalGas Water Energy Nexus AMI Pilot		
Pilot Program Partner	Coordination Mechanism	Expected Frequency
California American Water	Teleconference	Monthly or greater
Aclara	Teleconference	Monthly or greater
Valor Water Analytics	Teleconference	Monthly or greater

- o) Logic Model: Please append the logic model for this sub-program to the end of this PIP. Describe here any additional underlying theory supporting the sub-program intervention approach, referring as needed to the relevant literature (e.g., past evaluations, best practices documents, journal articles, books, etc.).

See Appendix E for the Logic Model.

11) Additional Sub-Program Information

- a) Advancing Strategic Plan Goals and Objectives: Describe how sub-program advances the goals, strategies and objectives of the California Long Term Energy Efficiency Strategic Plan (word limit: 150 words).

While the Strategic Plan does not specifically address water-energy nexus efforts, this pilot may help inform potential future energy efficiency activities in the residential and commercial sectors.

b) Integration

- i. Integrated/coordinated Demand Side Management: As applicable, describe how sub-program will promote customer education and sub-program participation across all DSM options. Provide budget information of non-EE sub-programs where applicable.

Not applicable.

Table 16: Non-EE Sub-Program Information

SoCalGas Water Energy Nexus AMI Pilot		
Non-EE Sub-	Budget	Rationale and General Approach for Integrating Across
N/A	N/A	N/A

- ii. Integration across resource types (energy, water, air quality, etc.): If sub-program aims to integrate across resources types, please provide rationale and general approach.

Not applicable.

- c) Leveraging of Resources: Please describe if the subprogram will leverage additional investments by market actors or other state, local or federal agencies.

The overall cost for the Pilots between SoCalGas and CalAm is estimated to be \$412,681, as shown in Figure 1 below.

Figure 1: SoCalGas and CalAm Pilot Costs

Deliverable/Material	SoCalGas Cost	CalAm Cost
AMI Hardware and Software, associated training, installation hardware, integration, services and contingency	-	\$157,801
Network use fee to SoCalGas	-	\$5,000
Analytics services and reporting	\$60,000	\$62,880
Consumer engagement software	-	\$53,500
Hot water leak field visits	\$13,500	-
SoCalGas IT interface	-	-
Project Management	\$40,000	-
General Overhead	\$20,000	
Total	\$133,500	\$279,181

- d) Trials/ Pilots: Please describe any trials or pilot projects planned for this sub-program.

This is a Pilot which will serve to determine viability of potential future programs of this kind.

- e) Knowledge Transfer: Describe the strategy that will be used to identify and disseminate best practices and lessons learned from this sub-program.

Valor Water Analytics will develop a whitepaper presenting the methodologies used for the pilot program assessment, results from the pilot randomized control experiment (customer data will be de-identified and aggregated), integrated trend analytics and water-energy nexus insights gained, innovations or new thinking developed, future work necessary, and recommendations for future programs. This whitepaper will be incorporated into the SoCalGas WEN AMI Pilot Final Report.

- 12) Market Transformation Information: For programs identified as market transformation programs, include the following (suggested page limit- five pages):

- i. A summary of the market transformation objectives of the program.
- ii. A description of the market, including identification of the relevant market actors and the relationships among them;
- iii. A market characterization and assessment of the relationships/dynamics among market actors, including identification of the key barriers and opportunities to advance demand side management technologies and strategies;

- iv. A description of the proposed intervention(s) and its/their intended results, and specify which barriers the intervention is intended to address;
- v. A coherent program, or “market,” logic model that ensures a solid causal relationship between the proposed intervention(s) and its/their intended results²¹; and
- vi. Appropriate evaluation plans and corresponding Market Transformation indicators and Program Performance Metrics based on the program logic model.

Not applicable.

13) Additional information as required by Commission decision or ruling or as needed: Include here additional information as required by Commission decision or ruling (As applicable. Indicate decision or ruling and page numbers):

Per D.16-06-010, Ordering Paragraph 7, SoCalGas shall file and serve, by Tier 2 Advice Letter, a Program Implementation Plan, adapted to meet the pilot criteria set forth in the Energy Efficiency Policy Manual v.5., for their approved pilot that includes, but is not limited to:

- Detailed schedules for implementation (See Section 10 / Table 5)
- Proposed budgets (See Section 11c)
- Projected savings and cost-effectiveness using the Water Energy calculator as applicable (Not Applicable)
- Marketing, education, and outreach guidelines (See Section 10h)
- Data requirements (See Appendix A)
- Measurement and evaluation plan (See Appendix B)
- Control group size (See Appendix A)

The Pilot criteria set forth in Energy Efficiency Manual v.5 referenced in the decision regarding WEN AMI Pilots are detailed in Appendix C.

Appendix Guide:

Appendix A – Data Requirements & Control Group Size

Appendix B – Measurement and Evaluation Plan

Appendix C – Pilot Criteria based on Energy Efficiency Manual v.5

Appendix D – Pilot Program Process Flow Chart

Appendix E – Pilot Program Logic Model

²¹ If this logic model is the same as that requested in #10.(O), only provide once. As needed, provide a more detailed logic model emphasizing the market transformation elements of the program and/or how such elements integrate with resource acquisition elements.

Appendix A - Data Requirements & Control Group Size

Data requirements for this pilot are that both CalAm and SoCalGas shall send to Valor Water Analytics hourly consumption data for the approximately 1301 pilot treatment group accounts, monthly reads for the control group from CalAm, and hourly reads for the control group from SoCalGas. SoCalGas shall also send to Valor confirmation of any validated hot water leaks based on field visits, as well as any negative results.

- Valor is requesting gas meter consumption data for approximately 2,602 customers every hour (AMI) for a historic period between January 1, 2015 and present date.
- Test and control group customers will be common customers between CalAm and SoCalGas.

Data requested by Valor from SoCalGas includes:

- Data Identifiers
 - A unique meter number.
 - A unique ID number per customer such as “Address”, “Location ID” or “Premise ID.”
- Meter Data
 - Timestamp. Month, day, year and hour interval for the meter read
 - Gas meter Size
 - Consumption amount per meter - usage in consumption unit for the associated interval timestamp.
 - Unit of measurement for consumption - e.g., therms.
 - Hot Water Leak Alert Identifier, when applicable – Was a hot water leak detected during this interval?

Appendix B - Measurement and Evaluation Plan

The Measurement and Evaluation plan is included in Attachment 2 and will be undertaken by SoCalGas. Valor Water Analytics will provide inputs to SoCalGas for the EM&V.

Appendix C - Pilot Criteria based on Energy Efficiency Manual v.5

The Energy Efficiency Manual v.5 specifies:

Pilot programs should be designed to create the measures and program delivery mechanisms of the future, enabling IOUs to achieve deeper savings and market transformation. The pilots should be limited in scope and duration so that results are available in a specified time frame and limited in budget so that unsuccessful programs have a limited impact on the overall portfolio. All results of pilot programs must be shared widely with the other IOUs and with the stakeholders in the sector impacted by the pilot. There should be a specific plan and timeframe to move successful pilot programs into statewide use (if applicable). Each proposed pilot should contain the following elements:

- a. A specific statement of the concern, gap, or problem that the pilot seeks to address and the likelihood that the issue can be addressed cost-effectively through utility programs;

The statement of concern, gap or problem that the Pilot seeks to address is detailed in Section 9a.

- b. Whether and how the pilot will address a Strategic Plan goal or strategy and market transformation;

While the strategic plan does not specifically address water-energy nexus efforts, this pilot may help inform potential future energy efficiency activities in the residential and commercial sectors.

- c. Specific goals, objectives and end points for the project;

The goals and objectives for this Pilot are detailed in Section 9a. Details regarding the end points for this Pilot are provided in Appendix B.

- d. New and innovative design, partnerships, concepts or measure mixes that have not yet been tested or employed;

Bringing separately owned and operated utilities together under the same AMI is a novel solution not yet readily available in the AMI industry.

Leveraging joint water and gas utility data for the detection of hot water leaks is a novel concept in the analytics industry and the ability

to identify a water leak specifically as a hot water leak is expected to help utility providers as well as customers to better understand and identify the source of the leak, which may lead to reduced time to correct the issue and increased water and energy savings.

Quantifying the benefits of using combined water and gas AMI data to identify and calculate the embedded energy savings based on reduced water loss, and subsequent reductions in GHG emissions is not prevalent in the industry today.

This pilot and the goals targeted represent industry leading efforts in identifying the benefits of combined water and gas analytics - to a greater extent than can be done with data analytics from just one AMI utility source.

- e. A clear budget and timeframe to complete the project and obtain results within a portfolio cycle - pilot projects should not be continuations of programs from previous portfolios;

SoCalGas' estimated costs incurred to conduct its pilot with CalAm using Valor Water Analytics as the collaborative analytics vendor is \$133,500. SoCalGas has been approved by the Commission in D.16-06-010 for a budget of up to \$175,000 per water utility participant, with a not to exceed budget of \$300,000 across all water utility participants.

Additional details regarding the components of this budget are provided in Section 11c.

Targeted timeframe for this pilot is to begin water MTU installations in August 2016, begin joint utility analytics in January 2017, and continue analytics for a one year period through January of 2018 with reporting of results by May 2018. Additional timeline details are provided in section 10a.

- f. Information on relevant baselines metrics or a plan to develop baseline information against which the project outcomes can be measured;

Baseline metrics are not yet available, and this pilot may aid in developing such baseline metrics.

- g. Program performance metrics;

In D.15-10-028, the California EE Program Administrators were relieved from their reporting requirements for PPMs.²²

- h. Methodologies to test the cost-effectiveness of the project;

Valor will provide SoCalGas with an “Integrated Water Energy Calculator,” based on the CPUC Water Energy Calculator. SoCalGas will use this calculator for reporting requirement measuring the pre- post energy savings for this piggybacking pilot and across joint customers in CalAm’s Ventura County District over the pilot’s 12-month time frame. Valor will calculate embedded energy savings of hot water leak savings, per the analytical results captured in the Side-by-Side Leak Detection Dashboard.

- i. A proposed EM&V plan;

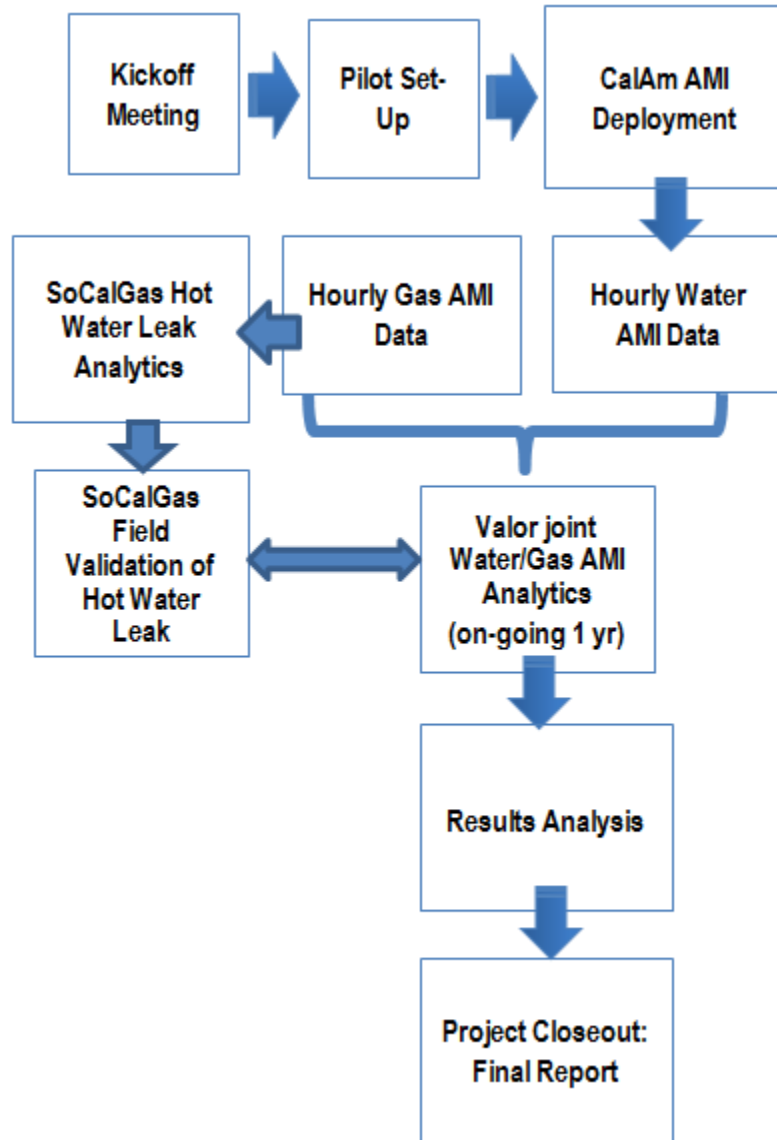
Proposed EM&V plan is included in Appendix B, Attachment 2.

- j. A concrete strategy to identify and disseminate best practices and lessons learned from the pilot to all California IOUs and to transfer those practices to resource programs, as well as a schedule and plan to expand the pilot to utility and hopefully statewide usage.

SoCalGas will submit a final report at the end of the Pilot program, a copy of which will be made available to all California IOUs detailing the result of the objectives of this pilot described in Section 9a.

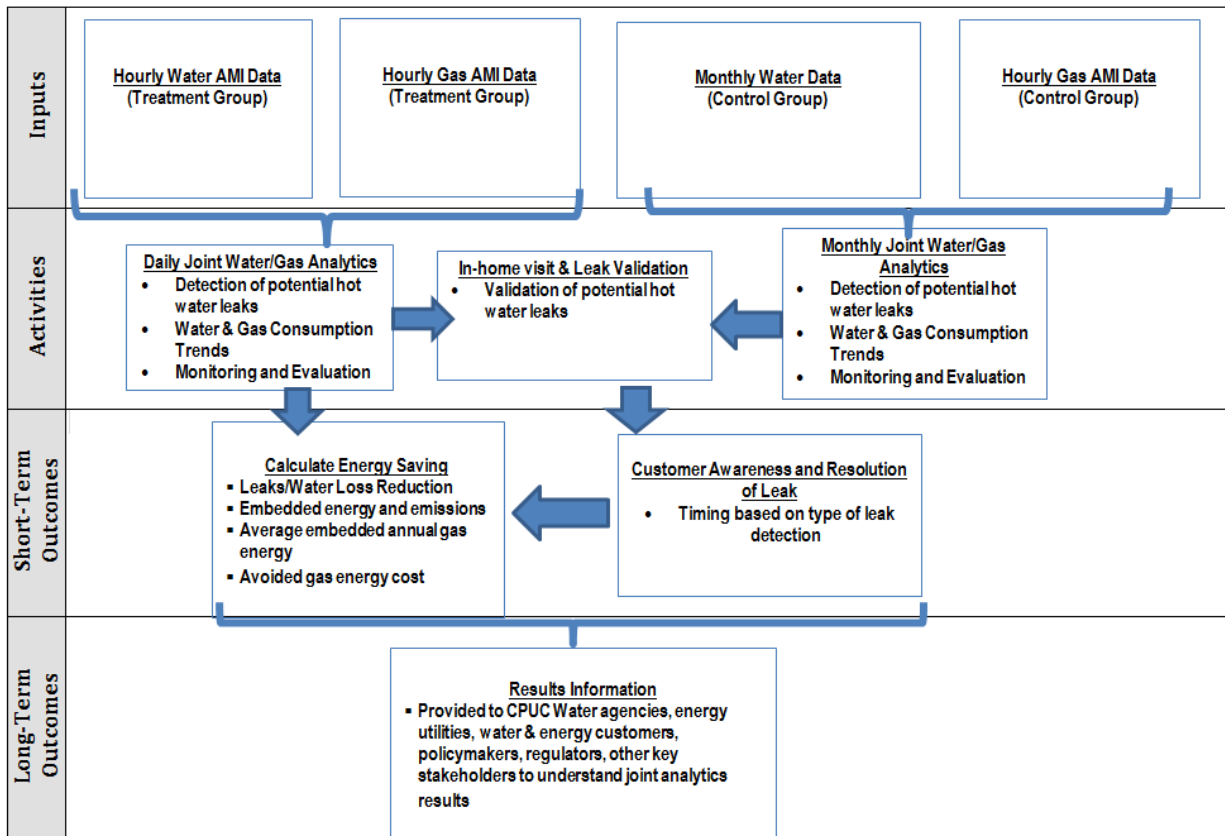
²² See D.15-10-028, pg. 54.

Appendix D - Process Flow Chart
SoCalGas Water Energy Nexus AMI Pilot – Hot Water Leak Detection and Validation Process Flow Chart



Appendix E - Logic Model

SoCalGas Water Energy Nexus AMI Pilot Logic Model



ATTACHMENT 1

Excel Tables

Subprogram	PG&E (\$)	SCE (\$)	SDG&E (\$)	SCG (\$)	Kwh	KW	Therms
A - SoCalGas WEN AMI Pilot with California American Water	-	-	-	\$133,500	-	-	-
Total				\$133,500			

Table 2: Total Projected Program Savings by IOU

Subprogram	PG&E Kwh	PG&E	PG&E	SCE	SCE	SDG&E	SDG&E	SDG&E	SCG	Total
		KW	Therms	Kwh	KW	Kwh	KW	Therms	Therms	
SoCalGas WEN AMI Pilot with California American Water	-	-	-	-	-	-	-	-	N/A	N/A
Total									N/A	N/A

Table 1: Projected Sub-Program Budget, by Calendar Year

Sub-Program	Program Year		
	2016	2017	Total
Admin (\$)	\$20,000	\$20,000	\$40,000
General overhead (\$)	\$10,000	\$10,000	\$20,000
Incentives (\$)	N/A	N/A	N/A
Direct Install Non-Incentives (\$)	\$30,000	\$43,500	\$73,500
Marketing & Outreach (\$)	N/A	N/A	N/A
Education & Training	N/A	N/A	N/A
Total Budget	\$ 60,000	\$73,500	\$133,500

Individual utility specific information to be provided in this table.

Table 2: Projected Sub-Program Net Energy and Demand Impacts, by Calendar Year

	Program Years		Total
	2016	2017	
SoCalGas WEN AMI Pilot - California American Water			
GWh	-	-	N/A
Peak MW	-	-	N/A
Therms (millions)	-	-	N/A

Individual utility specific information to be provided in this table.

Table 3: Quantitative Program Targets (PPMs)

Target	2016	2017
Approx 1301 participants in the Pilot Treatment Group with both water and gas advanced meters	-	-
Approx 1301 participants in the Pilot Control Group with only gas advanced meters	-	-

Table 4: Work Paper Status

#	Work Paper Number/Measure Name	Approved	Pending Approval	Submitted but Awaiting Review
1	N/A			

Table 5: Sub-Program Milestones and Timeline

Milestone	Expected Date
AMI Pilot Workshop	1/19/2016
CPUC Decision Issued	6/9/2016
Final pilot Selection Set	Aug-16
CalAm Installations	Aug 2016 - Dec 2016
SoCalGas → Valor: Interfaces and Dashboard	Dec-16
Start of Analytics Period	Jan-17
Monthly Progress Reports	Jan 2017 - Dec 2017
Conclude Pilot Program	Jan-18
SoCalGas 2017 EE Annual Report	May-17
Valor Final Report and Whitepaper (to SoCalGas)	Mar-18
SoCalGas WEN AMI Pilot Final Report	Mar-18
SoCalGas 2018 EE Annual Report	May-18

Table 6: Geographic Regions

Geographic Region	SoCalGas Water Energy Nexus AMI Pilot
CEC Climate Zone 1	
CEC Climate Zone 2	
CEC Climate Zone 3	
CEC Climate Zone 4	
CEC Climate Zone 5	
CEC Climate Zone 6	X - Las Posas, Thousand Oaks
CEC Climate Zone 7	
CEC Climate Zone 8	
CEC Climate Zone 9	X - Thousand Oaks
CEC Climate Zone 10	
CEC Climate Zone 11	
CEC Climate Zone 12	
CEC Climate Zone 13	
CEC Climate Zone 14	
CEC Climate Zone 15	
CEC Climate Zone 16	

Table 7: Program Administration of Program Components

Program Name	Program Component	Implemented by [energy] IOU Staff? (X = Yes)	Implemented by contractors to be selected by competitive bid process (if Yes then enter type of contractor/other market actor possibly used)	Implemented by contractors NOT selected by competitive bid process (list prime contractor and sub-contractor names)	Implemented by local government or other entity (X = Yes)
SoCalGas Water Energy Nexus AMI Pilot - California American Water	Network Infrastructure Provider, Gas Analytics & field validation of potential hot water leaks based on anomalous gas consumption	X			
	Joint water/gas analytics, WEN Calculator Results, Reports, Whitepapers			Valor Water Analytics	
	Water AMI deployment				California American Water
	AMI technology provider & support			Aclara	

Table 8: Customer Eligibility Requirements (Joint Utility Table)

Customer Eligibility Requirement (list of requirements)	PGE	SCE	SDGE	SCG
Must have gas MTU installed and fully operational	-	-	-	X

The utilities must work together and submit this table jointly in their respective applications.

Table 9: Contractor Eligibility Requirements (Joint Utility Table)

Contractor Eligibility Requirement (list of requirements)	PGE	SCE	SDGE	SCG
N/A	-	-	-	-

List any contractor (and/or developer, manufacturer, retailer or other “participant”) eligibility requirements (e.g. specific IOU required trainings; specific contractor accreditations; and/or, specific technician certifications required).

The utilities must work together and submit this table jointly in their respective applications.

Table 10: Manufacturer/Retailer/Distributor Partners

Manufacturer/Retailer/Distributor Partner Information	PGE	SCE	SDGE	SCG
Manufacturers enrolled in program	-	-	-	N/A
Manufacturers targeted for enrollment in program	-	-	-	N/A
Retailers enrolled in program	-	-	-	N/A
Retailers targeted for enrollment in program	-	-	-	N/A
Distributors enrolled in program	-	-	-	N/A
Distributors targeted for enrollment in program	-	-	-	N/A

Table 11: Summary Table of Measures, Incentive Levels and Verification Rates

Measure Group	Market Actor Receiving Incentive or Rebate	PGE		SCE		SDGE		SCG	
		Incentive Level	Installation Sampling Rate	Incentive Level	Installation Sampling Rate	Incentive Level	Installation Sampling Rate	Incentive Level	Installation Sampling Rate
N/A	N/A	-	-	-	-	-	-	N/A	N/A

- a. Use a single excel spreadsheet to indicate the eligible measures for the program across all IOUs. Indicate the expected incentive level by measure or measure grouping for each IOU, making clear where these vary.
- b. For each incented or rebated measure, indicate the market actor to whom this will be provided.

Table 12: Additional Services

Additional Services that the Sub-Program Will Provide	To Which Market Actors	PGE	SCE	SDGE	SCG
N/A	N/A	-	-	-	N/A

- a. For each service provided, indicate any expected charges to market actors of the services, and/or the level at which any such services will be incented or funded.

Table 13: Program Related Audits

Levels at Which Program Related Audits Are Rebated or Funded	Who Receives the Rebate/Funding (Customer or Contractor)
N/A	N/A

NOTE: If software tools are required sub-program participation, and if there is a program related audit for the sub-program, this table shows the levels at which the audit is rebated or funded and to whom such rebates/funding will be provided (i.e., customer or contractor).

Table 14: Quality Assurance Provisions

QA Requirements	QA Sampling Rate (Indicate Pre/Post Sample)	QA Personnel Certification Requirements
N/A	N/A	N/A

NOTE: Please list quality assurance, quality control, including accreditations/certification or other credentials required.

Table 15: Cross-cutting Sub-program and Non-IOU Partner Coordination

SoCalGas Water Energy Nexus AMI Pilot		
Pilot Program Partner	Coordination Mechanism	Expected Frequency
California American Water	Teleconference	Monthly or greater
Aclara	Teleconference	Monthly or greater
Valor Water Analytics	Teleconference	Monthly or greater

Note: “Mechanisms” refers to communication methods (i.e. quarterly meetings; internal list serves; monthly calls, etc.) and/or any cross-program review methods (i.e., feedback on program plans; sign off on policies, etc). or harmonization techniques (i.e. consistent certification requirements across programs, program participant required cross trainings, etc).

Table 16: Non-EE Sub-Program Information

SoCalGas Water Energy Nexus AMI Pilot		
Non-EE Sub-Program	Budget	Rationale and General Approach for Integrating Across Resource Types
N/A	N/A	N/A

NOTE: Column C --> Integrated/coordinated Demand Side Management: As applicable, describe how sub-program will promote customer education and sub-program participation across all DSM options. Provide budget information of non-EE sub-programs where applicable. Column D --> Integration across resource types (energy, water, air quality, etc): If sub-program aims to integrate across resources types, please provide rationale and general approach.

ATTACHMENT 2

EM&V Plan

Evaluation, Measurement and Verification Plan for the SoCalGas Water-Energy Nexus Shared Network AMI Pilot Program

A. Description of Pilot Program

The Pilot will leverage the existing Southern California Gas Company (SoCalGas) Advanced Meter Infrastructure (AMI) network to allow for California American Water (CalAm) water meters to ‘piggyback’ on the SoCalGas AMI network and includes an analytics component for identification and evaluation of potential hot water leaks based on analysis of both gas and combined gas and water usage data. Valor Water Analytics will perform joint water-gas analytics for hot water leak detection, and quantification of water, embedded energy, and greenhouse gas (GHG) benefits associated with hot water leak detection and resolution. Valor will also conduct trend analytics, to identify where water loss reduction has resulted in a change in gas consumption. Analysis will be performed on AMI (treatment) vs. control; pre and post.

The pilot will be conducted with approximately 2,602 SoCalGas and CalAm customers in the CalAm Ventura County District. Approximately 1301 customers will be selected to receive water AMI module by CalAm, based on the planned meter upgrade schedule for customers residing in the CalAm Ventura County District (treatment group). Under the program, SoCalGas will share its AMI network to collect and transmit CalAm’s hourly water data. A control group of approximately 1301 additional joint customers will be selected to conduct the randomized pilot program evaluation.

B. Pilot Program Objectives

The program implementation plan identified three objectives for this pilot.

Goal 1: Network Piggybacking

Due to the cost, length of time, and maintenance requirements involved in setting up and running an advanced metering infrastructure within its service territory, it may not be feasible for many water utilities to deploy their own advanced metering network infrastructure. The objective for Goal 1 of this Pilot is to demonstrate the feasibility of a water utility “piggybacking” meter data on the SoCalGas AMI Network.

Goal 2: Combined utility data analytics for water leak detection

SoCalGas has identified that approximately 30% of the anomalous gas consumption investigations based on exploratory enhanced data analytics performed in 2015 were the result of a hot water leak at the customer premise.^{1,2} This pilot will use hourly water data for the identification and evaluation of potential water leaks, and hourly gas data for the identification and evaluation of potential hot water leaks. Leveraging joint water and gas utility data for the detection of hot water leaks is a novel concept in the analytics industry and the ability to identify a water leak specifically as a hot water leak is

¹ SoCalGas Advanced Meter Semi Annual Report Feb 2016, Page 12-13

² Reply Comments of SoCalGas on Final AMI Pilot Proposals, Page 9

expected to help utility providers as well as customers to better understand and identify the source of the leak, which may lead to reduced time to correct the issue and increased water and energy savings.

Goal 3: Determine the embedded energy savings from reduced water loss

Hot water leaks that are identified by leveraging joint water and gas utility data and verified by field technicians are expected to be resolved by customers in the treatment group in a timely manner than those in the control group. Integrated water and gas analysis will be used to measure the water savings due to timely determination of hot water leaks, gas savings due to timely determination of hot water leaks, and the embedded energy in the water saved. An aggregation of the water, gas, and electricity savings will provide a measure of associated GHG emissions reductions.

C. Evaluation Objectives

The objectives of this evaluation plan are to:

1. Determine the gross water, gas, and embedded energy savings
2. Verify hot water leaks detected by analytics with on-site inspections
3. Develop and track program metrics and costs

D. Evaluation Objective 1: Gross Water, Gas, and Embedded Energy Savings Methodology

Analytical Methodology

A quasi-experimental design approach is proposed to determine the gross water and energy savings for the test population. This requires a valid comparison group of program non-participants be identified in addition to the program participants. The analytical methodology used for this study is detailed below.

Sample Selection

Our goal is to determine a sample size that will allow us to establish statistically significant results for an hourly AMI (test Group) vs. monthly AMR reads effectiveness comparison (Control Group). In general, we recommend as large a sample size as possible within a practical resource budget. For the CalAm engagement, we have used standard statistical estimation techniques [1] to determine the minimal test group sample size:

$$n = z^2(p \cdot q) / 2, \text{ with } z=2, p=0.5, q=0.05 \\ \Rightarrow n = 400$$

We require at least 400 test accounts in our sample size, and therefore have reasonable confidence that with a test sample size of approximately 1301, we can carry out our experiments in a suitable manner. It must be noted that with any statistical experiment, it is not possible to have any a priori determination³.

In summary, we expect with our test sample size of approximately 1301, we can make statistically plausible inferences about results of the study across CalAm Ventura County District.

³ <http://www.itl.nist.gov/div898/handbook/ppc/section3/ppc333.htm>

Quasi-Experimental Design

The goal of the two-stage approach is to quantify the change in water use and gas use that is due to the pilot program, and not due to background effects, otherwise known as exogenous changes. Exogenous changes are changes in consumption that result from non-program influences such as changes in fuel prices, trends in the economy, natural disasters, and so on. The best evaluation scenario to account for these effects is a randomized control trial (RCT) where participant and non-participant groups are pre-selected, and the program treatment offered only to the participant group. In this study, the test group is AMI customers and the control group is monthly AMR customers (for water).

As described in the program implementation plan, approximately 1301 customers in CalAm's Ventura County District will be selected for participation. This group will potentially be composed of single-family, multi-family, commercial, and industrial customers. The test group selection is based on CalAm's scheduled meter service replacement program. Test group accounts will have both natural gas and water AMI data available. These accounts will also have access to a web-based water customer portal provided by CalAm that provides notifications to participants about water leaks in their homes or businesses on a daily basis. This group will be called the Test group.

A second group of approximately 1301 customers will also be selected from the CalAm Ventura County District. These non-participant accounts will have only natural gas advanced meters and will not be provided any program information, water customer portal, or materials. Monthly water meter reads will also be collected. This group will also potentially be composed of single-family, multi-family, commercial, and industrial customers. This group will be called the Control Group.

Data & Duration

Data inputs for this study are:

Hourly gas meter read data for approximately 2602 study customers –

1 year of historic data provided to establish baseline

Daily Batch feeds for duration of the study period

Hourly Water meter read data for approximately 1301 Test Group Customers

2 years of historic data (manual reads) provided to establish baseline

Daily Batch feeds for duration of the study period

Monthly Water AMR meter read data for approximately 1301 Control Group customers

2 years of historic data (AMR reads) provided to establish baseline

Monthly Batch feeds for duration of the study period

Daily weather data for CalAm Ventura County District

Identify the nearest weather station associated with each premise in the analysis.

Obtain daily temperature data from each weather station for a period that matches the consumption data.

Alert and Validation Inputs from SoCalGas

Positive and negative validated hot water leaks be sent as available (at least monthly) for the study period

Duration:

This study will occur over a 12-month pilot period (referred to as the analytical period) beginning in January 2017.

Measurement Methodology

Embedded Energy of Reduced Water Loss

Valor Water Energy Nexus calculator is based on the CPUC Water Energy Calculator, as specified in the September 2015 proceedings (CPUC Rulemaking 13-12-011). So Cal Gas will use this calculator for reporting requirement measuring the pre-post energy savings for this piggybacking pilot and across joint customers in the CalAm Ventura County District over the pilot's 12-month time frame. Valor will calculate embedded energy savings of hot water leak savings, and estimate the gas savings incurred via timely hot water leak resolution.

The key embedded energy of water savings measures include but are not limited to:

- Average embedded annual gas energy (therms);
- Avoided gas energy cost (2014\$);
- Average embedded annual electricity energy (kwhs);
- Avoided electricity cost (2014\$).

Pilot Evaluation

Once the measurements above are determined for each account (test and control groups), the next step is to assess the impact of the pilot program according to these null and alternative hypotheses:

Hypothesis 1

H₀ AMI technology has no impact on water loss and associated energy savings;

H₁ AMI technology results in greater water (and associated energy savings) than monthly meter read technology;

Hypothesis 2

H₀ Integrated water and gas analytics result in the same number of hot water leak findings than either gas or water data analyzed alone;

H₁ Integrated water and gas analytics result in a greater number of hot water leak findings than either gas or water data analyzed alone;

Hypothesis 2 may be revised, if suitable validation data is not available from either the gas utility, or the water utility involved in the pilot.

Both hypotheses will be tested with a number of summary and advanced statistical techniques, including but not limited to the following:

Summary Statistics (compare treated group to control group during treatment period only):

- Leaks / Water Loss Reduction (Hot & Cold Water)
 - gallons, percentage (by month and cumulative)
- Embedded Energy and Emissions
 - Tons CO₂, percentage, by month and cumulative
 - Therms, percentage, by month and cumulative
 - Electricity, percentage, by month and cumulative

Advanced level statistical modeling to be conducted, for each of the above measurements, per hypothesis:

- Compare treated group performance to their historical performance
- Compare control group performance to their historical performance
- Weather normalize consumption (emissions and water)
- Regression based difference in difference analysis

E. Evaluation Objective 2: Verification of Hot Water Leaks Detected by Analytics with On-Site Inspections

Water leaks that have been identified by joint AMI data analysis will be displayed on the Side by Side Leak Detection Dashboard provided by Valor to SoCalGas.

SoCalGas will perform a field visit in the event that hot water leak flags (from joint water and gas data) and/or anomalous gas usage is detected at the customer premise. The purpose of this visit would be to validate the source of the gas consumption and inform the customer accordingly.

During the site visit technicians will substantiate evidence of a hot water leakage using a process developed for this program. This process will include physical investigation of the premises, inspection of all gas appliances at the site, and an occupant interview focusing on potential sites for hot water leaks. Technicians will determine the presence of the hot water leakage by evaluation of the hot water heating appliance and a cursory check of the water meter for indication of water flow with all known water usage eliminated. Evaluation of the water heating appliance includes, routine inspection of the burner, controls, and associated piping and hardware as prescribed by SoCalGas policy, observation of the vent, appliance operation, evidence of water or water flow through the appliance, and any indications of excessive consumption of gas and/or hot water incidental to this inspection.

Field technicians will record a variety of information, if available, about the premise and the hot water appliance(s) observed on site. Collected data may include:

- Age and make/model of the domestic hot water appliance(s).
- Type of leak: Leak at the water heating appliance on a valve, connector, vessel, or apparatus; fixture leak; in wall, underground, or under slab.

- Rate of water leakage measured at the leak(s). Commonly at the hot water heater, hot tub, pool, other appliance or hot water line.

F. Evaluation Objective 3: Tracking Program Metrics and Costs

Please refer to Appendix 1: Program Metrics for a partial list of important data points which will be used to track program metrics

Appendix 1: Program Tracking Data

A partial list of program information and data in their respective categories is provided in this section. The list of data points may potentially be modified during the course of the program. Collection of data points listed will be subject to availability.

Customer Information Fields:

- Premise location
- Customer classification
- Climate zone
- Meter numbers (gas & water)
- Gas meter size
- Gas consumption historical data
- Water consumption historical data

Fields on Leak Detection Dashboard:

- GNN Unique Identifier
- Gas Meter ID
- Water Account ID
- Alert Time Stamp (YY MM DD HH)
- Leak Alert confidence
- Leak Alert Type (hot water)
- Leak outreach timestamp for validated hot water leaks (YY MM DD HH)
- Leak resolution timestamp for validated hot water leaks (YY MM DD HH)
- Estimate of monthly water savings (kgals)
- Estimate of monthly embedded energy savings (therms)

Fields on Monitoring and Evaluation Platforms:

A statistical comparison of treatment and control groups. Base level metrics and savings estimates of the following three categories:

- Leaks/Water Loss Reduction (hot and non-hot water)
 - In gallons, percentage of total use, by month and cumulative
- Embedded energy and emissions
 - Tons CO₂, percentage of total use, by month and cumulative
 - Therms, percentage of total use, by month and cumulative
 - kWhs, percentage of total use, by month and cumulative

Advanced metrics, at six month intervals, to estimate energy savings for each of the three categories above will include:

- Results of comparisons of treatment group to historical performance
- Results of comparisons of control group to historical performance
- Weather normalized consumption (emissions and water)
- Results of analysis of regression based differences

Fields from Site Inspection:

- Age and make/model of the domestic hot water appliance(s).
- Type of leak: Leak at the water heating appliance on a valve, connector, vessel, or apparatus; fixture leak; in wall, underground, or under slab.
- Rate of water leakage measured at the leak(s). Commonly at the hot water heater, hot tub, pool, other appliance or hot water line.