The Regional Municipality of Halton

Report To:	Regional Chair and Members of Regional Council
From:	Jim Harnum, Deputy CAO and Commissioner of Public Works Cyndy Winslow, Acting Commissioner, Finance and Regional Treasurer
Date:	October 16, 2019
Report No. - Re:	PW-45-19/FN-35-19 – Long Term Water Meter Strategy Implementation Plan

RECOMMENDATION

1. THAT the Implementation Plan as outlined in Report No. PW-45-19/FN-35-19 re: "Long Term Water Meter Strategy – Implementation Plan" be approved.

2. THAT the Regional Clerk forward a copy of Report No. PW-45-19/FN-35-19 to the City of Burlington, the Town of Halton Hills, the Town of Milton and the Town of Oakville for their information.

REPORT

Executive Summary

- The 2019-2022 Strategic Business Plan that was approved by Regional Council includes the Action to implement the advanced meter infrastructure to automate meter reading.

- Water meters log the amount of water consumed by Halton Region's residential and Industrial, Commercial and Institutional (ICI) customers.

- Water meter reading and billing is contracted out to the four Local Hydro Distribution Companies.

- Water and wastewater revenues are necessary to finance the water and wastewater operating program, maintain high levels of service and ensure that the existing water and wastewater infrastructure is in a state-of-good repair.

- Through Report No. PW-18-18/FN-25-18, re: "Long-Term Water Meter Strategy", Regional Council approved the implementation of Advanced Metering Infrastructure.

- The benefits of Advanced Metering Infrastructure (AMI) technology include:

    - Revenue protection;
    - Operational efficiency;
    - Enhanced customer service;
    - Improving distribution system performance; and,
    - Environmental benefits.

- Through a competitive request for proposal, Halton Region retained the consulting firm Excergy Corporation to assist with the development of the Region-wide AMI implementation plan, communications plan and the procurement documents as well as support Halton Region through the lifecycle of the project.

- As part of the AMI project, Halton Region's water meter assets will require a retrofit or replacement. It is expected that approximately 96,000 water meter throughout Halton Region will be replaced. These meters are nearing end-of-life and require replacing between 2020 and 2028.

- The implementation plan, as detailed in this report, is the roadmap for a successful installation of a Region-wide AMI system. It outlines the necessary implementation steps to ensure the project is well planned, customers are engaged, disruption to customers is minimized and the project objectives are achieved. The Communications and Customer Service division with the assistance of Excergy Corporation staff are developing a comprehensive communications plan to support the implementation plan.

- The Region-wide AMI project is anticipated to be completed by mid-2024 at an estimated cost of $50.0 million, which is an increase of $6.5 million from the $43.5 million included in the 2019 Budget and Business Plan.

Background

The basic function of a water meter is to log the amount of water consumed by the property to facilitate fair and accurate billing of water and wastewater services. As of December 31, 2018, Halton Region had over 162,600 water meters installed across the City of Burlington, the Town of Halton Hills, the Town of Milton and the Town of Oakville. Of this total, there are approximately 154,200 meters installed within residential homes and 8,400 ICI meters.

Water meters ensure that appropriate revenues are collected to fund the water and wastewater operating program, maintain high levels of service and ensure that water and wastewater infrastructure is in a state-of-good repair. Accurate meter readings are also essential to provide fair billing for all of Halton Region's residential and ICI customers.

Water meter reading and billing is contracted out to the four Local Hydro Distribution Companies. Halton Region and the Local Hydro Distribution Companies continue to work cooperatively to provide timely and accurate water meter reading, billing and collection services to the benefit of our mutual customers. This cooperation includes on-going quality assurance and quality control processes are continuously monitored to ensure the billing and collections services for Halton Region's water customers are efficient and accurate.

The current meter technology in Halton Region enables most meters to be read via touchpad for residential and ICI customers. This involves a Meter Reader driving to and walking up to each residential and ICI property to "touch" the reading device to the touchpad, which is located on the outside of the property. The touchpad is physically connected to the water meter inside the property by a wire, which transmits the meter read. Once the meter reading device has the data, the meter reader manually or electronically enters the read into a logging device before the information is finally sent to the Local Hydro Distribution Company for billing.

Currently in Halton Region, approximately one million individual touchpad reads are conducted annually. Manual reading, inputting and transferring of data presents a risk of inaccurate reads and billings. In addition, inaccessibility of the meter or the touchpad due to location, weather and other barriers leads to estimated reads and potential customer service complaints due to these estimated consumption bills.

Implementation of radio frequency reading technology through AMI will significantly improve the ease with which meters are read, reading reliability, accuracy and access to data.

Many municipalities and utilities in the water sector across North America have moved to or have started the process to migrate to AMI for meter reading. In Ontario, the Cities of Toronto and Barrie have deployed AMI systems. Numerous other municipalities including the Cities of Greater Sudbury, Cambridge and Halifax, are in the process of implementing AMI systems.

In June 2018, Regional Council approved Report No. PW-18-18/FN-25-18, re: "Long-Term Water Meter Strategy", and authorized staff to develop a detailed implementation plan for a Region-wide Advanced Metering Infrastructure system for residential and ICI customers. This report outlines the AMI implementation plan for Halton Region.

Advanced Metering Infrastructure (AMI)

The AMI system is comprised of radio transmitters, data collectors and software. AMI technology replaces the existing touchpads on the exterior of the property with a battery operated radio transmitter. Radio transmitter batteries typically last 20 years, which is similar to the service life of a residential water meter. The installation of the radio transmitter then allows for water meter readings to be sent digitally from the residential or ICI property to a system of data collectors placed strategically throughout the community.

Data collector units are typically mounted on poles, towers or buildings and collect water meter readings from individual meters for billing, reporting and analysis.

As outlined in Report No. PW-18-18/FN-25-18, the benefits of AMI technology can be broadly grouped into five categories:

- Revenue protection;
- Operational efficiency;
- Enhanced customer service;
- Improving distribution system performance; and,
- Environmental benefits.

Discussion

Projects to deploy AMI systems are quite complex as they involve specialized technology, network design, software implementation and experts in field installation services that require customer interaction and appointment scheduling across wide geographic areas.

Excergy Corporation was retained in April 2019 through a comprehensive competitive procurement process to support staff as consultants and subject matter experts. Excergy Corporation has assisted several municipalities across North America with development and implementation of AMI systems, most recently Halifax Water. Excergy Corporation is assisting Halton Region with the development of the AMI implementation plan and the procurement documents to solicit proposals from vendor(s) for an AMI system (technology and software) and water meters. Excergy Corporation will also assist Halton Region through the lifecycle of the project, providing project management and contract management support, as well as subject matter expertise during implementation.

Halton Region's cross-departmental project team is comprised of staff from Public Works, Finance, Communications, Access Halton and Information Technology. The project team began working with Excergy Corporation in May 2019 to plan the water meter replacement and AMI implementation project. The Implementation Plan has been developed based on the following key project considerations:

- Maintain a high degree of customer service throughout meter replacement and AMI system deployment;
- Deliver accurate, informative and easy to access information;
- Enhance customer service and improve efficiency;
- Position Halton Region to be able to take advantage of future technology opportunities to improve distribution system management;
- Improve data driven decision making; and,
- Leverage technology and system integration for other municipal initiatives, where possible.

As part of project planning efforts, members of Halton Region's project team have engaged with staff from municipalities that have or are in the process of implementing

AMI including the Cities of Toronto, Barrie, Cambridge and Halifax Water. The insight gained allowed the project team to make informed choices about Halton Region's requirements for the AMI system, procurement process and implementation.

Furthermore, the project team met with Local Hydro Distribution Companies representatives to understand the process changes that will be necessary to ensure a smooth transition from manual meter reading to automated meter reading while maintaining current service levels.

Halton Region's water customers are significant stakeholders in the AMI project and therefore a comprehensive communications plan to engage with residential and ICI customers is required. Staff have initiated work with Excergy Corporation to develop a communications plan that ensures internal and external stakeholder engagement that effectively addresses the needs of the community and supports successful project implementation. As the project progresses, Regional Council will receive communications that provide information about AMI technology and meter replacement, project schedule and status updates.

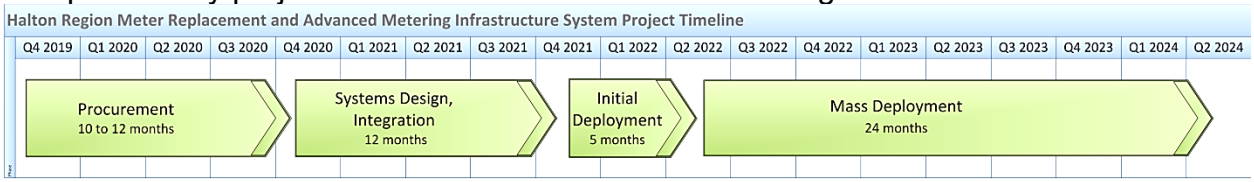
The project team will consider known topics of concern such as price/rates, privacy and data security, health and safety as well as best practices that have been successful for other municipalities that have moved to AMI. The communication plan will outline the requirements for informing water customers and other stakeholders about the project before, during and after the transition to AMI technology. The project team anticipates that a variety of engagement tools will be utilized. Effective communication with customers will ensure the highest conversion rate of manually read water meters to automated meter reading.

The Implementation Plan forms Halton Region's roadmap for a successful AMI deployment including customer engagement. The schedule was developed with consideration of timelines for AMI projects across North America. Dependant on the selection of the vendor, the implementation schedule may be subject to refinement following procurement.

The Implementation Plan is comprised of several stages as follows:

1. Procurement;
2. Systems Design, Integration and Testing;
3. Initial Deployment; and,
4. Mass Deployment.

The preliminary project schedule and duration of each stage is as follows:



The elements of each stage of the implementation plan are described in the following sections.

1. Procurement

A procurement strategy has been developed to ensure that Halton Region's requirements for a robust AMI system that meets the long-term goal of a reliable, accurate, cost effective and customer service focused metering and billing systems will be met. This will be achieved through a negotiated Request for Proposal process with an extensive evaluation process that will include vendor demonstrations, reference checks and a comprehensive cost analysis. The negotiated Request for Proposal process is the best suited procurement process for this project as it will give Halton Region staff the ability to formalize the scope of work and service level agreements for the duration of the project. Staff will also have the ability to negotiate with the selected vendor based on the specifications and requirements outlined in the procurement documents to ensure that there is mutual agreement to the expectations for the project.

The AMI system consists of radios, data collector units and software. Data collector units receive the meter reading transmission from the radios attached to meters and relay this information to the Meter Data Management software. Meter Data Management software is used for meter reading data storage and analytics and is used to communicate information to Halton Region's information systems such as Hansen, GIS and the Region-wide Meter Billing database as well as the Local Hydro Distribution Companies' Customer Information and Billing systems.

In addition to AMI system deployment, radio transmitter that must be installed on every meter in Halton Region, approximately 96,000 water meters nearing end-of-life will be replaced. The remaining water meters, approximately 66,580, will be retrofit with a radio transmitter only.

The provision of excellent customer service to Halton Region's water customers is a critical element of implementation. The project team anticipates that direct communication with residents and businesses will follow a similar approach as with the recent Pulse Meter Replacement program whereby 12,000 outdated pulse water meters were successfully replaced with very few complaints from residents and businesses. Similar to the Pulse Meter Replacement program, there will be stringent requirements to deliver exceptional customer service placed on the meter installation vendor as representatives of Halton Region.

The competitive procurement process will be undertaken beginning in November 2019 to solicit proposals from vendors in order to procure the technology and software necessary for Halton Region's AMI system which includes AMI infrastructure and meter installation services. The project team expects to evaluate AMI solutions and vendors for selection in early 2020 and enter into negotiations with the selected vendor.

A negotiated Request for Proposal will be publically advertised on Bids & Tenders for a minimum of 45 days. A minimum of 35 days is required by the Canada-European Union Trade Agreement. The contract will be awarded to one vendor that will have responsibility to fulfil all equipment/hardware/software supply, installation and project management obligations.

The vendor selection process will be comprised of a robust and transparent evaluation of the proposed AMI system capabilities in alignment with Halton Region's requirements, the vendor's ability to provide field installation services and excellent customer service.

Staff have begun working with Excergy Corporation to develop the procurement documents, and the Procurement stage is expected to be approximately 10 to 12 months from the November 2019 issuance. Following contract execution, implementation will move into the Systems Design, Integration and Testing stage.

2. Systems Design, Integration and Testing

Supported by Excergy Corporation, staff will work closely with the chosen vendor to finalize the implementation plan and schedule. The implementation plan and schedule will detail tasks, timing and responsibility for all aspects of the project, including network and meter deployment and communication.

This stage is focused on designing, building and testing the AMI system, as well as completing integrations and enhancements to the existing Region systems related to AMI. Any necessary refinement to the implementation plan or schedule will also be made. During this stage, the AMI network will be deployed across Halton Region and all software will be installed, configured, integrated and tested. This stage is a necessary and critical element of a successful implementation as it ensures that the AMI network will reach all of Halton Region's water customers and provide uninterrupted meter reading and billing once radio transmitters are installed on the meters. No meters/radios will be deployed until the AMI system has undergone and passed rigorous testing.

Data collector unit locations will be selected and installed across the Region. The vendor is expected to complete a comprehensive network propagation study considering the viability and suitability of Region-owned property (facilities, land, assets) as locations for data collector units. Viability and suitability of Region-owned property will be dependent on the availability of communications infrastructure and meter density in the vicinity of the potential location. Data collector units will be installed in locations that ensure the most efficient performance of the AMI system and appropriate network coverage across the region.

Communication to Halton Region's residents and businesses will begin during this stage as well. Early communication will build awareness of the project and benefits of implementing AMI. Working closely with the Region's Communications and Customer Service group, the vendor, the content, methodology and timing of customer engagement

will be developed to ensure consistent, effective messaging that encourages acceptance of AMI technology.

This stage is expected to last approximately 12 months. Once the design, build and testing of the AMI system is completed and customers have been engaged, implementation will enter the Initial Deployment stage.

3. Initial Deployment

A well-planned Initial Deployment stage is essential to successful implementation. The purpose of Initial Deployment is to ensure that the AMI system is fully functioning Region-wide.

Initial deployment is the proof of concept stage of the project and refers to a subset of customers throughout the Region that will be set-up with AMI technology. It is expected that approximately 75-100 radio transmitters will be deployed in each of the 21 wards and will include both residential and ICI customers requiring water meter replacement and retro-fit only.

This stage will verify that accurate meter readings are obtained via the AMI network and that the required data exchange (i.e. meter read) to each of the four Local Hydro Distribution Companies' systems for billing is completed without interruption. Furthermore, the business processes associated with meter replacement and radio installation will be reviewed and optimized, as necessary. At this stage, all necessary information technology integrations and interfaces will be validated to ensure the smooth transition from manual meter reading to automated meter reading. Billing verification will also be completed during Initial Deployment to ensure no disruption to the billing and revenue collection services provided by the Local Hydro Distribution Companies.

The Initial Deployment stage is expected to last approximately five months. Mass deployment will commence once the AMI system and associated business processes have been fully tested and confirmed to be effective.

4. Mass Deployment

Mass Deployment will involve installation of radios and water meter replacements where necessary across the Region. Each water customer will be contacted directly and they will be provided with information about the work that is required at their property, the benefits of AMI and details on how to book an appointment, if required, to have their water meter upgraded to an AMI meter. Leveraging the success of the Pulse Meter Replacement program, we anticipate a similar process for communicating with customers will be implemented to ensure maximum participation. This includes letters, phone calls, emails and door knockers.

Based on the duration of the mass deployment process in other municipalities that are currently implementing or have completed AMI projects, approximately 24 months has

been planned as a reasonable estimation of the time it will take to complete meter replacements and radio installation Region-wide. The mass deployment schedule will be finalized with the vendor.

Water meters will continue to be read manually by the Local Hydro Distribution Companies until the property is successfully connected to the AMI network. Once connected, meters at these properties will be read using the new AMI system and Halton Region will provide the meter read data to the Local Hydro Distribution Companies to continue billing services uninterrupted. Halton Region is working closely with each of the Local Hydro Distribution Companies to coordinate the timing and logistics of the changeover from manual meter reading done by the Local Hydro Distribution Companies to automated meter reading.

Additional Considerations

Network Integration and Other Municipal Uses

As technology continues to evolve at a rapid pace municipalities have begun to consider how to leverage technology in alignment with the concept of Smart Cities. There are many definitions of a “Smart City”, with a common objective of leveraging data and networks to increase operational efficiency, minimize energy, improve citizen engagement and generally improve the quality of life for citizens through better access to information and smart technology.

Halton Region is currently undertaking several projects and initiatives that leverage data in alignment with the smart cities concepts, two of which are the Regional Advanced Traffic Management System and the implementation of adaptive street lights controls.

AMI systems also align well with other initiatives through gathering accurate consumption data and providing better access to this data for customers. Currently, wide area network integration is still far from being standardized across the industry and there are many proprietary network systems within the AMI, traffic management and hydro metering areas that continue to evolve. Typically, each system is specific to the functionality required for each area and currently there are limited opportunities for comprehensive integration across platforms.

Technology continues to evolve and there may be future opportunities for network integration which will be considered through the procurement process. The Request for Proposal will seek responses from proponents regarding the capability of the AMI system being proposed to leverage technology and data to support Halton residents and businesses for the future.

Project Cost Update

Halton Region’s 2019 Budget and Business Plan identified $43.5 million in capital costs for AMI implementation, including an accelerated meter replacement program for meters

near end-of-life, as outlined in Report No. PW-18-18/FN-25-18. A comprehensive review of this cost estimate was completed by Excergy Corporation in conjunction with the development of the implementation plan. The following project elements were assessed:

- Halton Region's water meter population as of December 31, 2018;
- Number of meters to be replaced or retrofit;
- IT infrastructure – AMI system and software; and,
- Resource needs during implementation and post implementation.

The actual total project cost is dependent on the AMI solution and therefore, it will be refined accordingly following vendor selection; however, based on this data refresh and refinement of cost components the cost to implement AMI is expected to be closer to $50.0 million. The additional $6.5 million can be attributed to the updated meter count which was calculated based on the known meter population on December 31, 2018 as well as the number of new meters that are expected to be added to Halton Region's inventory before mass deployment begins in 2022 as well as IT infrastructure costs such as additional hardware that were not captured in the original estimate.

Halton Region's 2019 Budget and Business Plan funded the project in phases over three years, 2020-2022 as set out in the Financial Implications section of this report. Through the review process, Excergy Corporation identified that the preferred method and most cost effective method is to award the contract with upfront funding approval. This approach is consistent with other municipalities who implemented AMI. As such, the updated AMI project cost of $50.0 million will be requested through the 2020 capital budget and business plan process.

In order to provide the increased level of customer service and realize opportunities that AMI technology provides, additional or redeployed staff resources will be required once the AMI system is fully implemented across Halton Region.

Next Steps

Following the approval of Report No. PW-45-19/FN-35-19 by Regional Council, staff will initiate the procurement process to select an AMI solution and vendor to supply and install the AMI system, meter data management software, meters and radio transmitters, at a cost of approximately $50.0 million (subject to Regional Council approval as part of the 2020 Budget and Business Plan). As well, staff will develop the communications plan and business processes to support AMI implementation. Staff will provide regular updates, as necessary, throughout the life of the project to Regional Council.

Conclusion

The implementation of Automated Metering Infrastructure (AMI) achieves Halton Region's long-term goal of a reliable, accurate, cost effective and customer service focused metering and billing program that positions Halton Region well for the future and leverages new technology to meet current and evolving needs of Halton and its

customers. Staff will develop the communications plan and business processes to support AMI implementation in the coming months with full implementation anticipated by mid-2024.

FINANCIAL/PROGRAM IMPLICATIONS

Through Report No. PW-18-18/FN-25-18 the original anticipated costs of the Region-wide AMI implementation was $43.5 million financed in years 2019-2022. Excergy Corporation identified that the preferred and most cost effective method is to award the contract with upfront funding approval. As such, the updated AMI project cost of $50.0 million will be requested through the 2020 Budget and Business Plan. The increase of $6.5 million will be reviewed as part of the 2020 capital budget and business plan process and funded through the water and wastewater state of good repair program.

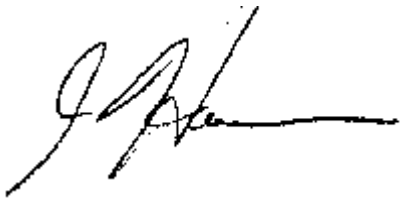
($000s)	2019	2020	2021	2022	2023-2028	Total
Capital Expenditures						
Replacement	$ -	$ 7,469	$ 7,469	$ 7,469	$ -	$ 22,408
Incremental AMI	400	6,822	6,922	6,922	-	21,066
Total	$ 400	$ 14,291	$ 14,391	$ 14,391	$ -	$ 43,473
Financing						
Water Capital Reserve	400	14,291	14,391	14,391	-	43,473
Total	$ 400	$ 14,291	$ 14,391	$ 14,391	$ -	$ 43,473

Capital Plan per Report No. PW-18-18/FN-25-18:

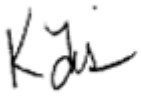
($000s)	2019	2020	2021	2022	2023-2028	Total
Capital Expenditures						
Replacement	$ -	$ 22,407	$ -	$ -	$ -	$ 22,407
Incremental AMI	400	27,193	-	-	-	27,593
Total	$ 400	$ 49,600	$ -	$ -	$ -	$ 50,000
Financing						
Water Capital Reserve	400	49,600	-	-	-	50,000
Total	$ 400	$ 49,600	$ -	$ -	$ -	$ 50,000

Respectfully submitted,

Kiyoshi Oka P. Eng.
Director, Water and Wastewater System Services



Jim Harnum
Deputy CAO and Commissioner of Public Works



Kathy Fischer
Acting Director, Financial Services & Payroll

Cyndy Winslow
Acting Commissioner, Finance and Regional Treasurer

Approved by

Jane MacCaskill
Chief Administrative Officer

If you have any questions on the content of this report, please contact: Kiyoshi Oka Tel. # 7602

Attachments: None