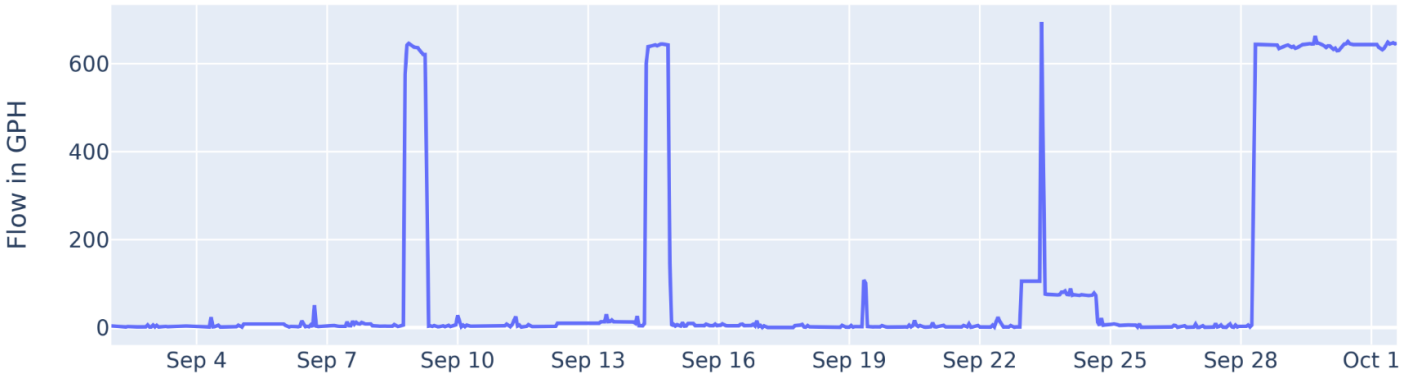
Open Analytics for Advanced Metering Infrastructure

Project Narrative

A Proposal to the U.S. Bureau of Reclamation, WaterSMART Applied Science (R23AS00446)

October 17, 2023



Detecting and prioritizing outreach to a customer with 600 GPH continuous use for more than 4 days.

APPLICANT
California Data Collaborative
a fiscally sponsored project of Social and Environmental Entrepreneurs, Inc.
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TECHNICAL PROPOSAL AND EVALUATION CRITERIA

1. Executive Summary

DATE:
October 17, 2023

APPLICANT:
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SUMMARY:
In response to California's evolving climate challenges and the urgent need for robust data-driven solutions, the California Data Collaborative/SEE, building on the foundation of the California Urban Water Efficiency Platform (CUWEP), seeks a matched funding of $400,000 from WaterSMART to augment its own commitment of $438,445 for the Open Analytics for Advanced Metering Infrastructure (OAAMI) project. This Project Type 3 initiative intends to harness the immense potential of Advanced Metering Infrastructure (AMI) by closing the implementation gap needed to leverage the vast amounts of data generated through the development of an open-source library of data adapters to seamlessly import, analyze, and manage both historical and near real-time water consumption data. Collaborating with partner agencies and leveraging mature metering technology, OAAMI will introduce enhanced data visualizations, shedding light on water usage patterns and weather trends, enabling rapid adaptive strategies to mitigate the adverse impacts of climate change. Offered as a free online platform, with an optional premium version for advanced features, OAAMI epitomizes the synergy of technology and policy, steadfastly supporting WaterSMART's overarching objectives of bolstered water reliability, efficiency, and resilience against drought, while concurrently fulfilling its criteria for broadened access to indispensable water management data.

The project is expected to take 24 months, with a completion date of September 30, 2026. The project is not located on a federal facility.

2. Technical Project Description

Applicant Category:
California Data Collaborative (CaDC) was founded in 2016 as a coalition of water supply agencies in California to shape the future of data-driven water management. CaDC operates as a fiscally sponsored project of Social and Environmental Entrepreneurs (SEE), Inc. a 501(c)3 nonprofit organization. CaDC/SEE is a **Category B** applicant that works in close partnership with and is largely funded by annual dues from member agencies which are all Category A regional or local authorities with water delivery authority. CaDC/SEE's mission is to leverage community and technology to provide water suppliers with easy access to trustworthy data so they can make confident decisions.

Detailed Project Description:
CaDC/SEE requests $400,000 from WaterSMART to match $438,445 from CaDC/SEE. CaDC/SEE proposes to partner with our member agencies for the Open Analytics for Advanced Metering Infrastructure (OAAMI) project. OAAMI will develop adapters for easy data integration with major AMI providers, publish a library of open source AMI queries to implement some of the most valuable AMI analyses and reports, and will build out time-series data visualizations to allow suppliers to drill-down to individual customers and provide a nuanced understanding of customer water use behavior. OAAMI will build this functionality on top of the California Urban Water Efficiency Platform (CUWEP) which is a software platform currently in development, funded by CaDC/SEE and WaterSmart, and on track to assist water suppliers with tracking,

quality controlling, and analyzing their water production and demand data. With easy data access, sophisticated reports, and essential visualizations, OAAMI will help suppliers evaluate their current efficiency levels, identify and respond to leaks, improve their system operations, and share data for regional collaboration and reporting.

The software will be made accessible online using technologies common in modern consumer software. A free version of the software will be made accessible to all water suppliers who might benefit, while long-term operation and maintenance of the software will be supported by a paid "premium" version that offers advanced data analysis and visualizations. The CaDC will use matching funds and our statewide network of partners to conduct outreach promoting the benefits and encouraging adoption of the software.

This project will directly support WaterSMART management objectives to enhance water supply reliability, water efficiency, and drought management activities by improving the quality, availability, and usability of critical data for effective water demand management. This project meets the criteria for eligible project type, "Projects improve access to and use of water resources data or to develop new types of data to inform water management decisions" from solicitation section C.4.2.

OAAMI will provide three new technical offerings integrated with and on top of the existing CUWEP:

1) Develop Adapters for AMI Data Providers to Import and Manage Historical Data

As the adoption rate of AMI systems across the water sector continues to accelerate, the majority of water providers are faced with the new challenge of actively managing the influx of high-resolution data at 15 minute to 1 hour intervals. Due to the high-volume of data that AMI systems generate, the many AMI data providers only offer to store historical data for the past 60 – 90 days. This limited data set provides a limited perspective on long-term historical trends and individual user water usage behavior.

OAAMI will provide adapters for the major AMI data providers to help water suppliers to export their data from their AMI vendors, import the data to systems where they have greater control (such as CUWEP), and actively manage historical AMI data to enable time-series analysis and reporting.

2) Create a Library of Common AMI Use Cases and Develop Reports to Implement Them While Publishing the Queries as Open Source SQL

The availability of high-resolution AMI data enables new scenario-based insights that can benefit the majority of water providers previously not available with lower-resolution monthly data.

OAAMI will develop a library of reports for common scenarios and use cases to highlight insights on customer-level water use, meter, and system behavior, which include, but are not limited to:

- Customer leak detection, timed irrigation events, irregular water usage and mixed-use (indoor+outdoor) behavior
- Meter failure/malfunction
- System segmentation, identifying pressure zones, and calculating aggregate water loss

Where feasible, these reports will be implemented within CUWEP for easy access by water supplier staff. The code implementing these reports will also be published as a library of open source SQL queries.

3) Implement Time-Series Data Visualizations of High-Resolution AMI Data To Streamline Decision Making

Although the possible insights available in high-resolution data are abundant and plentiful, these data insights are only valuable if they can streamline decision making from the day-to-day tasks to long-term planning.

OAAMI will implement a suite of time-series data visualizations of common scenarios and use cases to streamline decision making. These data visualizations will provide a user interface to drill-down to individual meters/customers to provide a nuanced understanding of historical water use behavior. A sample set of decision making processes these data visualizations can streamline include, but are not limited to, the following:

- Develop prioritized outreach to customers with potential leaks, drought irrigation violations, or irregular water usage to save on water bills, and provide general customer education.
- Identify failed or malfunctioning meters to fix data quality issues and recoup lost revenue and establish an optimized route for field service technicians.
- Develop a granular understanding of water demand for individual pipe segments and compare against SCADA to estimate aggregate system water loss.
- Track and report water usage trends for compliance with State regulations and adjust water efficiency strategies based on data insights.

Goals:
The overall goal of the project is to advance the use and utility of AMI data to address a variety of water management needs. This will be done through several key objectives:

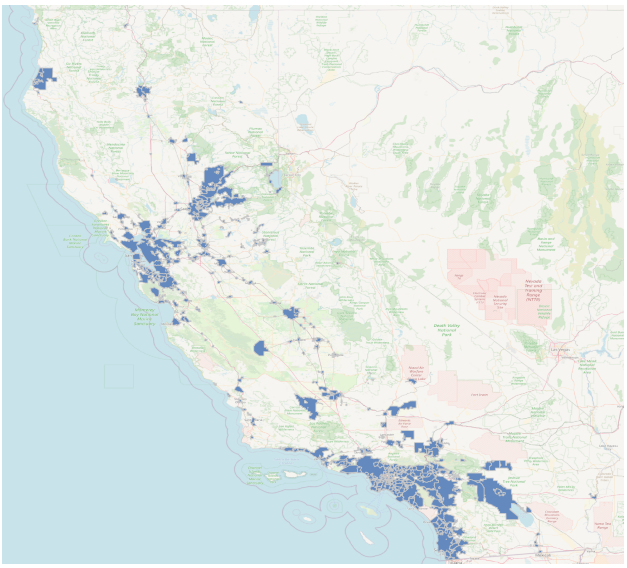
- Enabling easy access to AMI data by developing adapters to connect to the data systems of major AMI vendors.
- Provide useful, relevant analysis “out of the box”, especially for suppliers that may not be able to afford more expensive solutions offered by private vendors.

- Allow insight into customer, meter, and system behavior at multiple scales through interactive data visualizations.
- Scale the developed technology to as many agencies as possible to enable broad-scale benefits.

3. Project Location

The project location primarily spans areas across the state of California, with a primary focus on areas served by Urban Retail Water Suppliers (URWS), defined by the California Water Code as water suppliers, either publicly or privately owned, that directly provide potable municipal water to more than 3,000 end-users or that supply more than 3,000 acre-feet of potable water annually at retail for municipal purposes. A secondary focus will be on areas served by Urban Wholesale Water Suppliers (UWWS), defined as water suppliers, either publicly or privately owned, that provide more than 3,000 acre-feet of water annually at wholesale for potable municipal purposes.

Where feasible, use by utilities outside the state of California will also be pursued.



Areas shown in blue are served by urban retail water suppliers in California.

4. Data Management Practices

Data will be obtained directly from users of the software (employees of water supply agencies) or directly from AMI vendors through software integrations. CaDC will protect any data obtained from water agencies under an appropriate data use and nondisclosure agreement. Data sharing with regional partners or state agencies will occur only at the discretion of the data owner and in compliance with the data use and nondisclosure agreement.

Data will be stored on Amazon Web Services[1], which offers solutions for file object storage as well as within Snowflake[2] which offers a powerful cloud data warehouse for querying large data sets. Any data storage solutions used will be secured using password protection, network firewalls, and encryption where appropriate to prevent unwanted data access. The CaDC will review security procedures and network configurations annually to ensure that they stay up to date. Spatial data used in the tool, such as meter, parcel, and agency boundary locations, will

[1] https://aws.amazon.com/
[2] https://www.snowflake.com/en/

be accessible in industry-standard formats compatible with Geographic Information System (GIS) platforms.

5. Evaluation Criteria

5.1 Evaluation Criterion A — Water Management Challenge(s) (30 points)

5.1.1 Water Management Challenges. Climate change projections[3] [4] for California indicate increasingly variable weather swings in a state that already faces the highest precipitation variability in the nation[5]. The early symptoms of this change were on display this year as California's water supply outlook transitioned from a record dry period in 2022 to abundant snowpack and flooding in 2023. These drastic shifts have pushed water managers to new limits as they face the need for more timely data to enable rapid responses to unexpected water supply shifts.

In 2022, California's State Water Resources Control Board (SWRCB), in a quest for quicker monthly water conservation reporting, urged local water suppliers to submit reports within 7 days of the end of the month. Suppliers with manual meter reads and monthly or bimonthly billing struggled to meet these requests, while those with AMI met the request more easily.

Similarly, millions of residents of southern California were put under emergency water restrictions that limited their ability to irrigate landscapes to just one day per week. Typical responses from water suppliers were to hire manual water patrols to catch irrigators in the act. However, suppliers with the technical capability to leverage high-resolution AMI data were able to enhance their enforcement with automated irrigation detection.

To tap into benefits like these, more suppliers are adopting AMI – often with federal or regional funding assistance. Yet, after the meters are in the ground, there remains a substantial implementation gap needed to leverage the vast amounts of data generated by these meters every hour or even every fifteen minutes. Existing commercial software systems can and do fill some of this need, yet the most innovative water suppliers often find themselves needing to build their own custom solutions for effective data management in order to reap the full value of their AMI data, while the suppliers with the least capacity often find themselves paying off a massive capital investment while barely scratching the surface of what is possible with the data they have invested in.

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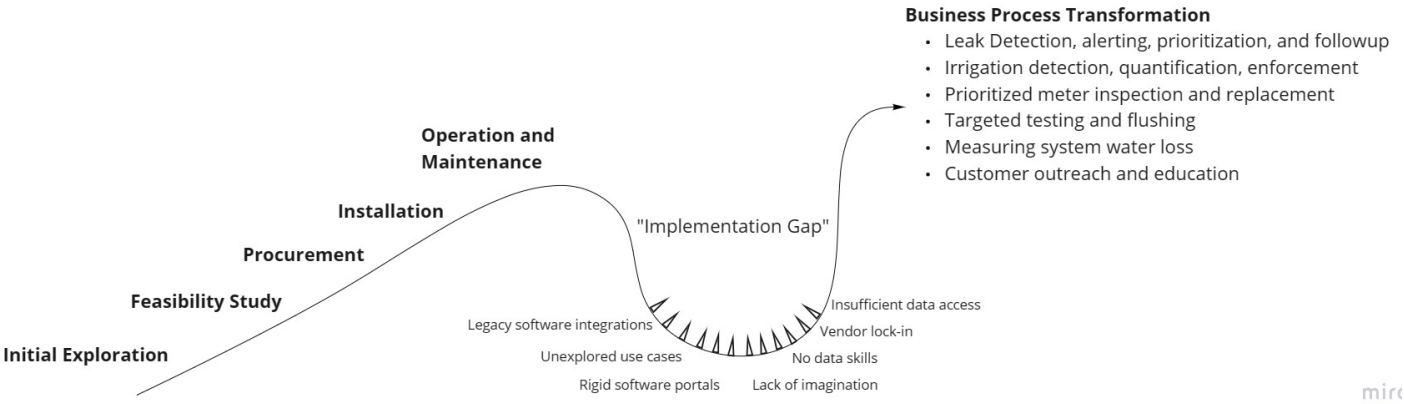
[3] https://energyinnovation.org/2023/03/29/atmospheric-river/

[4] Swain, D. L., Langenbrunner, B., Neelin, J. D., & Hall, A. (2018). Increasing precipitation volatility in twenty-first-century California. *Nature Climate Change*, *8*(5), 427-433.

[5] https://cwc.ca.gov/-/media/CWC-Website/Files/Documents/2019/08_August/Dettinger_CA_Precipitation.pdf

This project will address a whole host of water management challenges by directly tackling this AMI implementation gap to help water agencies get the most out of their AMI investment. By connecting to AMI vendors to pull data, granting easy query and dashboarding access to the full body of hourly AMI data, automating key reports and visualizing the results, OAAMI will create a nonprofit data platform to grant cutting edge AMI data analytics to a variety of water agencies that otherwise may not be able to access them.



Many water supply agencies get stuck in the AMI “implementation gap” with working AMI deployments that leave them far short of true business process transformation. Original diagram. Stages of AMI deployment adapted from Wastewater Digest “*What is Advanced Metering Infrastructure (AMI)?”* [6]

5.1.2 Concerns or outcomes if this water management challenge is not addressed. If this challenge is not addressed, the inevitable outcomes include:

- Delayed Responses: AMI provides the potential to adapt to emerging customer, meter, and system issues within a day or less, limited only by the delay in receiving data from AMI vendors. Without leveraging their hourly data, agencies continue to be reactive rather than proactive.
- Ineffective Enforcement: Without utilizing AMI data, enforcing water restrictions becomes inefficient, leading to wasted resources on manual patrols and a potential inability to catch all violators. This can undermine the public's trust in water management institutions.
- Untapped Data Potential: AMI installations are expensive. If their vast data-generating potential is left untapped, it becomes a sunk cost for suppliers.
- Resource Misallocation: The need to build custom solutions for every individual supplier is not only costly but also a potential misallocation of resources.

6 https://www.wwdmag.com/what-is-articles/article/10940067/what-is-advanced-metering-infrastructure-ami

- Strain on Financial Resources: Smaller suppliers might face financial strains as they attempt to extract value from their AMI systems while grappling with the costs of custom solution development. They will also struggle to realize the potential of AMI to help with recouping lost revenue from failing meters, leaving them further financially burdened. Lack of Collaboration: Without a centralized platform for data analysis and sharing, regional collaboration becomes challenging. This lack of shared insights and best practices can hinder the state's overall ability to manage its water resources effectively.

- Public Perception and Trust: Failing to address these challenges can erode public trust in water management institutions. If the public perceives that their water suppliers are not making the best use of available technology, it could lead to resistance in supporting future water management initiatives. In contrast, water suppliers that showcase their effective management of resources can be recognized as innovators, such as when the Moulton Niguel Water District was identified by Amazon Web Services as a best practice leader[7] for their work with CaDC/SEE storing and querying their AMI data in the cloud.

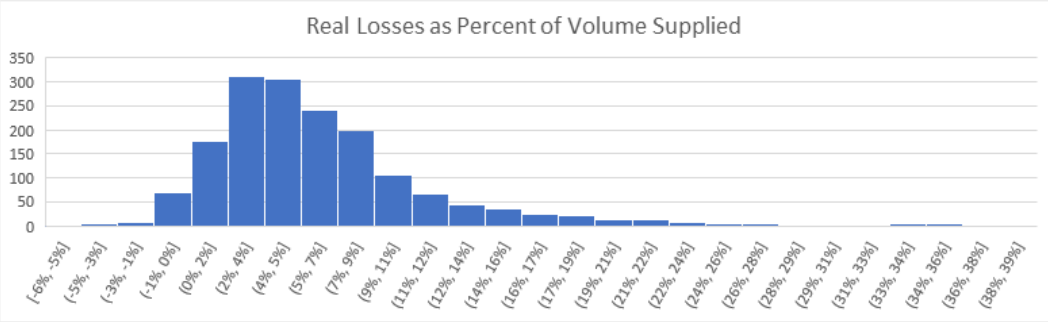
5.1.3 How This Project Will Address Water Management Issues. Our project will expand on prior pioneering work by CaDC/SEE and funded by the USBR to bring state of the art AMI capabilities to an existing software platform that improves access to and usability of water demand data collected by retail water suppliers. Using the current CUWEP platform which is under development through June 2024, local water suppliers can more easily manage, analyze, and share their own data. OAAMI will expand this to further help them meet key water management objectives such as water supply reliability, management of water deliveries, water marketing activities, drought management activities, conjunctive use of ground and surface water, as well as conservation and efficiency. Specifically, our project will support:

***Water Supply Reliability*:** OAAMI will support water supply reliability by equipping water managers with tools designed to allow targeted action to reduce demands. By increasing the effectiveness of water conservation and efficiency as a management action, water suppliers will have greater flexibility to match demand levels to available supply, with the result being an increase in water supply reliability. By providing detailed insights into the water demand behavior or their customers, and by offering streamlined data access, water suppliers will be able to reduce water loss, coordinate with partners and regulators, and encourage the efficient use of water during both drought and non-drought periods.

***Management of Water Deliveries*:** At the local level, distribution system water loss through leaks can constitute a substantial fraction of total system water use. In California, between 0% and 12% of real losses are typical, with an average of 7% reported across all water loss audits reported to the California Department of Water Resources (CA DWR) between 2017 and April 2021[8]. Under California's new water efficiency framework, urban water suppliers will be required to meet water loss performance standards. CaDC member agencies have used AMI to create district metered areas to enable timely analysis of system water losses to help optimize water

[7] https://aws.amazon.com/blogs/publicsector/announcing-the-2018-city-on-a-cloud-finalists/
[8] https://wuedata.water.ca.gov/awwa_export

deliveries in local distribution systems. Easy access to a system's full body of AMI data, such as enabled by OAAMI, is essential for such an initiative.



Histogram of reported real water loss as a percentage of all water supplied for all water loss audits reported to CA DWR between 2017 and April 2021

Further benefits to the management of water deliveries can be achieved by grouping AMI meters along "dead ends" within a distribution system to better understand turnover within these pipe segments to understand water quality as water treatment components degrade. This enables more informed testing and flushing of pipe segments, saving both staff time and water. An active pilot project by CaDC/SEE is testing this use case, and the flexible grouping of meters enabled by CUWEP, when expanded to AMI data should make this analysis easier to scale.

***Water Marketing Activities*:** Some groundwater management agencies, such as the Fox Canyon GMA are turning to AMI[9] to meter their groundwater wells to enable water marketing activities. A simple platform to manage AMI data allowing easy grouping and drill down to individual customers can support enforcement and tracking within water markets. OAAMI will enable such data access.

***Drought Management Activities*:** Timely and accurate demand management is critical during extended droughts when water managers must stretch water supplies to ensure the continued reliability of the water system. OAAMI will create a data management and analysis platform for AMI tailored to support more effective demand management during all time periods by enabling targeted outreach to inefficient water users, and customer segmentation for accurate program planning. The platform will align with agencies' water shortage contingency plans (required in California) by supporting common actions taken during a water shortage. For example:

- During severe water shortages, outdoor irrigation may be curtailed through a number of approaches. OAAMI can offer identification of and outreach to customers that are heavy irrigators by identifying regular spikes in water use that correspond to irrigation.
- During water shortages, agencies may impose deadlines on when leaks need to be repaired. OAAMI can identify customers with continuous water use who may have unrepaired leaks.
- During water shortages, agencies with allocation-based rates often compress the upper pricing tiers to increase the cost of water use above an efficient threshold. OAAMI can

[9] https://fcgma.org/faqs-ami-water-market/

support these agencies by offering additional context such identifying indoor use vs. irrigation and projecting a customer's budget status before their bill is actually due.

***Conjunctive Use of Ground and Surface Water*:** Conjunctive use often requires close collaboration between water suppliers and groundwater management agencies. OAAMI will strengthen this collaboration by making it easier for local suppliers to report the volume of extractions they make during a specific time period from AMI-enabled wells.

***Conservation and Efficiency*:** Water efficiency is increasingly a way of life in California. Many existing water sources are already over-allocated so that, in the absence of radical new water sources, most future economic and population growth must be supported through increases in efficiency rather than new supply development. The passage of SB606/AB1668 has written this reality into state law, with increases in efficiency mandated over the next decade. OAAMI aims to equip water managers, particularly water efficiency professionals, with the software tools they will need to plan for, and achieve these new levels of efficiency. Key features of the platform that will support this goal include the ability to identify and target key customer subsets of interest for water demand management, such as heavy irrigators, customers with leaks, and those potentially violating water efficiency ordinances.

5.2 Evaluation Criterion B — Project Benefits (30 points)

5.2.1 Identification of Project Need. The direct motivation for OAAMI arises from the on-the-ground experience of CaDC staff while working with our member agencies starting with the CaDC's founding in 2016. The need for AMI analytics support has intensified in recent years thanks to the broader adoption of AMI across the industry and external drivers such as drought that place pressure on suppliers to find new ways to leverage their data in response.

In 2018, CaDC staff first worked with the Moulton Niguel Water District to develop a high speed database for their AMI data, allowing them full, unfettered access to their data to support data science to improve operations, water use efficiency, and communications. After developing this project, CaDC observed that other agencies such as the Eastern Municipal Water District, Alameda County Water District, and more were also developing their own "data warehouses" to house their AMI data for analytics. This observation led to the realization that easy bulk data access and specialized reports were broadly missing from current AMI software platforms, and also that these abilities were a prerequisite for more advanced analysis with AMI data.

In response, the CaDC began in 2022 to pilot our own AMI data platform that any CaDC member agency could take advantage of. Still in the pilot phase, this platform has assisted suppliers like the cities of Long Beach and Thousand Oaks with archiving their AMI data long term, querying their data, enforcing irrigation restrictions, identifying priority leaks, and more.

Recognizing that this pilot platform could be scaled in scope and functionality, CaDC brought a proposal to invest in the AMI platform, along with several other opportunities, to the CaDC

Steering Committee in March of 2023. The CaDC Steering Committee is composed of staff from each of CaDC's 20 member agencies which constitute both retail and wholesale water suppliers collectively representing more than 21 million Californians. Of the opportunities brought before the committee, OAAMI was selected by a large majority of the Steering Committee as the highest priority to be pursued for funding.

5.2.2 Immediate Applicability. Tools and information to inform water resource management actions will be accessible immediately upon completion of the project, and even before completion of the project through alpha and beta testing with CaDC members. Additional future work beyond the scope of this application is expected to continue to increase the utility and water management benefits of OAAMI, but this additional work is not necessary to inform decisions immediately.

5.2.3 Extent of Project Benefits.

Beneficiaries: OAAMI will serve the needs of water resource managers at several different levels in the water system. Local water retailers will likely benefit the most from previously described tools and analyses supporting operational decision-making. Local and regional water wholesalers, along with state water agencies will benefit from improved timeliness of access to aggregate water demand data. Legislators and the broader water community will benefit indirectly from the policy analysis and new insights that will be made possible through the increased availability of timely, accurate, and verifiable data.

Improvements to Water Management Decisions: As previously described, OAAMI will enable easier access to AMI data specifically for the purposes of analysis and decision making, which currently often take a back seat to operational concerns of remote meter reading a customer billing. Decision making will be improved by providing:

1. Information about customers to support decision making around customer outreach, prioritization, and enforcement related to leaks, irrigation, and more.
2. Information about meters to support more proactive decisions around meter inspection and replacement.
3. Information about the distribution system and the water system as a whole to support decisions related to pressure control, testing, flushing, water loss, as well as high level system trends for planning and reporting.
4. Bulk data and query access to support flexibility and creativity on the part of water suppliers to improve decisions that CaDC has not foreseen.

***Transferability*:** Most of OAAMI is expected to be transferable across the United States (or even beyond). In any situation where local water suppliers need to access and analyze their AMI data to inform demand management, operations, and resources planning, OAAMI will be applicable. OAAMI will be built on the foundation of CUWEP which offers some functionality specific to water suppliers in California, though special attention will be given to ensuring that the benefits of OAAMI are as broadly applicable and available as possible.

Addressing Water Management Challenges:. As described in section 5.1.1, OAAMI will contribute most fundamentally to helping agencies cross the AMI implementation gap by providing cost-effective data storage, data access, and analysis. OAAMI contributions to water management challenges are further outlined in section 5.1.3. Many of these previously highlighted benefits have not yet been quantified, but a few are possible to estimate.

Calculations by CaDC show, for one small water supplier, more than $40,000 per year in water purchases are likely being lost to residential end use leaks. The costs are even higher when considering the value of this water during times of drought. OAAMI can help agencies prioritize their response to these leaks to more effectively target outreach to the largest and longest running leaks. For the same agency, CaDC assisted with automated enforcement of their irrigation restrictions in 2022, helping increase the total number of citations issued to customers by 35% at a cost effectiveness more than twice that of their manual water patrols.

Unlike a one-time study, OAAMI will be a living software platform that grows in functionality over time, increasing benefits as new capabilities are added. This is similar to the way that many consumer web applications operate. Both platform maintenance and future improvements will be funded by paid subscriptions that grant access to the higher tier of platform functionality.

5.2.4 Complementarity with Similar Efforts. The work most directly relevant to OAAMI is the CaDC's own prior work developing CUWEP. CUWEP is a software-as-a-service web application provided by the CaDC to our member agencies. OAAMI is imagined as an expansion of CUWEP to add support and functionality tailored to AMI data, and as such it would benefit from the years of learning and years of previous financial investment by CaDC member agencies toward creating a data engineering platform and a standardized cross-agency database of water demand and water efficiency data. This previous investment dramatically reduces the risk of further development because the user needs and technical approaches have already been thoroughly validated. Funding from the USBR will allow a dramatic improvement and expansion of capabilities to CUWEP.

There are other related efforts to this project underway, but the OAAMI project fills a unique niche. These related efforts are described below:

- Several industry groups have recently published or are preparing research reports on the benefits and uses of AMI. OAAMI offers a unique opportunity to take the findings of this report and implement them in a nonprofit software platform.
    - The Alliance for Water Efficiency recently released a report in 2023 titled "Smart Practices to Save Water: An Evaluation of AMI-enabled Proactive Leak Notification Programs" [10].

[10] https://www.allianceforwaterefficiency.org/impact/our-work/smart-practices-save-water-evaluation-ami-enabled-proactive-leak-notification

    - The Alliance for Water Efficiency is also currently preparing a report titled “A Practical Primer on the Many Uses for AMI in Water Conservation & Efficiency” [11] for release in 2024.
    - The Water Research Foundation published a study AMI-Meter Data Analytics[12] in 2020 and is planning to release case studies on uses of AMI planned at the end of 2024.
    - The American Water Works Association published a report “Increasing consumer benefits & engagement in AMI-based conservation programs” [13] in 2022 and has another AMI report planned for 2024.
- A number of private companies, such as WaterSmart Software or AMI vendor portals, offer browser-based software-as-a-service applications. While the ability to view customer-level AMI trends and offer leak alert notifications may be similar to some of the functionality proposed here, several items set OAAMI apart. The most important of these is that, as a nonprofit governed by water suppliers, the CaDC can act as an extension of the water management community rather than as a vendor. This allows for greater trust, lower cost, and deep integration with the specifics of state regulations.

The proliferation of reports about putting AMI to use is a reflection of the intense interest in this topic, and also further highlights the unique opportunity posed by a nonprofit data platform to implement many of the ideas and suggestions from research and apply them in software.

5.3 Evaluation Criterion C — Project Implementation (20 points)

OAAMI, as proposed, is grounded in the daily problems and real needs of water managers at the local and regional levels. To ensure that this focus on user needs remains central throughout project implementation, a human-centered approach and a Lean UX methodology will be employed to implement functionality in minimum viable increments while measuring results. In this way, hypotheses about how best to implement requirements can be quickly validated and previously undiscovered needs can be brought to life sooner in the project lifecycle.

To enable comprehensive testing and validation, we will recruit a diverse pool of stakeholders representing a cross-section of user personas and archetypes of end users. These stakeholders will be deeply integrated into our design and development process to offer early validation of core features, contribute their subject matter expertise to test prototypes, and provide contextual feedback based on their needs and special circumstances.

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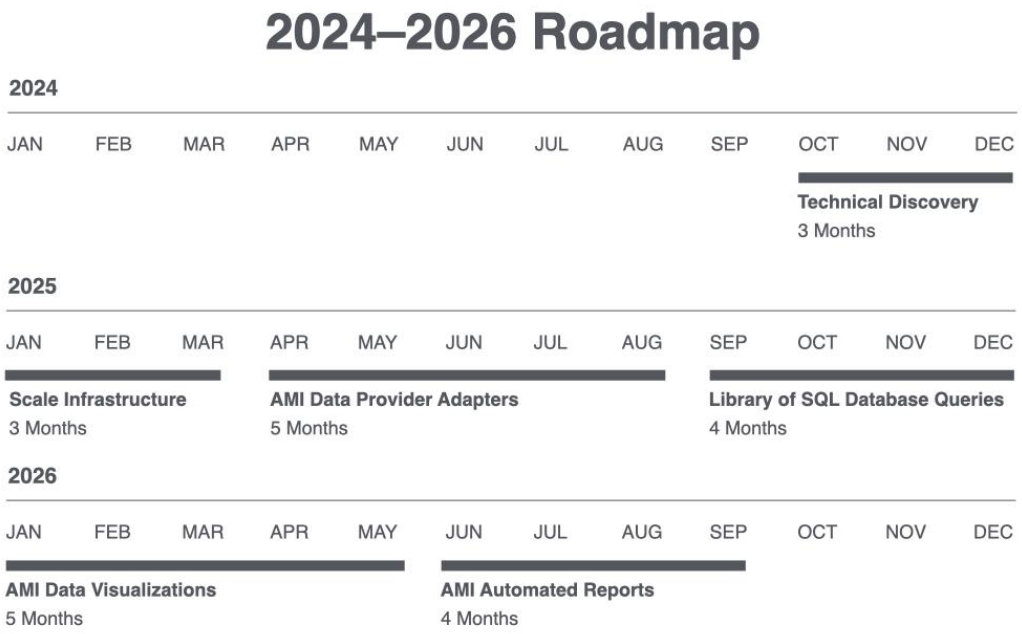
[11] https://www.allianceforwaterefficiency.org/sites/default/files/assets/AMIprimer_AWE%20Project%20Brief_2023.pdf

[12] https://www.waterrf.org/research/projects/ami-meter-data-analytics

[13] https://www.awwa.org/Portals/0/AWWA/ETS/Resources/Technical%20Reports/ami_report_feb_2022.pdf

Our process will be highly iterative and follow an agile “design-build-test” software development methodology. Milestones will be strategically planned to systematically lower the risk of ambiguity, remove obstacles, and increase the odds of OAAMI succeeding upon public deployment. We believe that the unique combination of a human-centered approach, a lean UX methodology, and open-source development tools will enable OAAMI to become an industry standard and viable tool for water managers across the state of California and beyond.



OAAMI product roadmap.

5.3.1 Project Phases & Segments: The project phases are described below, including the timeframe of the phase and the tasks that will be accomplished in each phase. For a full description of each task, please refer to the Budget Narrative. The timeframes listed below assume a start date of October 1, 2024. Any delay in the start date of the project, for example, due to delayed availability of funds, will delay each phase by a corresponding amount of time.

Phase 1: Infrastructure Discovery & Technical Requirements (3 months: October – December 2024)

Phase 1 is focused on developing a data strategy and defining data architecture and infrastructure requirements to implement OAAMI on top of the existing CUWEP platform.

Tasks:

- Define OAAMI + CUWEP technical requirements and specifications
- Load large AMI dataset to benchmark database performance requirements
- Define integration plan for all major AMI data providers
- Define and validate common scenarios and use cases for SQL database queries
- Define OAAMI reports and metrics to be integrated with CUWEP platform

Phase 2: Upgrade and Scale Data Infrastructure (3 months: January – March 2025)
Phase 2 will focus on upgrading and scaling the data infrastructure required to import and manage high-resolution AMI data and integrate with the existing CUWEP platform.

Tasks:

- Upgrade and scale OAAMI cloud storage per technical requirements
- Develop, test and iterate data pipeline to integrate OAAMI + CUWEP

Phase 3: AMI Data Framework and Provider Adapters (5 months: April – August 2025)
Phase 3 will focus on developing an AMI data framework for CUWEP and adapters for all major AMI data providers as data becomes available from member agencies. Tasks will include developing data pipelines for all major AMI data providers, loading sample data sets, and incrementally loading available historical data.

Tasks:

- Develop flexible AMI data framework to integrate adapters for AMI data providers
- Develop data pipeline adapter for each major AMI data provider as data becomes available
- Incrementally load historical data sets (if available)

Phase 4: Develop, test, and deploy SQL database queries (4 months: September – December 2025)
Phase 4 will focus on developing, testing, and deploying SQL database queries for common scenarios and use cases to highlight insights on customer, meter, and system behavior.

Tasks:

- Develop SQL database queries per scenario and use case specifications
- Validate that SQL database queries match desired objective and outcomes
- Deploy SQL database queries to member agency datasets and distribute query results as automated email with CSV/PDF attachments

Phase 5: Design, Develop, & Deploy SQL Query Data Visualizations (5 months: January – May 2026)
Phase 5 will focus on designing, developing, and deploying data visualization modules for the validated SQL database queries to be integrated as part of the CUWEP platform.

Tasks:

- Design data visualization modules based on validated SQL database queries
- Partitioning of DB data tables to precompute values and increase query performance
- Develop API queries of DB partitions to deliver data for frontend integration
- Develop frontend data visualization UI and implement API data
- Test and deploy data visualization modules to CUWEP platform

Phase 6: Automate AMI Reports Generation and Distribution (4 months: June – September 2026)
Phase 6 will focus on automating report generation and distribution based on aggregate AMI data insights per agency service area and reporting needs.

Tasks:

- Design reports based on use case specifications
- Partition DB data tables to precompute values and increase query performance
- Develop API queries of DB partitions to deliver data for frontend integration
- Develop frontend data visualization UI and implement API data
- Test and deploy data visualization modules to CUWEP platform

Anticipated Products: The primary product resulting from this project will be the CUWEP software with OAAMI functionality deployed and publicly accessible to qualifying users. The table below provides an abridged list of the features. Please reference “Project Technical Description” for a full description of final product outputs.

Product	Description
Adapters to import data from major AMI data providers	OAAMI will provide adapters to import data from major AMI data providers to enable time-series analysis and reporting.
Scaled database infrastructure to manage high-resolution AMI data	OAAMI will implement an upgraded and scaled CUWEP database to actively manage high-resolution AMI data at 15 min – 1 hour intervals
Library of open source SQL database queries for common analysis scenarios and use cases	OAAMI will publish an open source library of SQL database for common analysis scenarios and use cases
Suite of time-series data visualization modules to streamline decision making	OAAMI will deploy a suite of time-series data visualization modules for validated SQL database queries for common analysis scenarios and use cases
Automated AMI report generation and distribution	OAAMI will deploy automated AMI report generation and distribution for common tasks and analysis

Key Personnel Credentials and Experience

Christopher Tull
Chief Data Officer & Project Manager

Christopher Tull is a public technologist, nonprofit leader, and data scientist specializing in using data to improve operations, program effectiveness, and efficiency within water agencies. He

worked in several roles over the years with the California Data Collaborative, most recently as Chief Data Officer where he leads the organization, and before that as lead data scientist where he designed and built data infrastructure to process, store, and analyze metered water use data from water utilities across California, including hourly AMI data. He has an M.S. in Urban Informatics from New York University and a B.S. in Computer Science and Mathematics from CSU Channel Islands.

California Data Collaborative
Project Principal

For seven years, the California Data Collaborative (CaDC) has brought together tech-forward water utilities to invest in the design and development of open-source data analysis software tools that inform its member agencies' operational decisions. The CaDC's commitment to open-source software design and development results in scalable and cost-effective data tools that allow member agencies to quantify the value of their water-efficiency programs and develop targeted customer outreach and conservation marketing campaigns. Powered by industry professionals and expert technologists, the CaDC sees data and technology as a tool to realize a more reliable, resilient, and sustainable future.

Abe Serrano
Director of User Experience & Product Manager

Abe Serrano is the Director of User Experience for Water UX and positions himself at the convergence of business, design, and technology to simplify challenges, identify innovation opportunities, and design data solutions within water-related sectors. Abe is a strategic leader with a human-centered design approach, a lean User Experience (UX) methodology, and a thoughtful approach to User Interface (UI) design systems. With 17 years of industry experience, Abe has had the opportunity to lead digital transformation initiatives for Fortune 100 companies, acted as an advisor for startups within the Los Angeles Cleantech Incubator network, and was recently a 2019 E2 Fellow. His latest initiatives focus on streamlined data reporting, advanced data analysis reports and visualizations, and developing the future of water data management for state regulators and local water utilities.

Water UX, Inc.
Subconsultant

Water UX, Inc. specializes in human-centered data solutions for water innovation. With the rise of available data within the water sector, Water UX, Inc. partners with public and private water utilities to translate available data into analysis tools and visualization dashboards that provide actionable insights. With a world-class design and development team, Water UX delivers data technology solutions that are standards-compliant, modular, and scalable. With 20 years of collective experience, Water UX, Inc. offers a process that is informed by the evaluation of complex data systems, identifying strategic innovation opportunities, and defining a clear pathway to achieve desired business objectives.

Project Partners

CaDC will partner with nine member agencies, listed in the attachments, each of which is a Category A water supplier. Partners will provide input to inform the design and functionality of the software platform, allow the data they already share with CaDC to be used to inform the software architecture, share additional data on case-by-case basis, and test the platform to provide feedback and ensure it meets their needs

No Project Delay

The project team can proceed with the proposed project immediately upon entering into a financial assistance agreement with no delay.

5.4 Evaluation Criterion D — Dissemination of Results (10 Points)

OAAMI will build upon CUWEP, which is the flagship product for the CaDC with the core offering of a web-based water data management platform, integrated streamlined reporting, and basic data analysis and visualization provided as a free subscription to water agencies. A paid premium subscription will grant water agencies access to advanced data analysis and visualization tools for trend analysis, future demand planning, and targeted customer conservation outreach. As such, the CaDC is highly invested in the success and widespread adoption of OAAMI.

The CaDC continuously leans on the expertise of CaDC member agencies and will also work with the California Water Efficiency Partnership (CalWEP) to recruit water agencies to establish OAAMI pilot programs across the State of California. The CaDC will share pilot program status updates monthly via public blog posts, social media, and newsletters.

Once a public release is available, OAAMI will be immediately disseminated to agencies that provided feedback as stakeholders, agencies that participated in pilot programs, and CaDC member agencies. The CaDC will implement a campaign to promote OAAMI on the CaDC website and through webinars, podcasts, online video channels, conferences, and water professional networks such as the CA Water Data Summit, CalWEP Peer to Peer, WaterSmart Innovations, ACWA Conferences, and The Stream with Will & Tom.

5.5 Evaluation Criterion E — Presidential and Department of the Interior Priorities (10 Points)

Increasing resilience to the impacts of climate change is one of the core motivating drivers for this project, as identified in the “project need” section above. OAAMI will help water supply agencies respond more quickly to rapid changes in water availability by providing them with more timely data on water demand that they can access within a day or less, and then more

quickly turn around and share with regional and state partners and regulators to support climate resilience planning and response. In the face of climate change, where variable water availability and extreme weather events become more common, having precise and real-time data on water usage can be critical. The ability to quickly detect and respond to issues like leaks, irrigation restrictions, and system inefficiencies makes the water system more resilient to both short-term crises and long-term challenges posed by a changing climate.

The OAAMI project is specifically tailored to equip communities with the necessary tools to respond proactively to drought conditions. By leveraging AMI data, OAAMI provides a comprehensive and granular insight into water usage patterns, facilitating timely detection and rectification of inefficiencies such as leaks. For example, based on CaDC's observations, one small Southern California water supplier potentially faces losses in excess of $40,000 annually due to residential end-use leaks.

Moreover, the platform plays a pivotal role in enforcing irrigation restrictions, further optimizing water use during drought conditions and ensuring water availability. With features facilitating decision-making around water efficiency, system checks, pressure control, and water loss management, OAAMI not only offers short-term solutions but lays the foundation for building long-term resilience to drought.

Having the ability to “flip a switch” and thereby reduce the threshold for what qualifies as a leak, or instantly identifying all outdoor irrigation in a supplier’s service area, the response time to drought conditions (or a water use reduction mandate) is greatly reduced. Furthermore, customers can be reached with targeted messaging tailored to their water use behavior helping them understand specifically how they can change their water use patterns to save money, avoid fines, and become resilient under drought.

The broader implications of OAAMI go even beyond water management. Climate change challenges are multifaceted, and the interconnectedness of various ecological, social, and economic systems necessitates a holistic approach to resilience. Potential ripple effects include:

- Biodiversity Preservation: Ensuring efficient water usage can indirectly contribute to maintaining water levels in natural habitats.
- Economic Resilience: A community that efficiently manages its water resources is less susceptible to the economic repercussions of droughts meaning fewer losses and a steadier economy even amidst ecological challenges.
- Energy Conservation: Water delivery and wastewater treatment are energy-intensive processes. By effectively managing water usage, OAAMI indirectly contributes to reduced energy consumption.

While the exact longevity of the project is unknown, OAAMI is conceived as a living software platform that grows in functionality over time and will see substantial ongoing maintenance, improvement, and scaling from the CaDC for many years or even decades to come.

ALAMEDA COUNTY WATER DISTRICT

43885 SOUTH GRIMMER BOULEVARD • FREMONT, CALIFORNIA 94538
(510) 668-4200 • www.acwd.org

October 11, 2023

United States Department of the Interior
Bureau of Reclamation
Financial Assistance Support Section
P.O. Box 25007, MS 84-27133
Denver, CO 80225

Dear United States Department of the Interior, Bureau of Reclamation:

Subject: Support of California Data Collaborative's Grant Proposal for Development of the Open Analytics for Advanced Metering Infrastructure Project

Alameda County Water District (ACWD) supports the California Data Collaborative's (CaDC) proposal to the Bureau of Reclamation for a grant to fund the development of the Open Analytics for Advanced Metering Infrastructure project in California to assist local water suppliers with tracking, quality controlling, analyzing, and reporting their Automated Meter Infrastructure (AMI) water demand data. We believe this grant application and the focus on improving the quality, availability, and usability of data to enhance water supply reliability, water efficiency, and drought management activities is necessary to further conservation efforts in California. ACWD has made an investment in AMI throughout its service area and recognizes the significant benefit and economy of scale the CaDC's project will provide its member agencies when analyzing customer water use data throughout California.

As an urban retail water supplier required to comply with California's Urban Water Management Plan, Water Shortage Contingency Plan, and water efficiency regulations established under California Senate Bill 606 and Assembly Bill 1668 (2018), our agency has a strong interest in being able to evaluate the current efficiency levels of our customers, identify opportunities for improvement, share data for regional collaboration, and report trustworthy data for compliance. A data integration tool that pulls near real-time water use into the existing CaDC software platform will allow us to proactively manage water demand more effectively in our service area while allowing us to adapt to changing water supply conditions.

As a member agency of the CaDC, we support the use of our annual membership dues as matching funds towards this grant. In addition, we acknowledge specific roles and responsibilities we will fulfill in this partnership. In the event this proposal is funded, we would expect our role in the Open Analytics for Advanced Metering Infrastructure project to include:

- Providing input to inform the design and functionality of the software platform.

- Allowing data that we already share with the CaDC to be used to inform the software architecture, and possibly sharing additional data on a case-by-case basis.
- Testing the platform and providing feedback to ensure that it meets our needs.

We look forward to working with your organization to enhance water supply reliability, water efficiency, water equity and drought management activities by improving the quality, availability, and usability of data that are critical for effective water demand management.

Sincerely,

Ed Stevenson
General Manager
Alameda County Water District

sn/jrs

City of Thousand Oaks

2100 Thousand Oaks Boulevard • Thousand Oaks, CA 91362
Phone 805/449.2100 • Fax 805/449.2125 • www.toaks.org

October 5, 2023

United States Department of the Interior
Bureau of Reclamation
Financial Assistance Support Section
P.O. Box 25007, MS 84-27133
Denver, CO 80225

I write on behalf of the City of Thousand Oaks in support of the California Data Collaborative's (CaDC) proposal to the Bureau of Reclamation for a grant to fund the development of the Open Analytics for Advanced Metering Infrastructure project in California to assist local water suppliers with tracking, quality controlling, analyzing, and reporting their Automated Meter Infrastructure (AMI) water demand data. We strongly support this grant application and the focus on improving the quality, availability, and usability of data to enhance water supply reliability, water efficiency, and drought management activities.

As an urban retail water supplier required to comply with California's Urban Water Management Plan, Water Shortage Contingency Plan, and water efficiency regulations established under Senate Bill 606 and Assembly Bill 1668 (2018), my agency has a strong interest in being able to evaluate the current efficiency levels of our customers, identify opportunities for improvement, share data for regional collaboration, and report trustworthy data for compliance. A data integration tool that pulls near real-time water use into the existing CaDC software platform will allow us to proactively manage water demand more effectively in our service area while allowing us to adapt to changing water supply conditions.

As a member agency of the CaDC, we support the use of our annual membership dues as matching funds towards this grant. In addition, we acknowledge the specific roles and responsibilities we will fulfill in this partnership. In the event this proposal is funded, we would expect our role in the Open Analytics for Advanced Metering Infrastructure project to include:

- Providing input to inform the design and functionality of the software platform.
- Allowing the data that we already share with the CaDC to be used to inform the software architecture, and possibly sharing additional data on a case-by-case basis.
- Testing the platform and providing feedback to ensure that it meets our needs.

We look forward to working with you to enhance water supply reliability, water efficiency, water equity and drought management activities by improving the quality, availability, and usability of data that are critical for effective water demand management.

Sincerely,

John Brooks

John Brooks
Senior Sustainability Analyst
City of Thousand Oaks

COACHELLA VALLEY WATER DISTRICT
Established in 1918 as a public agency

GENERAL MANAGER
Jim Barrett

ASSISTANT GENERAL MANAGER
Robert Cheng

CLERK OF THE BOARD
Sylvia Bermudez

ASSISTANT GENERAL MANAGER
Dan Charlton

October 5, 2023

United States Department of the Interior
Bureau of Reclamation
Financial Assistance Support Section
P.O. Box 25007, MS 84-27133
Denver, CO 80225

I write on behalf of Coachella Valley Water District in support of the California Data Collaborative's (CaDC) proposal to the Bureau of Reclamation for a grant to fund the development of the Open Analytics for Advanced Metering Infrastructure project in California to assist local water suppliers with tracking, quality controlling, analyzing, and reporting their Automated Meter Infrastructure (AMI) water demand data. We strongly support this grant application and the focus on improving the quality, availability, and usability of data to enhance water supply reliability, water efficiency, and drought management activities.

As an urban retail water supplier required to comply with California's Urban Water Management Plan, Water Shortage Contingency Plan, and water efficiency regulations established under Senate Bill 606 and Assembly Bill 1668 (2018), my agency has a strong interest in being able to evaluate the current efficiency levels of our customers, identify opportunities for improvement, share data for regional collaboration, and report trustworthy data for compliance. A data integration tool that pulls near real-time water use into the existing CaDC software platform will allow agencies to proactively manage water demand more effectively in our service area while allowing us to adapt to changing water supply conditions.

As a member agency of the CaDC, we support the use of our annual membership dues as matching funds towards this grant. In addition, we acknowledge specific roles and responsibilities we will fulfill in this partnership. In the event this proposal is funded, we would expect our role in the Open Analytics for Advanced Metering Infrastructure project to include:

- Providing input to inform the design and functionality of the software platform.
- Allowing the data that we already share with the CaDC to be used to inform the software architecture, and possibly sharing additional data on a case-by-case basis.
- Testing the platform and providing feedback to ensure that it meets our needs.

We look forward to working with you to enhance water supply reliability, water efficiency, water equity and drought management activities by improving the quality, availability, and usability of data that are critical for effective water demand management.

Sincerely,

Scott Burritt
Director of Service & Communication
Coachella Valley Water District

October 5, 2023

United States Department of the Interior
Bureau of Reclamation
Financial Assistance Support Section
P.O. Box 25007, MS 84-27133
Denver, CO 80225

I write on behalf of Coastside County Water District in support of the California Data Collaborative's (CaDC) proposal to the Bureau of Reclamation for a grant to fund the development of the Open Analytics for Advanced Metering Infrastructure project in California to assist local water suppliers with tracking, quality controlling, analyzing, and reporting their Automated Meter Infrastructure (AMI) water demand data. We strongly support this grant application and the focus on improving the quality, availability, and usability of data to enhance water supply reliability, water efficiency, regulatory reporting, and drought management activities.

As an urban retail water supplier required to comply with California's Urban Water Management Plan, Water Shortage Contingency Plan, and water efficiency regulations established under Senate Bill 606 and Assembly Bill 1668 (2018), my agency has a strong interest in being able to evaluate the current efficiency levels of our customers, identify opportunities for improvement, share data for regional collaboration, and report trustworthy data for compliance. A data integration tool that pulls near real-time water use into the existing CaDC software platform will allow us to proactively manage water demand more effectively in our service area while allowing us to adapt to changing water supply conditions.

As a member agency of the CaDC, we support the use of our annual membership dues as matching funds towards this grant. In addition, we acknowledge specific roles and responsibilities we will fulfill in this partnership. In the event this proposal is funded, we would expect our role in the Open Analytics for Advanced Metering Infrastructure project to include:

- Providing input to inform the design and functionality of the software platform.
- Allowing the data that we already share with the CaDC to be used to inform the software architecture, and possibly sharing additional data on a case-by-case basis.
- Testing the platform and providing feedback to ensure that it meets our needs.

We look forward to working with you to enhance water supply reliability, water efficiency, water equity and drought management activities by improving the quality, availability, and usability of data that are critical for effective water demand management.

Sincerely,
Cathleen Brennan
Cathleen Brennan
Water Resource Analyst
Coastside County Water District

Crescenta Valley Water District

2700 Foothill Boulevard, La Crescenta, California 91214
Phone (818) 248-3925 Fax (818) 248-1659

Directors
Judy L. Tejeda
James D. Bodnar
Kerry D. Erickson
Jeffery W. Johnson
Sharon S. Raghavachary

General Manager
James K. Lee

October 2, 2023

United States Department of the Interior
Bureau of Reclamation
Financial Assistance Support Section
P.O. Box 25007, MS 84-27133
Denver, CO 80225

I write on behalf of Crescenta Valley Water District in support of the California Data Collaborative's (CaDC) proposal to the Bureau of Reclamation for a grant to fund the development of the Open Analytics for Advanced Metering Infrastructure project in California to assist local water suppliers with tracking, quality controlling, analyzing, and reporting their Automated Meter Infrastructure (AMI) water demand data. We strongly support this grant application and the focus on improving the quality, availability, and usability of data to enhance water supply reliability, water efficiency, and drought management activities.

As an urban retail water supplier required to comply with California's Urban Water Management Plan, Water Shortage Contingency Plan, and water efficiency regulations established under Senate Bill 606 and Assembly Bill 1668 (2018), my agency has a strong interest in being able to evaluate the current efficiency levels of our customers, identify opportunities for improvement, share data for regional collaboration, and report trustworthy data for compliance. A data integration tool that pulls near real-time water use into the existing CaDC software platform will allow us to proactively manage water demand more effectively in our service area while allowing us to adapt to changing water supply conditions.

As a member agency of the CaDC, we support the use of our annual membership dues as matching funds towards this grant. In addition, we acknowledge specific roles and responsibilities we will fulfill in this partnership. In the event this proposal is funded, we would expect our role in the Open Analytics for Advanced Metering Infrastructure project to include:

- Providing input to inform the design and functionality of the software platform.
- Allowing the data that we already share with the CaDC to be used to inform the software architecture, and possibly sharing additional data on a case-by-case basis.
- Testing the platform and providing feedback to ensure that it meets our needs.

We look forward to working with you to enhance water supply reliability, water efficiency, water equity and drought management activities by improving the quality, availability, and usability of data that are critical for effective water demand management.

Sincerely,
Patrick Atwater
Regulatory and Public Affairs Manager
Crescenta Valley Water District
2700 Foothill Boulevard
La Crescenta, CA 91214

Inland Empire Utilities Agency
A MUNICIPAL WATER DISTRICT

6075 Kimball Avenue • Chino, CA 91708
P.O. Box 9020 • Chino Hills, CA 91709
TEL (909) 993-1600 • FAX (909) 993-1985
www.ieua.org

September 26, 2023

United States Department of the Interior
Bureau of Reclamation
Financial Assistance Support Section
P.O. Box 25007, MS 84-27133
Denver, CO 80225

Dear Sir or Madam,

I write on behalf of the Inland Empire Utilities Agency (IEUA), a wholesale water recycled water provider in Southern California. IEUA supports the California Data Collaborative's (CaDC) proposal to the Bureau of Reclamation for a grant to fund the development of the Open Analytics for Advanced Metering Infrastructure project in California to assist local water suppliers with tracking, quality controlling, analyzing, and reporting their Automated Meter Infrastructure (AMI) water demand data. We strongly support this grant application and its focus on improving the quality, availability, and usability of data to enhance water supply reliability, water efficiency, and drought management activities.

As an urban wholesale water supplier, IEUA has a strong interest in being able to access aggregate, anonymized data from our member agencies to inform water resources planning. We also support the ability of our retail agencies to evaluate the current water demand of their customers, identify opportunities for improvement, and report trustworthy data for compliance. A data integration tool that pulls near real-time water use into the existing CaDC software platform will allow water agencies to proactively manage water demand more effectively in their service area while allowing us to adapt to changing water supply conditions.

As a member agency of the CaDC, we support the use of our annual membership dues as matching funds towards this grant. In addition, we acknowledge specific roles and responsibilities we will fulfill in this partnership. In the event this proposal is funded, we would expect our role in the Open Analytics for Advanced Metering Infrastructure project to include:

- Providing input to inform the design and functionality of the software platform.
- Allowing the data that we already share with the CaDC to be used to inform the software architecture, and possibly sharing additional data on a case-by-case basis.

- Testing the platform and providing feedback to ensure that it meets our needs.

We look forward to working with you to enhance water supply reliability, water efficiency, water equity and drought management activities by improving the quality, availability, and usability of data that are critical for effective water demand management. Please contact Cathy Pieroni, Acting Water Resources Manager, at cpieroni@ieua.org if you have any questions.

Sincerely,
INLAND EMPIRE UTILITIES AGENCY

Shivaji Deshmukh, P.E.
General Manager

LONG BEACH Utilities
Water · Gas · Sewer

CHRISTOPHER J. GARNER, General Manager

1800 E. Wardlow Road, Long Beach, CA 90807
562.570.2300 | LBUtilities.org

October 13, 2023

United States Department of the Interior
Bureau of Reclamation
Financial Assistance Support Section
P.O. Box 25007, MS 84-27133
Denver, CO 80225

Long Beach Utilities supports the California Data Collaborative's (CaDC) proposal to the Bureau of Reclamation for a grant to fund the development of the Open Analytics for Advanced Metering Infrastructure project in California to assist local water suppliers with tracking, quality controlling, analyzing, and reporting their Automated Meter Infrastructure (AMI) water demand data. We strongly support this grant application and the focus on improving the quality, availability, and usability of data to enhance water supply reliability, water efficiency, and drought management activities.

As a member agency of the CaDC, we support the use of our annual membership dues as matching funds towards this grant. In addition, we acknowledge specific roles and responsibilities we would fulfill in this partnership in the event this proposal is funded, including providing input to inform the design and functionality of the software platform, allowing the data we share with the CaDC to be used to inform the software architecture, and testing and providing feedback on the platform to ensure that it meets our needs.

We look forward to working with you to enhance water supply reliability, water efficiency, water equity and drought management activities by improving the quality, availability, and usability of data that are critical for effective water demand management.

Sincerely,

Christopher J. Garner
General Manager

moulton niguel water district

October 5, 2023

United States Department of the Interior
Bureau of Reclamation
Financial Assistance Support Section
P.O. Box 25007, MS 84-27133
Denver, CO 80225

RE: Support for California Data Collaborative's Open Analytics for Advanced Metering Infrastructure Proposal

To Whom It May Concern:

I write on behalf of Moulton Niguel Water District in support of the California Data Collaborative's (CaDC) proposal to the Bureau of Reclamation for a grant to fund the development of the Open Analytics for Advanced Metering Infrastructure project in California to assist local water suppliers with tracking, quality controlling, analyzing, and reporting their Automated Meter Infrastructure (AMI) water demand data. We strongly support this grant application and the focus on improving the quality, availability, and usability of data to enhance water supply reliability, water efficiency, and drought management activities.

As an urban retail water supplier required to comply with California's Urban Water Management Plan, Water Shortage Contingency Plan, and water efficiency regulations established under Senate Bill 606 and Assembly Bill 1668 (2018), my agency has a strong interest in being able to evaluate the current efficiency levels of our customers, identify opportunities for improvement, share data for regional collaboration, and report trustworthy data for compliance. A data integration tool that pulls near real-time water use into the existing CaDC software platform will allow us to proactively manage water demand more effectively in our service area while allowing us to adapt to changing water supply conditions.

As a member agency of the CaDC, we support the use of our annual membership dues as matching funds towards this grant. In addition, we acknowledge specific roles and responsibilities we will fulfill in this partnership. In the event this proposal is funded, we would expect our role in the Open Analytics for Advanced Metering Infrastructure project to include:

- Providing input to inform the design and functionality of the software platform.
- Allowing the data that we already share with the CaDC to be used to inform the software architecture, and possibly sharing additional data on a case-by-case basis.
- Testing the platform and providing feedback to ensure that it meets our needs.

We look forward to working with you to enhance water supply reliability, water efficiency, water equity and drought management activities by improving the quality, availability, and usability of data that are critical for effective water demand management.

Sincerely,

Joone Lopez
General Manager
Moulton Niguel Water District

THE METROPOLITAN WATER DISTRICT
OF SOUTHERN CALIFORNIA

Office of the General Manager

October 10, 2023

United States Department of the Interior
Bureau of Reclamation
Financial Assistance Support Section
P.O. Box 25007, MS 84-27133
Denver, CO 80225

I write on behalf of The Metropolitan Water District of Southern California (Metropolitan) in support of the California Data Collaborative's (CaDC) proposal to the Bureau of Reclamation for a grant to fund the development of the Open Analytics for Advanced Metering Infrastructure project in California to assist local water suppliers with tracking, quality controlling, analyzing, and reporting their Automated Meter Infrastructure (AMI) water demand data. We strongly support this grant application and the focus on improving the quality, availability, and usability of data to enhance water supply reliability, water efficiency, and drought management activities.

As an urban wholesale water supplier, Metropolitan has a strong interest in accessing aggregated and anonymized data from our member agencies to inform water resources planning. We also support the ability of our member agencies to evaluate the current water demand of their customers, identify opportunities for improvement, and report trustworthy data for compliance. A data integration tool that pulls near real-time water use into the existing CaDC software platform will allow water agencies to proactively manage water demand more effectively in their service area while allowing us to adapt to changing water supply conditions.

As a member agency of the CaDC, we support the use of our annual membership dues as matching funds towards this grant. In addition, we acknowledge specific roles and responsibilities we will fulfill in this partnership. In the event this proposal is funded, we would expect our role in the Open Analytics for Advanced Metering Infrastructure project to include:

- Providing input to inform the design and functionality of the software platform.
- Allowing the data that we already share with the CaDC to be used to inform the software architecture, and possibly sharing additional data on a case-by-case basis.
- Testing the platform and providing feedback to ensure that it meets our needs.

We look forward to working with you to enhance water supply reliability, water efficiency, water equity, and drought management activities by improving the quality, availability, and usability of data that are critical for effective water demand management.

Sincerely,

Bradley M. Coffey

10/10/23

Brad Coffey Date
Manager, Water Resource Management

TB:vsm

Global Partnership for Sustainable Development Data

Better **data.**
Better **decisions.**
Better **lives.**

October 13, 2025

United States Department of the Interior
Bureau of Reclamation
Financial Assistance Support Section
P.O. Box 25007, MS 84-27133
Denver, CO 80225

I write on behalf of Global Partnership for Sustainable Development Data in support of the California Data Collaborative's (CaDC) proposal to the Bureau of Reclamation for a grant to fund the development of the Open Analytics for Advanced Metering Infrastructure project in California to assist local water suppliers with tracking, quality controlling, analyzing, and reporting their Automated Meter Infrastructure (AMI) water demand data. We strongly support this grant application and the focus on improving the quality, availability, and usability of data to enhance water supply reliability, water efficiency, and drought management activities - not only for individual water agencies but for water suppliers across the globe.

California's urban retail water suppliers face growing pressures from climate change, population growth, and regulations that require them to make the most of the state's limited supply of water. They would benefit from the ability to easily evaluate the current water demand of their customers, identify opportunities for improvement, share data for regional collaboration, and report trustworthy data for compliance. A data integration tool that pulls near real-time water use into the existing CaDC software platform will allow water agencies to proactively manage water demand more effectively in their service area to quickly adapt to changing water supply conditions.

In the event this proposal is funded, we would expect our role in the Open Analytics for Advanced Metering Infrastructure project to include:

- Advising CaDC as part of our ongoing work on effective and ethical data sharing by bringing them together with multiple parties to exchange knowledge and best practices on data sharing initiatives.

We look forward to working with you to enhance water supply reliability, water efficiency, water equity and drought management activities by improving the quality, availability, and usability of data that are critical for effective water demand management.

Sincerely,

Claire Melamed
Chief Executive Officer
The Global Partnership for Sustainable Development Data
United Nations Foundation
1750 Pennsylvania Avenue NW, Suite 300, Washington, DC 20006

CALIFORNIA
WATER EFFICIENCY
PARTNERSHIP

A Chapter of the Alliance *for* Water Efficiency

United States Department of the Interior
Bureau of Reclamation
Financial Assistance Support Section
P.O. Box 25007, MS 84-27133
Denver, CO 80225

September 25, 2023

I write on behalf of the California Water Efficiency Partnership in support of the California Data Collaborative's (CaDC) proposal to the Bureau of Reclamation for a grant to fund the development of the Open Analytics for Advanced Metering Infrastructure project in California to assist local water suppliers with tracking, quality controlling, analyzing, and reporting their Automated Meter Infrastructure (AMI) water demand data. We strongly support this grant application and the focus on improving the quality, availability, and usability of data to enhance water supply reliability, water efficiency, and drought management activities.

California Water Efficiency Partnership. CalWEP (formerly known as the California Urban Water Conservation Council) is a membership-based non-profit organization with a mission to maximize urban water efficiency and conservation throughout California by supporting and integrating innovative technologies and practices; encouraging effective public policies; advancing research, training, and public education; and building collaborative approaches and partnerships. Our membership consists of many urban retail water suppliers required to comply with California's Urban Water Management Plan, Water Shortage Contingency Plan, and water efficiency regulations established under Senate Bill 606 and Assembly Bill 1668 (2018). Our members have a strong interest in being able to evaluate the current efficiency levels of our customers, identify opportunities for improvement, share data for regional collaboration, and report trustworthy data for compliance. A data integration tool that pulls near real-time water use into the existing CaDC software platform will allow water agencies to proactively manage water demand more effectively in their service area to quickly adapt to changing water supply conditions.

We look forward to working with you to enhance water supply reliability, water efficiency, water equity and drought management activities by improving the quality, availability, and usability of data that are critical for effective water demand management.

Sincerely,

TC Fleming

Tia Fleming
Co-Executive Director
California Water Efficiency Partnership

Open Analytics for Advanced Metering Infrastructure

Budget Narrative

Project Budget

Funding Plan and Letters of Funding Commitment

The non-federal share of the project cost will be contributed by Social and Environmental Entrepreneurs, on behalf of its project California Data Collaborative, through in-kind personnel match and cash.

The CaDC has a seven-year operating history as a nonprofit membership organization of water suppliers with a mission to create tools and applied research supporting planning and analysis in the water industry. Over the last three fiscal years, the CaDC has averaged more than $300,000 per year in membership revenue, and this membership revenue has grown in recent years and is expected to grow in the future with growth in the CaDC member base. Throughout the project, CaDC commits to funding a total of at least $400,000 in matching funds for this project, with the budget below forecasting a matched contribution of 438,445. CaDC/SEE proposes to contribute $150,000 as matching funds during fiscal year (Oct-Jun) 24-25, $220,000 of matching funds during FY 25-26, and $68,445 of matching funds during FY 26-27.

Budget Proposal

Table 1. Total Project Cost

SOURCE	AMOUNT
Costs to be reimbursed with the requested Federal funding	$400,000
Costs to be paid by the applicant	$438,445
Value of third-party contributions	$0
TOTAL PROJECT COST	$838,445

Table 2. Budget Proposal

BUDGET ITEM DESCRIPTION	$/UNIT	QUANTITY	QUANTITY TYPE	TOTAL COST
Salaries and Wages				
Christopher Tull, Chief Data Officer / Project Manager	$77	832	Hours	$64,000
Member Experience Specialist	$58	1040	Hours	$60,000
Head of Technical Solutions	$60	1040	Hours	$62,400
Fringe Benefits				
Christopher Tull, Chief Data Officer / Project Manager	$9.23	832	Hours	$7,680
Member Experience Specialist	$6.92	1040	Hours	$7,200
Head of Technical Solutions	$7.20	1040	Hours	$7,488
Supplies and Materials				
Cloud Servers and Databases	$1,200	24	Months	$28,800
Contractual/Construction				
Software Development Contract				
Abe Serrano, Product Manager	$3,302	24	Months	$79,250
Project Manager	$2,250	24	Months	$54,000
Data Engineer	$5,850	24	Months	$140,400
Backend Developer	$4,625	24	Months	$111,000
Frontend Developer	$5,639	24	Months	$135,350
UX/UI Designer	$2,500	24	Months	$60,000
TOTAL DIRECT COSTS				$817,568
Indirect Costs				
De minimus, Personnel and Fringe	10%	$208,768		$20,877

TOTAL ESTIMATED PROJECT COSTS	$838,445

Budget Narrative

1 Salaries and Wages

The CaDC will have one key personnel working on the proposed project, who will lead the following task.

Personnel
The CaDC's Chief Data Officer, **Christopher Tull**, will serve as the overall **Project Manager** for the proposed project and collaborate with the sub-contractor as a product manager. Christopher led the development of the existing data pipelines, workflows, and models for the CaDC Analytics platform and has extensive knowledge of what is needed to develop a robust data ecosystem for California water data.

A **Member Experience Specialist (MES)** will provide user testing, design feedback, and will assist with project outreach, which will include setting up meetings with partners to gather user requirements, validate prototypes, and perform user acceptance testing. The Member Experience Specialist will also assist with disseminating project results by organizing webinars, creating case studies and other content, and helping to onboard agencies into using the new platform.

The **Head of Technical Solutions (HTS)** will oversee integrating of the contractor's work with the current CUWEP product and the CaDC"s data infrastructure. In addition to supporting the contract team, the HTS will also onboard agencies to the platform, which includes writing data parsers, validating data quality, and troubleshooting with agency staff.

Task 1: Grant Administration
Christopher will work 48 hours at a rate of $77/hour to administer grant funds and generate financial and performance reports.
Salary Sub-Total = $3,696 over 24 months

Task 2: Project and Product Management
Christopher will work 784 hours at a rate of $77/hour, providing product guidance, overseeing project progress, facilitating stakeholder outreach, gathering stakeholder feedback, and stewarding project scope and roadmap.
Salary Sub-Total = $60,368 over 24 months

Task 3: Stakeholder Outreach, User Research, User Onboarding
The MES will work 1040 hours at a rate of $58/hour, facilitating stakeholder outreach, gathering feedback from partners, organizing webinars, developing educational materials, and onboarding

agencies to use the platform. The HTS will work 500 hours at a rate of $60/hour to write data parsers to onboard new agencies.
Salary Sub-Total = $90,320 over 24 months

Task 4: Contract Software Team Support
The HTS will work 540 hours at a rate of $60/hour to support the contracted software development team with integration with the CaDC's data and software platform.
Salary Sub-Total = $32,400 over 24 months

Total Salaries:
Christopher Tull = $64,000 over 24 months
Member Experience Specialist = $60,000 over 24 months
Head of Technical Solutions = $62,400 over 24 months
Total Salaries = $186,400

2 Fringe Benefits

CaDC/SEE provides benefits to employees at a rate of 12% on listed salaries. This includes payroll taxes as well as workers compensation fees.

Total Salaries for The CaDC = $186,400
Total Fringe Benefits for CaDC salaries (12%) = $22,368
Total Salaries + Fringe Benefits = $208,768

3 Materials and Supplies

Based on past experience and estimates, the CaDC estimates the cost of servers and databases to require a monthly service fee of $1,200/month for 24 months.

Total Materials and Supplies = $28,800

4 Contractual

Software Design and Development. CaDC/SEE proposes to contract with Water UX, Inc for software design and development. Water UX specializes in human-centered data solutions for water innovation. With a world-class design and development team, Water UX delivers data analysis and visualization solutions that empower water professionals to generate critical data insights and solve large-scale water conservation challenges.

CaDC/SEE's decision to select Water UX to fulfill this role is informed by CaDC/SEE's years of experience building software applications to support decision-making by staff at local water supply agencies. Water UX's knowledge of the CaDC's existing operations and data systems will reduce the project start-up time compared to another firm with similar expertise. Water UX's knowledge of water management needs related to the requirements imposed by SB606/AB1668 is unparalleled thanks to Design Director Abe Serrano's dedication to research and building solutions to address this topic. Water UX's product development methodology, built on approaches to design and software engineering pioneered in the technology sector, reduces the risk and increases the odds of successfully launching new products, which is uncommon among firms providing similar services in the water sector. Lastly, Water UX's proposed labor costs are reasonable for a product of OAAMI's complexity while still being adequate to bring high-quality technical talent to bear on the project. It is the belief of CaDC/SEE that no other firm could successfully deliver a project of the scope described here for the reasonable price being proposed.

Personnel

The Director of User Experience for Water UX, **Abe Serrano**, will serve as the **Product Manager** for the proposed project and will steward the vision, facilitate the project scope, and manage five key roles listed below to meet milestones and deliverables. Abe's research into SB606/AB1668 during his time as an E2 Fellow has granted him a unique viewpoint into ensuring the success of OAAMI.
Salary Sub-Total = $79,250 over 24 months

The **Project Manager** role will coordinate the four key roles listed below to manage the product roadmap, implement Agile development best practices, and coordinate weekly team Scrum rituals. This role will be proactive in resolving roadblocks, coordinating communication channels, and facilitating task management.
Salary Sub-Total = $54,000 over 24 months

The **Data Engineer** role will work with the Systems Architect and Product Manager in developing ETL and BTL data layers to ingest, process, format, and output data sets necessary for the Backend Developer to query and develop API endpoints. This role will also establish data standards, implement data management best practices, and develop a workflow to aggregate disparate data sources into a standardized data model for long-term implementation and scaling of OAAMI.
Salary Sub-Total = $140,400 over 24 months

The **Backend Developer** role will work with the Systems Architect and Product Manager in developing database infrastructure and API endpoints to allow for quick and easy access to data for the Frontend Developer to display in the user interface. This role will also establish database infrastructure standards, implement database query best practices, and ensure that database queries are fast and reliable.
Salary Sub-Total = $111,000 over 24 months

The **Frontend Developer** role will work with the Backend Developer and Product Manager to develop the front-end web application framework and integrate all available API endpoints provided by the Backend Developer. This role will also work closely with the UX/UI designer to develop a design system that utilizes modular user interface components and respond to feedback collected from stakeholder testing sessions.
Salary Sub-Total = $135,350 over 24 months

The **UX/UI Designer** role will work with the Frontend Developer and Product Manager to design a system of modular user interface components, establish user workflows, and develop prototypes to validate features with stakeholders and increase the overall success of the project by decreasing ambiguity and providing clarity on the specifics of the final web application deliverable.
Salary Sub-Total = $60,000 over 24 months

Task 1: Define OAAMI technical requirements and specifications
The Water UX, Inc. team will develop a data strategy to import, standardize and enrich high-resolution AMI data at 15 minute – 1 hour intervals for the platform. The data strategy will detail systems architecture and technology infrastructure requirements, specifications, and outputs. The CaDC will contract with Water UX, Inc for $10,740 for Task 1, which includes salaries and wages for Product Manager $4,500, Project Manager $1,440, Data Engineer $2,400, and Backend Developer $2,400.

Task 2: Load large AMI dataset to benchmark database performance requirements
The Water UX, Inc. team will import a large sample AMI dataset to benchmark database performance and specify database infrastructure requirements. The CaDC will contract with Water UX, Inc for $13,140 for Task 2, which includes salaries and wages for Product Manager $4,500, Project Manager $1,440, Data Engineer $4,800, and Backend Developer $2,400.

Task 3: Define integration plan for all major AMI data providers
The Water UX, Inc. team will gather API documentation from all major AMI data providers and define data pipeline requirements to import and manage high-resolution data. The CaDC will contract with Water UX, Inc for $8,340 for Task 3, which includes salaries and wages for Product Manager $4,500, Project Manager $1,440, Data Engineer $2,400.

Task 4: Define and validate common scenarios and use cases for SQL database queries
The Water UX, Inc. team will define and validate common AMI analysis scenarios and use cases to develop SQL database queries to return corresponding data insights. The CaDC will contract with Water UX, Inc for $10,740 for Task 4, which includes salaries and wages for Product Manager $4,500, Project Manager $1,440, Data Engineer $4,800.

Task 5: Define OAAMI reports and metrics

The Water UX, Inc. team will define and validate automated report generation and distribution for common AMI reporting scenarios and use cases. The CaDC will contract with Water UX, Inc for $8,340 for Task 5, which includes salaries and wages for Product Manager $4,500, Project Manager $1,440, Data Engineer $2,400.

Task 6: Upgrade and scale OAAMI cloud storage per technical requirements
The Water UX, Inc. team will upgrade and scale the data infrastructure required to import and manage high-resolution AMI data. The CaDC will contract with Water UX, Inc for $24,600 for Task 6, which includes salaries and wages for Product Manager $1,800, Project Manager $1,800, Data Engineer $3,000, Backend Developer $18,000.

Task 7: Develop, test and iterate data pipeline
The Water UX, Inc. team will develop the data pipelines needed to integrate OAAMI high-resolution AMI data with the existing platform. The CaDC will contract with Water UX, Inc for $24,600 for Task 7, which includes salaries and wages for Product Manager $1,800, Project Manager $1,800, Data Engineer $18,000, Backend Developer $3,000.

Task 8: Develop data pipeline adapter for each major AMI data provider
The Water UX, Inc. team will develop data pipelines to import high-resolution data for each major AMI data provider. The CaDC will contract with Water UX, Inc for $55,800 for Task 8, which includes salaries and wages for Product Manager $3,600, Project Manager $7,200, Data Engineer $36,000, Backend Developer $9,000.

Task 9: Incrementally load historical data sets (if available)
The Water UX, Inc team will prepare and deploy the code base for public release. The CaDC will contract with Water UX, Inc for $11,875 for Task 9, which includes salaries and wages for Product Manager $5,625, Backend Developer $3,125, and Frontend Developer $3,125.

Task 10: Develop SQL database queries per scenario and use case specifications
The Water UX, Inc. team will develop SQL database queries for common scenarios and use cases to highlight insights on customer, meter, and system behavior. The CaDC will contract with Water UX, Inc for $43,200 for Task 10, which includes salaries and wages for Product Manager $2,400, Project Manager $4,800, Data Engineer $36,000.

Task 11: Validate that SQL database queries match desired objective and outcomes
The Water UX, Inc. team will test SQL database queries for common scenarios and use cases to validate that queries are returning desired data insights. The CaDC will contract with Water UX, Inc for $21,600 for Task 11, which includes salaries and wages for Product Manager $2,400, Project Manager $4,800, Data Engineer $7,200, Backend Developer $7,200.

Task 12: Deploy SQL database queries to member agency datasets and distribute query results as automated email with CSV/PDF attachments
The Water UX, Inc. team will deploy SQL database queries for common scenarios and use cases to automatically generate recurring datasets and monitor for performance. The CaDC will

contract with Water UX, Inc for $43,200 for Task 12, which includes salaries and wages for Product Manager $2,400, Project Manager $4,800, Backend Developer $36,000.

Task 13: Design data visualization modules based on validated SQL database queries
The Water UX, Inc. team will design data visualization modules based on validated SQL database queries. The CaDC will contract with Water UX, Inc for $45,055 for Task 13, which includes salaries and wages for Product Manager $13,615, Project Manager $1,440, UX/UI Designer $30,000.

Task 14: Partitioning of DB data tables to precompute values and increase query performance
The Water UX, Inc. team will partition the necessary database tables to allow data visualizations values to be precomputed and optimize API query performance. The CaDC will contract with Water UX, Inc for $10,080 for Task 14, which includes salaries and wages for Product Manager $1,440, Project Manager $1,440, Data Engineer $7,200.

Task 15: Develop API queries of DB partitions to deliver data for frontend integration
The Water UX, Inc. team will develop APIs to query database partitions to return data visualizations values to the frontend. The CaDC will contract with Water UX, Inc for $14,880 for Task 15, which includes salaries and wages for Product Manager $1,440, Project Manager $1,440, Backend Developer $12,000.

Task 16: Develop frontend data visualization UI and implement API data
The Water UX, Inc. team will develop frontend UI modules and implement corresponding API data. The CaDC will contract with Water UX, Inc for $46,555 for Task 16, which includes salaries and wages for Product Manager $1,440, Project Manager $1,440, Frontend Developer $43,675.

Task 17: Test and deploy data visualization modules
The Water UX, Inc. team will deploy frontend UI modules to the platform and test for performance. The CaDC will contract with Water UX, Inc for $26,880 for Task 17, which includes salaries and wages for Product Manager $1,440, Project Manager $1,440, Frontend Developer $24,000.

Task 18: Design reports UI based on use case specifications
The Water UX, Inc. team will design automated analysis reports UI based on use case specifications to be integrated with the platform. The CaDC will contract with Water UX, Inc for $45,055 for Task 18, which includes salaries and wages for Product Manager $13,615, Project Manager $1,440, UX/UI Designer $30,000.
Task 19: Partitioning of DB data tables to precompute values and increase query performance
The Water UX, Inc. team will partition the necessary database tables to allow report values to be precomputed and optimize API query performance. The CaDC will contract with Water UX, Inc for $10,080 for Task 19, which includes salaries and wages for Product Manager $1,440, Project Manager $1,440, Data Engineer $7,200.

Task 20: Develop API queries of DB partitions to deliver data for frontend integration
The Water UX, Inc. team will develop APIs to query database partitions to return report values to the frontend. The CaDC will contract with Water UX, Inc for $14,880 for Task 20, which includes salaries and wages for Product Manager $1,440, Project Manager $1,440, Backend Developer $12,000.

Task 21: Develop frontend reports UI and implement API data
The Water UX, Inc. team will develop frontend reports UI and implement corresponding API data. The CaDC will contract with Water UX, Inc for $46,555 for Task 21, which includes salaries and wages for Product Manager $1,440, Project Manager $1,440, Frontend Developer $43,675.

Task 22: Test and deploy reports UI The Water UX, Inc. team will deploy frontend UI modules to the platform and test for performance. The CaDC will contract with Water UX, Inc for $26,880 for Task 22, which includes salaries and wages for Product Manager $1,440, Project Manager $1,440, Frontend Developer $24,000.

Total Contractual Costs = $580,000

6.3.5 Indirect Costs

CaDC/SEE will use a 10% *de minimus* fee applied to the personnel salaries and fringe benefit costs of $208,768 resulting in indirect costs of $20,877.

Total Indirect Costs = $20,877

Environmental and Cultural Resources Compliance (as applicable to the project)

The OAAMI project will create a software program accessible on the internet, and its development will not involve any earth disturbing work or impacts on the environment. No listed or proposed endangered species will be affected by development of OAAMI. No wetlands or surface waters will be impacted by the software development. No water delivery systems or irrigation systems will be constructed, modified, or affected as part of the work proposed in this project. There are no irrigation districts associated with this project; thus none are listed or eligible for listing on the National Register of Historic Places. There are archaeological sites within California, but no physical impacts from OAAMI development are anticipated. Similarly, the development of OAAMI will have no impact on low-income or minority populations. This project will not limit access or use of Indian sacred sites or tribal lands. OAAMI will not contribute to the introduction, continued existence, or spread of noxious weeds or non-native invasive species.

Required Permits or Approvals

No permits or approvals are required for the OAAMI project because it is a software tool. The CaDC will obtain permission to access and use any non-public data required for the functioning of the tool through appropriate data use agreements with the relevant entities.

Overlap or Duplication of Effort Statement

The activities and costs associated with this project will build upon work to develop the CUWEP platform which is currently funded under an active agreement with USBR (R22AP00292). However, the project activities **will be distinct** and the proposed project **will not overlap** in time with the active project.

This proposal has not been submitted for funding consideration with any other potential funding source.

Conflict of Interest Disclosure Statement

CaDC/SEE maintains procedures to identify, disclose, and mitigate or eliminate identified conflicts of interest and these procedures can be provided upon request. CaDC/SEE has no conflicts of interest to disclose at this time and acknowledges responsibility for notifying the Financial Assistance Officer in writing of any conflicts of interest that may arise during the life of the award.

Uniform Audit Reporting Statement

CaDC/SEE was not required to perform a single audit in 2022, our most recently closed fiscal year.

Disclosure of Lobbying Activities (if Applicable)

CaDC/SEE has no applicable lobbying activities to report.

Letters of Support

Letters of support from two associated nonprofit organizations are attached, including:

- California Water Efficiency Partnership
- Global Partnership for Sustainable Development Data

Letter of Partnership

As a nonprofit membership association of water suppliers, CaDC maintains a large network of highly-involved partners committed to furthering the goals of this proposed project. Letters of partnership from nine CaDC member agency partners demonstrating their intent to participate in the project are attached. These include:

- Alameda County Water District
- City of Thousand Oaks
- Coachella Valley Water District

- Coastside County Water District
- Crescenta Valley Water District
- Inland Empire Utilities Agency
- Long Beach Utilities
- Moulton Niguel Water District
- Metropolitan Water District of Southern California

Official Resolution

An official resolution will be adopted by CaDC/SEE's board of directors during the first regularly scheduled board meeting after receiving a notification of selection.