



Village of Winnetka

Village Council Study Session

May 9, 2023 at 7:00 PM
Village Hall
510 Green Bay Road

AGENDA

1. **Call to Order**
2. **Public Comments**
3. **Discussion**
 - a. Advanced Metering Infrastructure (AMI)
4. **Adjournment**

NOTICE

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Agenda Item Executive Summary

TITLE: Advanced Metering Infrastructure (AMI)

PRESENTER: Nicholas Narhi, Tim Sloth

AGENDA DATE: May 9, 2023

CONSENT: No

ITEM TYPE: Reports

ITEM HISTORY:

October 2021 - The AMI program concept was presented during the FY 2022 budget review meeting. Funding was authorized to engage a consultant to plan and assist with the management of the project.

June 2022 - After a competitive Request for Proposal (RFP) process, the consulting firm of Power System Engineering (PSE) was recommended and the Village Council approved a professional services agreement with PSE on June 7, 2022.

October 2022 - The AMI project was presented during the FY 2023 budget review meeting. At Council's request, in consideration of the full budget implications, the AMI project was deferred from FY 2023 to future years, pending further discussion of the AMI project at a Council study session.

May 9, 2023 - Council Study Session to discuss the AMI project.

EXECUTIVE SUMMARY:

The current meter reading system is an entirely manual process. The AMI project would modernize our systems and processes to automate the meter reading process. Residents would realize numerous benefits from the AMI project related to customer service improvements, such as the elimination of estimated reads, faster identification of customer-side water leaks, and improved power quality management. The Water and Electric Utility would realize benefits from the modernization, including financial efficiencies. A detailed analysis of the extensive benefits to both residents and the Village is outlined in the attached staff report.

In June 2022, the Village engaged Power System Engineering to assist with developing a budgetary cost estimate for the five-year CIP, developing bid specifications to procure related metering technology and services for the AMI deployment, assisting the Village in evaluating bids from vendors and making recommendations based upon industry knowledge, managing the new meter technology deployment, and assisting the Village in obtaining grant funding for the project, among other activities.

The AMI project will require an expenditure of approximately \$4.7 million over the next ten years. However, there would also be offsets to this expenditure of \$2.73 million over the next ten years in the form of increased revenues, staffing efficiencies (including a reduction in overtime), reduced vehicle expenses, and equipment savings. Netting the budget offsets against the increased costs, the calculated total cost of ownership over the next ten years is \$1.97 million. Since the project benefits different departments across multiple funds, the proposed project funding will be allocated between the Electric Fund, the Water Fund, the General Fund and the Information Technology Fund. A detailed

analysis of the financial implications of the AMI project is outlined in the attached staff report.

RECOMMENDATION:

Provide policy direction on implementation of Advanced Metering Infrastructure.

ATTACHMENTS:

1. Advanced Metering Infrastructure Staff Report
2. Exhibit A: Tentative AMI Schedule

Agenda Item Staff Report

Title: Advanced Metering Infrastructure (AMI) Deployment

Presenter: Nicholas Narhi & Tim Sloth

Agenda Date: May 9, 2023

Item History:

- Included in the five-year Capital Improvement Plan (CIP) is the Advanced Metering Infrastructure program (AMI). This program was presented during the October 2021 annual departmental budget presentations and expenses related to planning and implementation were included in the FY 2022 budget.
- During March 2022 the Village issued RFP #022-001: Advanced Metering Infrastructure for professional services required to successfully implement this program. Village staff evaluated six (6) proposal responses, with the winning respondent being Power System Engineering (PSE.)
- The Village Council approved a Professional Services Agreement with PSE in an amount not to exceed \$68,900 (R-76-2022) for the consulting services needed to plan and manage the AMI project on June 7th, 2022. To date, \$16,188.75 has been spent on these services. The scope of the contracted professional services include: developing a budgetary cost estimate for the five-year CIP, developing bid specifications to procure related metering technology and services for the AMI deployment, assisting the Village in evaluating bids from vendors and making recommendations based on industry knowledge, managing the new meter technology deployment, and assisting the Village in obtaining grant funding for the project, among other activities.
- With PSE's assistance, staff presented the proposed AMI project cost as a part of the FY 2023 annual budget presentation in October 2022, with the costs being allocated across the General Fund, Water Fund and Electric Fund over a two-year period. At Council's request, in consideration of the full budget implications, the AMI project was deferred from the 2023 Budget and shifted into further years, pending further Council discussion in 2023.

Current System and Progression of Technology:

The current meter reading system is entirely manual. In each 2-month billing cycle, the Village reads approximately 5,100 electric meters and 4,300 water meters and bills approximately 5,400 customers for electric (including tax, and a power cost adjustment), water, wastewater, and/or refuse/yard waste usage. The meter readers input readings directly into an application for Smart Phone Meter Reading (SPMR) on their Village issued phones. Those readings are then imported in Tyler New World's Utility Management module. Once the readings are complete and verified, and the billing file is ready to be issued, the Utility Billing Clerk sends the billing file to Third Millennium, the third-party vendor currently used for printing and mailing utility bills.

The original vintage of electric meters consisted of electromechanical components to measure the kilowatt-hours (kWh) used by customers. Customer consumption caused a metal dial to spin in the meter, with the usage being tracked by an odometer style register. Manual door-to-door readings of these registers every month provided the data necessary to charge customers for electricity. In the 1980s, advances in one-way wireless communication allowed for drive-by meter readings where a meter reader in a vehicle could quickly capture reads without going door-to-door. Towards the 1990s, the industry started moving towards digital meters which had no moving parts and allowed for even more robust wireless communication, known as Automated Meter Reading (AMR.) By 2000, the first generation of Advanced Metering Infrastructure (AMI) technology started to be deployed, which allowed for two-way communications with smart meters, more precise consumer interval data and the first implementation of Outage Management Systems (OMS.)

Currently, the Village's electric meters are predominantly digital meters, although they are still read manually and not by an AMR or AMI system. There are still mechanical meters on the system at residences where the meter is in a basement or garage. These meters require a wired touchpad to be read manually, similar to our existing water meters. AMI would alleviate the need for bringing a wired signal to the exterior.

The second generation of AMI technology came about in 2010, which ushered in improvements to create what has since been called the "Smart Grid." Outage notifications were improved, leading to more robust OMS systems for utilities. Distribution Automation (DA) was also made a reality around this time. DA systems utilize meter data to communicate with the broader electric distribution system, allowing for the system to automatically reconfigure and "self-heal" itself in the event of a disturbance on the grid. Around this time, utilities started offering web portals for customers to view their consumption in more detail than the simple register reads offered by legacy systems. Utilities also started implementing Demand Side Management (DSM) systems, where customers opt in to allow the utility to control devices in their homes to reduce electric consumption on a large scale in response to pressures on the macro electric system.

This decade technology has improved to the extent that the industry is now calling the Third Generation of AMI. Third generation AMI is offering increased resiliency through improvements in OMS, DA and DSM systems. Utilities are realizing benefits from the increased access to data as the electric landscape shifts around them. Increased electrification of appliances, homes and vehicles is adding load to the grid that utilities need to appropriately manage to ensure system reliability. Utilities are also faced with the increased adoption of distributed generation (DG) such as solar, which introduces non-typical power flows and dynamics on the system that AMI will help manage.

AMI for Village Utilities

By electing to pursue the deployment of the latest generation of AMI for Village utilities, staff is seeking to modernize our systems and processes to prepare us for the challenges that lie ahead. The two largest Investor-Owned Utilities (IOUs) in the state,

Commonwealth Edison, and Ameren, have fully deployed AMI systems. Among other IMEA/IMUA electric utilities in northern Illinois, Winnetka is in the minority of municipalities that are still using door-to-door electric meter reading. In comparison to our northern Illinois water utility neighbors (communities within a ten-mile radius,) Winnetka is the only utility to read water meters manually.

As a part of the assistance PSE is providing, the Village is developing an RFP for a turn-key AMI deployment that will be released once Council has approved the project in its entirety. PSE will evaluate the RFP responses down to a “short list” for the Village’s consideration prior to selecting a vendor and going under contract for the project. Part of that evaluation response will be deciding what AMI communication method works best for the Village. Cellular, point-to-point or mesh networking are all options, and the final rollout may be a combination of one or more options based on the geography and topography of the Village’s customer base. After the Village executes the contract, work can begin on procuring meters and any hardware or software required for system implementation. If communications hardware is needed to bring back the meter signals (i.e. an antenna on the Public Safety monopole) then this work would occur while the meters are on order.

Supply chain issues have the potential to lengthen the overall AMI deployment, depending on the meter vendor(s) chosen. This will be a consideration for staff and Council to make when executing the contract. In any case, immediately after contract execution it would be the goal of staff to start off with a small deployment of electric and water meters on the system. A start up deployment helps develop the system and allow for testing of the communications and software necessary to properly bring back the water and electric meter data. Full meter deployment across the entire system would most likely be handled by a contractor. Most of the electric meters, those not inside structures, can be changed without disruption to the customers. Replacement of the water meters on the system will require scheduling appointments with individual customers. This service is typically handled by the contractor. At this point, staff is projecting a total three year rollout for the full meter deployment.

There are several benefits residents will realize from deployment of the AMI system and are as follows:

Customer Service Improvements

- Eliminate bill estimating and provide more clarity to customers.
- Faster identification of customer-side water service leaks.
- Automated Move-in/Move-out/Final Readings
- Remote Disconnect/Reconnect of electric service.
- Reduced intrusion for the purposes of accessing meters.
- Improved Power Quality (Blink vs. Outage) Management.
- Better customer bill understanding/education through more precise data and reporting capabilities.
- Quick response and low impact to customers in resolving issues (Ex. high bill complaints)

- Implementation of an Outage Management System (OMS) to improve response times and customer service in the event of a system disturbance
- Ability to implement Demand Response (DR), if desired. Demand Response provides an opportunity for consumers to shift their electricity usage during peak periods, which helps balance supply and demand.
- Improved access to near-real-time customer consumption data

The benefits to the Water and Electric Utilities are as follows:

Electric System Modernization & Improvements

- Ability to monitor transformer loading real time to monitor for overloaded transformers and protect valuable assets
- Ability to implement a Distribution Automation (DA) system, allowing for the system to automatically reconfigure and “self-heal” itself in the event of a disturbance on the grid.
- Ability to realize cost savings on the distribution system through Conservation Voltage Reduction (CVR.)
- Analyze interconnected solar customer output onto the distribution system to maintain reliability.
- Increased insight into power system flow characteristics on the system and the potential to optimize how load is distributed across Winnetka’s electric grid.
- Greater detail into customer consumption trends for the purposes of rate making.
- Detection of potential back feeding through the meter during outage events.
- Flag suspected theft or meter tampering

Water System Modernization & Improvements

- Assist with pressure management and help determine possible leaks which are of value to the customer.
- Decrease in unaccounted water loss through the improved accuracy of meters.
- Potential remote disconnect/reconnect options and alerts to identify potential theft.
- Greater detail into customer consumption trends for the purposes of rate making.

Financial Efficiencies

- Realize increased water revenue through higher meter accuracy and faster detection of leaks on the customer side of the meter.
- Eliminate dispatching a lineman for turn-on/turn-off of electric service.
- Staffing efficiencies realized by automation.

Budget Impact

Based on work performed by PSE in preparing budgetary estimates, the Village expects to spend approximately \$4.2 million over the next three years for the full AMI deployment. This amount is for the upfront capital expenses (ex. new meters) and includes an allowance for inflation of \$500,000 (15%) and a contingency component of \$337,000 (10%). In addition to the upfront capital costs, there are annual recurring software and cellular fees of approximately \$48,000 a year. The total ten-year cost for an advanced AMI system is estimated at \$4.7 million.

With the implementation of AMI there would also be offsets to the budgeted costs in the form of increased revenue, staffing efficiencies (including reduced overtime), reduced vehicle expense and equipment savings. The ten-year total of the budget offsets is calculated at \$2.73 million. Netting the budget offsets against the increased costs the calculated total Cost of Ownership over the next ten years is \$1,970,555.

Village of Winnetka - Estimated 10-Year AMI Cost of Ownership Summary

Cost Component	2024	2025	2026	2027 - 2033	Total Est. 10-Years
Capital	730,000	1,300,000	1,300,000	-	3,330,000
Inflation	100,000	200,000	200,000	-	500,000
Contingency	67,000	135,000	135,000	-	337,000
Annual Recurring	48,000	48,000	48,000	389,000	533,000
Total Estimated Costs	\$ 945,000	\$ 1,683,000	\$ 1,683,000	\$ 389,000	\$ 4,700,000
Budget Offsets	2024	2025	2026	2027 - 2033	Total Est. 10-Years
Increased Revenue	-	(29,445)	(55,000)	(1,100,000)	(1,184,445)
Staffing Efficiencies	-	(57,500)	(115,000)	(1,207,500)	(1,380,000)
Overtime Savings	-	(7,500)	(10,000)	(70,000)	(87,500)
Equipment Savings	-	-	-	(35,000)	(35,000)
Vehicle maintenance / Fuel		(2,500)	(5,000)	(35,000)	(42,500)
Total Budget Offsets	\$ -	\$ (96,945)	\$ (185,000)	\$ (2,447,500)	\$ (2,729,445)
Total Cost of Ownership	\$ 945,000	\$ 1,586,055	\$ 1,498,000	\$ (2,058,500)	\$ 1,970,555

Project Funding

This project was included in the 2023 5-Year Capital Improvement Plan utilizing a two-year project plan beginning in 2024. Given current cost estimates and the feasibility of project scheduling and implementation, Staff now envisions a three-year project implementation versus the initial two-year estimate. Included with this memo is a Gantt chart outlining the timing of key milestones and costs per year for the implementation period.

The AMI project benefits different departments across multiple funds, project costs are proposed to be distributed across various cost centers as detailed below:

Village of Winnetka - Estimated 10-Year AMI Budget

Cost Component	2024	2025	2026	2027 - 2033	Total Est. 10-Years
Electric Fund	205,000	415,000	415,000	15,000	1,050,000
Water Fund	375,000	745,000	745,000	28,000	1,893,000
General Fund	317,000	475,000	475,000	10,000	1,277,000
Information Technology Fund	48,000	48,000	48,000	336,000	480,000
Total Estimated Costs	\$ 945,000	\$ 1,683,000	\$ 1,683,000	\$ 389,000	\$ 4,700,000

If the Council agrees to move forward with AMI, this project will be included in the 2024 5-year Capital Improvement Plan presented to Council later this fall. As in previous years, staff will analyze the 5-year capital plan, along with projected operating costs and available cash reserves and recommend water and electric rates as part of the 2024 Annual Budget. Expenditures incurred by the General Fund are anticipated to be paid within the current tax and fee structure utilizing accumulated fund balance and are expected to be fully recovered over ten years from increased staffing efficiencies. Recurring operating costs for the software licenses and cellular services will be charged to the Information Technology fund. The RFP for this project will not be awarded until the Annual Budget / 5-Year CIP is approved by Council in December.

EXHIBIT A

Task	2024											
	Jan	Feb	Mar	April	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Phase I: Draft AMI RFP, Issue RFP, Etc.												
1 Bid Package Development and Issuance												
Draft the RFP Document, Attachments, and Exhibits												
Present the Draft RFP to the Village Team												
Finalize the RFP Package												
Advertise and Issue the RFP												
Gather Bid Questions and Draft Addenda for Village Review												
Issue Addenda												
Receive all Bids and Prepare for Evaluation												
2 Bid Evaluation												
Review all Bid Materials and Initially Evaluate Responses												
Present Initial Evaluation to the Village Team - Shortlisted Vendors												
Schedule Shortlisted Meetings												
Follow up and Vendor Best Fit Evaluation												
Draft Final Recommendation on Village Vendor of Choice												
Finalize Recommendation												
3 Recommendation and Council Presentations												
Contract Negotiations												
Draft presentation to the board for AMI Recommendation												
Final presentation given to the board												
4 Phase I (Pilot Area) Deployment												
Issue PO and Kick-Off AMI Project												
Delivery of Phase I Meters												
Installation of Phase I Meters												
ISAT and Acceptance of System - Move to Phase II												
5 Phase II: Full Deployment												
Order Phase II Meters (Production Queue)												
Delivery of Phase II Meters												
Installation of Phase II Meters												
FSAT and Acceptance of System - Project Close												
1 Estimated Costs by Year	2024											
Upfront - Capital Estimates												730,000
10% Contingency - Pole Replacements, Fittings, Meter Bases, Etc.												67,000
15% Inflation Estimation												100,000
Recurring and On-Going Maintenance Fees												48,000

Task	2025											
	Jan	Feb	Mar	April	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Phase I: Draft AMI RFP, Issue RFP, Etc.												
1 Bid Package Development and Issuance												
Draft the RFP Document, Attachments, and Exhibits												
Present the Draft RFP to the Village Team												
Finalize the RFP Package												
Advertise and Issue the RFP												
Gather Bid Questions and Draft Addenda for Village Review												
Issue Addenda												
Receive all Bids and Prepare for Evaluation												
2 Bid Evaluation												
Review all Bid Materials and Initially Evaluate Responses												
Present Initial Evaluation to the Village Team - Shortlisted Vendors												
Schedule Shortlisted Meetings												
Follow up and Vendor Best Fit Evaluation												
Draft Final Recommendation on Village Vendor of Choice												
Finalize Recommendation												
3 Recommendation and Council Presentations												
Contract Negotiations												
Draft presentation to the board for AMI Recommendation												
Final presentation given to the board												
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Delivery of Phase I Meters												
Installation of Phase I Meters												
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5 Phase II: Full Deployment												
Order Phase II Meters (Production Queue)												
Delivery of Phase II Meters												
Installation of Phase II Meters												
FSAT and Acceptance of System - Project Close												
1 Estimated Costs by Year	2025											
Upfront - Capital Estimates												\$ 1,300,000
10% Contingency - Pole Replacements, Fittings, Meter Bases, Etc.												\$ 135,000
15% Inflation Estimation												\$ 200,000
Recurring and On-Going Maintenance Fees												\$ 48,000

Task	2026											
	Jan	Feb	Mar	April	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Phase I: Draft AMI RFP, Issue RFP, Etc.												
1 Bid Package Development and Issuance												
Draft the RFP Document, Attachments, and Exhibits												
Present the Draft RFP to the Village Team												
Finalize the RFP Package												
Advertise and Issue the RFP												
Gather Bid Questions and Draft Addenda for Village Review												
Issue Addenda												
Receive all Bids and Prepare for Evaluation												
2 Bid Evaluation												
Review all Bid Materials and Initially Evaluate Responses												
Present Initial Evaluation to the Village Team - Shortlisted Vendors												
Schedule Shortlisted Meetings												
Follow up and Vendor Best Fit Evaluation												
Draft Final Recommendation on Village Vendor of Choice												
Finalize Recommendation												
3 Recommendation and Council Presentations												
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Draft presentation to the board for AMI Recommendation												
Final presentation given to the board												
4 Phase I (Pilot Area) Deployment												
Issue PO and Kick-Off AMI Project												
Delivery of Phase I Meters												
Installation of Phase I Meters												
ISAT and Acceptance of System - Move to Phase II												
5 Phase II: Full Deployment												
Order Phase II Meters (Production Queue)												
Delivery of Phase II Meters												
Installation of Phase II Meters												
ISAT and Acceptance of System - Project Close												
1 Estimated Costs by Year	2026											
Upfront - Capital Estimates												\$ 1,300,000
10% Contingency - Pole Replacements, Fittings, Meter Bases, Etc.												\$ 135,000
15% Inflation Estimation												\$ 200,000
Recurring and On-Going Maintenance Fees												\$ 48,000