

AMI Use Case:

B4 - Contract Meter Reading (or Meter Reading for other Utilities)

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Document History

Revision History

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Approvals

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1. Use Case Description

1.1 Use Case Title

Contract Meter Reading (or Meter Reading for other Utilities).

1.2 Use Case Summary

Advanced meters can be used to interface with non-electrical metering functions such as water and gas. It is envisioned that non-electrical utilities will contract the meter reading to the electrical utilities for use with their Advanced Metering Infrastructure. The electric utilities would then transmit this information to the other utilities. Both utilities could benefit from the shared infrastructure.

This scenario includes the inter-connection between the non-electric metering and the advanced meter.

1.3 Use Case Detailed Narrative

A non-electric utility operating in the electric utility's service territory desires to have the electric utility's AMI system provide meter reads on its behalf. This other utility may not intend to acquire and install new meters in order to achieve this capability, however their existing meters (or attached devices) must be compatible with the electric utility AMI System. The non-electric utility enters into an agreement with the electric utility for contracted meter reading. On a regular schedule, the AMI system collects the other utility's meter read information and transmits this data to the requesting utility. The shared usage of the AMI communications network may defer the cost of the AMI infrastructure among more than one utility and may permit the other utilities to control costs and meet other regulatory requirements.

Going beyond basic meter reading, the non-electric utility may desire to extend the electric utility contracts such that they are able to utilize additional advanced capabilities that may be made possible by the AMI system. Examples of such functionality might include on-demand meter reads, interval meter reads, remote meter on/off switching, and other monitoring and control functions related to the meter or other devices at the customer premise.

1.4 Business Rules and Assumptions

- Two way communication is available – From Gas and Water meeting
- Mostly Residential meters/Small commercials. Below 200KW – From Gas and Water meeting
- This Use Case will not identify requirements for AMI Compatible Gas/Water meters, or the installation of such meters.
- Gas/Water Meters to be read by the SCE AMI System must be compatible with the SCE AMI Communications Network.
- Gas/Water meters will be constrained by battery life → particularly with interval reads where more intervals means shorter battery life.
- The shortest Interval length Gas/Water utilities would require is 1 hour.

2. Actors

<i>Actor Name</i>	<i>Actor Type (person, device, system etc.)</i>	<i>Actor Description</i>
AMI System	System	The AMI system is made up of various back office systems that are required to enable remote two-way communications and control with meters and allow for data storage and retrieval
ADCS	System	Automated data collection systems (ADCS) manages data collection (recognizes when data doesn't come in, automatically attempts to retrieve data from meter that wasn't collected).
MDMS	System	Meter Data Management System represents either the organization or system responsible for capturing and maintaining large quantities of data produced by interval meters.
Gas/Water Meter	Device	Meter owned and operated by a gas and/or water utility operating within the electric utility's service territory
Gas/Water utility	Organization	The actual gas and/or water utility which operates within the electric utility's territory.

3. Step by Step analysis of each Scenario

3.1 Primary Scenario 1 - Electric utility performs regularly scheduled ERT water/gas meter read.

This scenario describes the process by which a schedule of reading/reporting of non-electric ERT meters takes place through the AMI system.

<i>Triggering Event</i>	<i>Primary Actor</i>	<i>Pre-Condition</i>	<i>Post-Condition</i>
<i>(Identify the name of the event that start the scenario)</i>	<i>(Identify the actor whose point-of-view is primarily used to describe the steps)</i>	<i>(Identify any pre-conditions or actor states necessary for the scenario to start)</i>	<i>(Identify the post-conditions or significant results required to consider the scenario complete)</i>
Gas/Water utility notifies the electric utility of ERT device on meter	AMI System	Installed meter has an ERT device.	Water/gas utility receives meter read information from the electric utility.

3.1.1 Steps for this scenario

<i>Step #</i>	<i>Actor</i>	<i>Description of the Step</i>	<i>Additional Notes</i>
<i>#</i>	<i>What actor, either primary or secondary is responsible for the activity in this step?</i>	<i>Describe the actions that take place in this step. The step should be described in active, present tense.</i>	<i>Elaborate on any additional description or value of the step to help support the descriptions. Short notes on architecture challenges, etc. may also be noted in this column.</i>
1	Water/gas utility	Water/Gas utility notifies SCE of ERT device on meter along with location and ID	
2	AMI System	The electric utility loads data into AMI System.	
3	AMI System	The electric utility establishes communication with meter.	

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<i>Step #</i>	<i>Actor</i>	<i>Description of the Step</i>	<i>Additional Notes</i>
4	AMI Back Office System	AMI System schedules read cycle based on water/gas utility requirements.	
5	AMI System	AMI System reads water/gas meter at scheduled time <ul style="list-style-type: none"> Register Read Water/gas meter identifier 	
6	AMI System	AMI System adds data points to the ERT water/gas meter read information. <ul style="list-style-type: none"> Date/Time stamp AMI Read device 	
7	AMI Back Office System	AMI System loads read information into MDMS.	
8	MDMS	MDMS verifies data received from all meters	
9	MDMS	MDMS identifies meters where data was not received	
10	MDMS	MDMS transmits meter read information to client utility	

3.2 Primary Scenario 2 - Regular Scheduled AMI Compatible Gas/Water Meter Read

<i>Triggering Event</i>	<i>Primary Actor</i>	<i>Pre-Condition</i>	<i>Post-Condition</i>
<i>(Identify the name of the event that start the scenario)</i>	<i>(Identify the actor whose point-of-view is primarily used to describe the steps)</i>	<i>(Identify any pre-conditions or actor states necessary for the scenario to start)</i>	<i>(Identify the post-conditions or significant results required to consider the scenario complete)</i>
Gas/Water utility notifies the electric utility of installation of AMI	AMI System	Installed gas/water meter is compatible with the AMI system.	Water/gas utility receives meter read information from the electric

compatible meter.			utility.
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3.2.1 Steps for this scenario

Step #	Actor	Description of the Step	Additional Notes
<i>#</i>	<i>What actor, either primary or secondary is responsible for the activity in this step?</i>	<i>Describe the actions that take place in this step. The step should be described in active, present tense.</i>	<i>Elaborate on any additional description or value of the step to help support the descriptions. Short notes on architecture challenges, etc. may also be noted in this column.</i>
1	Non-electric utility	Gas/Water utility notifies the electric utility of AMI compatible meter along with location and ID.	
2	AMI System	The electric utility loads data into AMI System.	
3	AMI System	The electric utility establishes communication with meter.	
4	AMI System	AMI System schedules read cycle based on Gas/Water utility requirements.	
5	AMI System	AMI System reads meter at scheduled time <ul style="list-style-type: none"> • Register Read, Gas/Water • Gas/Water Meter Identifier 	
6	AMI System	AMI System adds data points to the ERT Read <ul style="list-style-type: none"> • Date/Time stamp • AMI Read device 	
7	AMI System	AMI System loads read information into MDMS.	
8	MDMS	MDMS verifies data received from all meters	
9	MDMS	MDMS identifies meters where data was not received.	

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<i>Step #</i>	<i>Actor</i>	<i>Description of the Step</i>	<i>Additional Notes</i>
10	MDMS	MDMS transmits meter read information to client utility.	

3.3 Primary Scenario 3 - Electric utility performs an interval based water/gas meter read

This scenario describes the process by which the electric utility reads the third-party interval meter at specified intervals and then reports the value of the intervals at a later time. For example, the AMI system could read hourly intervals from a third-party meter once per day and report those values once per month.

<i>Triggering Event</i>	<i>Primary Actor</i>	<i>Pre-Condition</i>	<i>Post-Condition</i>
<i>(Identify the name of the event that start the scenario)</i>	<i>(Identify the actor whose point-of-view is primarily used to describe the steps)</i>	<i>(Identify any pre-conditions or actor states necessary for the scenario to start)</i>	<i>(Identify the post-conditions or significant results required to consider the scenario complete)</i>
Water/gas utility notifies the electric utility of interval read requirements	AMI System	Water/gas must have an AMI compatible device	Water/gas utility receives meter read information from the electric utility.

3.3.1 Steps for this scenario

<i>Step #</i>	<i>Actor</i>	<i>Description of the Step</i>	<i>Additional Notes</i>
<i>#</i>	<i>What actor, either primary or secondary is responsible for the activity in this step?</i>	<i>Describe the actions that take place in this step. The step should be described in active, present tense.</i>	<i>Elaborate on any additional description or value of the step to help support the descriptions. Short notes on architecture challenges, etc. may also be noted in this column.</i>

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<i>Step #</i>	<i>Actor</i>	<i>Description of the Step</i>	<i>Additional Notes</i>
1	Water/gas utility	Water/gas utility notifies the electric utility of AMI compatible communication device on meter along with location and ID	
2	AMI System	The electric utility loads data into the AMI System	
3	AMI System	The electric utility establishes communication with the water/gas meter	
4	AMI System	AMI system schedules read cycle based on water/gas utility requirements	
5	AMI System	AMI system reads meter at scheduled time <ul style="list-style-type: none"> • Register read, of water/gas usage • Interval Values • Water/gas meter identifier 	
6	AMI System	AMI system adds data points to the read at every Interval <ul style="list-style-type: none"> • Date/Time stamp • AMI Read device 	
7	AMI System	AMI System loads interval data into MDMS	
8	MDMS	MDMS verifies interval data is received from all meters	
9	MDMS	MDMS identifies meters where data was not received	
10	MDMS	MDMS transmits interval meter data to client utility	

3.4 Primary Scenario 4 - Electric Utility Control of Water/Gas Meter

This scenario describes how the Electric Utility could control or configure the water/gas meter through the AMI system. One example of this control would be remote turn-on/turn-off.

<i>Triggering Event</i>	<i>Primary Actor</i>	<i>Pre-Condition</i>	<i>Post-Condition</i>
<i>(Identify the name of the event that start the scenario)</i>	<i>(Identify the actor whose point-of-view is primarily used to describe the steps)</i>	<i>(Identify any pre-conditions or actor states necessary for the scenario to start)</i>	<i>(Identify the post-conditions or significant results required to consider the scenario complete)</i>
Water/gas utility wants the electric utility to turn the water/gas meter on/off	AMI System	Water/gas must have an AMI compatible device with a remote control function	Water/gas utility receives meter read information from the electric utility and control action is performed

3.4.1 Steps for this scenario

<i>Step #</i>	<i>Actor</i>	<i>Description of the Step</i>	<i>Additional Notes</i>
<i>#</i>	<i>What actor, either primary or secondary is responsible for the activity in this step?</i>	<i>Describe the actions that take place in this step. The step should be described in active, present tense.</i>	<i>Elaborate on any additional description or value of the step to help support the descriptions. Short notes on architecture challenges, etc. may also be noted in this column.</i>
1	Water/gas utility	Water/gas utility determines need to remotely control/configure the water/gas meter. They also determine whether a meter read should take place, and notifies the Electric Utility	This scenario assumes that the electric utility will be controlling this function. Water/gas utility control would fall under B1 Use Case – Third Party access scenario
2	Electric Utility	Electric Utility executes the instruction from the water/gas utility.	
3	AMI System	The AMI System sends command to connect/disconnect the water/gas meter	In the event that the compatible Water/gas meter has capability of remote connect/disconnect

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<i>Step #</i>	<i>Actor</i>	<i>Description of the Step</i>	<i>Additional Notes</i>
4	Water/gas Meter	The water/gas meter receives the command from the AMI System	
5	AMI System	<p>The AMI System receives interval data and register read from meter</p> <ul style="list-style-type: none"> • Register read, of water/gas usage • Interval values, if available • Water/gas meter identifier 	
6	AMI System	<p>AMI System adds data points to the water/gas meter read information.</p> <ul style="list-style-type: none"> • Date/Time stamp • AMI Read device 	
7	Water/gas Meter	The water/gas meter executes the control/configuration action and transmits a confirmation to the AMI system	

3.5 Primary Scenario 5 - Electric utility performs monitoring of water/gas Meter (monitoring request)

This scenario describes the process by the utility monitors the third-party meter. Event information is transmitted the the client within a short time frame.

<i>Triggering Event</i>	<i>Primary Actor</i>	<i>Pre-Condition</i>	<i>Post-Condition</i>
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<i>(Identify the name of the event that start the scenario)</i>	<i>(Identify the actor whose point-of-view is primarily used to describe the steps)</i>	<i>(Identify any pre-conditions or actor states necessary for the scenario to start)</i>	<i>(Identify the post-conditions or significant results required to consider the scenario complete)</i>
Water/gas utility notifies the electric utility of meter monitoring needs	AMI System	Water/gas must have an AMI compatible device	Water/gas utility receives meter status information from the electric utility.

3.5.1 Steps for this scenario

Step #	Actor	Description of the Step	Additional Notes
<i>#</i>	<i>What actor, either primary or secondary is responsible for the activity in this step?</i>	<i>Describe the actions that take place in this step. The step should be described in active, present tense.</i>	<i>Elaborate on any additional description or value of the step to help support the descriptions. Short notes on architecture challenges, etc. may also be noted in this column.</i>
1	Water/gas utility	Water/gas utility determines need to remotely monitor the water/gas meter	This scenario assumes that the electric utility will be controlling this function. Water/gas utility monitoring would fall under B1 Use Case – Third Party access scenario
2	AMI System	The AMI System sends command to monitor a specific data point from the gas/water meter	In the event that the compatible water/gas meter has capability of providing data for remote monitoring
3	Gas/Water Meter	The water/gas meter receives the command from the AMI System	
4	AMI System	The AMI System receives the requested data point, as well as the current interval data and register read from meter	This scenario could be used to retrieve an on-demand read from a Gas/Water meter using the AMI System
5	AMI System	AMI System provides data to requestor	

3.6 Primary Scenario 6 - Electric utility performs event detection monitoring of water/gas Meter (Non-Read ? event detection/ alarm)

This scenario describes the process for transmission of unsolicited event reports through the AMI system. The AMI system receives events from the meter when they occur, or picks up the events during a routine meter read. That event is then transmitted to the client within a short time of the event detection by the AMI system,

<i>Triggering Event</i>	<i>Primary Actor</i>	<i>Pre-Condition</i>	<i>Post-Condition</i>
<i>(Identify the name of the event that start the scenario)</i>	<i>(Identify the actor whose point-of-view is primarily used to describe the steps)</i>	<i>(Identify any pre-conditions or actor states necessary for the scenario to start)</i>	<i>(Identify the post-conditions or significant results required to consider the scenario complete)</i>
Water/gas utility notifies the electric utility of event detection/alarm monitoring needs	AMI System	Water/gas must have an AMI compatible device	Water/gas utility receives meter event information from the electric utility.

3.6.1 Steps for this scenario

<i>Step #</i>	<i>Actor</i>	<i>Description of the Step</i>	<i>Additional Notes</i>
<i>#</i>	<i>What actor, either primary or secondary is responsible for the activity in this step?</i>	<i>Describe the actions that take place in this step. The step should be described in active, present tense.</i>	<i>Elaborate on any additional description or value of the step to help support the descriptions. Short notes on architecture challenges, etc. may also be noted in this column.</i>
1	Water/gas utility	Water/gas meter detects an event that requires immediate notification	In the event that the compatible Gas/Water meter has capability of detecting events and sending "alarm" messages
2	Water/gas Meter	Water/gas meter sends an event message to the electric utility using the AMI communications network	
3	AMI System	AMI system receives the water/gas meter event message and determines routing based on message type/content	

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<i>Step #</i>	<i>Actor</i>	<i>Description of the Step</i>	<i>Additional Notes</i>
4	AMI System	AMI system forwards event message to identified recipient(s)	

3.7 Primary Scenario 7 - AMI System fails to read water/gas meter (Regularly Scheduled Read)

This scenario describes the process for re-reading “missed” third-party meters.

<i>Triggering Event</i>	<i>Primary Actor</i>	<i>Pre-Condition</i>	<i>Post-Condition</i>
<i>(Identify the name of the event that start the scenario)</i>	<i>(Identify the actor whose point-of-view is primarily used to describe the steps)</i>	<i>(Identify any pre-conditions or actor states necessary for the scenario to start)</i>	<i>(Identify the post-conditions or significant results required to consider the scenario complete)</i>
Regularly scheduled water/gas read cycle (Scenario 1, 2, or 3) completes	AMI System	Must be an AMI Compatible or ERT device	Gas/Water utility receives meter read information from the electric utility.

3.7.1 Steps for this scenario

<i>Step #</i>	<i>Actor</i>	<i>Description of the Step</i>	<i>Additional Notes</i>
<i>#</i>	<i>What actor, either primary or secondary is responsible for the activity in this step?</i>	<i>Describe the actions that take place in this step. The step should be described in active, present tense.</i>	<i>Elaborate on any additional description or value of the step to help support the descriptions. Short notes on architecture challenges, etc. may also be noted in this column.</i>
1	AMI System	Regularly scheduled water/gas read cycle (Scenario 1,2, or 3) completes	
2	MDMS	MDMS identifies and logs water/gas meters where complete data was not received by the AMI System	

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<i>Step #</i>	<i>Actor</i>	<i>Description of the Step</i>	<i>Additional Notes</i>
3	MDMS	MDMS sends a command to identified water/gas meters to retrieve missing read data	
4	ADCS	Automated on demand read command completes	
5	MDMS	MDMS identifies meters where data is received by automated on demand read request instead of default schedule, stores the retrieved data, and logs the successful result.	
6	MDMS	MDMS identifies meters where previous day's data is still missing/ incomplete and logs the failed retry attempt.	
7	AMI System	Steps 4-7 are repeated for two additional cycles	
8	MDMS	MDMS reports problematic water/gas meters to water/gas utility	

4. Requirements

4.1 Functional Requirements

<i>Functional Requirements</i>	<i>Associated Scenario # (if applicable)</i>	<i>Associated Step # (if applicable)</i>
AMI system shall be compatible with existing water/gas Encoder-Receiver-Transmitter (ERT) devices (Itron or other)	1	1
Back office systems shall manage water/gas meter population including a unique, configurable read schedule	1	4
	2	4
	3	4
The AMI system shall uniquely identify each water/gas meter and associate it with the water/gas utility's service delivery point	1	2
	2	2
	3	2
AMI system shall have the capability to track multiple third party meters per the water/gas utility's service delivery point	1	2
	2	2
	3	2
AMI system shall add date/time stamp to water/gas reads (if not already provided by water/gas meter)	1	6
	2	6
	3	6
The MDMS shall track the source of the read information (person, AMI, etc.).	1	6
	2	6
	3	6
The MDMS system shall store water/gas meter read data	1	7

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<i>Functional Requirements</i>	<i>Associated Scenario # (if applicable)</i>	<i>Associated Step # (if applicable)</i>
	2	7
	3	7
The MDMS shall provide data in multiple, configurable formats, and at whatever frequency (i.e. daily, monthly, etc.) is provided for in the contract to the water/gas utility.	1	10
	2	10
	3	10
The MDMS shall provide validation capabilities for water/gas reads.	1	7
	2	7
	3	7
The MDMS shall identify water/gas meters that did not send requested read data	1	9
	2	9
	3	9
	7	2
	7	6
AMI system shall accommodate self registering and non-self registering water/gas meters	1	3
	2	3
	3	3
The AMI System shall maintain a meter reading schedule for multiple service types at one premise	1	3
	2	3
	3	3
The AMI System shall maintain a meter inventory for each premise, including meter ownership	1	2
	2	2
	3	2
The AMI System shall have the ability to read water/gas meters at least once per day.	1	4

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<i>Functional Requirements</i>	<i>Associated Scenario # (if applicable)</i>	<i>Associated Step # (if applicable)</i>
	2	4
	3	4
The AMI System shall have the ability to read interval data for water/gas meters (if the water/gas meter is setup for interval reads)	3	5
The AMI System shall have the ability to retrieve a corrected read (corrected for gas pressure) for gas meters.	1	0
	2	0
	3	0
The AMI System shall be able to retrieve corrected and uncorrected reads for gas meters.	1	0
	2	0
	3	0
The AMI System shall be able to interface with non-electric meters either (1) directly through the AMI Communications Network, or (2) via a nearby AMI electric meter.	1	5
	2	5
	3	5
The AMI System shall support receipt of any data messaging from water/gas meters so long as it is formatted according to SCE AMI defined standards	6	3
The AMI System shall support communications with any SCE approved AMI compatible water/gas meters	1	3
	2	3
	3	3
The AMI System shall be able to retrieve non-usage data along with usage data (i.e. battery level, temp, pressure, etc.) from water/gas meters if available.	5	4
The AMI System shall manage read frequency of water/gas meters to enable maximum battery life.	3	4
The AMI System shall support polling of water/gas meters as well as accepting information originated directly from the water/gas meters.	1	5
	2	5

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<i>Functional Requirements</i>	<i>Associated Scenario # (if applicable)</i>	<i>Associated Step # (if applicable)</i>
	3	5
	4	2
	5	2
	6	2
AMI system shall add the device identifier of the AMI device that was entry point into the AMI System for water/gas reads (e.g. AMI meter ID, AMI communications network device ID, etc.)	1	6
	2	6
	3	6
AMI system shall be able to send commands to water/gas meters for remote turn on/turn off (for those gas/water meters equipped to handle such commands)	4	2
AMI System shall be able to read water/gas meters on demand	5	4
	7	3
	7	7
MDMS shall be able to issue automated on demand reads to water/gas meters	7	3
	7	7
The AMI system shall not prevent contract billing for water/gas meter reads that it collects.	1	0
	2	0
	3	0
The MDMS shall be able to extend validation logic to provide for additional data validation steps in the future.	1	7
	2	7
	3	7
The MDMS validation steps for water/gas data shall be optional. That is, data will be able to be provided to water/gas utility as validated or non-validated, according to the contract reached with the specific water/gas utility.	1	7
	1	10
	2	7
	2	10

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<i>Functional Requirements</i>	<i>Associated Scenario # (if applicable)</i>	<i>Associated Step # (if applicable)</i>
All water/gas meters read by the AMI System shall be registered with the AMI System	3	7
	3	10
	1	1
	2	1
	3	1

4.2 Non-functional Requirements

<i>Non-Functional Requirements</i>	<i>Associated Scenario # (if applicable)</i>	<i>Associated Step # (if applicable)</i>
The MDMS shall store water/gas read data for the same length of time as electric reads, (currently 4 years.)	1	7
	2	7
	3	7

4.3 Business Requirements

<i>Business Requirement</i>	<i>Associated Scenario # (if applicable)</i>	<i>Associated Step # (if applicable)</i>

5. Use Case Models (optional)

This section is used by the architecture team to detail information exchange, actor interactions and sequence diagrams

5.1 Information Exchange

For each scenario detail the information exchanged in each step

Scenario #	Step #, Step Name	Information Producer	Information Receiver	Name of information exchanged
#	Name of the step for this scenario.	What actors are primarily responsible for Producing the information?	What actors are primarily responsible for Receiving the information?	Describe the information being exchanged
1	Water/Gas utility notifies SCE of ERT device on meter along with location and ID	Water/Gas Utility	SCE	ERT device on meter Location ID
	SCE loads data into AMI System.	SCE Customer Representative	AMI Back Office System	ERT device on meter Location ID
	SCE establishes communication with meter.	SCE AMI Back Office System	ADCS	Communication request
	SCE establishes communication with meter.	ADCS	Gas / Water Meter	Communication request
	SCE establishes communication with meter.	Gas / Water Meter	ADCS	Communication confirmation
	SCE establishes communication with meter.	ADCS	MDMS	Communication confirmation
	SCE establishes communication with meter.	MDMS	AMI Back Office System	Communication confirmation
	AMI System schedules read cycle based on Gas/Water utility requirements.	AMI System	AMI System	Read Cycle scheduling information
	AMI System reads meter at scheduled time Register Read, Gas/Water Gas/Water Meter Identifier	ADCS	Gas / Water Meter	Register Read request Gas / Water Gas/Water Meter Identifier request

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<i>Scenario #</i>	<i>Step #, Step Name</i>	<i>Information Producer</i>	<i>Information Receiver</i>	<i>Name of information exchanged</i>
	AMI System reads meter at scheduled time Register Read, Gas/Water Gas/Water Meter Identifier	Gas / Water Meter	ADCS	Register Read Gas / Water Gas/Water Meter Identifier
	AMI System adds data points to the ERT Read Date/Time stamp AMI Read device	AMI System ADCS	ERT Read	Register Read Gas / Water Gas/Water Meter Identifier Date Time stamp
	AMI System loads read information into MDMS.	ADCS	MDMS	Read information
	MDMS verifies data received from all meters	MDMS	MDMS	All meters read
	MDMS identifies meters where data was not received	MDMS	MDMS	Following meters not read
	MDMS transmits meter read information to client utility	MDMS	Client Utility	Meter Read information
2	Gas/Water utility notifies SCE of ERT device on meter along with location and ID.	Water/Gas Utility	SCE	ERT device on meter Location ID
	SCE loads data into AMI System.	SCE Customer Representative	AMI Back Office System	ERT device on meter Location ID
	SCE establishes communication with meter.	SCE AMI Back Office System	ADCS	Communication request
	SCE establishes communication with meter.	ADCS	Gas / Water Meter	Communication request
	SCE establishes communication with meter.	Gas / Water Meter	ADCS	Communication confirmation
	SCE establishes communication with meter.	ADCS	MDMS	Communication confirmation
	SCE establishes communication with meter.	MDMS	CSS	Communication confirmation

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<i>Scenario #</i>	<i>Step #, Step Name</i>	<i>Information Producer</i>	<i>Information Receiver</i>	<i>Name of information exchanged</i>
	AMI System schedules read cycle based on Gas/Water utility requirements.	AMI System	AMI System	Read Cycle scheduling information
	AMI System reads meter at scheduled time Register Read, Gas/Water Gas/Water Meter Identifier	ADCS	Gas / Water Meter	Register Read request Gas / Water Gas/Water Meter Identifier request
	AMI System reads meter at scheduled time Register Read, Gas/Water Gas/Water Meter Identifier	Gas / Water Meter	ADCS	Register Read Gas / Water Gas/Water Meter Identifier
	AMI System adds data points to the ERT Read Date/Time stamp AMI Read device	ADCS	ERT Read	Register Read Gas / Water Gas/Water Meter Identifier Date Time stamp
	AMI System loads read information into MDMS.	AMI System ADCS	MDMS	Read information
	MDMS verifies data received from all meters	MDMS	MDMS	All meters were read
	MDMS identifies meters where data was not received.	MDMS	MDMS	Following meters not read
	MDMS transmits meter read information to client utility.	MDMS	Client Utility	Meter Read information
3	Water/Gas utility notifies SCE of AMI communication device on meter along with location and ID			
	SCE Loads data into AMI System			
	SCE establishes communication with meter			
	AMI system schedules read and interval cycle based on Gas/Water utility requirements			

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<i>Scenario #</i>	<i>Step #, Step Name</i>	<i>Information Producer</i>	<i>Information Receiver</i>	<i>Name of information exchanged</i>
	AMI system reads meter at scheduled time and at specified Intervals Register Read, Gas/Water Gas/Water Meter Identifier			
	AMI system adds data points to the Read at every Interval Date/Time stamp AMI Read device			
	AMI System loads Interval data into MDMS			
	MDMS verifies Interval data is received from all meters			
	MDMS identifies meters where data was not received			
	MDMS transmits Interval meter data to external client			
4	There is a need to remotely turn on/off the gas/water meter			
	The AMI System sends command to connect/disconnect gas/water meter	AMI Back Office System	ADCS	Command to CONNECT or DISCONNECT
	The AMI System sends command to connect/disconnect gas/water meter	ADCS	Gas / Water Meter	Command to CONNECT or DISCONNECT
	The AMI System sends command to connect/disconnect gas/water meter	AMI System	Gas / Water Meter	Command to CONNECT or DISCONNECT
	The Gas/Water meter receives the command from the AMI System			
	The AMI System receives interval data and register read from meter	Gas / Water Meter	ADCS	Interval data Register read

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<i>Scenario #</i>	<i>Step #, Step Name</i>	<i>Information Producer</i>	<i>Information Receiver</i>	<i>Name of information exchanged</i>
	The AMI System receives interval data and register read from meter	ADCS	MDMS	Interval data Register read
	The Gas/Water meter executes the turn on/turn off command			
5	There is a need to remotely monitor the gas/water meter			
	The AMI System sends command to monitor a specific data point from the gas/water meter	AMI Back Office System	ADCS	Command MONITOR specific data point
	The AMI System sends command to monitor a specific data point from the gas/water meter	ADCS	Gas / Water Meter	Command MONITOR specific data point
	The Gas/Water meter receives the command from the AMI System			
	The AMI System receives the requested data point, as well as the current interval data and register read from meter	Gas / Water Meter	ADCS	Requested data point data Interval data Register read
	The AMI System receives the requested data point, as well as the current interval data and register read from meter	ADCS	MDMS	Requested data point data Interval data Register read
	The AMI System receives the requested data point, as well as the current interval data and register read from meter	MDMS	CSS	Requested data point data Interval data Register read
	AMI System determines provides data to requestor	AMI Back Office System	Requestor	Requested data point data Interval data Register read
6	Gas/Water Meter detects an event that requires immediate notification			
	Gas/Water Meter sends an event message to the utility (SCE)	Gas / Water Meter	ADCS	Event data

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<i>Scenario #</i>	<i>Step #, Step Name</i>	<i>Information Producer</i>	<i>Information Receiver</i>	<i>Name of information exchanged</i>
	AMI system receives the Gas/Water meter event message and determines routing based on message type/content	ADCS	MDMS	Event data
	AMI system forwards event message to identified recipient(s)	MDMS	Vairable recipient, depending on Event type	Event data
7	Regularly Scheduled Gas/Water read cycle (Scenario 1) Completes			
	MDMS identifies gas/water meters where data was not received	MDMS	MDMS	The following meters were not read
	MDMS notes meters with missing/incomplete data	MDMS	MDMS	The following meters were not correctly read
	MDMS sends a command to identified gas/water meters to retrieve missing read data	MDMS	ADCS	Command to retrieve missing read data
	MDMS sends a command to identified gas/water meters to retrieve missing read data	ADCS	Gas / Water Meter	Command to retrieve missing read data
	Automated on demand read command completes	Gas / Water Meter(s)	ADCS	Requested read data
	Automated on demand read command completes	ADCS	MDMS	Requested read data
	MDMS identifies meters where data is received by automated on demand read request instead of default schedule, stores the retrieved data, and logs the successful result.	Gas / Water Meter	ADCS	

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<i>Scenario #</i>	<i>Step #, Step Name</i>	<i>Information Producer</i>	<i>Information Receiver</i>	<i>Name of information exchanged</i>
	MDMS identifies meters where data is received by automated on demand read request instead of default schedule, stores the retrieved data, and logs the successful result.	ADCS	MDMS	Meter with successful on demand read
	MDMS identifies meters where previous day's data is still missing/incomplete and logs the failed retry attempt.	MDMS	MDMS	The following meters could not be read
	Steps 4-7 are repeated for two additional cycles			
	MDMS makes a report available for Gas/Water utility to identify problematic Gas/Water meters	MDMS	CSS	Identification of problematic meters
	MDMS makes a report available for Gas/Water utility to identify problematic Gas/Water meters	CSS	Gas / Water Utility	Identification of problematic meters

5.2 Diagrams

The architecture team shall use this section to develop an interaction diagram that graphically describes the step-by-step actor-system interactions for all scenarios. The diagrams shall use standard UML notation. Additionally, sequence diagrams may be developed to help describe complex event flows.

6. Use Case Issues

Capture any issues with the use case. Specifically, these are issues that are not resolved and help the use case reader understand the constraints or unresolved factors that have an impact of the use case scenarios and their realization.

<i>Issue</i>
<i>Describe the issue as well as any potential impacts to the use case.</i>

7. Glossary

Insert the terms and definitions relevant to this use case. Please ensure that any glossary item added to this list should be included in the global glossary to ensure consistency between use cases.

Glossary	
Term	Definition

8. References

Reference any prior work (intellectual property of companies or individuals) used in the preparation of this use case.

9. Bibliography (optional)

Provide a list of related reading, standards, etc. that the use case reader may find helpful.