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Valor Water Analytics Comments on Innovative Water Conservation and Water Loss Detection

Additional submitted attachment is included below.

Valor Water Analytics, Inc.
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October 21, 2016

Commissioner Andrew McAllister
California Energy Commission
1516 Ninth Street
Sacramento, California 95814

RE: Valor Water Analytics Comments on Innovative Water Conservation and Water Loss Detection and Control Technologies

Dear Commissioner McAllister:

Valor Water Analytics is a technology firm that delivers analytical software to water agencies to identify and address water loss. The company was founded in 2013 and is located in San Francisco, CA. Our clients include Sonoma County Water Agency, California American Water, San Gabriel Valley Water Company, and Palm Beach County Utilities, among others. We are a team of data scientists, water planners, and technologists and operate under a technology transfer agreement with the University of North Carolina at Chapel Hill, where our methodologies were developed. In 2015 we won the Imagine H2O Water Technology Prize.

We appreciate the opportunity to provide these comments regarding Innovation in Water Conservation and Water Loss Detection Technologies.

Computational data science and advanced data analytics are emerging methodologies in the area of water technologies. Further, using these methodologies to detect water loss and perform water use desegregation is also new. The field of computational data science for water, which leverages the much more granular usage data made possible by advanced metering infrastructure (AMI) (compared to older technologies like manually-read or automated meter reading (AMR) technologies) is nascent. Data is especially useful when analysts take the time to measure the data quality, create analytical methodologies, and then test and validate analytical results in the field. Valor Water has completed each of these steps and has a validated set of analytical methodologies with three distinct aims:
- To detect and measure water loss behind the meter
- To detect and measure other apparent losses (as described in AWWA M36, Ch. 3)
- To disaggregate indoor and outdoor water use with a high level of accuracy

A secondary benefit of these technologies is quantifying the embedded energy savings associated with more efficient water use. Valor Water also has a tool (The Water Energy Nexus Calculator) that quantifies the embedded energy in water from the above noted water efficiency measures.

We believe that the state should evaluate the impact of joint technologies such as Advanced Metering Infrastructure (AMI) plus analytics that advance water, and energy, efficiency. The current scope of innovative technologies under consideration by the state has a limited scope of focus on water savings from end use devices, such as low flow shower heads. This scope of water savings measurement, although important, represents only a small portion of total savings occurring throughout the state, and omits water savings contributions of innovative joint meter & analytics technologies in use by urban water utilities.

Valor Water Analytics utilizes hourly interval AMI data to provide the following benefits to water agencies and their communities:

Reduce water losses due to leaks
By providing a continuous flow of water use information, typically in hourly or 15-minute intervals, AMI enables the use of analytics to quickly spot anomalies, identify leaks and notify water users about water use restriction violations and undetected or excessive water use. AMI allows utility operators to calculate how much water is lost in the distribution system. Once AMI is installed, they can use the same infrastructure to monitor other devices, such as leak-detection equipment installed on water mains or overflow sensors on sewers.

Reduce apparent losses
Apparent losses are one of the most pressing problems for water utilities, and one of the hardest to detect and quantify. On average, about 3-5% of retail utility water is unaccounted for and unbilled for. This retail water loss represents approximately 1-5% of a utility's top-line revenue. For an average-sized utility, this can result in millions of dollars per year in unbilled water. Valor's analytics utilize advanced meter data to detect apparent losses on all meters within a utility's system. Our Hidden Revenue Locator uses AWWA M36 standards and finds losses in the form of metering inaccuracies, systematic data handling errors, leaks and unauthorized consumption.

Water use disaggregation
High frequency interval data provides the data resolution necessary to identify and measure the volume of water being used indoor versus the volume of water being used outdoors (such as for landscaping). This type of disaggregation analysis can be used by water utilities and also by state regulators as a cost-effective means to determine irrigation water charging, to detect violation of local irrigation ordinances, and also to set outdoor water use performance measures for the Department of Water Resources upcoming Target Framework to implement Governor Brown's Executive Order B-37-16.

Our team at Valor Water is working to refine and develop more precise methodologies for calculating detecting and validating water and energy savings opportunities from AMI data. We are doing this in

several ways. First, in our current work with IOU water utilities in southern California, we are integrating elements of CPUC Water Energy Nexus Calculator (CPUC WEN, version from February 2016) methodology with CARB GHG calculator methodology in order to capture the highest level of both water and energy savings science from each calculator. Representatives from Valor Water Analytics have presented at multiple CPUC calculator workshops over the last year on these methodologies and projects. Second, we are applying rigorous statistical methods to establish pre-AMI baseline water / energy levels in order to measure impacts of AMI interventions. Methodologies includes randomized control experimental design with difference in difference statistical evaluation. Peer reviewed studies on this technology have yet to be carried out, and our team is working with agencies throughout the state to gather and analyze the data and measure the energy and water savings and publish these results. You can see more information on current projects by clicking here.

In our work to date, we have identified and quantified 4 savings areas through which we measure AMI impacts on water and energy use in urban utilities. The four water and energy savings areas are:

1. Hot water leaks
2. Non hot water leaks, at and behind the meter
3. Water use disaggregation
4. Other water losses

Our analytics engine is able to measure each of these aspects individually, use statistical methods to determine water savings, and then calculate the associated energy and water savings per savings area. AMI data streams hourly from each utility customer making for highly granular data and strong data signals (i.e. leak, conservation) that we detect and analyze.

In closing, we believe that the field of computation analytics for meter data has only scratched the surface in terms of both innovation and also impact across California urban water utilities. We understand that the CEC desires to see more rigorous studies demonstrating energy and water savings from implementation of AMI + Analytics project. This letter means to demonstrate that work to satisfy these requirements is occurring right now, and we believe that the work will fulfill the quantification requirements of the CEC. Further, we believe that innovative water technology such as AMI + Analytics has benefits for citizens of California including but not limited to:

- Water and energy savings
- Operational cost savings for water utilities, passed through to customer
- Contributions to better local air quality and greenhouse gas reductions
- Quantification of indoor / outdoor use for pricing, ordinance xxxx and performance measure compliance.

We urge the CEC to take these comments into consideration as you consider further development and use cases AMI + Analytics.

Thank you for your time and consideration. Please do not hesitate to reach out to me, Christine E. Boyle, PhD with any follow up questions via email at christine@valorwater.com.

Sincerely,

Christine E. Boyle, PhD
Founder and CEO
Valor Water Analytics, Inc.