City of Arts & Innovation

City Council Memorandum

TO: **HONORABLE MAYOR AND CITY COUNCIL** **DATE: NOVEMBER 9, 2021**

FROM: **PUBLIC UTILITIES DEPARTMENT** **WARDS: ALL**

SUBJECT: **PHASE THREE PROJECT UPDATE FOR IMPLEMENTATION OF AN ELECTRIC ADVANCED METER SYSTEM AND METER DATA MANAGEMENT SYSTEM**

ISSUE:

Receive an update on the phase three project for implementation of an Electric Advanced Meter System and Meter Data Management System.

RECOMMENDATION:

That the City Council receive and file the phase three project update for implementation of an Electric Advanced Meter System and Meter Data Management System.

COMMITTEE RECOMMENDATION:

The Land Use/Sustainability/Resilience Committee met on June 14, 2021, with Vice Chair Edwards and Member Perry present, to consider, receive and file the phase three project update for implementation of an Electric Advanced Meter System and Meter Data Management System. After discussion the Committee unanimously voted to recommend that the City Council receive and file the phase three project update for implementation of an Electric Advanced Meter System and Meter Data Management System.

BOARD RECOMMENDATION:

On May 10, 2021, the Board of Public Utilities (Board), with one member absent, voted unanimously to receive an update on the progress of and movement to phase three of the advanced meter system and meter data management system for Fiscal Year 2021/22; approve an increase to Work Order No. 1707248 by $2,502,341 for Fiscal Year 2020/21 for a total amount of $13,390,991 for the third phase of implementation of an Electric Advanced Meter System and Meter Data Management System; approve a Second Amendment to Software Implementation Services Agreement with Systems and Software, Inc., a Vermont Corporation, in the amount of $87,470 and extension of term through June 3, 2021; and approve a First Amendment to Support and Maintenance Agreement with Systems and Software, Inc., a Vermont Corporation, in the amount of $6,450 and extension of term through December 31, 2021.

BACKGROUND:

On June 12, 2017, the Board approved a Professional Services Agreement with Utiliworks Consulting, LLC, now E Source Companies, LLC, a professional consulting firm with over 13 years of experience successfully planning and implementing utility Advanced Meter Programs, to support the Advanced Meter Infrastructure (AMI) Project from planning through execution.

On January 28, 2019, the Board approved the Electric Advanced Meter System and Meter Data Management System (MDMS), which included a Professional Services Agreement with Tantalus Systems, Inc. for a cloud-based AMI Head-End System (HES), and a Software as a Service Agreement with SmartWorks for a cloud-based Meter Data Management System.

On April 22, 2019, the Board approved integration services with Systems and Software, Inc. to integrate the AMI HES and MDMS with the Riverside Public Utilities existing enQuesta Customer Information System (CIS).

On October 28, 2019, the Board approved an increase to Work Order No. 1707248 of $7,228,650 for Fiscal Year 2019/20 for a total work order amount of $10,888,650 for the second phase of implementation of an Electric Advanced Meter System and Meter Data Management System.

DISCUSSION:

AMI is an integrated system of advanced electric meters, communications networks, and data management systems that enables automation and two-way communication between the utility and the meter provided to the customer. The system provides a number of important functions that were not previously possible or had to be performed manually, such as the ability to automatically and remotely measure electricity use, identify and isolate outages, verify correct billing information, connect and disconnect service, detect tampering, and monitor voltage. AMI provides RPU near real-time and actionable information about system performance, power quality, and outages, which increases reliability and efficiencies, and lowers overall operating costs.

Once fully implemented, AMI will give Riverside Public Utilities (RPU) customers expanded control, increased flexibility, and additional choices in how they manage energy usage and energy efficiency. Customers will have access to energy usage through an online customer portal, which means the customer will not have to wait for a monthly bill to know how much energy they are using each month. They will be able to set up usage threshold alerts so that they can be notified if their bill is reaching their pre-determined budgeted amount. AMI will also open the door for other cost-saving programs, more flexible time-of-use rates, and customer pre-payment plans.

AMI is the current industry standard for electric meters. According to the U.S. Energy Information Administration, “in 2017 U.S. electric utilities had about 78.9 million advanced (smart) metering infrastructure (AMI) installations”, which is over half of the 150 million electricity customers in the United States. According to the Wood Mackenzie Power & Renewables, AMI Global Forecast, 2019-2024 report, “[the] global smart meter total will rise from 665.1 million in 2017 to more than 1.2 billion by the end of 2024”.

Most California utilities have already implemented AMI. The California investor-owned utilities (IOUs), Pacific Gas and Electric, San Diego Gas and Electric, and Southern California Edison, began deploying AMI in 2007 with the approval of the California Public Utilities Commission (CPUC) and had largely completed the meter conversions with their customers by 2013. The

CPUC also approved Southern California Gas Company's AMI project to retrofit and replace approximately six million natural gas meters with a wireless communications device from 2010 through 2017. This project included Riverside residents. The following table, from the IOU 2019 Smart Grid Reports and Data Requests shows the total number of AMI meters that have been implemented by the IOUs as of October 2019, as well as customer opt-out rates, which are less than 1%.

Figure 1. California IOU AMI Rollout

4.1.2 ADVANCED METERING INFRASTRUCTURE DEPLOYMENT

Table 4. Advanced Metering Infrastructure (aka Smart Meters) Rollout[95] as of Oct. 2019[96]

IOU	Total Number of Electric Smart Meters (Millions)	Cumulative Electric Smart Meter Opt-outs[97] (No. of customers)	Percentage of Opt-outs	Annual Customer Complaints (escalated)[98]
PG&E	5.44	43,064	0.79%	9
SDG&E	1.45	4,217	0.29%	0
SCE	4.7	22,972	0.48%	495
Total	11.59	70,253	0.61%	504

Source: IOU 2019 Smart Grid Reports and Data Requests

On January 28, 2019, after several years of extensive industry research and gathering best practices from other successful electric AMI implementations, and in partnership with RPU's AMI consultant, E Source, staff presented and obtained approval from the Board to proceed with an Advanced Meter Program (Program). RPU's Program approach maximized the current investment in residential Encoder Receiver Transmitter (ERT) meters, while introducing new AMI functionality across the entire service territory. RPU plans to replace all commercial and industrial (C&I) meters, many of which are obsolete mechanical meters that are beyond the expected service life. Additionally, the Utility plans to initially replace about 1 out every 6 residential electric meters. Staff, in partnership with E Source, composed a business case to determine the return-on-investment (ROI) for this approach. The business case is available on the AMI Project page of RPU's website.

Program Approach

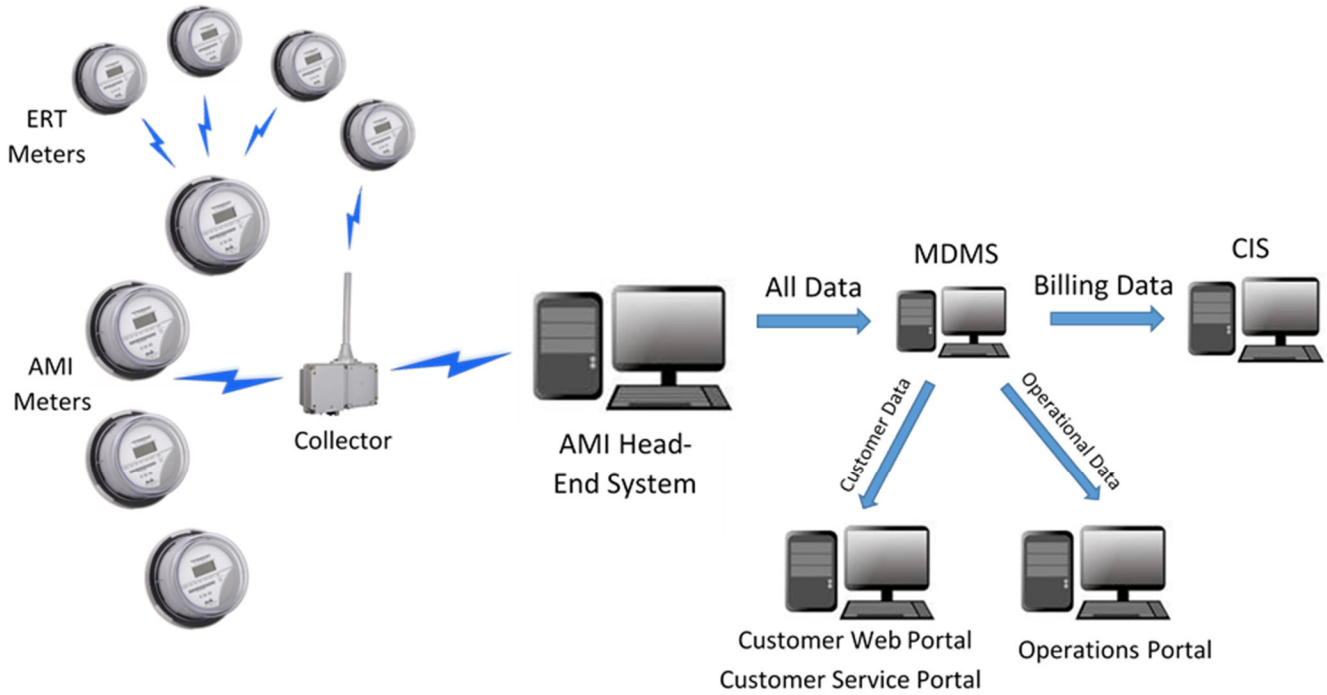
To effectively manage the implementation of the new systems and significant business processes, AMI has been implemented using a phased approach, including a two-part proof-of-concept (POC), followed by full implementation.

Phase 1, the Alpha POC, consisted of installing approximately 100 new AMI meters and corresponding communications devices in strategic "clusters" throughout the City that corresponded to each of Riverside's seven wards. This Phase began March 1, 2019 and was successfully completed September 30, 2019. Phase 2, the Beta POC, consists of installing 1,000 new AMI meters, the remaining communication devices, and integration of AMI with the Meter Data Management System and the existing Customer Information System, including a customer usage portal. This Phase began January 1, 2020 and was successfully completed March 31, 2021. The third and final phase (Phase 3), full implementation, consists of installing the remaining 24,000 AMI meters, which creates a full AMI network capable of

reading the remaining 87,000 legacy ERT meters. All of the meter replacements for the three phases have been and are planned to be performed by in-house Electric Meter Shop Technicians. The labor associated with this work is tracked separately from this work order and will be capitalized in accordance with accounting standards. The Board will receive an accounting of the associated labor costs at the end of the project.

The AMI solution that is being implemented is an "ERT overlay," which means that the new AMI devices (collectors and meters) will also collect and transmit data from the legacy ERT meters. This means that RPU only needs to initially purchase 25,000 new AMI meters to collect data from the remaining 87,000 legacy ERT meters. The legacy meters will be exchanged through the normal annual meter replacement cycle, and when meters fail. Once Phase 3 is complete, there will be no manual electric meter reading activities conducted in the field, as all meter reads will be sent remotely through the communications network.

Figure 2. High-Level System Diagram



Program Update

Following the January 2019 approval from the Board, and presentation to City Council, RPU proceeded with the first phase of the Program, the Alpha POC. The Alpha POC consisted of laboratory testing and field installation of 14 communication devices and 88 AMI meters. There was also extensive system design and configuration completed during Alpha to ensure that all AMI and ERT electric meter data continued to flow seamlessly and consistently through multiple RPU software systems.

On October 28, 2019 and December 17, 2019, staff presented to the Board and City Council that the Alpha POC phase of the project had been successfully completed. The 88 AMI meters were successfully transmitting AMI and ERT meter data through the collector devices back to the head-end system. RPU was remotely receiving hourly interval reads from residential AMI meters, fifteen-minute intervals from commercial and industrial AMI meters, and daily intervals from the authorized ERT meters. The data was transmitted to the CIS for billing and the process was

working as expected for the entire meter-to-cash life cycle. There were no system errors or impacts to billing.

At that time, the Board approved proceeding with the second phase of the Program, the Beta POC. During the Beta POC, all the remaining communication devices were installed throughout RPU's service territory, as well as approximately 1,000 additional AMI meters. Staff worked extensively with the vendors to integrate the MDMS with the CIS via a real-time interface for alerts, alarms, and connect/disconnect functionality. Extensive testing was conducted on all system functionality and integrations.

The following tasks were also completed in the Beta POC:

1. Installed all remaining communication devices
2. Installed approximately 1,000 AMI meters
3. Completed the integration between the AMI HES and the MDMS
4. Developed the real-time interface between the MDMS and the CIS
5. Verified design, security, and capabilities of the AMI HES and the MDMS
6. Validated that data flows accurately from the meter all the way through to the billing system
7. Configured the customer usage web portal
8. Re-engineered impacted business processes
9. Implemented initial staffing changes

During this Phase, it was determined that additional work will be necessary for the Systems and Software enQuesta billing system integration to automate an AMI manual work order process. enQuesta integration is necessary to obtain meter read data for utility billing automatically from the MDMS, to issue and complete work orders, and to provide customers with usage information. This additional work requires amendments to two agreements with Systems and Software. First, a Second Amendment to the Implementation Services Agreement is needed to extend the term to June 3, 2021 and increase the amount of the agreement by $87,470 to cover the additional work. Secondly, a First Amendment to the Support and Maintenance Agreement in the amount of $6,450 for the licensing costs of the additional functionality and to extend the term through December 31, 2021.

RPU also continued the Community/Customer Engagement Campaign during the Beta POC phase which included the following:

1. Maintained / updated AMI Program webpage
2. Postcard mailer to all Beta POC customers
3. Letter mailed to all Beta POC customers
4. AMI Program 1-page flyer, available at all customer service locations

Lessons Learned

During both the Alpha and Beta Proof-of-Concepts, extensive coordination occurred between the AMI vendors, City IT, and the RPU AMI project team, as well as a significant number of tests performed. There were many lessons learned that led to adjustment, edits, and corrections, prior to advancing at each step in the testing process. A few examples of lessons learned that led to improvements in the AMI system and internal procedures are as follows:

1. Lack of coordination between the multiple venders in the early design, testing and implementation phases. This was corrected in the Beta phase and resulted in smoother implementation.
2. Vendors utilized different versions of communication software (Multispeak). This was corrected in the Beta phase.

3. During the Beta POC, an AMI collector was taken out of service due to a car hitting and taking down the streetlight pole to which it was attached. The meters communicating through that collector automatically identified another path back to the head-end system. No manual intervention was required. This instance also led to better asset management tracking and coordination between the Electric Meter Shop and Electric Field to ensure recovery and restoration of the AMI collector device.
4. Identified the need to purchase back-up collectors and cell modems for instances such as item 3 above.
5. Using AMI data, we were able to identify a poor connection in a customer's switchgear.
6. During an AMI outage investigation, Electric Meter Shop, using the AMI dashboard, identified a down powerline that fed a seldom used irrigation pump located in an orange grove and were able to direct Electric Operation/Field to the problem.
7. The project team found it helpful to utilize other analytical software tools (such as OSI-Pi and Power-BI) to conduct complex AMI system testing and verify AMI test results.

Next Steps

The third phase of the Program is the full deployment of the "ERT overlay". RPU will create a full AMI network with the deployment of approximately 24,000 AMI meters to collect data from all the remaining legacy ERT meters in the system. All commercial and industrial meters (approximately 12,500) will be replaced, and the remaining 11,500 residential meters will be distributed. The residential meters will be installed at ends of feeders to capture distribution voltage data, in high turn-over areas for automated meter connects and disconnects, and other strategic locations that maximize the return on investment. In addition, the new customer usage portal, where customers can view detailed usage information and set usage threshold alerts, will be integrated so that it is accessible through the existing customer web portal.

The increase in the work order amount provides the necessary funding for the purchase of the remaining AMI meters from Tantalus AMI System, the software, data and customer portal development by SmartWorks MDMS, as well as approving funding for the City of Riverside Innovation and Technology Department labor costs. The authorization for the contingency funding comprises the remaining contingency originally authorized by the Board and City Council for the AMI project.

During the Full Deployment Phase, letters will be sent to all RPU electric customers advising them that they may receive a new AMI meter throughout the next year.

RPU is developing a new Electric Rule for customers who elect to opt-out of AMI installations. This policy will be presented for approval by both the Board and City Council during the full implementation phase of the project no later than January 2022.

Project Costs

The Public Utilities Board approved Fiscal Year 2020/21 expenditures in the amount of $2,502,341 on May 10, 2021. Sufficient funds were available for in the Electric Fund Advanced Meter Infrastructure Account No. 6130200-470823 to cover these costs. The total fiscal years' estimated costs are summarized below:

Item	18/19 Actual	19/20 Actual	20/21 Actual	21/22 Projected	22/23 Projected	TOTAL
Tantalus AMI System	$140,000	$5,800,000	$1,327,644			$7,267,644
SmartWorks MDMS	$47,918	$595,732	$319,697	$395,665	$395,665	$1,754,677
EnQuesta Integration	$100,000	$275,000	$0	$0	$0	$375,000
Innovation & Technology Labor	$50,000	$230,000	$20,000	$0	$0	$300,000
Meter Test, IT and other Equipment	$150,000	$100,000	$0	$0	$0	$250,000
Customer Engagement Campaign	$150,000	$150,000	$0	$0	$0	$300,000
Contingency	$22,082	$77,918	$835,000	$0	$0	$935,000
TOTALS:	**$660,000**	**$7,228,650**	**$2,502,341**	**$395,665**	**$395,665**	**$11,182,321**

STRATEGIC PLAN ALIGNMENT:

This item contributes to the following City Council Strategic Priorities and Goals:

- Goal 2.6: Strengthen community preparedness for emergencies to ensure effective response and recovery;
- Goal 4.6: Implement the requisite measures to achieve citywide carbon neutrality no later than 2040;
- Goal 6.2: Maintain, protect and improve assets and infrastructure within the City's built environment to ensure and enhance reliability, resiliency, sustainability and facilitate connectivity; and
- Goal 6.4: Incorporate Smart City strategies into the planning and development of local infrastructure projects.

This item aligns with each of the five Cross-Cutting Threads:

1. **Community Trust** – Once fully implemented, AMI gives Riverside Public Utilities (RPU) customers expanded control, increased flexibility, more transparency, and additional choices regarding how they manage energy usage and energy efficiency and how they interact with RPU.
2. **Equity** – RPU is committed to ensuring that all RPU ratepayers share in the realized utility cost savings and distribution grid improvements obtained from the deployment of this new AMI network.
3. **Fiscal Responsibility** – The business case for AMI includes anticipated benefits in the form of operational savings, revenue enhancement, efficiency improvements, and recovery of losses, which results in a 7-year payback period.
4. **Innovation** – AMI is the current industry standard for meter reading. It is an integrated system of advanced electric meters, communications networks, and data management systems that enables automation and two-way communication between the utility and the meter provided to the customer.
5. **Sustainability & Resiliency** – AMI directly reduces carbon emissions associated with service vehicles, enables RPU to better support the integration of customer sited and local utility sited advanced technologies such as solar PV systems, energy storage, and electric vehicle charging, and helps customers better understand and use their electricity data and information to meet sustainability goals and manage bills.

FISCAL IMPACT:

There is no fiscal impact as a result of this update. Staff will return to Public Utilities Board in the future regarding the use of funding in the amount of $395,665 which is included in the adopted FY 2021/22 budget and Capital Improvement Plan. Funding for subsequent years will be included in the next biennial budget process.

Prepared by:	Todd M. Corbin, Utilities General Manager
Certified as to availability of funds:	Edward Enriquez, Chief Financial Officer/City Treasurer
Approved by:	Kris Martinez, Interim Assistant City Manager
Approved as to form:	Phaedra A. Norton, City Attorney

Concurs with;

Gaby Plascencia, Chair
Land Use/Sustainability/Resilience Committee

Attachments:
1. Presentation
2. Second Amendment to System and Software, Inc. Implementation Services Agreement
3. First Amendment to System and Software, Inc. Support and Maintenance Agreement