BEFORE THE
DEPARTMENT OF ENERGY

QUADRENNIAL TECHNOLOGY REVIEW FRAMING DOCUMENT

COMMENTS OF THE

AMERICAN ELECTRIC POWER SERVICE CORPORATION

INTRODUCTION

AEP is a multistate vertically integrated electric utility holding company providing electric service at retail and wholesale in eleven states. AEP owns and operates about 80 generating stations in the United States, with a capacity of approximately 38,000 megawatts. System wide, there are approximately 39,000 circuit miles of transmission lines and more than 214,000 miles of overhead and underground distribution lines. AEP companies participate as transmission owners in the PJM and Southwest Power Pool RTOs and in ERCOT.

AEP has successfully maintained low energy costs for its customers and is embarking on some of the largest transmission and generation infrastructure development endeavors in the country.

GENERAL COMMENTS

In general, AEP supports DOE's mission ''[t]o facilitate the invention, refinement, and early deployment of meaningful technologies that enable options for scaling by the private sector toward national energy goals." As a DOE partner in the AEP Ohio Smart Grid Demonstration and Mountaineer Carbon Capture and Storage projects, funded in part through American Recovery and Reinvestment Act (ARRA) grants, AEP is keenly aware of DOE's support for development and deployment of emerging technologies in partnership with industry. Without DOE's support, many promising technologies would never receive the funding required to move from research and development to commercialization.

INTERSTATE TRANSMISSION SYSTEM

There is an urgent need for new transmission, especially bulk interstate transmission to be developed offering more capacity, greater reliability and efficiency than lower voltages. A high voltage interstate transmission system would require fewer resources, land, materials and time to develop that a patchwork approach

AEP sees three main areas of technology development for electric transmission:

1. System Control - using synchro-phasor measurements to evaluate system conditions and provide decision support to system operators; linking local controls to more central optimization

assessments

2. Advanced Diagnostics - Detecting equipment and line condition and providing decision support to reduce failures and optimize maintenance effort and cost; thereby improving system reliability and economy

3. Efficient Transmission - energy efficiency, and the application of higher voltage, higher capacity, higher economic efficiency infrastructure; ensuring economy of scale and sustainability in materials, labor, land, siting; the number of projects required for sufficient transmission infrastructure is less when choosing the most appropriate (generally higher) voltage transmission systems; fewer projects mean less environmental and social impact, less cost, less total material, and the prospect of speedier completion of the modernized grid

ADDITIONAL COMMENTS

- Monitoring, modeling and control
  - Algorithms are needed to interpret the data and provide decision support and visualization
  - A missing link in much of this is the telecommunications piece – we need to be able to have the necessary bandwidth, and must a have practical cyber security as needed
- Power electronics must become far more energy efficient and inexpensive
  - Many benefits of power electronics are tempered by their poor energy efficiency – as in converter/inverters for HVDC, SVCs and FACTs devices
- Energy Storage is an extremely valuable development
  - The US should devote heavy resources in the R&D and deployment of storage
  - We should lead the world in large scale energy storage as it is a great means of making the system more efficient and moderating the variability of renewable sources
- Clean energy is a high priority, but not the only one. Energy independence using all available resources is needed
  - Adequate transmission infrastructure is needed for renewable resources

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