State of Rhode Island Public Utilities Commission

Proceeding to Establish a Pilot Metering Program
for Municipal-Owned Streetlights

Docket No. 4513

Supplemental

Pre-Filed Testimony of

George A. Woodbury

January 7, 2015

Q. By whom are you employed at this time and in what capacity?

A. I am self employed as the Owner and President of LightSmart Energy Consulting which is a company I founded to assist communities with the opportunities street lights can provide to support more than just roadway lighting in this rapidly expanding technological age.

Q. Do you believe the proposed pilot is necessary on technical or practical grounds?

A. No, I do not believe that a pilot is needed on technical or practical grounds. This type of metering data transfer is widely used across the United States and is already being used in a slightly different manner by National Grid. The accuracy of these systems is already established by independent laboratory testing. The only, potentially unresolved issue is National Grid's experience with the form of data received from the system and the integration of that data into the MDMS system. A system manufacturer, like Silver Spring Networks, has extensive experience with this process having over seventeen million of their devices in the field already and having assisted numerous utility companies with the integration of the data into the MSMS system.

National Grid acknowledged in previous testimony that the use of these control systems is inevitable. The only question is when they will be allowed and adopted. Towns will install these systems and work with National Grid to resolve data integration challenges as long as National Grid is committed to reach an end solution that allows for metering. The Town of Randolph Massachusetts is in National Grid's service territory and will be installing over 2600 Silver Spring Network controls. This system can provide

the information National Grid seeks regarding scaled implementation at no added cost to National Grid. The Towns support this approach that is consistent with the Towns' goal of being able to take advantage of the control capability as soon and efficiently as possible.

Q. National Grid claims that there is industry concern with "minimal energy consumption at extreme dimming levels of LED luminaires." (Division 1-13) Do you agree and how does this challenge compare to the inaccuracies in unmetered billing under the current S-05 tariff?

A. The IC chips that are used within control systems accurately measure energy consumption and meet the required ANSI standards. This is the same standard that applies to the meters employed by National Grid throughout their system. The current unmetered billing system has tested to be from 5 to 7 percent inaccurate. So we are dealing with a billing system that is quite inaccurate to begin with. Secondly NGRID is proposing a tariff that introduces errors by as much as just under fifty percent with low wattage fixtures through their tiered billing system. Any data integration inaccuracies from the metering controls would occur only when the energy consumption is so small as to be insignificant particularly in light of the fact that NGRID's current model does not seem to be overly concerned with accuracy. More importantly, most LED lights are not continuously dimmable; they dim in steps with the lowest setting being 10 percent. Communities are very unlikely to dim a light to 10 percent. The most likely dimming would be to a lowest setting of 30 percent; below that they would turn the light off.

Q. What remains to be "proven" regarding streetlight metering?

A. There is no technical area where the metered control systems are not more accurate than non-metered rates. The meters are far more accurate than current billing practices. The only "issue" is how National Grid will adapt its billing system to a new form of data. National Grid has thousands of metered accounts, and the metering streetlight controls use industry standard protocols, so there should not be any substantial issue with data integration. The control software can match the account aggregation of current municipal accounts. Metering will be an improvement, and as new metering chips are developed, they can be deployed seamlessly. In National Grid's December 29 Response to Division 1-7, they were asked if the IC chip was "seamlessly interchangeable," and they answered "The IC meters are not seamlessly interchangeable." This is technically true, since each manufacturer is operating on specific frequencies and using varying mean of data transfer. and some of these systems are proprietary. ANSI and the international group TALQ are working to developing standards to make these systems more interchangeable. But, for now, if you install one manufacturer's system and you use their compatible IC chip the interchange process is seamless.

Q. Please describe a metering system and how it can be distinguished from a "control system"?

A. Currently all "metering" systems for streetlights in the United States are chips within control units. The controller is mounted in place of the photocell on each light that both controls the light and communicates with neighboring lights in a mesh network. The mesh network connects to the internet through which the control of the lights can be

achieved by any individuals with the required system access codes. Within the control unit is a single chip that measures the power being used by the luminaire; it is an integral part of the control device. Access to the data would be provided to National Grid and the software can be partitioned to limit access to certain data. If metering is not allowed, then this accurate measurement is wasted, but the ability to control a town or city's lights remains. If the town or city chooses to dim their lights beyond the dimming specified in the S-05 Tariff rate, then they could be accurately billed for the usage and have much broader options for control.

Q. National Grid has drawn a distinction between a streetlight control system and a metering system. Do you agree and if not, why not?

A. I do not agree completely. Modern control systems can be both a control and a meter system for the lights. You can buy a system that does not provide the metering capability and use it only for control, but in so doing the controls exercised must follow specific agreed on protocols in order for the utility to accurately bill. As a result, the industry is moving to the control device with the integrated metering chip to provide the required billing accuracy and flexibility for the customer. Most major LED manufacturers are starting to only use the diming ballasts in their fixtures.

Q. How would you design a pilot that answers the outstanding technical question with metering, how best to integrate the data into National Grid's billing system?

A. I believe the only "reason" for a pilot is to give National Grid time to accommodate metered billing data into its system. This is not difficult, but will take time. The

"compromise' proposed by the Municipalities in Docket 4442 would have given National Grid enough time to accommodate billing system changes, if any. The term "pilot" is a misnomer. This should be a phased approach to implement a metered tariff for streetlights employing intelligent controls. The "pilot" should be a collaborative effort designed to determine what is needed to put into place such a tariff and to learn how to integrate the meter data into the MDMS. Communities need some certainty that, as National Grid has said, it is not a question of whether but rather when metering will be integrated into streetlight system, The "pilot" should be designed to accelerate that integration. We would identify communities that would like to acquire their street lighting systems and convert them to LED lighting and that have a strong interest in implementing control technology. These communities would complete the acquisition, convert to LED lights and then partner with National Grid to install the control network. National Grid would subsidize the network costs and provide the energy conservation incentives under their customized program for the LED conversion work, with some allowance provided for the added energy savings of the dimming capability included in the incentive calculation. During the time this work is being completed National Grid would send their local experts to locations where streetlight metering integration is currently underway to meet with their counterparts at other utilities and learn from their experience. They could work with the information from the Randolph, Massachusetts project to gain the needed insights to larger installations.

If the PUC chooses to require a pilot, then a very small pilot will provide all the data needed. A few lights that are currently metered (as many underground-wired lights are) can be selected, metering controls installed, and the billing data can then be compared between the nonmetered rate, and the new meters. This would only need to have 10 or so lights, but could be larger or smaller and provide the desired comparison and information for assimilation. National Grid can learn the impacts of larger scale integration of system data from the larger integration underway in Randolph, Massachusetts.

Q. Are you familiar with the proposal to use the LED installation currently planned by the Rhode Island Department of Transportation and the Office of Energy Resources to serve as the "pilot"?

A. I am generally familiar with RIDOT's planned installation of 154 LED luminaires, and Cimcom controllers.

Q. Could this installation meet the PUC's requirements for a pilot?

A. The PUC (in its July 25, 2014 Memorandum) summarized its requirements: "The goals of the pilot should, at a minimum, address meter accuracy, integration with the billing system, a comparison to the unmetered rates, and cost allocation." Meter accuracy can be compared between the existing meters on these lights, the new metering controls, and the nonmetered rate that would be imposed if these lights were billed as if they were unmetered. Any good metering control system, and the Cimcon one in particular, will

provide aggregated data in a form that should be usable by National Grid for billing integration and will allow comparison with nonmetered rates. The controls will be owned the community, so there would be no issue of cost allocation. If the 'cost allocation' means the cost of the pilot, then there is no user cost - this pilot would be conducted by the system owner, the State of Rhode Island.

Q. Are there any questions that cannot be answered with this OER/DOT pilot?

A. Yes. One of the objectives outlined by National Grid was the opportunity to look at a larger system to review system reporting liability. This aspect can be addressed at very little cost by studying the integration of the control system in Randolph, MA.

Q. Can you estimate the cost of the proposed National Grid pilot for all municipalities and per municipality?

A. National Grid has proposed a "recoverable" cost of $3,080,000 for their pilot . In my opinion, this can be reduced substantially. They propose that it be recovered from ratepayers using the S-05, 06, 10, and 14 rates. It is not clear how many lights served under these tariffs are municipally owned but we can make some reasonable assumptions from National Grid's response to Division 1-14 (12.29.2014). National Grid states that there are no customers using S-05 or S-06, and that customers using S-14 used 55,396,640 kWh last year, and customers using the private lighting tariff or S-10 used 8,670,015 kWh last year. We know from National Grid's inventories that there are approximately 98,500 "municipal" streetlights, so we can extrapolate by using the

average energy consumption per fixture divided into the private total energy consumption to estimate that there are some 15,400 lights in S-10. We expect that the average wattage of private lights is higher than for municipal streetlights so this number is likely high. However, if these figures are correct (and we have made a clarifying Data Request) then the National Grid pilot proposal would cost approximately $36.87 per light. Should this pilot be approved, those lights serviced under the S-10 tariff would be liable for approximately $568,000 of the pilot cost recovery. The question is what benefit the S-10 customers will get from the pilot?

On the municipal side, if the National Grid pilot is approved and the figures estimated above are correct, then Rhode Island's cash-strapped cities and towns would have to pay over $3,631,000 for the pilot. Many of these municipalities are too rural for current control systems, so would be subsidizing other towns.

National Grid admits that implementation of these control systems is inevitable. They have stated that they will be examining the same issues as they look to AMI metering systems. This integration should be viewed as a cost of doing business with evolving technology to improve customer service.

Q. Will you please summarize briefly how you see the metering situation in Rhode Island and how you feel this docket can best be resolved?

A. In my opinion, National Grid has made streetlight metering into a vastly more complex issue than it really is. The solution should be quite simple. Here is my summary:

- There are thousands of meters in Rhode Island and most of them are read electronically with hand held or vehicle mounted readers. The collected data is then downloaded into National Grid's computer network for billing. National Grid knows how to accept and integrate electronic metered data.
- Streetlight control systems have a single chip that measures usage. This is integral to the control and cannot be separated.
- The streetlight owner should invest in and own the control system for their own lights, and thus, own the metering chip.
- Data from these chips can be fully transparent to the owner, to National Grid, and to any regulatory entity with an interest.
- These metering controls are more accurate than current, unmetered service billing and therefore are, unquestionably, an improvement.

While I do not believe a pilot is needed to prove anything, if one is required it should be small is size (few lights), should have accepted meters in place, and should be operated according to the unmetered parameters of S-05 so that billing can be compared between unmetered, metered, and control/metered. The pilot should be of short duration (2 months data will provide all the answers needed). Finally, it should not require further PUC action to implement metering through the municipal streetlight tariff – a successful pilot should but should result in amendments to the tariff language as previously proposed in Docket 4442.

Q. Is there any other reason why streetlight metering makes sense?

A. Many efficiencies have already been accomplished in Docket 4442. Rhode Island now allows municipalities to buy their streetlight systems, install LED lighting, maintain their systems more effectively and operate their systems more efficiently through part-night streetlighting and dimming. In this time when Rhode Island electricity prices are so high and our regional grid operator foresees more system restraints and price inflation, it

is most important to ensure that our policies align with reduced consumption and efficiency to the maximum extent possible. Metering gives municipal streetlight operators every incentive to run their systems efficiently because their bills will be based directly on consumption rather than limiting and inaccurate operational and consumption assumptions. This enhanced alignment will not only save the Towns money, it will also have a significant impact on reducing demand for electricity thereby helping to resolve the transmission and distribution constraints that cause price inflation.

Q. Does this conclude your testimony

Yes

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Pre-Filed Testimony of

Kenneth R. Mason

January 7, 2015

Q. What are your name and address, occupation and present employer?

A. Kenneth R. Mason, 13 Sharon Drive, Coventry, RI 02816. I am the Director of Public Works for the City of Cranston, Rhode Island.

Q. What is your work experience and expertise?

A. I have been the Director of Public Works for the City of Cranston for two years. Prior to Cranston, I was Deputy Utilities Director for the City of Newport for six years. I am a licensed professional engineer in the State of Rhode Island and have been involved with PUC rate filings for a number of years.

Q. Are you aware of the RI PUC proceedings regarding municipal ownership of streetlights? If so, what is your general feeling about this issue?

A. Yes, I am aware of the PUC proceedings and am in favor of municipal ownership of the streetlight resources. The current system appears inaccurate and the costs seem to exceed the services provided.

Q. Approximately how many streetlights does Cranston pay for?

A. Cranston has approximately 9,645 streetlights.

Q. What is your annual streetlights budget?

A. We currently pay approximately $1,300,000 annually for streetlight services.

Q. What are Cranston's estimated savings through municipal ownership as provided in the Municipal Streetlights Investment Act and approved by the RI PUC in Docket 4442?

A. We have estimated that if we purchase our streetlights, it would cost about $451,372, and if we join PRISM our annual cost would drop to less than $910,000. Thus, the annual savings would exceed $390,000. This means we could purchase our streetlights from the savings generated in approximately 14 months. Since the Municipal Streetlights Investment Act and the PUC actions in Docket 4442 allow conversion to LED lights with controls, there will be additional savings through efficiency but we have not calculated those savings yet.

Q. Are you familiar with the general issues involved in PUC docket 4513, metering.?

A. Yes, I am generally familiar with the issues involved in metering streetlights. I am certain that metering technology will improve the accuracy of Cranston's streetlights billing significantly over the current unmetered rate.

Q. Will Cranston benefit from PUC approval of streetlight metering?

A. Yes, Cranston will certainly benefit when the PUC approves metering. The meters are simply chips within the control that we could install on each light in order to accurately record electrical use and take full advantage of operational flexibility and the associated savings. Controls allow me to dim or brighten as neighborhoods wish, but this only makes economic and operational sense if our bills are determined by the metered use of electricity. The current tariff only allows ranges of reduction for part-night streetlighting and dimming but we should have more flexibility to operate for efficiency and be charged for our actual consumption of electricity, as metering allows.

The metering chip is, as I understand it, between +/- 0.5% accurate. Some are slightly less accurate depending on the manufacturer. As a Director of Public Works and a Professional Engineer, accuracy is very important to me. It is easy to compare 0.5% accuracy with the current system, because the inaccuracy of the current system is not based on actual electricity usage, but on an inventory that may not be accurate as to what lights are where, and does not attempt to identify whether lights are actually working. In my opinion, this is why National Grid proposes to sell us the lights "as is where is," because there are inaccuracies in the current inventory. With metered and controlled lights, however, this inaccuracy is completely eliminated. We know where every light is and whether it is working properly. We will be billed for precisely how much energy we use.

I do not see how the PUC could turn down metering. In my opinion, this is the only equitable solution and I urge the RI PUC to approve metering now. Even if the meter manufacturer's measurements of accuracy were off by half, it still would be a

significant and important improvement in the accuracy of our billing. I firmly believe that every municipality in Rhode Island, and Cranston in particular, should pay for every kilowatt-hour of electricity that we use. We should not, however, pay for electricity we do not use, and that is what the unmetered tariff forces us to do.

Q. What do you think of the proposed metering pilot?

A. Towns and Cities like Cranston will fund their own installation of metering once they know metering is approved. Such a significant investment in a test phase seems wasteful to me, especially since the proposal is to remove the test meters after testing. As I understand National Grid's proposed pilot, it would cost Cranston more than $380,000, even if the equipment were to be located in another community. This is certainly not an outcome Cranston could support. If the metering technology has been proven elsewhere, it would be much more efficient to let National Grid resolve any challenges it has integrating data from the meters as the Towns move forward with proven metering technology. No need to reinvent this wheel here.

Q. Does this conclude your testimony?

Yes.