NextGrid: Utility of the Future Study

Working Group 2: Metering, Communications, and Data

Meeting No. 1

March 15, 2018

Meeting Summary

[Note: descriptions of presentations and discussion are condensed summaries and paraphrases]

NextGrid Working Group 2 Leader: Matthew Olson, assisted by Chris Raider
NextGrid Senior Facilitation Consultant: Annette Beitel

Agenda Item I: Opening and Introductions

Working Group Leader Matt Olson opened the meeting and welcomed participants. Chairman Sheahan presented the purpose and process for the overall study.

Agenda Item II: Current State of Industry

Mr. Olson presented the roadmap for the working group
- The group will talk about metering today followed by data and communications.
- Some of the questions this group will try to address may include:
    - Technical infrastructure capable of bringing DER and other technologies and assets on, and acquiring data that needs to come from and to those devices.
    - What about control standpoint – where should control be? Distributed or centralized?
    - Are there special meters just for EVs or will they communicate through some other communication network? Who will own that network?
    - Maybe a network is offering that energy. How do we do this and provide stability? How do we forecast what needs are? How do we ensure capacity on system? How do we provide reliability on system that we are used to? If we move to distributed energy, may be connected to grid, but needs to be available when we need them to be there.
    - Do we have the right meters? In right places/ right capabilities? Do we trust other devices to provide us metering information? Maybe we trust for control, but not revenue. Or maybe for revenue and not control. Two aspects of metering we don't always talk about.

- o Who else has interest in this data? Real time controls or near real time controls or balancing – need info more frequently than right now. More people that need the information – not just utility and consumer. perspective – securely providing access?
- o Communications –Have to be able to send control signals. Do I tell you that your car can start charging now? Or other more transparent signals? Will consumers like control mechanisms to house about what you can and can't do ? .

Agenda Item III: Ameren Current State Overview

Presentation by Ryan Ellen, Director of AMI, Ameren Illinois
- AMI deployment overview
  - o End of last year, moved to more populated area. The focus this year is Metro East area. We are 62% complete with AMI deployment – over 770 thousand meters. Ameren is a combination utility – have gas as well. 800 thousand gas customers who will convert to AMI.
- Data collection and serving data to customers – how we rolled out functionality.
  - o Collect data – hourly interval data. 6 times per day. Every 4 hours. We collect 15 min data if required. Meters must have ability to collect a lot of information – haven't enabled functionality yet for some things
- Functionality roll out
  - o 2014 asset management put meter in the field. Know where it is, what account, billing, data access for customers (web portal), green button - download my data. End of 2015 remote disconnect. Looked at analytics. Revenue protection.
- Rolled out non-billing interval data to RESs.
  - o Due to some data access dockets we were involved in – at end of 2015 we implemented peak interval program. Integrated AMI solution into outage solution processes.
- subsequent releases of functionality.
  - o EE docket – directed Ameren to implement home area network connection for a customer's device for our electric meter. 2016 automated that to use mobile device without anyone from Ameren on customer communication side.
- More data access dockets
  - o Provide bill quality interval data – went live mid last year. Green button - connect my data – residential only. Rolled out technology looking at other ways to service up data for non-RES.
- Data access
  - o Residential web portal. Customer can see energy usage based on meter. Monthly. Daily. Or hourly. Served up at 9am and its previous day's usage.
  - o

Discussion
- On customer devices are you doing auto identification?
  - o They tell us what type of device they have, but we have to look at the MAC address to connect to our meter, tracking down the individual device.

- What had the most impact for residential customers? What did they like the most or use the most?
  - On operational side - remote service orders – remotely disconnect or connect customers. Value in analytics as well.
  - But with our customer base we don't have a lot of prosumers. The foundation is there. As people get more comfortable with technology and programs, it will increase.

Agenda Item IV: ComEd Current State Overview

Presentation by Joe Svachula, VP of Smart Grid Technology, ComEd
- AMI deployment overview
  - Service Northern half of Illinois. Currently 3.8 million customers and 4.2 million meters.
- Customer information and outage management systems
  - Changed management and system upgraded. Now we drive outage information from customers calling and telling they have outage (Couldn't detect nested outages – better info now). Continue to educate customers.
- Capabilities of meters
  - Meter reading recorded every 30 minutes. Can adjust time of recordings if needed. Can record energy delivered. Separate that energy that is received. Becomes important in two-way flow world with more renewables. Can measure voltage, temperature, usage, etc. Data points are synchronized in time and provides a lot of good information for operations. Detects outages and theft of power.
- Billing accuracy
  - Great reduction in delayed bills and estimated bills during snow storms. Meter information presented next day for customers – in certain programs – peak time savings to get rebates on bill during peak times, to getting alerts at high usage. Enabled green button – anonymous usage data. There is a program to anonymize data for others. Operational data is becoming more important. Voltage optimization. Discrete end points available.
- Data collected is protected and not sold to 3rd parties.

Agenda Item V: Working Group Member Discussion

Mr. Olson – AMI Communications
- We have AMI communications, but need to predict what to do with mesh over time. Need to understand data information we will see. Having worked on Silver Springs deployments, there's a fair amount of capacity on the system to take on tasks. But if we say as a group – want to increase interval reads or increase data collected, that may have significant impact on AMI mesh needs. Doesn't need to be replaced, but how often do we put connection points between mesh and higher speed connection?

Discussion:
- Need to discuss additional functionalities of meter, what is needed at utilities, and how to make that case that it is benefit for ratepayers. Utilities ask the same questions and can increase reliability and functionality by studying the data received from AMI.
- Now that we have this data, whether 5, 15, min, translates to customer in a diff way. Are we able to feed customers the right information to react? Give residential and small business customer info and they will react. But if they don't get benefit from reacting, you've failed.
- What hours do we need to be doing this? Get at right interval.
  - different ways to look at it. Energy supplier hat – want that data for customers hourly going back 12 months to see what we can offer them.
  - data perspective, what does a customer across all categories do with all the information you give them? Looking to do some action such as lower bill– or look at and see that it's in line with previous bill. This ranges from large to small customers.
- What about storage processing, utilization of all this data? Should we discuss this now so as to lay the infrastructure for innovations and upcoming opportunities?
- We need structure on defining what's needed. Inventers – list of functions they want. These are things we should have. What the data is that's required to carry out those functions and decision process. Function definition. Data needs to be done to meet functions. Third, defining sensors to do it, including timing. Three-step process. For now, and the future. Can aggregate. Once you create this. Just add more, more functionality, this data set won't support it.
  - To do this, we need this type of sensor, data, and the timing.
- If we are getting data from customer's equipment and the utility, should there be a common info platform for metering data, maybe not just settlement data? Ultimately does utility care about behind the meter info? We worry from control standard. Reactionary versus we probably know what solar will be tomorrow (have the tech to do that).
- How does communication hubs and meters work together? The ability to have a market and settle transactions and bid to neighbors is complex. But if we can identify frequency, length of message, system requirements, that could be a framework for decisions. Should the meter be talking to any devices behind it such as an EV or smart inverter?
- Who should be talking to meters? Utilities may be one option. May be third parties, aggregators, or others. Competitive advantage that the utility might have as a gateway – how, or do we mitigate that?
- All real-time market comes down to distribution system. How do we balance tech aspect of that? Someone might beat utilities to it – can do it all on WIFI. But does that mean reliability needs, real time distributed control? But it is competitive advantage.
  - Not everyone has internet in the home.
- What is metering to us? Is it essentially measuring historical usage or also a communication platform? When we say metering now, what do we mean by metering and how does it fit into communications.
- The challenge in the market is whether 5G will be around long enough to sustain what we want to do for metering? There are different aspects of metering.
- Utility meters should be able to talk to one another rather than buying separate meters for each utility function.

- When working with customers, the first question should be what functions are wanted, then worry about the tech.
- Who owns the network? If no owner, who manages it? What devices are allowed to join and how do we authenticate those devices? Is there a model where the utility manages the network?
- If we separate the financial transactions (telling customers when to use what) from the physical supply of electricity, the meter still has traditional role, and the utility has that role - communicating to make sure the power stays on.
- The Balancing of supply and demand is solved in the wholesale market. The market roles are defined. Now that has to happen on a distribution scale. The natural person to serve that role is the utility.
- Regulation must allow for it to function in a new way.
- When devices come at you, is there any type of prioritization of devices that get energy?
  - The more data you gain and interpret will place customers in a better position to be able to answer that question.
- The marketplace, however that may look like in the future, must define what a node may look like. What if the node is more efficient to generate all my power (goes against the current framework). If marketplace doesn't shift in that environment, much of current framework fits the current model. Don't want to own grid, want capability at my node. There is difficulty in having this discussion. So far, operating from existing perspective, there is not enough generation capacity in any individual node. We are dependent upon grid for primary power. If that shifts, a lot of what we are talking about goes out the window.
  - When that happens (it is coming) a whole new dynamic will be created when power of grid is not to delivery energy to me, but to share it.
  - Microgrids, rooftops, plug in car suddenly transitions into a power movement management business, rather than power generation and distribution business.
- Whoever manages the network has responsibility of maintaining network, which looks more like the internet than traditional power network.