



MEMORANDUM

EUGENE WATER & ELECTRIC BOARD

Rely on us.

TO: Commissioners Helgeson, Brown, Mital, Simpson and Carlson

FROM: Rod Price, Chief Electric Engineering & Operations Officer
Rene González, Customer Solutions Manager
Chris Jones, Advanced Metering Project Manager

DATE: September 22, 2017

SUBJECT: Advanced Meter Deployment – Lessons Learned, Benefits and Deployment Rate

OBJECTIVE: Strategy and deployment rate guidance

Summary

Advanced meter deployment has begun under an “opt in” approach, and early efforts have provided valuable lessons and tangible benefits. Data gathered from advanced meters will be key components to EWEB’s two strategic priorities, Emergency Preparedness and Disaster Recovery by improving outage response and Electric Supply Resources by providing accurate load data to EWEB and customers. Staff will be positioned to increase meter deployment in early 2018. This memorandum reviews experience to date for advanced metering, expected benefits and asks the board to approve an eight year deployment.

Background

The Board approved Resolution 1322 in October 2013, authorizing management to proceed with advanced metering under an “opt-in” approach. In April 2015, the Board authorized EWEB to sign contracts with Sensus and Harris Corporations to provide advanced electric and water meters, meter communication equipment and software, meter data management software and related services.

The most recent status report was provided in a May 2017 memo to the Board. At the Board’s May 2017 strategic planning meeting, the consensus of the Board and the General Manager was that advanced metering was needed, and that further discussion was required regarding linking the pace and cost of deployment to EWEB’s strategic direction.

Current Status

Staff members have begun deployment of advanced water and electric meters under the opt-in approach, with an initial focus on improving employee safety and reducing “difficult-to-read” meter reading costs, while verifying that the meter communication and billing system functions as designed.

So far, EWEB has deployed 1,500 advanced electric meters and 400 advanced water meters, upgrading about 1% of EWEB's 154,000 customer meters. Of those, 970 meters are in the "opt-in" communication state, allowing EWEB to obtain monthly meter readings automatically. Supporting computer hardware and software systems are in place to enable advanced meter deployment and operation and billing. Advanced meters are currently available to customers who live in the Eugene portion of EWEB's service territory.

Continued deployment of approximately 2,000 meters is planned through the first quarter of 2018 and is expected to enable more efficient move-in and move-out services and build a population of electric meters that provide better information regarding the location and extent of outages.

Lessons Learned to Date

- The technology works. At least 98% of advanced meters are read and billed automatically every month.
- Average residential cost per meter is about \$130 for Electric and \$145 for Water.
- The original business case envisioned a number of non-financial benefits that would contribute to overall customer value. Early opt-in experiences confirm these benefits, including a surprisingly high number of water leaks detected on customer property as well as automatic detection of failing electric service connections.
- We have experienced a much higher incidence of internally generated requests for advanced meters due to field personnel safety concerns than envisioned in the original business case. Over the last six years, meter readers and connect/disconnect staff have averaged three days of lost work per person per year due to on-the-job injuries. Selective deployment of advanced meters to unsafe locations is underway.
- More than 98% of customers who are asked whether they want to opt in choose to do so.
- The most significant challenge in converting specific accounts to advanced meters has been getting in touch with customers, especially commercial customers. Many customers simply do not answer their phones and do not respond to EWEB's communication efforts, making advanced meter deployment difficult for those accounts. Our current experience for failure to contact is around 20%. Customers that are not contacted have meters left in the non-communication mode.
- Removing individual meters from existing meter-reading routes – rather than upgrading entire routes – decreases meter-reading efficiency. Existing meter-reading notes that help meter readers locate meters become less useful as meters drop out of routes.
- Under the opt-in approach, when customers start service at locations where advanced meters are already deployed, up to two visits by meter technicians may be required in order to reconfigure water meters, replace commercial electric meters, or both. If that customer or the next customer opts in, up to two additional meter technician visits are required. The cost of this extra activity is currently absorbed by EWEB ratepayers.
- When an advanced electric meter is present at the home of a customer who has opted out, disconnecting that customer in the event of non-payment of utility bills requires a truck

roll instead of a remote disconnect performed in less than two minutes from the safety of the EWEB offices.

Tangible Benefits to EWEB Customers and Staff

Even with relatively few meters installed, EWEB and its customers have begun to realize the tangible benefits of advanced meters. EWEB staff have detected, via automated data collection and meter alerts, customer-side water leaks at about 10% of locations where advanced water meters have been installed. Those customers have been contacted and have been offered assistance with locating and fixing leaks on their property. In addition, at least two customers have had their electric weather head connections repaired by EWEB troubleshooters after advanced meters notified staff of intermittent voltage problems at those locations. In each of these instances, EWEB staff identified the problem and contacted the customer before the customer reported a problem to EWEB.

Advanced meters are improving employee safety as well. Many unsafe meter reading locations have been converted to automated reading, including locations along highway shoulders, on median strips, near active stinging-insect nests, and with unsafe footing.

Strategic Plan Alignment

Wider deployment of advanced meters can help EWEB make progress toward strategic values and priorities, including:

- **Strategic Priority: Disaster Recovery.** Improve outage response (both small outages and large storm events)
- **Strategic Priority: Electric Supply and Resources.** EWEB has the opportunity to focus deployment on customers with large loads and those with flexible loads (commercial and industrial), better positioning the electric utility for significant resource-related decisions starting in the early 2020s.
- **Safety:** Advanced metering is reducing risks to field staff who interact with meters. Meter readers and connect/disconnect staff have a high injury rate, almost all of which can be mitigated by reducing the number of meters staff need to visit monthly.
- **Responsible: Reduced operational costs.** To reduce meter reading costs significantly, entire meter-reading routes would need to be converted to advanced meters; for every 7,000 meters replaced, EWEB can reduce limited-duration meter reading staff levels by 1.0 FTE. The opt-in approach makes this route-by-route conversion challenging.
- **Responsible: Reduced operational costs.** Another opportunity for cost savings exists in the area of connect and disconnect (for move-in, move-out, and failure to pay), where each occupancy change requires at least one visit by field personnel, at an average cost of \$15 per visit. Installing advanced electric meters on high-turnover student rental properties (cost: about \$130 per meter including labor) provides more responsive service and pays for itself over the meter's lifetime with an average of one avoided field visit per year.
- **Community: Focus on low-income customers.** Advanced meters enable EWEB to reduce the cost of disconnecting and reconnecting customers who are unable to pay their bills. Upgraded meters, along with a new Customer Information System, will allow

customers to move to prepaid services, which give customers more control over their services and their finances.

- **Reliability and building customer confidence.** Advanced metering can:
 - Improve our response to water leaks, voltage problems, and other meter alerts before customers report a problem.
 - Actively respond to power quality problems and can reduce outage times and resulting economic losses experienced by commercial/industrial customers when they do not have power to run their businesses.
 - Increase the accuracy of meter reading through reduction of estimated and incorrect reads.
 - Allows EWEB to provide faster, more flexible move-in and move-out service.

Once the new Customer Information System (CIS) is implemented sometime after 2019, EWEB will be better positioned to pursue additional resource-related benefits and expand customer offerings, including prepaid metering, time-of-use rates, customer-viewable usage information, and demand-management services. As the Board explores options for the deployment of advanced meters, consideration should be given to preparing the installed base of meters for these future services.

Meter Deployment Rates

The rate of deployment for the advanced meters affects how quickly EWEB and customers will realize the benefits of AMI. Using lessons learned from initial advanced meter deployment, staff has created the three scenarios below based on different deployment rates. Each scenario's costs and benefits are discussed below, with further details in Appendix A:

Scenario 1 – Present assumed rate: The latest EWEB ten-year capital improvement plan (CIP), updated in July 2017, includes planned expenses of roughly \$900,000/yr for electric meters and \$300,000/yr for water meters (materials costs only; these do not include installation labor already in the budget). Roughly 7,000 electric meters and 8,000 water meters per year extending planned CIP costs forward gives a 12-year timeline for full electric meter deployment and a 24-year timeline for full water meter deployment. Even in the absence of advanced meters, these meter replacement rates are not rapid enough to maintain a viable population of functional meters. These timelines are also too slow to achieve full replacement of meters within their expected useful lifetime (industry replacement experience is ten years for electric meters, fifteen to twenty years for water meters). Deploying meters at this rate would not allow EWEB's ratepayers to see the benefits of advanced services at a significant scale until the mid-2020s.

Scenario 2 – Eight-year deployment: A second scenario illustrates deployment in eight years, installing roughly 12,000 electric meters and 8,000 water meters per year. This deployment rate is achievable with EWEB's existing electric meter technician staffing level, and would require about 2 FTE of additional water meter technician staffing (new staff or contract labor). The capital cost of meter materials would increase to \$1,300,000/yr for electric meters and \$1,100,000/yr for water meters. Net staffing costs would increase by a small amount in the first two years (\$310,000 total over two years), after which net labor savings would be achieved, increasing each year through the end of

deployment. By the time an updated CIS makes advanced services available to customers, more than one-third of EWEB's customers would have advanced meters installed.

Scenario 3 – Five-year deployment: The third scenario accelerates deployment to five years, installing roughly 19,000 electric meters and 12,000 water meters per year. This deployment rate would require 1 FTE of additional electric meter technician staffing and about 4 FTE of additional water meter technician staffing for installations compared to Scenario 1. The capital cost of meter materials would increase to \$2,100,000/yr for electric meters and \$1,800,000/yr for water meters. Net labor costs would be higher than the status quo for the first three years (\$1,200,000 total over three years), with savings in subsequent years.

In all scenarios, the 3,000 customers (about 2% of all EWEB services) in the “upriver” territory are likely to be upgraded to advanced metering in the later stages of deployment. Currently available communication equipment to cover the upriver area is expensive, but EWEB's advanced metering vendor is developing less expensive equipment, for which it makes sense to wait.

Discussion of Scenarios

The overall cost in today's dollars of advanced meter deployment is roughly the same regardless of the rate they are deployed. However, there are some factors and benefits to various rates of deployment. Staff recommends Scenario 2, an eight-year deployment plan, for the following reasons:

- An eight-year deployment is minimally disruptive to existing staffing plans while allowing a complete deployment within the expected lifetime of the new electric advanced meters.
- Scenario 2 results in a smoother financial impact than Scenario 1 or 3. Scenario 1 and 3 can create bubbles of spending during times when too many meters are being replaced due to rapid deployment and end of life replacement for Scenario 3, or a combination of end of life replacements and initial installations of meters for Scenario 1.
- Scenario 2, combined with strategic deployments, allows significant benefits related to management of power resources, affordability for low-income customers, and reliability to be realized as soon as a new CIS is available. A slower deployment would delay delivery of those benefits to EWEB and to ratepayers.
- Deployment in a time frame shorter than eight years will require additional dedicated resources to manage, resulting in higher overall costs and resource conflicts with EWEB's other strategic projects.

Requested Board Action

Management recommends adoption of an eight-year deployment of advanced meters, with a benefits focus in the first few years on improved employee safety, management of power resources (commercial and industrial customers), affordability for low-income customers, and reliability.

Appendix A: Deployment schedules: Three scenarios

Scenario 1: Current Assumed Rate, per ten-year capital budget

Deployment Years:	12 years	25+ years			
	Electric Meters	Water Meters	Electric Materials Cost	Water Materials Cost	Cumulative Meter reader FTE reduction
2018	8,302	1,765	\$ 938,000	\$ 257,500	(1)
2019	8,939	1,818	\$ 1,010,000	\$ 265,225	(3)
2020	9,027	1,872	\$ 1,020,000	\$ 273,182	(5)
2021	9,116	1,929	\$ 1,030,000	\$ 281,377	(6)
2022	8,319	1,986	\$ 940,000	\$ 289,819	(8)
2023	7,080	2,046	\$ 800,000	\$ 298,513	(9)
2024	6,638	2,107	\$ 750,000	\$ 307,468	(10)
2025	6,638	2,171	\$ 750,000	\$ 316,693	(11)
2026	6,638	2,236	\$ 750,000	\$ 326,193	(13)
2027	6,638	2,303	\$ 750,000	\$ 335,979	(14)
2028	6,638	2,372	\$ 750,000	\$ 346,058	(15)
2029	6,638	2,443	\$ 750,000	\$ 356,440	(17)
2030	2,390	2,516	\$ 270,000	\$ 367,133	(17)
2031		etc.		etc.	
Total	93,000	30,155+	\$ 10,508,000	\$4,399,728 +	(17)

Scenario 2: Eight-year deployment

	Electric Meters	Water Meters	Electric Materials Cost	Water Materials Cost	Cumulative Meter Reader FTE reduction	Cumulative New Advanced Metering Operations FTE	Meter Install FTE	Net FTE cost (savings in parentheses)
2018	11,625	7,625	\$1,313,500	\$1,112,500	(3)	0.6	2.3	\$220,625
2019	11,625	7,625	\$1,313,500	\$1,112,500	(6)	1.3	2.3	\$94,375
2020	11,625	7,625	\$1,313,500	\$1,112,500	(8)	1.9	2.3	\$(31,875)
2021	11,625	7,625	\$1,313,500	\$1,112,500	(11)	2.5	2.3	\$(158,125)
2022	11,625	7,625	\$1,313,500	\$1,112,500	(14)	3.1	2.3	\$(284,375)
2023	11,625	7,625	\$1,313,500	\$1,112,500	(17)	3.8	2.3	\$(410,625)
2024	11,625	7,625	\$1,313,500	\$1,112,500	(19)	4.4	2.3	\$(536,875)
2025	11,625	7,625	\$1,313,500	\$1,112,500	(22)	5.0	2.3	\$(663,125)
Total	93,000	61,000	\$10,508,000	\$8,900,000	(22)	5.0	2.3	\$(1,770,000)

Scenario 3: Five-year deployment

	Electric Meters	Water Meters	Electric Materials Cost	Water Materials Cost	Cumulative Meter Reader FTE reduction	Cumulative New Advanced Metering Operations FTE	Added Meter Install FTE	Net FTE cost (savings in parentheses)
2018	18,600	12,200	\$2,101,600	\$1,780,000	(4)	1.0	5.4	\$605,000
2019	18,600	12,200	\$2,101,600	\$1,780,000	(9)	2.0	5.4	\$403,000
2020	18,600	12,200	\$2,101,600	\$1,780,000	(13)	3.0	5.4	\$201,000
2021	18,600	12,200	\$2,101,600	\$1,780,000	(18)	4.0	5.4	\$(1,000)
2022	18,600	12,200	\$2,101,600	\$1,780,000	(22)	5.0	5.4	\$(203,000)
Total	93,000	61,000	\$10,508,000	\$8,900,000	(22)	5.0	5.4	\$1,005,000