MA DPU Grid Modernization Working Group

Questions for Utilities Regarding Current Meter Practices

RevisedThird Set

April 26, 2013

Response of National Grid

The purpose of this revised third set of questions is to clarify and expand upon some of the responses to the previous sets of metering questions, based on our discussion at the Customer-Facing Subcommittee meeting on April 23. This revised set of questions replaces the Third Set of Metering Questions dated April 6, in its entirety.

3.1 Installation date of current meters

Please provide an annual schedule of the installation date of all of your current meters. Please provide the data by meter type (e.g., energy or demand), by customer size (e.g., up to 200 kW), or by customer class (e.g., R-4 and G2), to the extent that the information is relevant and readily available for your company.

Response:

Please see the Table below for meters installed by year. The data is unavailable by rate class.

Install Year	Meters Installed	Percent Installed
1901	9	0.00%
1935	1	0.00%
1936	2	0.00%
1940	1	0.00%
1941	2	0.00%
1942	1	0.00%
1945	1	0.00%
1946	1	0.00%
1947	1	0.00%
1948	4	0.00%
1949	7	0.00%
1950	5	0.00%
1951	9	0.00%
1952	2	0.00%
1953	7	0.00%
1954	7	0.00%
1955	8	0.00%
1956	7	0.00%
1957	9	0.00%
1958	6	0.00%
1959	8	0.00%
1960	5	0.00%
1961	16	0.00%
1962	15	0.00%
1963	34	0.00%
1964	35	0.00%
1965	75	0.01%
1966	48	0.00%
1967	78	0.01%
1968	64	0.00%
1969	167	0.01%
1970	158	0.01%
1971	167	0.01%
1972	271	0.02%
1973	1712	0.13%
1974	1650	0.12%
1975	973	0.07%
1976	1555	0.12%
1977	919	0.07%
1978	2124	0.16%
1979	2252	0.17%
1980	2825	0.21%
1981	4882	0.36%
1982	2820	0.21%
1983	2764	0.21%
1984	2079	0.15%
1985	2562	0.19%
1986	4564	0.34%
1987	7058	0.52%

1988	7753	0.58%
1989	5663	0.42%
1990	4367	0.32%
1991	3750	0.28%
1992	2690	0.20%
1993	2400	0.18%
1994	6505	0.48%
1995	5487	0.41%
1996	4183	0.31%
1997	3483	0.26%
1998	4171	0.31%
1999	3915	0.29%
2000	4388	0.33%
2001	327581	24.31%
2002	409926	30.42%
2003	92561	6.87%
2004	147851	10.97%
2005	38769	2.88%
2006	33836	2.51%
2007	29781	2.21%
2008	28030	2.08%
2009	29630	2.20%
2010	30525	2.27%
2011	29343	2.18%
2012	39216	2.91%
2013	9727	0.72%
(blank)	4	0.00%
Grand Total	1347505	

3.2 Current meter replacement practices

In response to Question 2 in the First Set of Meter questions, all of the distribution companies noted that when an existing meter is retired it is replaced with a "like" meter.

a) Please explain the rationale for this practice.

Response:

When an existing meter is retired it is replaced with a "like" meter because the meter must work within the current infrastructure for communication to ensure accurate reads. A meter is one element of a system designed to bring readings from the meter to the billing system efficiently. The system is optimized to provide the service at the lowest possible cost. Replacement of meters with a like meter ensures functionality of the present infrastructure at the lowest cost. Introduction of a different meter with more functionality increases costs without changing functionality. It is not economical to install a single AMI meter when an AMR meter fails. This is because AMI meters require an expansive communications infrastructure in order to enable two-way communications. The meter alone without communications does not provide additional functionality to justify the added costs.

Question:

Each of the MA utility's implemented their AMR systems by using a concentrated time period during which all meters were converted to AMR along with associated communication and software systems.

a) Please explain the considerations and factors that a distribution company would have to address to replace a current meter with a more advanced meter, upon retirement of the current meter.

Response:

In general, the decision to replace an AMR meter with an AMI meter during the "normal" course of business is made after the decision to go forward with an AMI system, not as a hedge just in case. Replacing AMR with AMI meters without a clear full deployment plan would run the risk of increased costs with no benefit, changes in technology due to the extended time required to replace a significant part of the population, and the potential for stranded costs

Thus, a utility would evaluate four elements which are each related to one another. First, the utility would evaluate whether the advanced meter technology provides the functionality in communications and information required by its present AMR system and the effectiveness of the meter within the current system. If the meter can perform the current system's functions, it can be considered. However, if the meter requires different technologies for support, the added cost would be a consideration. Second, utilities consider the cost of the meter relative to an AMR meter. Greater cost for the same functionality would not be worth the price, particularly if the utility did not plan a conversion to advanced meters within the short-term. Correspondingly, the utility would consider changing the meter if it met the first criteria and it planned to convert to advanced meters within a fairly short timeframe, However, as the conversion moves out in time, the utility would probably choose to wait for the changes in technology and pricing that would occur during the interim before deciding on technology options for its conversion. Any decision to convert to AMI would be made with consideration of many economic, operational and policy considerations. Last, and most important, the utility would need to be confident that its meter selection and vendor selection is the correct long-term solution for customers of the utility. For example, if only one meter

manufacturer is providing an advanced meter that functions in an AMR system, is this vendor the correct partner for selection as its meter provider in an AMI system or would other AMI vendors be more appropriate on an economic and functionality basis?

MA DPU Grid Modernization Working Group

Questions for Utilities Regarding Current Meter Practices

Revised Third Set

May 9, 2013

NU/Unitil Response

The purpose of this revised third set of questions is to clarify and expand upon some of the responses to the previous sets of metering questions, based on our discussion at the Customer-Facing Subcommittee meeting on April 23. This revised set of questions replaces the Third Set of Metering Questions dated April 6, in its entirety.

3.1 Installation date of current meters

Please provide an annual schedule of the installation date of all of your current metersby filling in following table:

Year	Number of Current Meters Installed in Year	Percent of Current Meters Installed in Year
first relevant year …		
2010		
2011		
2012		
Total Current Meters		100%

Please provide the data by meter type (e.g., energy or demand), by customer size (e.g., up to 200 kW), or by customer class (e.g., R-4 and G2), to the extent that the information is relevant and readily available for your company.

Please see Attachment 3-1.

3.2 Current meter replacement practices

In response to Question 2 in the First Set of Meter questions, all of the distribution companies noted that when an existing meter is retired it is replaced with a "like" meter.

a) Please explain the rationale for this practice.

When an existing meter is retired it is replaced with a "like" meter because the costs and complexities associated with integrating additional end-points and maintaining those interfaces makes it impractical and uneconomical to do otherwise. This is also the reason that AMI metering systems are typically deployed system-wide, rather than in a piecemeal or one-off fashion.

In addition:

- It is not economical or practical to install a single AMI meter when an existing meter fails. This is because AMI meters require an expansive communications infrastructure in order to enable two-way communications. The meter alone without communications does not provide additional functionality to justify the added costs. Meters utilizing

cellular or modem based communications, similar to those used by the Companies today for opt-in TOU applications, are in many cases an effective way to implement TOU rates on a targeted basis, but rolling this infrastructure out on a large scale may not be appropriate in all cases, and may prove more costly than other alternatives. Depending on the specific characteristics of the utility and desired functionality, utilities would analyze other communications mediums, including mesh network or powerline carrier technology prior to transitioning to system-wide AMI.

- The meter is just one element of an integrated system that is required for system-wide AMI. For instance, in addition to the meter and communications system, companies would need a Meter Data Management System ("MDM") and billing system capable of handing the interval data to enable complex time varying rate designs. These systems are costly and complicated to purchase and implement, which detracts from the business case for going to AMI.

- Installing new AMI technology may require new procedures for installation, billing and troubleshooting as well as the potential for personnel with different skill sets.

- For a company with AMR meters, the business case is less appealing to install AMI meters. The Massachusetts distribution companies have already realized much of the cost savings associated with reading meters through reduced labor and fleet costs.

- Risk of obsolescence is greater in a long-term phased approach. Under a phased approach utilities would presumably purchase meters in limited quantities over time in order to match the assumed meter failure rate. Metering vendors may augment their product offering year-to-year, which would mean additional testing, integration, and support for each release.

- Installing new metering system on a large-scale, rather than one-off as current meters fail allows utilities to take advantage of economies of scale that would not be present in one-off replacements.

a) Please explain the considerations and factors that a distribution company would have to address to replace a current meter with a more advanced meter, upon retirement of the current meter.

Utilities are encouraged to provide a single response to this question, if appropriate and if possible.

As described above, the meter is just one element of an integrated system. The meter itself, regardless of its "intelligence" continues to serve as a measurement device unless it is coupled with other systems (e.g. Communications infrastructure, MDM, billing system), to access and process the data provided by the meter.

For instance:

a) In order to retrieve the outage identification and restoration notification signals offered by many AMI metering systems, an expansive communications system may be necessary in order to capture that data and communicate it back to the distribution company in real-time;

b) An expansive communications infrastructure may also be required in order to enable communication of remote or real time metering reading. In addition, if this information is intended to be used for billing purposes to enable Time Varying Rates ("TVR"),

significant effort may be required in order to interface with the distribution company's MDM and billing system.

As such, there would be many considerations that would need to be addressed prior to replacing a current meter with a more advanced meter, upon retirement of the current meter:

a) **Costs and benefits of the more advanced meter relative to the current meter.** Presumably the more advanced meter comes at a cost premium relative to the less advanced meter. Given, however, that much of the functionality promised by the advanced meter can only be realized with the presence of other systems, this functionality would lay dormant until those systems are implemented or augmented to interface with the advanced meter. It would therefore be imprudent to install a more advanced meter, at a higher cost, which does not enable additional functionalities of a less advanced meter at a lower cost.

b) **Costs and benefits of the additional systems required to enable to functionalities of the more advanced meter.** As technologies continue to progress and their associated costs and benefits change, the business case to adopt AMI will continue to evolve. At present, the business case is less appealing for a company with AMR meters to install AMI meters than it is for a company without AMR.[1] Over time, as the total costs and benefits of AMI systems (including the meter and requisite other systems) evolve, this dynamic will also evolve along with the dynamics of business case for AMI adoption.

c) **The unique characteristics of each distribution company should also be considered as a 'one-size-fits-all' approach is not advised.** For instance, the "bridge" approach being discussed at the working group meetings envisions utilizing the Itron Bridge metering solution, which, essentially, is an AMR meter that could remotely be transitioned to an AMI meter at some point in the future when the requisite communications infrastructure is built out. This approach would lock the utilities into the Itron Bridge solution which may not be the preferred approach for each utility. This would be informed by a variety of factors, including each utilities unique geographic and service territory characteristics, as well the differing technologies and integrated systems already in place.

In addition, it as has been discussed at various Grid Modernization working groups, the goals of the working group may be addressed through means other than the meter. Depending on the goals ultimately established, it may be more appropriate to enable communication via some other means or on a smaller scale. For instance, targeted radio or Internet enabled thermostats may contribute comparable savings for participants than broad-based deployment of AMI and TVR but a much lower cost.

As such, there are many considerations and factors that a distribution company would have to address to replace a current meter with a more advanced meter, upon retirement of the current meter. Put simply, a comprehensive analysis of the costs, benefits, and risks of installing an AMI metering system must be undertaken prior to making such a decision.

[1] NSTAR Electric and WMECO currently have AMR metering systems deployed throughout their service territory. Unitil has an AMI metering system. At present, the business case is difficult to cost-justify adopting AMI metering systems given that many of the operational benefits of automated meter reading have been realized through the adoption of current metering systems.