Panelist Comments
Technology Session 1: Power Delivery Infrastructure

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Flora Flygt, Strategic Planning & Policy Advisor, American Transmission Co.

1. Wind load shapes – I know that NREL has extensive information for 2006 but that is the only year. We need to replicate that effort for at least a couple more years and at different meter heights given the technological advances. We need to do this particularly because 2006 was a very odd wind year and studies using this information (because it is the only information available at the granular level that is needed) are depending on that and also because of the variability of the wind from year to year (e.g., MISO showed wind availability at the peak ranging from 0% to 67% depending on the year). After we collect a couple of full years, if the cost is prohibitive, a sampling methodology should be developed that could be used to expand and update the data set.
2. Wind forecasting – both short term (Day Ahead) and long term. For the short term we need better weather forecasting tools. For the long term we need a model/approach that enables people to cover a multiple set of possible outcomes efficiently.
3. How to model distributed resources in the future – the reality is outstripping the research on this. We need a study of what could happen in 2030 for instance with expanded smart grid applications and automated controls – what might the price and performance of DR look like under that scenario?
4. Power flow models or methodologies that can handle the much larger data sets that are needed to do interconnection wide planning. Right now the models run for days and we need to develop models that will substantially mimic the performance of the smaller models but run efficiently. This is especially true for long term planning studies where you need to be able to do a lot of scenarios and sensitivities to inform the discussion.
5. Value of transmission – we need to have research and discussion on what values from transmission can be monetized. This is a more in the market area rather than pure engineering but it requires the intersection of financial and market analysts, economists and engineers. This is more broad brush but we need to be able to talk about and agree on the value this is going to bring to everyone or we won't be able to use all the great technological fixes we are coming up with.
6. Development and use of scenarios and sensitivities for long term transmission planning and how to use results to make decisions. Again, this is more broad brush but my experience is that people don't understand different techniques and perhaps are not used to using this type of approach to do transmission planning (because it is already so complicated) and there are so many different types of analyses that should be done. Those include economic analysis for many different variables that could be monetized, and the many different types of reliability analysis, e.g., steady state, dynamics, etc. Again this would require the intersection of financial and market analysts, economists and engineers.

Jim McCalley, Iowa State University

1. What are the best ways to identify preferred generation portfolios, and how much should we utilize policy-driven incentive mechanisms to achieve them?
2. Should generation build-out lead transmission development, or should we design and build transmission to facilitate the generation portfolio we desire to obtain?
3. What are the engineering methods and procedures for developing attractive designs in terms of topologies, technologies, and right-of-way usage for high-capacity interregional transmission?
4. How would a high-capacity interregional transmission network change grid operations?
5. What is the best technology portfolio (ICE, PHEV, CNG, metro-rail, high-speed rail) and fuel portfolio (petroleum, electric, natural gas, and biofuels) for future passenger transportation systems?
    a. What impact does electric systems design have on the answer to this question?
    b. How much impact will the answer to this question have on electric systems design?
6. How can we, in future infrastructure designs, most effectively utilize the strengths of both distributed generation/microgrids and centralized generation/high capacity transmission?

Robert Saint, Principal Engineer, National Rural Electric Cooperative Association

Future Grid Challenges from the Distribution Operations Perspective

1. Interoperability
    - More data, more systems that need to interoperate (Distribution SCADA, Outage Management Systems (OMS), Real-Time Consumer Meter Data, Geographic Information Systems (GIS), Automated Vehicle Location (AVL), Work Force Management, Customer Information Systems (CIS), etc.)
    - Communication to Consumers/Consumer Owned Systems (outage notification, pre-pay notification, demand response/control communication)
2. Interconnected sources/loads
    - Distributed Generation (much of it variable output)
    - Distributed Energy Storage
    - Demand Response
        - Variable Pricing
        - Prices to devices
        - Direct Control (both local control and control by the distribution utility)
    - Micro-grids (most with interconnection to grid as backup)
3. Power Quality/Reliability issues
    - Overcoming the perception that dispersed generation brings better reliability
    - Dealing with large fluctuations in source/load
    - Dealing with increased levels of harmonics

Peter Sauer, University of Illinois at Urbana/Champaign

1. What features should the power delivery infrastructure have?
2. Advanced communication networks need to be integrated with the power delivery network functionality.
3. What is the business case (business plan) for the delivery system?
4. What is better - distributed or centralized storage?
5. What voltages and frequencies should we use?
6. What other business opportunities could be coupled with electric power delivery?