

## **Smart Grid in Rural America**

*by Steve Pullins, Team Leader, DOE/NETL Modern Grid Strategy*

About two years ago Pat Hoffman and Eric Lightner of DOE, Steve Bossart of DOE/NETL, and I had a discussion about whether the DOE solicitations around integration of distributed systems favor large utility versus small utility participation. It was discussed as a concern because of the risk in developing an energy technology (ET) that favors one group over another. There is a lot of talk and PR on what the “big guys” are doing but what about the value to rural America? Is a Smart Grid only for the big guys?

### **Checking Our Pulse**

Is rural America (electrification) sufficiently different from urban or suburban America to make a Smart Grid not valuable to them? If there is value, how can it be cost-effectively applied with such long distances and low customer density?

Does the rural customer warrant a different level of electric service, e.g. reliability, price, and security, because of their rural location?

Typically, when we talk about the benefits and technologies of a Smart Grid it is in relation to managing load pockets, peak demand, and speedy outage recovery of large blocks of customers. All this drives us to think more urban than rural. Typically, the Smart Grid conversation goes like this: “There will be 5 or 10% in our service territory where it just won’t make sense [incremental costs] to implement this new technology.” Those 5 or 10% being discussed are always rural customers.

Do rural customers experience more and/or longer outages than their urban counterparts? Do rural customers pay less on average than urban customers?

We don’t have sufficient data in our industry to conclusively show whether rural or urban outage frequency is higher. But we do know that rural outage duration is higher because of the longer travel distances for utility staff to get to the problem area. Thus, a Smart Grid technology or process that reduces the frequency and duration of outages in rural areas would be valuable to the utility and customer alike.

Paying for the electric service is an interesting question. In the U.S., more rural states pay less for electricity than more urban ones. But on closer examination, within a utility there is no differentiation in rates between rural and urban areas. So, it must be that the utility cost of delivery must follow the same rule; there is no differentiation in costs between rural and urban areas. If this is true, then a Smart Grid business case in a rural area should be just as compelling as that we find in an urban area. If this is not true, then one group is subsidizing the other group under today’s utility model (same rates rural and urban).

If we check our thinking on this, we see that the cost of lines and poles is greater in rural areas but not so for the rest of the infrastructure. Also, we see in urban areas that right-of-way costs and property costs are higher than in rural areas, but we need less right-of-way (length) in the urban areas. So, maybe it is true that a Smart Grid business case applies similarly in rural America.

### **What Does This Mean for Rural Electric?**

I sometimes hear that “small utilities cannot afford a Smart Grid.” But, we really don’t have hard data in the U.S. to support or refute this statement. From the argument above, being rural

may not be a factor in the benefit-to-cost ratio for a business case. This suggests that the next step should be to determine if being rural makes a difference in the business case. Based on past experience, maybe the Rural Utilities Services (RUS) within the U.S. Department of Agriculture has some insights here.

Another interesting part of the discussion is about rewarding rural America for allowing transmission systems to pass through their lands to reach urban areas which gives these urban areas access to lower cost electricity. How does this factor into the business case?

Maybe the true question is not whether a small utility can afford a Smart Grid, but whether or not that utility can gain access to investment capital for infrastructure, smart or not. Today, with the financial troubles in the nation, that's an entirely different problem.

### **Do We Need To Do Something Different?**

I don't think so.

In the end, it will be the business case on a utility by utility basis as to whether or not any infrastructure, smart or not, is deployed in rural or urban areas. Technology selection will take place with due consideration for locational variables because it is business case driven within a utility. We simply need to do a proper, complete business case determination making sure that we collect all the costs and system, consumer, and societal benefits for a total cost of ownership (TCO), total benefit of ownership (TBO) picture.

Next month, we will take a look at the "Utility of the Near-Future".

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