Advanced Metering Infrastructure (AMI) System

South Tahoe Public Utility District
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Executive Summary

March 10, 2016

South Tahoe Public Utility District
1275 Meadow Crest Dr.
South Lake Tahoe, CA 96150
El Dorado County

The task areas identified for this project: Task A: Make Additional Water Supplies Available and Improve Water Management through Measurement, Modeling and Tools. This project, the installation and implementation of an Advanced Metering Infrastructure (AMI) System is designed to provide real-time operational modeling information to track water customer demand and use. The project is matched with Phase 3 of the STPUD meter installation project, which will bring the STPUD service area to within 90% fully metered. The meter project and the AMI system will provide significant water savings, adding to additional water supply availability, as well as improving current water management throughout the STPUD area. Currently, STPUD tracks supply conditions, but little information is known about customer daily use and this information is key in evaluating user restrictions, water delivery needs and how best to meet the State of California drought compliance standards. The new metering of all resiential water connections within the STPUD service area and the implementation of the AMI system would allow District staff, as well as water customers, to have access to immediate water use information for drought planning and behavioral water use changes.

The estimated length of time to complete this project is 24 months with a start date of October 1, 2016 and a project end date of September 30, 2018. An additional two months to complete a final report on the project has also been incorporated into the schedule.

Total Project Cost: $5,712,900 (including meter installation)
Total AMI System Installation Cost and request: $297,606

The project is not located on a Federal facility.

Background Data
Automated Meter Infrastructure (AMI) System
STPUD

South Tahoe Public Utility District (STPUD) is a special district that supplies approximately 14,000 drinking water services and 17,000 sewer services to the City of South Lake Tahoe and portions of El Dorado County. All water supply sources are from 12 wells, with an average water supply of 9528 AFY (2010 STPUD Urban Water Management Plan). 260 miles of water main lines deliver drinking water to the commercial and residential services provided. The District does not have any industrial or agricultural water users in El Dorado County, although we do provided treated effluent for agricultural users in neighboring Alpine County.

STPUD operates within the delicate environment of Lake Tahoe and is subject to a high level of regulatory and environmental agencies and their mandates. In addition, STPUD must meet the California State Drinking Water and Sewer Treatment requirements, some of the most stringent in the country. As STPUD provides services in designated disadvantaged communities (U.S. Census Bureau), staff must also be more mindful of the financial impacts of all capital projects on the ratepayers it serves.

One of the more recent California State mandates, AB 2752, requires all urban water suppliers (serving over 3000 water connections) to install water meters on residential/commercial water services by the year 2025 and begin volumetric pricing for metered customers on January 1, 2011. Of the 14,000 connections, STPUD has installed a total of 7100 commercial and residential meters. The remaining approximately 6900 meters are being installed in phases, with Phase 1 being completed by October 2015 for an additional 1500 meters. Phases 2-5 will be completed by 2018. The District has received a Drinking Water State Revolving Fund loan from the California State Water Resources Control Board in order to complete the meter installation. In addition, AB 1420 mandates the implementation of water conservation measures (Best Management Practices). STPUD has developed a water conservation program and implements the following: turf removal incentives, water efficient appliance rebates, water saving audits (both residential and commercial), and high efficiency irrigation rebates.

In addition to the water saving measures above, recent drought conditions in California have led the District to implement Stage 3 from the Water Shortage Contingency Plan contained in the Urban Water Management Plan 2010 (see table below). Although we are under Stage 3 restrictions, we do still allow Sunday only water use on weekends, but if the drought continues, this will be dropped and we will move to Stage 4.

Table 5.9 (DWR Table 35)

Water Shortage Contingency – Rationing Stages[a] to Address Water Supply Shortages

Stage No.	Water Supply Conditions	% Shortage
Continuous	Water Waste Prohibited	NA
1 Normal Conditions	Prohibition against runoff from site	10%
	Prohibition against irrigating non-landscaped property except to mitigate fire risk	
	Inspection/repair/adjustment of irrigation systems	
	Shutoff nozzle required on hoses used for vehicle washing	
	Encouragement to report water leaks/waste	
2 Minor Water Supply Shortage	All Stage 1 Restrictions	20%
	Designated irrigation days	
	Prohibition against washing hard surfaces except to mitigate fire or sanitation concerns	
	Restaurant water service on request	
3 Severe Water Supply Shortage	All Stage 1 and 2 Restrictions	30%
	Weekend irrigation prohibition	
	Prohibition agains filling outdoor swimming pools	
	Prohibition against operating non-recirculating fountains and ornamental water features	
4 Critical Water Supply	All Stage 1, 2 and 3 Restrictions	40%
	Outdoor irrigation limited to once per week	
	Prohibition against water use for landscaping for new construction	
	Prohibition against hydrant use except for fire fighting	
5 Water Emergency	All Stage 1, 2, 3 and 4 Restrictions	50%
	Prohibition against water use for other than domestic and commercial purposes (no irrigation)	
	Prohibition against water use for construction dust control	
	Prohibition against hydrant flushing	
	Prohibition against water use for air conditioning where an alternate source of fresh air is availalble	

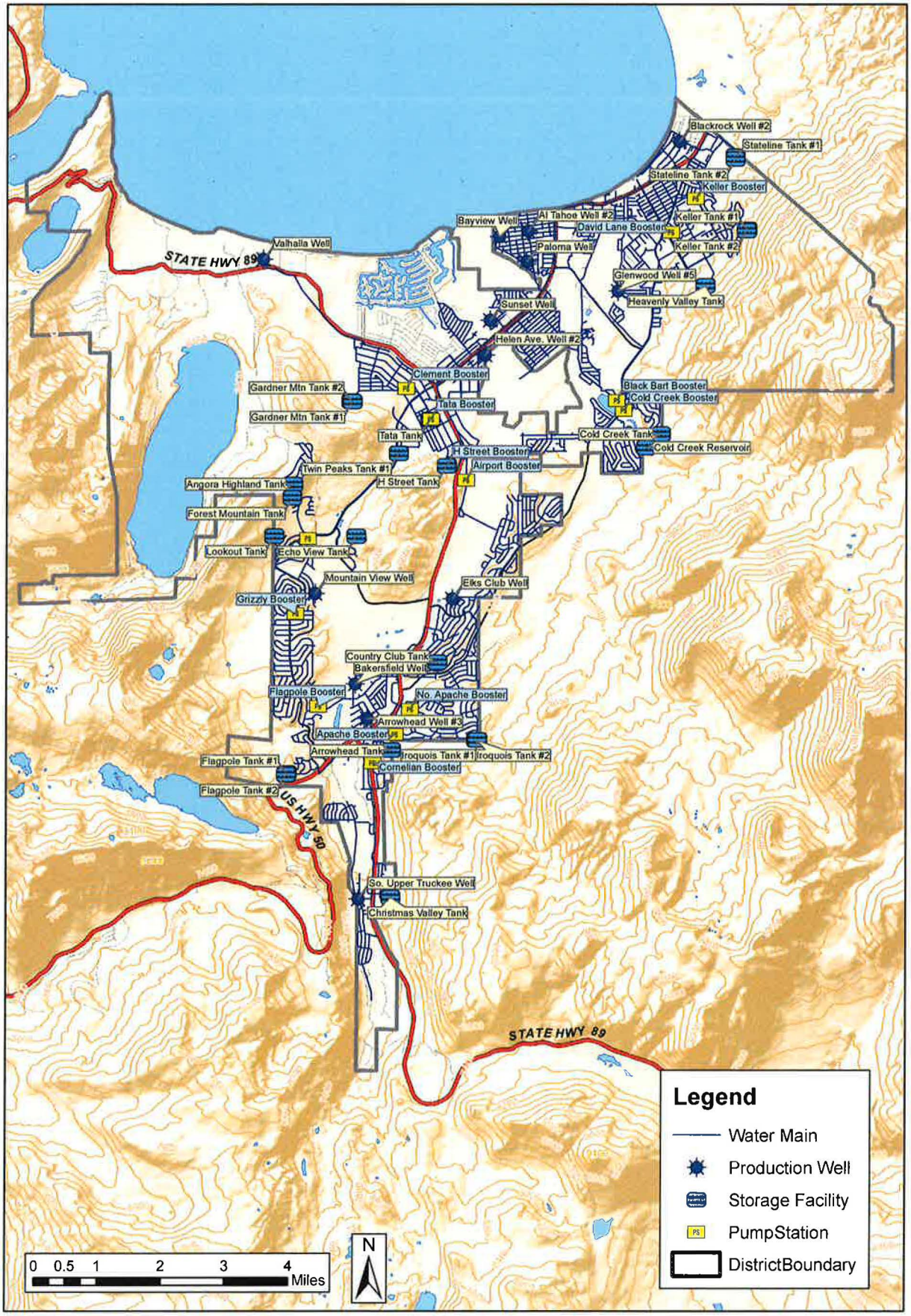
[a] One of the stages of action must be designed to address a 50 percent reduction in water supply.

Although the District's service area is considered a water-rich area with a groundwater basin that is designated a "medium priority" basin by the California Department of Water Resources, the impacts of the drought affect not only the lake levels but also further downstream in the city of Reno, Nevada and ultimately Pyramid Lake on the Washoe Indian Tribal grounds. When drought occurs and the lake level falls, the only existing outflow, the Truckee River, is severely impacted. The Truckee River brings a significant water supply to Nevada and is dependent upon water sources from the many tributaries on the south side of the Lake. Although snowfall is the single most important contributor to water levels in these tributaries, it is imperative during drought years that the District educate water users on the long term effects of also depleting groundwater resources. With a high percentage of unmetered customers, this has been a challenging goal, made more challenging by the recent mandate by the State of California drought

impact mandate to reduce water use by 20% within the next year, in addition to the meter mandates and the 20% by 2020 mandate from earlier years.
The most important goal in meeting these reductions is the current meter installation project, however, the installation of meters is not enough. The District is requesting Bureau of Reclamation WaterSMART Drought Resistance Funding for the installation of an automated meter infrastructure system that would allow both District personnel and the 14,000 water service customers to have access to "real-time" water use data for future drought resistance planning. Customers will be educated in how to access this information in order to understand how to curb their indoor and outdoor water use and provide them with the ability to evaluate water use per person per household. The District will utilize the data for drought contingency planning efforts to assess actual water use to replace the estimated water use data that is currently being used for drought planning efforts.

Attached to this section is a project map detailing the service area of STPUD that includes all the water storage tanks and booster stations. Listed below are the capacities of the water storage tanks:

TANKS	CAPACITY
STATELINE -TATA TANK	0.396
STATELINE #1 TANK	1.285
STATELINE #2 TANK	2.284
H STREET TANK	0.090
GARDNER MTN. TANK #1	0.212
GARDNER MTN. TANK #2	0.187
KELLER TANK #1	0.208
KELLER TANK #2	0.123
JUNE WAY HEAVENLY VALLEY TANK	1.000
UPPER MONTGOMERY COLD CREEK TANK	0.480
CHRISTMAS VALLEY TANK	0.185
ARROWHEAD TANK	1.080
IROQUOIS TANK #1	0.301
IROQUOIS TANK #2	0.230
COUNTRY CLUB TANK	0.345
FLAGPOLE TANK #1	0.172
FLAGPOLE TANK #2	0.204
TWIN PEAKS LOOKOUT TANK	0.304
TWIN PEAKS ECHO VIEW TANK	0.214
FOREST MTN TANK	0.159
ANGORA TANK	0.259



South Tahoe PUD - Service Area Boundry
El Dorado County, California

SOUTH TAHOE PUBLIC UTILITY DISTRICT
Sewer · 1950 · Water

Technical Project Description

South Tahoe Public Utility District
Advanced Metering Infrastructure (AMI) System

As described in the Background Data section, this project consists of the implementation of an advanced metering infrastructure (AMI) system that provides "real time" water use data for both the District and the 14,000 water customers the District serves. This system will allow for better water management

The following outline breaks this project into the major tasks and the deliverables:

Task 1. Project/Grant Administration

1.1 Provide all technical and administrative services as needed for Agreement completion; review all work performed; and coordinate budgeting and scheduling to assure that the Agreement is completed within budget, on schedule, and in accordance with approved procedures, applicable laws, and regulations.

1.2 Ensure that the Agreement requirements are met through completion of progress reports submitted to the Contract Manager when timely and through regular communication with the Contract Manager. The progress reports shall describe activities undertaken and accomplishments of each task during the reporting period, milestones achieved, and any problems encountered in the performance of the work under this Agreement. The description of activities and accomplishments of each task during the reporting period shall be in sufficient detail to provide a basis for payment of invoices and shall be translated into percent of task work completed for the purpose of calculating invoice amounts.

1.3 At the completion of this project and prior to final payment, the Project Director shall develop and provide a draft and a final report to the Contract Manager.

Task 1 Deliverable/Milestones : 1.1 Contract agreement, 1.2 Progress Reports, 1.3, Draft and Final Report

Task 2. Land, Structures, Rights of Way, Appraisals

No tasks are proposed in this category.

Task 3. Relocation expenses and payments

No tasks are proposed in this category.

Task 4. Project Engineering/Design and Procurement

This task has been 90% completed to date. A full set of plans and specifications, bidding documents, and all other pertinent engineering design and procurement tasks have been completed for the meter installation project. STPUD engineering staff utilizes a master construction contract that includes all appropriate federal contracting requirements. Preliminary design for the AMI System has also been completed. Estimates have been submitted by suppliers, a field survey has been completed and two water tanks identified as ideal for the installation of the towers necessary to provide the wireless data. Software hosting needs have been established and evaluated by the District's Information Technology Department. The only remaining task under this category is:

4.1 Bid/Procurement process to purchase AMI system, select consultant for installation; select contractor for meter installation

Task 4 Deliverable/Milestones: 4.1 Plans and specifications, copy of advertisements, final contractor bids

Task 5: Other architectural and engineering

5.1 Environmental Review and preparation of the CEQA Notice of Exemption (Phase 3 meter project is currently undergoing a cultural and biological assessment and a initial study determination for a filing of Exempt and this is expected to be completed August 2016)

5.2 Obtain City of South Lake Tahoe/El Dorado County encroachment permits as needed (STPUD Engineering Staff)

5.3 File TRPA request for height variance permit for tower installation on existing STPUD water tanks

Task 5 Deliverable/Milestones: 5.1 Copy of CEQA filed and stamped; copy of TRPA height variance permit

Task 6: Project Inspection

These tasks are included in Task 9: Construction

Task 7: Site Work

These tasks are included in Task 9: Construction

Task 8: Demolition and Removal

No tasks are proposed in this category

Task 9: Project Implementation/ Construction

Construction of the Phase 3 meter installation project will be completed in a six month time frame due to weather restrictions and the mandates of the Tahoe Regional Planning Agency, which state that construction that involves soil disturbance can only be implemented during a May 1 through Oct. 15 timeframe.

9.1 Select construction contractor for meter installation from bids received during procurement process

9.1.1 Prepare a final construction contract after review and approval of both contractor and STPUD

9.1 2 Award contract at a regularly scheduled STPUD board meeting.

9.2 Provide construction staking of project area, mobilization as required.

9.3 Review and approve shop drawings for materials required to construct the project. Partial list of items are:

Mxu's (meter reading)
Meter Boxes
Meters

9.4 Begin installing meter boxes, meters and mxu's per site

9.5 Develop "As Built" drawings at the end of the construction to include modifications to the design drawings reflecting any changes or deviations in the actual finished construction

9.6 Construction management by STPUD staff to include paying contractor submitted invoices,
performing both project and financial audits to ensure contractor meets all construction requirements, and oversight of all aspects of the contracts.

Task 9 Deliverables/Milestones: 9.1 Construction Contract, 9.3 List of Construction Materials, 9.5 Copies of "as built" drawings, 9.6 Copies of all invoices, communication with contractor, etc.

Task 10: Equipment/Supplies/Material

Meter reading tower/hardware and software will be purchased as per specifications of AMI system chosen in procurement process. In addition, due to bulk purchase savings, the District will purchase the meters and smartreads (allows the meter information to be sent to the AMI system).

10.1 Follow District procedures and guidelines for the purchase of equipment, supplies and materials

Task 11: AMI Tower/Software-Hardware Installation

Meter reading tower/software installation and training will be performed by a consultant hired during the procurement process

11.1 Follow District procedures and guidelines for the procurement of consulting services
11.2 Schedule Information Technology department staff to monitor software installation
11.3 Schedule training for customer service staff to learn AMI system
11.4 Schedule field inspectors to oversee installation of AMI system towers on District owned water tanks

Task 11 Deliverables/Milestones: 9.1 Consultant Contract

PROJECT TIMELINE

TASK	SUB- TASK	TASK/DELIVERABLE	Start Date	End Date
1.0		**PROJECT ADMINISTRATION**		
	1.1	Contract/Grant agreement	10/01/2016	9/30/2018
	1.2	Progress Reports/Invoices	Ongoing	
	1.3	Draft/Final Reports	8/01/2018	9/30/2018

4.0		**PROJECT**		
		Plans and specifications developed for meter installation Phase 3; tower installation for AMI system is 90% complete	7/1/2014	9/15/2016
	4.1	Bid/Procurement process for purchase of AMI System, Consultant for Installation and Contractor for meter installation (Phase 3)	1/1/2017	4/15/2016
5.0		**OTHER ARCHITECTUAL/ENGINEERING/ENVIRONME**		

	5.1	Complete and File CEQA, Phase 3 Meters	1/1/2017	4/1/2017
	5.2	Obtain Encroachment permits	1/1/2017	5/1/2017
	5.3	TRPA Height Variance Permit	2/1/2017	4/1/2017
9.0		**PROJECT**		
	9.1	Contract awarded for meter installation (Phase 3)	4/15/2017	5/1/2017
	9.2	Construction staking/mobilization	5/1/2017	10/15/2017
	9.3	Review and approve shop drawings	5/1/2017	5/15/2017
	9.4	Meter installation in the field	5/15/2017	10/15/2017
	9.5	Develop “as built” drawings		
	9.6	Construction management	5/1/2017	10/31/2017

10.0		**EQUIPMENT/SUPPLIES/MATERIALS**		
	10.0	Follow District procedures and guidelines for the purchase of equipment, supplies and materials	10/01/2016	3/31/2017
11.0		**AMI TOWER/SOFTWARE-HARDWARE INSTALLATION**		
	11.1	Follow District procedures and guidelines for the procurement of consulting services	10/1/2016	12/31/2016
	11.2	Schedule IT staff to monitor software	1/1/2017	3/31/2017
	11.3	Schedule training for staff to learn AMI	8/1/2017	1/1/2018
	11.4	Oversee installation of AMI system towers/hardware	5/1/2017	7/1/2017

Evaluation Criteria
South Tahoe Public Utility District
Advanced Metering Infrastructure (AMI) System

<u>Evaluation Criteria A</u>: Project Benefits

- **How will the project make additional water supplies available? If so, what is the estimated quantity of additional supply the project will provide and how was this estimate calculated? What percentage of the total water supply does the additional water supply represent?**

The proposed project is an AMI system and the match proposed is the installation of 1863 water meters to bring the STPUD service area to within 90% of full metering. (Phase4/5 will complete the metering and be installed the following construction year but are not considered in this proposal). The additional water supplies will be the direct result of the decrease on the current water production within the South Tahoe Watershed by the implementation of the 1863 water meters and resultant water savings as a result. The water saved can then continue to remain in the aquifer, acting as a recharge and preserving the groundwater reserves that supply the potable water to the STPUD service area. Based only on the Phase 3 meter installation numbers that are used for a match to this project, there is an estimated 118.88 AFY of saved water, or remaining in the groundwater reserves for additional water supplies as needed.

Explanation of calculation:
The STPUD reports on total water usage into the system and a 10% loss reduction is then taken from the total for unaccounted for water usage. Commercial accounts are tracked separately and an annual water usage is calculated. This is deducted from total water usage. The water savings are then calculated by finding the percentage of the overall residential accounts that 1863 meters represent and the corresponding water use. A twenty percent reduction is then calculated to estimate total average water savings for this project. See below.

Determining the AFY Total Usage from the STPUD Annual Report
1,963,577,000 gallons of total water into system divided by 325,851 gallons to derive AFY = 6025.98 AFY
Determining the Percentage of Total Usage Represented by Commercial Accounts
Commercial accounts utilized 382,683,532 Gallons in 2011 (as per STPUD customer service records) or 1174.41 AFY
Determining the Unaccounted For Water Usage

6025.98 AFY x 10% annual estimate of unaccounted for water = 602.59 AFY
Determining the Percentage of Total Usage Represented by 1863 Newly Metered Accounts
1863 Newly Metered Accounts / 13,240 Total Residential Accounts = .14 = 14% of Accounts
.14 **x 4245.98** Acre-feet = 594.43 *Acre-feet*
Estimating Water Savings Based on Assumed 20% Reduction in Use of Newly Metered Accounts
594.43 Acre-feet **x** .20 = **Savings of 118.88 AFY**

- **How will the project build long term resilience to drought? How many years will the project continue to provide benefits?**

An advanced metering infrastructure (AMI) system helps customers monitor water usage with a wireless system that collects hourly meter data, allowing the District to operate more efficiently and provide customers with in-depth water usage reports. The web portal, which is an integral part of the AMI system, gives customers a "real time" view of water usage, helping them to estimate where changes need to occur in indoor and outdoor water use to lower bills and meet water efficiency goals, as well as show possible leaks in their private system. Customers can also set alerts that automatically notify them via email or text if usage rises above certain preset limits. On the District's side, the hourly water meter usage data can transform the customer service approach from reactive to proactive. District staff can give detailed information on usage and identify possible problems to help customers reduce bills and save water. In addition, District water managers can use the data to establish long term water use numbers to plan for drought contingency. The system produces simple usage reports and reveals anomalies that could indicate problems in the water system or at residential or commercial properties. It also provides daily reports that prioritize and identify customers with possible leaks or unplanned water use. From a management perspective, it also takes the meter readers off the road, saving fuel and reducing carbon emissions. The benefits of the system as described above will help to build a long term resilience to drought by providing the management tools necessary to evaluate actual water use and make significant changes in behavior and assessment, on both the customer side and for District water managers. The best long term resilience to drought is to reduce the need for water. This project would help to ensure that the District does not produce more water than is needed by identifying any leaks on the private side and helping to enforce their correction, providing the information to assess unnecessary water use and identifying trends. This information would also help to develop drought related capital water projects, such as water storage projects, by providing the

information necessary to evaluate future growth and water demands. The system, which is dependent upon the meter installation, has an industry standard life of 20 years. The project would need significant replacement and upgrades at that time, however, the actual benefits of changing water use habits and demands would provide for a much longer benefit term.

- **Will the project improve the management of water supplies? Will the project make new information available to water managers?** Yes, this project would improve the management of water supplies as well as provide new information to water managers at the District. The proposed project would allow the District, as well as its water customers, to have access to daily water use data. With daily data on each customer type, the District can better understand water loss and better predict future water demands as opposed to depending upon estimates based on annual water production and annual wastewater treatment capacity. The details of customer demand by day would help to explain water use variations among customer class and service delivery type. This more detailed understanding will make future drought rate setting more predictable and target water conservation programs to areas with the highest cost-benefit reward.

- **What is the estimated quantity of water better managed as a result of the project and how was this estimate calculated? What percentage of the total water supply is being better managed.**

Estimated Total Project Amount of Water Supply Better Managed = 1296.4 AF
Average Annual Water Supply =9528 AF (STPUD Urban Water Management Plan, 2010, pg 25)

Water better managed as a percentage of total annual supply is 13.60 %. Estimates above are based on industry standard drop in water use by 20% when water conservation standards are applied and water meters installed. This number also calculates for leak identification and repair, which with our current water management system we cannot do on the customer end. Current estimated annual use per household is 117,360 gallons. This translates into 6482 AF annually for all 18000 customers, which corresponds with current annual water production data. If we can reduce water demand by identifying leaks immediately and being able to report actual water use by individual site by 20%, or 1296.4 AF, we can better manage this water by leaving it in the aquifer for storage for potential drought shortfalls.

Evaluation Criterion B: Drought Planning and Preparedness

- **A copy of the applicable drought plan, California Drought Contingency Plan, has been attached as an appendix to this application.**

- The California Drought Contingency Plan, as prepared by the State of California, Natural Resources Agency and the California Department of Water Resources, addresses

drought from a wide range of perspectives. As California has experienced a history of drought periods and has an expectation that climate change will increase periods of extreme weather, California Governor's Arnold Schwarzenegger and Jerry Brown both issued Drought Proclamations and Executive Orders beginning in 2008 and continuing into 2015 that directed State agencies to take immediate actions to manage the potential crisis of prolonged drought. The Drought Contingency Plan (DCP) was thus developed. The purpose of the DCP is to "minimize drought impacts by improving agency coordination, enhancing monitoring and early warning capabilities, water shortage impact assessments; and preparedness, response and recovery programs" (DCP, Executive Summary, page v) Climate change is addressed throughout the plan, but is specifically addressed in Section 3: Historical Drought and Climate Change. The DCP identifies warming temperatures due to climate change to increase the frequency and intensity of droughts in California, and assume that these warmer temperatures will likely increase evapotranspiration rates and extend growing seasons, increasing the amount of water needed for crops,urban landscaping and other water needs. (DCP, page 3) Throughout the remaining plan sections, strategies to deal with these climate change impacts are developed.

- The implementation of the Advanced Metering Infrastructure (AMI) System implements several actions supported by the California DCP as described below:

Urban Water Use Efficiency

*Project implements water management technological tools that lead to behavioral improvements in indoor and outdoor water use.

Water Agency Response

*Project implements the ability for customers to implement voluntary water conservation goals/targets by providing "real time" water use information and allowing the customer to see the impacts of water conservation efforts.

Water Use Efficiency, urban and agricultural

**Project promotes water use efficiency through the water use data provided for each individual customer.

Local:

*Project is the result of the District's inadequate water use data and the development of a program that would be able to determine actual water use by customer.

Individual:

*Project allows the urban water users within the STPUD water service district to pay attention to their water use, placing responsibility for responding to the drought well within their reach.

- The proposed project is not prioritized in the DCP, as the plan does not prioritize drought response and resiliency from a project implementation perspective, but instead addresses the problem with a wholistic approach that combines collaboration between state, federal, local, tribal and city/county to work together on an integration of approaches. The reality is that drought affects such a broad spectrum of issues, a wide range of approaches is going to be needed to mitigate the impacts. The District's proposed project DOES fall into the mission of the California DCP and meets several of the goals and objectives outlined in the plan.

Evaluation Criterion C: Severity of Actual Potential Drought Impacts

- **Indicate whether the proposed project area is currently experiencing drought or has the potential for drought in the future. If the project area is currently in a drought, describe the existing drought conditions.**

  The project is located in South Lake Tahoe, CA which is listed as an area of "exceptional drought" on the Drought Monitor webpage. In addition, Lake Tahoe levels may reach an historical low, dropping below the lowest recorded in 1957 if the drought continues.

- **Describe any projected increases to the severity or duration of drought in the project area resulting from climate change.**

Various studies have been conducted in the last decade to measure the effects of climate change in the Lake Tahoe basin. The results of these studies have indicated three major changes are occurring in the basin: (1) the air temperature is increasing, (2) the percent of total annual precipitation falling as snow is decreasing, and (3) the timing of the spring snowmelt peak discharge is shifting towards earlier dates.[1] Climate change scenarios for the Tahoe basin also indicate increased use of groundwater to accommodate population growth.

"In a study based on 30 years of snow survey data(1966-1996) from 260 snow courses in the Sierra Nevada, Johnson et al. (1999) found that the Tahoe basin had the highest loss – 54% - in May SWE(snow water equivalent) of any of the 21 river basins studied."

[1] Climate change in the Tahoe Basin: regional trends, impacts and drivers, Robert Coats

If the snowpack continues to decline and melt earlier in the year, it will affect the recharge of the Tahoe basin groundwater aquifers. STPUD's peak water usage is during the summer months, mostly due to landscape irrigation and a higher seasonal population. The inability of the snowpack to sufficiently recharge the aquifers in spring and early summer could potentially cause a shortage or overuse of groundwater when demand is at its highest level.

If the Tahoe basin were to enter a multi-year drought, as has happened in the past and is believed to happen again based on historical weather patterns, STPUD could face the challenge of maintaining an adequate water supply for its customers. By instituting this project and allowing water users to maintain an aggressive water conservation program as well as provide the necessary water use data for long-term drought resiliency planning, STPUD can mitigate potential future water shortages.

Climate Change Impacts on California's Water, State of CA-Dept of Water Resources

- **Describe ongoing or potential drought impacts to specific sectors in the project area if no action is taken and the severity of those impacts**

    - Public health concerns exist in the form of increased risk of wildfire as this excerpt from www.theweathernetwork.com describes:

Wednesday, May 6, 2015, 2:52 - California is in its fourth year of a drought and the lack of water has taken a toll on the trees. The U.S. Forest Service says at least 12 million trees have died across the state. Dry conditions and all that dead wood means the risk of wildfires is extremely high. Officials at the Bernardino National Forest call them "red trees." Instead of the typical vibrant green color, pine trees now dawn hues of brown and burnt-red -- with needles that crumble at the touch of a hand -- as result of the state's unprecedented drought. In a recent survey, the The U.S. Forest Service estimated that 12.5 million trees have dried up since last year -- a number researchers expect to only grow. "It is almost certain that millions more trees will die over the course of the upcoming summer as the drought situation continues and becomes ever more long term," said biologist Jeffrey Moore, acting regional aerial survey program manager for the U.S. Forest Service, in an interview with the LA Times.

As South Lake Tahoe is located in a wildland urban fire interface, these conditions exist in our National Forest as well, leading to significant increase in the potential for a devastating fire event. Increases in water supply this project will provide will provide necessary water storage and supply options for fire suppression.

    - Whether there are ongoing or potential, local, or economic losses associated with current drought conditions and ongoing or potential environmental impacts:

As described in the article below from the San Jose Mercury news, www.mercurynews.com/drought there is the potential for ongoing drought to have economic and environmental impacts on the lake, forest and recreational areas, such as local ski resorts.

TAHOE CITY -- There's something disconcerting about life at Lake Tahoe these days.It's still winter, but visitors are renting bikes instead of snowshoes and kayaks instead of skis. Come summer -- without last-ditch torrential rains -- the lake level is expected to be at such a historic low that some marinas will have to dredge for boats to launch. Jumping off the end of a pier could result in a rock-hard landing.California's epic drought, entering its perilous fourth year, has combined with a pattern of warming temperatures to cast a "Twilight Zone" quality on one of the state's most popular winter destinations and iconic landmarks.Long-term predictions by Lake Tahoe scientists warn that by the end of the century, summers could be two months longer and temperatures 8 degrees hotter than when Squaw Valley hosted the 1960 Winter Olympics. The dire effects of climate change present daunting challenges to local government officials, who have been patting themselves on the back for their efforts to Keep Tahoe Blue and reverse some of the damage caused by rampant lakeside development in the 1960s and '70s.But there's nothing they can do to guarantee winter.Already, regional planners are battling the various impacts of Lake Tahoe's new reality, such as algae growth and invasive species that thrive in warmer water. And even when the drought eases, a future inwhich precipitation falls more as rain than snow means problems: Instead of snowmelt coursing through natural streams, rainwater on parking lots and rooftops will increase fine sediment flowing into the lake. And that damages the lake's Holy Grail -- its famous clarity.The record-low Sierra snowpack levels over the past two winters also has devastated water supplies from Reno to Los Angeles and raised grave concerns about wildfires throughout the Tahoe region."For everyone, climate change is the gorilla in the room," said Tom Lotshaw, a spokesman for Tahoe Regional Planning Agency. In 2012, for the first time in 25 years, the agency updated its long-term plan to reflect the warming trend. Officials are inspecting the bottoms of boats to reduce the chances of nonnative species invading the lake, thinning ultradry forests to reduce the devastation of wildfires that send soot into the lake, encouraging more bikes and fewer cars, and razing old lakeside hotels and campgrounds to return those areas to forests and runoff-friendly marshes .The Tahoe Basin is particularly vulnerable because at 6,200 feet, the lake level is becoming a temperature "transition zone" between freezing snow and warmer rain. And that changes the traditional wintertime activities at the lake.

Evaluation Criterion E: Nexus to Reclamation

- The applicant does not receive Reclamation project water nor is the project on Reclamation lands or utilize any facilities, however the project is in the same basin as a

Reclamation activity described below and has a direct bearing on lake levels via water pulled from the South Tahoe aquifer/watershed:

Newlands Project - The Bureau of Reclamation has a contract with the Truckee-Carson Irrigation District to operate and maintain the Newlands Project on behalf of the Federal government.

Facility: Lake Tahoe Dam - Lake Tahoe Dam was built in 1913 but was not acquired by the Bureau of Reclamation for the Newlands Project until 1915. The concrete dam has 17 vertical gates and is used to regulate the outflow into the Truckee River. It is 18 feet high and 109 feet long. The storage capacity is 744,600 acre-feet.

- The proposed project does contribute water to a basin where a Reclamation project/facility is located…please see above.

- The project will help Reclamation meet trust responsibilities to the Paiute Tribe at Pyramid Lake.

Water supply increases will benefit the Paiute Tribe and the fisheries they manage at Pyramid Lake. The mission of Pyramid Lake Fisheries is to "operate and maintain fishery facilities at Pyramid Lake and the lower Truckee River for the purpose of enhancing Cui-ui and Lahontan Cutthroat Trout populations, while creating a balance within natural resources management actions, which reflects the social, cultural, economic, and natural resource values of the Pyramid Lake Paiute people," (Pyramid Lake Fisheries 2011).The conserved water, originating from the Tahoe Basin flows from Lake Tahoe into the Truckee River where it terminates in Pyramid Lake, which has no outlet. The Paiute Tribe Reservation encompasses a lengthy stretch of the Lower Truckee River and Pyramid Lake in its entirety. The reservation bears the brunt of any upstream impairment of either water quality or water quantity. Lake level, river habitat, and endangered and threatened fish species suffer the consequences of water removed from the river. The Pyramid Tribe has pursued many avenues, including litigation to secure and protect adequate water supply to Pyramid Lake. The Tribe's primary water rights were decreed under claims 1 and 2 of the *Orr Ditch Decree,* as a result of the priority date of the establishment of the reservation. To protect its resources, beginning in the 1980's the Tribe protested and litigated many applications seeking to change the place or manner of use of other Truckee River surface water rights. The battles on this front spanned decades and resulted in multiple decisions from the Ninth Circuit Court of Appeals relating the law of forfeiture and abandonment as applied to the Newlands Project. The Truckee-Carson-Pyramid Lake Water Rights Settlement Act of 1990, Title II, Public Law 101-618, 32 Stat. 3294, 3306 (Settlement Act), and the resulting Operating Agreement for the Truckee River are keystones in

the long range health of the river and Pyramid Lake. The Settlement Act resulted in a 20 year negotiation to produce the Operating Agreement which was signed in 2008, by the state of Nevada, California, the Secretary of the Interior, the Pyramid Tribe and others. The Operating Agreement provides for actions by the Tribe and Water Authority to cooperate in the use of their water rights, to take specific measures to prevent the waste of water, and to take steps to acquire additional Truckee River water rights to meet their needs for Truckee River water.
In 1998, the Nevada State Engineer issued ruling 4683, giving the Tribe the right to appropriate all of the "unappropriated waters" of the Truckee River for, "instream/in situ right to the high flows in excess of decreed or existing water rights on the Truckee River system in order to sustain the threatened and endangered fishery at Pyramid Lake." After years of appeals, in 2009, the Nevada Supreme Court dismissed the last appeal and upheld ruling 4683. The Tribe was officially granted the rights to all remaining unappropriated waters of the Truckee River. For all the Tribe's various water rights, the authority granting those rights has recognized the importance of Truckee River surface flows to Pyramid Lake to protect their fisheries for their cultural and recreational value. Any decrease of the in-stream flow of the Truckee River and water level in Pyramid Lake is of critical importance to the Tribe, Pyramid Lake Reservation and the threatened and endangered species found there (Springmeyer et al. 2011).

Source: Excerpts taken from: Don Springmeyer, Wolf, Rifkin, Shapiro, Schulman, Rabkin, 2011. "The Pyramid Lake Paiute Tribe, The Truckee River an Pyramid Lake- Decades of Battles for Better Instream Flow, Quantity and Quality." *American Bar Association: Section of Environment, Energy and Resources*. San Diego, CA.
Pyramid Lake Fisheries. Welcome to Pyramid Lake Fisheries! http://pyramidlakefisheries.org/ (accessed January 8, 2012).

Evaluation Criterion F: Project Implementation

- **Describe the implementation plan of the proposed project:**

The Advanced Metering Infrastructure (AMI) System is tied to the four year meter installation project that is currently in its second year on Phase 2. The AMI System is scheduled to be installed in Phase 3 of the Meter Installation Project, or the 2017 construction season (May 1 through October 15). After completion of Phase 3 meter installation, there will only be two phases of meter installations remaining and the District proposes to have the AMI System installed and training of staff completed in Phase 3 in order to allow time to work out any problems or issues before running a "full" AMI meter read on all 14,000 water customers. The plans and specifications for all 5 meter phases is complete and during this process, pre-design was also completed on the AMI System as well. The District plans on completing the procurement process for this system in 2016 and completing the AMI tower installation and software/hardware installation in 2017.

The schedule for implementation is included in the Technical Review section, but the project will be completed within a two year time frame.

- **Describe any permits that will be required, along with the process for obtaining such permits.**

  The project will require three permits:

1. California Environmental Quality Act Notice of Exemption (can be filed separately or included in the meters installation project filing). CEQA NOE for each phase of the meters installation project is filed with the appropriate plans for that phase. The AMI system is scheduled for implementation in the 2017 construction season (May 1 through Oct 15 as per regional mandates), but involves no ground disturbance. It is expected that the CEQA filing for that construction season will occur in April 2017 and that the installation of the two towers will be covered under this CEQA filing.
2. Tahoe Regional Planning Agency (TRPA) permit for the height variance for the AMI tower installation on District owned water tanks. This a requirement based on regional mandates and will be requested in February 2017. The only requirement for applying for this permit is design drawings of the project height and an assessment of the surrounding property.
3. El Dorado County/City of South Lake Tahoe Encroachment permits for work in the right of way while installing meters on residential properties will be necessary and obtained in February 2017 for Meter installation Phase 3, Construction season 2017.

- **Identify and describe any engineering or design work performed specifically in support of the proposed project.**

The proposed project will be gathering data from current meters and meters installed as part of the match project, the completion of the meter installation of the STPUD service district. All engineering and design work on the meter installation project has been completed and plans and specifications are available upon request. The first and second phase of the meter installation project for 2014/2015 has been bid and construction will be completed 10/2016. Phase 3 meter installation, which includes the AMI System installation project, will be bid in the spring of 2017. Preliminary design work for the AMI system has also been completed. Estimates have been submitted by suppliers, a field survey has been completed and two tanks identified as ideal for installation of the towers necessary to provide the wireless data. Software hosting needs have been established and evaluated by the District's Information Technology Department.

- **Describe any new policies or administrative actions required to implement the project.**

  There are no new policies or administrative actions that will be required to implement the project. The public process for the meter installation project, which is a match to this project, was conducted and approved by the Board of Directors in 2013.

Performance Measures for Quantifying Actual Post Project Benefits
South Tahoe Public Utility District
Advanced Metering Infrastructure (AMI) System

The following methods were determined to quantify the benefits of this project implementation:

Performance Measure No. 1: Improving Water Management through the implementation of monitoring tools

- The historical average amount of water utilized by a household or commercial entity as per meter data on file with the District
- Before and after water consumption data for each site will be evaluated using at least one-year of post project data.
- The project total savings will be calculated by summation of the individual site savings.
- Project total savings will be compared with historical water production data to identify trends in water use, evaluate future water needs, and estimate District capacity

Performance Measure No. 2: Increasing Energy Efficiency in Water Management

- STPUD will be also be calculating the quantity of energy savings resulting from the water use data by comparing pre-and-post project energy billings for water production and distribution, taking into account changes in pricing structure that would affect the anticipated cost savings.
- Anticipated cost savings are based on reduction of energy usage for water production and distribution due to a lesser demand for water.

Environmental and Cultural Resources Compliance

South Tahoe Public Utility District

Advanced Metering Infrastructure (AMI) System

South Tahoe Public Utility District will file a CEQA Notice of Exemption for this project. In addition, a complete cultural and biological resources survey is being completed for the meter implementation match project and will be completed by August 2016.

As the implementation of the project is fully on District owned parcels or privately owned parcels, and is in areas of previously disturbed soil, it is deemed to have an exempt status.

1) Will the project impact the surrounding environment (e.g., soil [dust], air, water [quality and quantity], animal habitat)? Please briefly describe all earth-disturbing work and any work that will affect the air, water, or animal habitat in the project area. Please also explain the impacts of such work on the surrounding environment and any steps that could be taken to minimize the impacts.

   All work is proposed to District and private property. The majority of the work is the implementation of residential meters, the implementation of a software program utilizing only two radio towers which are proposed to be affixed to existing District owned water tanks.

2) Are you aware of any species listed or proposed to be listed as a Federal threatened or endangered species, or designated critical habitat in the project area? If so, would they be affected by any activities associated with the proposed project?

   There are no threatened or endangered species or designated critical habitat that will be affected by any activities associated with the proposed project.

3) Are there wetlands or other surface waters inside the project boundaries that potentially fall under CWA jurisdiction as “waters of the United States?” If so, please describe and estimate any impacts the project may have.

   There are many wetlands and surface waters inside the project boundaries that fall under the CWA jurisdiction as “waters of the United States”, however, as all work proposed is on District property and is in compliance with TRPA environmental best management practices, no impacts on these waters will occur.

4) When was the water delivery system constructed?

1950 for original water delivery system, although there are many "add ons" as the District assumed ownership of several smaller private water companies in the course of operations.

5) Will the project result in any modification of or effects to, individual features of an irrigation system (e.g., headgates, canals, or flumes)? If so, state when those features were constructed and describe the nature and timing of any extensive alterations or modifications to those features completed previously.

There are no proposed modifications to irrigation systems that consist of headgates, canals, flumes, etc.

6) Are any buildings, structures, or features in the irrigation district listed or eligible for listing on the National Register of Historic Places? A cultural resources specialist at your local Reclamation office or the State Historic Preservation Office can assist in answering this question.

This project does not impact any building, structure or feature listed or eligible for the National Register of Historic Places.

7) Are there any known archeological sites in the proposed project area?

No.

8) Will the project have a disproportionately high and adverse effect on low income or minority populations?

No, the project would have a beneficial effect for disadvantaged populations by helping to reduce water costs and allowing them "real-time" access to their household water use.

9) Will the project limit access to and ceremonial use of Indian sacred sites or result in other impacts on tribal lands?

No, project proposed is on District and privately owned properties only.

(10) Will the project contribute to the introduction, continued existence, or spread of noxious weeds or non-native invasive species known to occur in the area?

No, there is no vegetation restoration proposed with this project.

Existing Drought Contingency Plan
Automated Meter Infrastructure (AMI) System
STPUD

South Tahoe Public Utility District utilizes the existing California Drought Contingency Plan as prepared in November 2010 by the State of California, Natural Resources Agency and the California Department of Water Resources. The final plan can be found at www.water.ca.gov/waterconditions/docs/Final but is also attached to this application as an appendix. Excerpts from the plan that pertain to the implementation of an Automated Meter Infrastructure Program and the beneficial drought relief impacts are listed below with the appropriate reference from the plan:

Urban Water Use Efficiency

Water use efficiency is a strategy to reduce water demand and part of the roadmap to sustainable water uses and reliable water supplies. Urban water use efficiency involves technological (such as stormwater capture) or behavioral improvements in indoor and outdoor residential, commercial, industrial, and institutional water use that lowers demand and per capita water use which results in benefits to water supply and water quality. This strategy has multiple benefits to citizens, the economy, and the environment.

Drought responses under this resource management strategy include water agencies providing educational and motivational programs to inform their customers and provide incentives for water conservation practices during drought.

Specific examples of urban water use efficiency programs and activities are described under the "Additional Strategies and Activities for Preparing for a Drought" below. (pg. 17)

Water Agency Response

Implementing enhanced water conservation programs and calling for customers to achieve either voluntary or mandatory water conservation goals or targets are common urban water supplier actions. Increases in customers' water rates – either to encourage conservation or to react to increased costs associated with acquiring supplemental water sources or implementing conservation programs – are common drought outcomes. These rate increases in California appear to be widespread in 2009 and appear to be effective in reducing water use. (page 23)

Reducing risk of shortfall by increasing the ability to store water supplies is another way to promote resilience, assuming that the state does not increase demand so that it is dependent on the full capacity of every supply. Similarly, although increasing water use efficiency in

residential, agricultural and industrial use will be the fastest and cheapest method of extending current supplies, if the population continues to grow, eventually demand will harden. When water users have conserved as much as they can while maintaining what they consider valuable in their lifestyle, their water use is no longer flexible. Demand hardening decreases resilience if the water freed by efficiency and conservation gets put to uses the state considers mandatory. The Resource Management Strategies that buffer the state from hydrologic variability and reduce risk of shortfall are:

- *Water Use Efficiency, urban and agricultural*
- *Conjunctive Management & Groundwater*
- *Surface Storage, CALFED and Regional*
- *Recycled Municipal Water*
- *Desalination*
- *Precipitation Enhancement*

Capacity

In this section, capacity to respond to drought means having the knowledge, tools, ability, money and authority to respond to drought. In general, California has a great deal of capacity, in delivery systems, expert staff, and legislative structures for emergency systems. Drought, like any stressor, exposes weaknesses in this capacity; those will be the topic of this section.

<u>Local:</u>

Water districts span a huge range of capacity, from large water districts with hundreds of staff, extensive knowledge of their deliveries and well-developed Shortage Contingency Plans, to small rural systems intermittently run by one person, usually with considerable experience but no redundancy nor preparation for unusual events.

For large water districts, increasing capacity to respond to drought involves the efforts that many urban districts have been doing the first two years of the current drought.
Many districts turned to their Shortage Contingency Plans (usually last updated in the last drought, in the early '90s) and revised them for current population and water supplies. Many cities passed water conservation ordinances, to be prepared for water rationing if it became necessary. Many realized that their water use data was insufficient to distinguish indoor and outdoor uses, and started to develop programs or calculations to determine those. Others realized they needed improved accounting and outreach tools. Bi-monthly billing creates a significant barrier to communicating with water users; by the time consumers receive their July/August bill, they've already done the bulk of their summer watering. Customers and the district have lost the ability to decrease summer water use in response to higher prices, and customers are shocked and angry at a bill much higher than expected. Districts and cities hired water efficiency staff or re- trained building inspectors to do water audits. All of these capacity improvements will serve them in good stead in the next drought. (Attachment 3: Drought Concepts and Impacts in California, pages 1-5)

Individual:

Most residential water users have the capacity to reduce their water use when they turn their attention to it. Repeatedly asking urban water users to reduce their per capita water use and spreading that conserved water among new users from population growth will gradually ratchet down their ability to conserve, but for now, conservation remains the largest potential source of new urban water. Californian urban water users use from 100 to 400 gallons of water per day; Australian urban water users use about 40 gallons of water per day. Gov. Arnold Schwarzenegger has set policy with the goal of a 20% reduction in per capita water use by 2020; DWR and other state agencies are developing a plan to achieve this.

Most urban water users have the capacity to respond to drought by technology substitution and behavior change. Technology substitution, such as changing to low- water using appliances or smart irrigation timers, requires that they know of the available technologies, have the attention and time to make the substitution and that they have the money available to buy them. Behavior change, such as fixing leaks and changing washing patterns, primarily requires the individual's attention. Of the types of capacity, most urban water users need knowledge (of potential substitutes) and money to make the substitutes. (Attachment 3: Drought Concepts and Impacts in California, pages 1-5)

As stated in these relevant sections from the California Drought Contingency Plan, behavioral improvements in indoor and outdoor residential and commercial water use that lowers demand and per capita use will benefit the water supply. The AMI system will provide the information necessary to implement behavioral improvements among STPUD's water users.

Required Permits or Approvals

South Tahoe Public Utility District
Advanced Metering Infrastructure (AMI) System

The project will require three permits:

1. California Environmental Quality Act Notice of Exemption (can be filed separately or included in the meters installation project filing). CEQA NOE for each phase of the meters installation project is filed with the appropriate plans for that phase. The AMI system is scheduled for implementation in the 2017 construction season (May 1 through Oct 15 as per regional mandates), but involves no ground disturbance. It is expected that the CEQA filing for that construction season will occur in April 2017 and that the installation of the two towers will be covered under this CEQA filing.

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Advanced Metering Infrastructure (AMI) System
South Tahoe Public Utility District
Resolution

The following resolution is scheduled to be adopted on the May 19, 2016 STPUD Board of Directors meeting.

RESOLUTION NO. _____

A RESOLUTION BY THE BOARD OF DIRECTORS
OF THE SOUTH TAHOE PUBLIC UTILITY DISTRICT
BUREAU OF RECLAMATION WaterSMART:
Drought Resiliency Project Grants 2016

BE IT RESOLVED by the Board of Directors OF THE South Tahoe Public Utility District (STPUD), County of El Dorado, State of California, as follows:

1. The General Manager, Assistant General Manager and/or the Chief Financial Officer is hereby authorized and directed to sign and file, for and on behalf of the STPUD, a Financial Assistance Application for a financing agreement from the Bureau of Reclamation for the planning, design, and construction of the following project:

   Advanced Metering Infrastructure (AMI) System

2. That STPUD hereby agrees and further does authorize the aforementioned representative or his/her designee to certify that the Agency has and will comply with all applicable state and federal statutory and regulatory requirements related to any financing or financial assistance received from the Bureau of Reclamation;

   NOW, THEREFORE BE IT RESOLVED that the STPUD Board of Directors supports the submission of an application under the Bureau of Reclamation WaterSMART: Drought Resiliency Project Grants for FY2016 Program and certifies that STPUD is capable of the providing the amount of funding and in-kind contributions specified in the funding application; and that STPUD will work with Reclamation to meet established deadlines for entering into a cooperative agreement.

   WE, THE UNDERSIGNED, do hereby certify that the above and foregoing Resolution No. 2940- was duly and regularly adopted and passed by the Board of Directors of South Tahoe Public Utility District at a regular meeting held on May 19, 2016 by the following vote:

AYES: _____

NOES: _____

ABSENT: _____

_____
Randy Volgelgasang
Board President
South Tahoe Public Utility District

ATTEST:

_____
Melonie Guttry, Clerk of the Board
South Tahoe Public Utility District