MEMORANDUM

To: Mayor and Members of the City Council

From: Rich Olson, City Manager
Angela Cole, Assistant City Manager

Date: January 24, 2020

Re: Consideration – Hold a Public Hearing - Nexgrid and Beacon Meters Smart Grid Implementation

During the Special Called City Council Work Session of January 13, 2020, the Council asked to delay voting on the electric and water smart metering implementation until after holding a public hearing on the matter. The public hearing was subsequently called for during the January 13, 2020 meeting to be held on January 27, 2020. In light of this, we anticipate consideration for LGC approval being moved from their February meeting to March.

BACKGROUND:

Advanced Metering Infrastructure (AMI) refers to systems that measure, collect, analyze energy usage, and communicate with metering devices such as electricity meters, gas meters, LCS, and water meters, either on request or on a schedule. These systems include hardware, software, communications, consumer energy displays and controllers, customer portals, meter data management software, and utility billing systems.

Government utilities are turning toward AMI systems as part of larger "smart grid" initiatives. AMI differs from traditional automatic meter reading (AMR) in that it enables two-way communications with the meter. AMI two-way meter communications allows commands to be sent toward the home for multiple purposes, including time-based pricing information, demand-response actions, or remote service disconnects/reconnects. Wireless technologies are critical elements of the network, aggregating a mesh configuration of up to thousands of meters for back haul to the utility's IT center of operations.

The network between the meter devices and billing / operations systems allows collection and distribution of information to customers, utility distribution / supply, and utility customer service. This enables the City to participate in demand response services. Since deregulation, time-of-use rates, and market-driven pricing, utilities have been looking for a means to match consumption with generation. Non-smart meters only measure total consumption, providing no information of when the resource (water, gas or electricity) was consumed. Smart meters provide a way of measuring this site-specific information, allowing utility companies to charge different prices for consumption according to the time of day and the season TOU rates. Likewise, smart metering offers potential benefits to households. Consumers can use real-time information provided by the smart grid system to change their normal consumption patterns to take advantage of lower prices. Pricing can be used to curb growth of peak demand consumption, saving the City a considerable amount of money.

City staff has been working on the development of AMI in Elizabeth City for almost 10 years. The Public Utilities Department facilitates the distribution of two utilities – water and electric. The Electric Division will be migrating to AMI hardware and mesh networking created by Nexgrid Solutions. The meter devices are the enhanced Aclara i210+c and KV2C meters for commercial customers; they will be enhanced by the AMI technology and the Verizon telecommunications network, making the two-way communication and data collection possible. The smart water metering technology is offered by Badger Meter. The technology specifically being considered is the Beacon Advanced Metering Analytics (AMA) system accompanied by the Orion Cellular LTE (long-term evolution) Endpoints and E-Series Ultrasonic Meters.

The integrated system of smart meters, communications network, and data management systems will improve the City's service delivery and service experience, all while saving the customers money. This AMI has already been introduced and supported in many other communities – small-, mid-, and large sized cities – across the nation. Within the northeastern region of North Carolina and for the member cities of the North Carolina Eastern Municipal Power Agency (NCEMPA) the incorporation of the technology has multiplied. In the last three years, the City's impediments have been varied, but with forward vision of the City Council, we have remained committed to implementing our AMI project. In February 2015, the City Council authorized staff to implement the Nexgrid AMI FAN Pilot, to include both water and electric utilities. Staff had planned to run the pilot for only a year; however, the utility billing migration deferred our being able to assess and evaluate the success of the pilot. The City Council authorized staff to extend our agreement with Nexgrid during their August 22, 2016 Work Session. During the intervening period, staff has continued to work with Nexgrid and ElectriCities representatives to evaluate electric meter and load management devices appropriate for the Elizabeth City project. Although the Nexgrid AMI offers both an electric and water solution, the smart metering for the water utility has been separated from the Nexgrid electric project. During the May 9, 2019 Regular Meeting, staff presented information regarding the Badger smart meter products and specifically Beacon. After considering the matter, Council directed staff to install the new technology at each of the Council members' houses and any locations where the meter was stopped or broken as part of the regular maintenance.

In addition to receiving several presentations exhibiting the data generated by each pilot, staff also previously provided to Council demonstrations of the existing and new meter devices, rate analysis reports, distribution system updates and usage reports for both utilities. Utility-specific reports, like water consumption and load management reports have been showcased during Regular, Work Session, and Budgetary meetings of the Council. Staff has also advised the Council that the City's water meters have exceeded their useful life expectancy, which could negatively affect meter accuracy. However, meter accuracy is essential to ensuring accurate billings. The aging meters tend to underreport consumption. Smart AMI technology aside, the inventory of existing water meters must be replaced in order to maintain system integrity.

The City's team of utility, system and information technology, and public administration have researched, vetted, and negotiated an AMI solution for Elizabeth City that will harness smart technology to better utilize staff resources, accurately measure services and protect our natural resources.

ANALYSIS

Smart Metering Program – Water

- Replacement of all approximately 8,000 water ultrasonic meters equipped with a cellular transmitter
- Rehabilitation of all water meter installations, including backflow prevention
- 15 minute interval meter reads
- Increase staff capabilities in system-wide leak tracking
- Customer access to meter information via a secure web portal
- User information to include: urgent message notification functions for incidents such as leak detection, customer configurable consumption thresholds and text message alerts

Smart Metering Program – Electric

- Installation of the ecoNet communication gateway and repeaters
- Replacement of all approximately 13,580 residential and commercial electric meters, along with a wireless mesh communication network
- Quarter hour meter reads
- Increase staff capabilities in outage tracking and restoration management and system balancing.
- Future load management capabilities and specialization
- Customer access to meter information and usage history via a secure intelaHome or Tyler portal
- Consumer information to include: urgent message notification functions for high usage and low account balance, past due / disconnection notification, customer configurable consumption thresholds and text message / call alerts

Financing – Water

During the City Council meeting of November 25, 2019, the City Council approved staff to request and negotiate contracts associated with the smart metering project for water AMI. We requested financing proposal for the meter and project deployment. The following proposals have been received:

Entity Name	Fixed Rate	Fees	Total Payments Including Fees
Bank of America	2.0656%	----	$5,510,760.00
BB&T	2.08%	----	$5,514,618.54
BciCapital (City National)	No Bid		
First Citizens Bank	No Bid		
PNC Bank Public Finance	No Bid		
Southern Bank & Trust Co.	No Bid		
Towne Bank	2.44%	$1,500.00	$5,622,468.00
Wells Fargo	No Bid		
Xenith Bank	No Bid		

The City received three very competitive proposals from Bank of America, BB&T, and Towne Bank; total interest to be paid over the ten years will be $535,760.

The City Council is recommended to adopt a resolution authorizing financing with Bank of America. Since we are retiring the debt over a longer period, the City must request approval from the Local Government Commission (LGC). In order to submit application to the LGC, the Council must first hold a public hearing, as well as adopt a resolution for financing. The next LGC meeting will be held on February 5, 2020; therefore, if the Council calls for a Public Hearing during its January 13th, 2020 meeting, it could be held on January 27th, 2020, and submitted in time for their February consideration.

Financing – Electric

The City Council included $2.25 million in the FY 2019-2020 budget to implement the Nexgrid AMI strategy. During the City Council meeting of November 25, 2019, the City Council approved staff to request and negotiate contracts associated with the smart metering project for electric AMI. We requested financing proposal for the hardware (meter) project component. The following proposals have been received:

Entity Name	Fixed Rate	Fees	Total Payments Including Fees
Bank of America	No Bid		
BB&T	1.89%	----	$2,729,455.87
BciCapital (City National)	No Bid		
First Citizens Bank	2.31%		$2,752,940.76
PNC Bank Public Finance	No Bid		
Southern Bank & Trust Co.	No Bid		
Towne Bank	2.27%	$1,500.00	$2,756,425.20
Wells Fargo	No Bid		
Xenith Bank	No Bid		

The City received three proposals from BB&T, First Citizens Bank, and Towne Bank; total interest to be paid over the five years will be $129,455.87.

The City Council is recommended to adopt a resolution authorizing financing with BB&T.

Return on Investment

City staff's primary objectives when evaluating a smart meter program is does it make economic sense? This is the best determined by looking at the return on investment (ROI). Staff, along with the help of outside services, has developed the return on investment projections for each project. The City Council needs to remember that we purchase our power through NCEMPA, while we produce our water through our treatment plant process. This is the primary reason we have substantially different ROI for each project.

Due to the excellent interest rates, the City received 1.89% for Electric and 2.06% for water. Staff has been able to do a financial analysis for both projects. The Smart Water Meter project indicates a positive cash flow of $195,998.00 in year one of the project. Over the 10-year period that the debt is issued, there is a cumulative savings of $2,648,493.00. Attached as Exhibit "A" is the financial analysis to support these numbers.

The Electrical Smart Metering project has an ROI of four years. (Exhibit B) These savings are directly associated with a reduction of the demand charges we will be paying NCEMPA. The City should experience a savings of $804,733.00 per year, while our debt payment cost will be $545,891.00 per year. The ROI can be decreased substantially by increasing the City's Load Management Switch Replacement Program.

Based on the City's existing rate plan neither the Electrical or Water Smart Meter Projects will require the City to increase our electrical rates or water rates.

Contracts & Agreements – Water

There are two contractual agreements exclusive to the smart water meter project:

1) the Beacon AMA Managed Solution Master Agreement, and 2) the Utility Management Services (UMI) Master Services Agreement. The agreement with Beacon is a services contract, establishing terms for the hosted, on demand, web based service website (or customer portal) accessible to its customers to provide metering and water usage service information. Per the agreement the information will be communicated via a cellular network. The UMS Agreement facilitates the installation of the Badger meters and integration into the Beacon AMA system and the City's Incode 10 utility billing software. Specifically, UMS will furnish all software, labor, integration and the other related services to manage the design, build and integration of a cellular metering system. The third obligation relates to the City's agreement with Tyler Technologies, our utility billing software provider. The City will be required to execute a purchase order with Tyler Technologies for every meter included within the mass meter swap. The water integration includes an estimated 8,000 water meters. The existing service agreement the City has with Tyler will be updated to reflect the reoccurring customer service portal access for all utility customers – both water and electric.

All elements accounted for, the Badger AMI System Implementation Project is estimated to cost $4,517,891.33, plus a 10% contingency ($444,087.11), for a project total of $4,961,948.44. Total annual fees would be estimated at $79,392,96. The City would debt finance the entire project , or $4,961,948,44. The estimated budgetary impact is $633,525.00 for the next 10 years.

The Elizabeth City Beacon AMI Project – Price Estimates (Exhibit C) spreadsheet enumerates the project summary described above, and is attached hereto. City staff expects the water project implementation to take a total of six to nine months to complete. Once LGC approval and financing is secured and authorizations provided by the City Council, staff anticipates beginning this project on or about April 1st and being completed in the fall of 2020.

Contract Summary for the Water Metering Integration						
Vendor	Type of Agreement	Product or Service Rendered	Duration (of the Agreement)	Contract Amount	Reoccurring Amount	Additional Comments or Highlights
Badger	Product	Meters, backbone hardware, and smart devices	One-time purchase	$2,029,366.00	N/A	
Various Vendors	Product	Misc. hardware	One-time purchase	1,136,578.63	N/A	
Beacon (AT&T)	End User Agreement	Web-based Software Platform	Initially five years, renewable annually	N/A	$79,392.96	
Utility Management Services	Master Services	Project Management and Installation Services	Nine months	$1,260,326.50	N/A	
Tyler Technologies	Purchase Order (Service)	Mass Meter Change Out (MMCO)	Annual subscription	$0.50 per meter	N/A	

Contracts & Agreements – Electric

Full implementation of the Nexgrid electric AMI system will require the execution of nine agreements, which have been reviewed by the City Attorney. Additionally, are the billing system integration and customer portal access with Tyler Technologies. There are two agreements the City will execute with Nexgrid: 1) the hardware contract for to include the Aclara meters, ecoNets, repeaters, handheld devices and antenna; and 2) the service and product licensing contract granting the City and customers access to the web based intelaHome portal. The City will be charged annual fees by Nexgrid relating to the Professional Services and Support Agreement. This agreement governs terms and coverage related to faulty meters, system disruption, transmitting of data, cyber security, etc. The service contract includes training for Electric Distribution and Customer Service personnel. In order to activate our Nexgrid pilot project, the City has already executed very similar agreements with the technology company. Still the new agreements have been reviewed, updated and negotiated for terms and level of service expectations. In total, including product shipping, the hardware expense is $2,484,573.00.[1] The PSSA contract value is $31,770.00; this is a reoccurring cost.

The third contract essential to the Nexgrid implementation is a reoccurring service agreement with Verizon Wireless. This component links the meter and Nexgrid hardware to the City's communication network. Verizon is supplying the sim cards to insert into the DIGI routers that the City will purchase from ElectriCities. Much like a mobile phone, the sim card is necessary for the device to receive and transmit data. The reoccurring element functions much like a mobile phone plan. This project element is a change from staff's November presentation to the Council. The technology and services offered by Verizon represent a better cost option and reliability over and above the inventory of radios and antenna initially proposed. The Verizon Wireless agreement is negotiated in keeping with the City's existing business plan we already have; the annual cost for sim card and plan is $6,720.00.

The City has negotiated with ElectriCities for the DIGIs cellular gateway hardware, programming and setup. This is a required smart grid element as it establishes and reinforces the communication backbone. Sister cities of Kinston, Ayden and Smithfield are using this technology. City facilities with internet access, will have a static IP and have a few locations backbone setup similar to the current Nexgrid pilot. For all remaining areas, the City will use cellular DIGIs. The City's Electric Distribution already has some DIGIs they are using for SCADA. The one-time cost is $6,750.00 for 15 units, and their setup. Again, the cellular service for the DIGIs will be provided by Verizon Wireless and priced separately.

Also included in project contracting are service agreements for meter and meter base hardware installation. The lowest bid for meter and ecoNet device installation was from NexGen Utility Solutions; their quote is $374,628.00. NexGen is a device installation

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[1] The Load Management Switch (3relay) included in the Hardware section of the *Elizabeth City Nexgrid AMI Project – Price Estimates* spreadsheet is considered an operations expenditure and is not included in the total amount to be financed.

vendor, also specializing in technical resources for energy utilities; the company implements, builds and supports many types of utility infrastructure, including smart grid, wireless communications systems, wireline telecommunications. The contract obligates NexGen to install approximately 13,500 electric meters and other related technology components within a six month period, beginning in early 2020.

As with the utility conversion project, City staff strongly supports the idea of engaging a project manager to facilitate the integration. ElectriCities offers project management expertise at a rate of $110.00 per hour. Other member cities using this service offering from ElectriCities have asserted its value. If the City chooses to hire the outside project manager, the individual would report to the City at least once a week, providing the following assistance to our AMI project:

- Assistance with vendor management for Nexgrid and other third parties that are part of the AMI project
- Assistance in establishing project schedule and budget
- Help maintain project schedule and budget
- Monitoring contract performance of third parties
- Assistance with establishing processes for meter change outs, data exchange, integrations, etc.
- Providing project updates to entire team throughout project.

ElectriCities is completing a similar electric and water AMI installation project with the Town of Ayden, estimating a minimum of 500 hours dedicated to project management. The ElectriCities estimate for project management and assistance is $55,000.00. Also included (and required) with the Nexgrid on-site participation is payment for their travel expenses. The project includes $5,000.00 for Nexgrid personnel travel and lodging.

Another segment of the Nexgrid system implementation includes utility billing system integration and portal access annual fees. Tyler Technologies will charge the City 50¢ per meter for the mass meter change out. Again, the City estimates 13,580 meters, resulting in $6,790.00 payable to Tyler Technologies for each electric meter that is replaced. (The 50¢ charge also applies to the 8,000 each water meters that must be replaced.) Elizabeth City Utility customers will be able to access their account information, usage data, make payments, establish usage, tampering and leak alerts via a universal customer portal maintained by Tyler Technologies. The portal would also be available to City Customer Service representatives. This one-stop portal will enhance our level of service to residential and commercial consumers. Tyler Technologies can make the portal available at an annual cost of $34,003.00 for both the electric and water utilities together.[2]

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[2] The Tyler Technologies portal will receive the meter (water and electric) data the City pushes to its servers and in turn create a dashboard for the consumer / customer to view their respective utility usage in the form of chart or data table, as well as make customer-specific account preferences. Separately, Nexgrid and Badger offer customer portals with their product. Both are relatively user-friendly; however, each will require a separate account set-up and login for the Elizabeth City Utility customer, for three Elizabeth City Utility-related logins. CSRs will also have to login to separate portals to explain usage options and data to the customer. Tyler will not allow Nexgrid and Beacon from the existing customer portal without the add-on feature.

Finally, the City will be charged $1,500.00 monthly or $18,000.00 annually for the storage of its AMI data ElectriCities. At the recommendation of the City's Director of Information Technologies Matthew Simpson, the Elizabeth City Utility will store all customer usage data at one of the ElectriCities secure facilities (rather than a virtual cloud server). The reoccurring cost escalates 5% annually; and although a rather substantial cost, many local governments that have been hacked and had their data compromised or even held for ransom, advocate for the additional security that data storage centers can give. The City must expand its current (pilot program) agreement with ElectriCities to include the entire system of smart meters.

All elements accounted for, the Nexgrid AMI System Implementation Project is estimated to cost $3,162,748.00, plus a 5% contingency ($158,137.00), for a project sum of $3,320,886.00. Total Annual Fees would be an estimated $69,793.00. The City would debt finance the hardware assets associated with the project, or $2,600,000.00. The load management switches, various fees (installation, project management and annual), and billing system integration charges would be paid from the Electric Distribution (enterprise) Fund budget. The estimated budgetary impact is $615,684, which is $545,891.00 in debt and $69,793.00 in fees.

The *Elizabeth City Nexgrid AMI Project – Price Estimates* (Exhibit D) spreadsheet enumerates the project summary described above, and is attached hereto.

City staff expects the electric project implementation to take a total of six to eight months to complete. Once financing is secured and authorizations provided by the City Council, staff anticipates starting the project on or about March 1, completing by early Fall 2020.

Vendor	Type of Agreement	Product or Service Rendered	Duration (of the Agreement)	Contract Amount	Reoccurring Amount
Nexgrid	Master Service / End User	Portal Access / Software	Annual subscription	$31,770.00	$31,770.00
Nexgrid	Product	Meters, backbone hardware, and smart devices	One-time purchase	$2,469,322.50	N/A
ElectriCities	Service	Project Management	6 months, until installation is complete	$55,000.00	N/A
ElectriCities	Product	DIGI cellular router	One-time purchase	$6,750.00	N/A
ElectriCities	Service	Data Hosting	Initially three years, with annual renewal	$18,000.00	Escalates 5% annually
Verizon Wireless	Product / Service	Sim cards / Data Plan	Ongoing	$6,720.00	$6,720.00
NexGen Solutions	Service	Meter and hardware installation	6 months, until installation is complete	$206,595.00	N/A
Tyler Technologies	Purchase Order (Service)	Technical support / Mass Meter Change Out (MMCO)	6 months, until installation is complete	.50 per meter	N/A
Tyler Technologies	Software	Customer Portal Access	Annual subscription	$34,753.00	$34,753.00

FINANCIAL:

The Finance Committee discussed this matter during their January 23, 2020 meeting. Upon motion made by Mayor Parker, seconded by Councilwoman Young, the Committee unanimously recommended forwarding to the City Council.

AT THE CONCLUSION OF THE PUBLIC HEARING:

STAFF RECOMMENDATION:

By motion, take the following actions:

- Approve Contracts and Orders for Electric Metering Integration including:
    - Nexgrid Master Service / End User Agreement for Portal Access / Software
    - Nexgrid Product Agreement for Meters, Backbone Hardware, and Smart Devices
    - ElectriCities Service Agreement for Project Management
    - ElectriCities Product Agreement for DIGI celluar router
    - ElectriCities Service Agreement for Data Hosting
    - Verizon Wireless Product / Service Agreement to SIM Cards and Data Plans
    - NexGen Solutions Service Agreement for Meter and Hardware Installation
    - Tyler Technologies Purchase Order for MMCO Support
    - Tyler Technologies Software Agreement for Customer Portal Access
- Approve Contracts for Water Metering Integration, including:
    - Beacon End User Agreement for Web-based Platform Software
    - Utility Management Services Master Services Agreement for Project Management and Installation Services
    - Tyler Technologies MMCO Service

Additionally, adopt a resolution authorizing financing for Electric Metering Integration with BB&T for $2,729,455.87; and adopt a resolution authorizing financing for Water Metering Integration with Bank of America for $5,510,760.00. Furthermore, authorize staff to delay the notice to proceed for the installation of the water meters until August 1, 2020, or until the City has reached an 80% installation threshold, whichever may come first.

RESOLUTION# 2020-1-01
Resolution for Electric Smart Metering Project to be Funded by Five-Year Installment Purchase Financing

WHEREAS, during the November 25, 2019 meeting of the City Council, the Council authorized staff to begin requesting and negotiating contracts and financing for the smart electric meter project deployment; and

WHEREAS, the total funding required for this project is $2,729,455.87, which includes interest of $129,455.87; and

WHEREAS, of the nine banks approached for financing, the City received three bids, the lowest of which was from BB&T, which had a fixed rate of 1.89%.

NOW THEREFORE, be it resolved by the City Council of the City of Elizabeth City to approve the the five-year installment purchase financing for the Electric Smart Metering Program through BB&T.

ADOPTED, this the 27th day of January 2020.

Bettie J. Parker
Mayor

April D. Onley
City Clerk

RESOLUTION# 2020-1-02
Resolution for Water Smart Metering Project to be Funded by 10-Year Installment Purchase Financing

WHEREAS, during the November 25, 2019 meeting of the City Council, the Council authorized staff to begin requesting and negotiating contracts and financing for the smart water meter project deployment; and

WHEREAS, the total funding required for this project is $5,510,760, which includes interest of $535,760; and

WHEREAS, of the nine banks approached for financing, the City received three bids, the lowest of which was from Bank of America, which had a fixed rate of 2.0656%; and

WHEREAS, the requisite public hearing soliciting input for the purchase was called for during the January 13, 2020 meeting, and held on January 27, 2020, after proper public notice.

NOW THEREFORE, be it resolved by the City Council of the City of Elizabeth City that application shall be made to the Local Government Commission (LGC) approving the 10-year installment purchase financing through Bank of America.

ADOPTED, this the 27th day of January 2020.

Bettie J. Parker
Mayor

April D. Onley
City Clerk