



U.S. Department of Energy
1000 Independence Ave., SW
Washington, DC 20585

June 29, 2016

RE: Submission of IEEE Reports in response to the Stakeholder Engagement Process for the Second Installment of the U.S. DOE Quadrennial Energy Review (QER 1.2)

The IEEE (Institute of Electrical and Electronic Engineers) is the world's largest professional organization dedicated to advancing technology for humanity, utilizing synergies among private and public sectors (e.g., utilities, vendors, academia, national labs, regulatory organizations, and other industry participants) to provide unbiased and independent technical leadership to electrical power and energy industry worldwide.

The U.S. government initiated the Quadrennial Energy Review (QER), following a Presidential Memorandum issued in January of 2014. This important effort has been coordinated through the leadership of the U.S. DOE and is divided into multiple installments.

On April 21, 2015, the U.S. DOE QER Task Force released the first installment of the QER entitled, "Energy Transmission, Storage, and Distribution Infrastructure", which examined the Nation's infrastructure for transmission, storage, and distribution, including liquid and natural gas pipelines, the grid, and shared transport such as rail, waterways, and ports.

In early 2016, the U.S. DOE initiated the Public Stakeholder process that started work on the second installment of the QER to be titled "An Integrated Study of the Electricity System." The intent of this second installment is to develop a set of findings and policy recommendations to help guide the modernization of the nation's electric grid and ensure its continued reliability, safety, security, affordability, and environmental performance through 2040.

As part of the U.S. DOE Public Stakeholder process, the IEEE membership would like to submit the following reports.

- "Summary of IEEE Report to DOE QER on Priority Issues" developed by IEEE leadership and members and dated 9/5/2014. This is a summary report consisting of individual summaries for seven key topics, including key findings and recommendations.
- "IEEE Report to DOE QER on Priority Issues" developed by IEEE leadership and members and dated 9/5/2014. This is the full report with detailed information on each of the seven topics.

These IEEE reports were developed following a U.S. DOE request to IEEE to provide insights on a specific set of priority issues. Development of these reports was coordinated by leadership in the IEEE Power and Energy Society (PES) and the IEEE-USA organizations. In turn, the IEEE leadership engaged a large IEEE volunteer community, including IEEE PES Technical Committees. The IEEE responses in these reports are based on work by IEEE members and other engineering and scientific publications. These reports have been extensively reviewed by the IEEE membership, IEEE PES Technical Committees, representatives from various industry organizations, utilities, RTOs, academia, and private companies.

These IEEE reports contain the following sections that address DOE QER topics:

1. Effects of renewable intermittency on the electric power grid and the potential role of storage in addressing these effects
2. Utility and other energy company business case issues related to microgrids and distributed generation (DG), including rooftop photovoltaics
3. The technical implications for the grid (bulk and local distribution) of electric vehicle (EV) integration - and the timing you see as necessary to avoid having the grid status slow down any potential progress
4. The implications and importance of aging infrastructure and the options for addressing these challenges, including asset management
5. Recommendations for metrics for addressing Smart Grid issues, especially to help policy makers determine the importance and necessity of protocols
6. Skilled workforce issues
7. Report cards on the condition and performance of the electric grid (this was a lower priority topic not to be addressed in detail, at this time).

On February 4, 2016 the DOE issued a document titled, “QER 1.2: An Integrated Study of the U.S. Electric System” as part of the Stakeholder Engagement Process for QER 1.2. This DOE document includes a set of Framing Questions that are intended to help provide guidance to Stakeholders that are providing responses during the Stakeholder Engagement Process. The table below titled “Cross Reference of IEEE Reports to DOE Framing Questions” shows a cross reference between the 14 DOE Framing Questions and Sections 1 through Sections 7 of the IEEE Reports. While the IEEE Reports can serve as stand-alone documents in response to QER 1.2 this cross-reference may serve as an aid in further matching IEEE insights to particular areas of DOE interest.

Cross Reference of IEEE Reports to DOE Framing Questions

<div style="border: 1px solid black; padding: 5px; display: inline-block;">DOE QER 1.2 Framing Questions</div>	Generation Portfolio, Reliability, Supply Chains, and Equity	Distributed Energy Resources (DER): Demand Response, Distributed Generation and Distributed Energy Storage	Grid Operations and Planning	Electricity Consumption and Energy Efficiency by Sector (residential, commercial, industrial, transportation) Status, Trends and Barriers	Electricity Markets	Electricity Finance	Electricity Valuation	Innovation and Technology	Jurisdiction and Regulations	Environment	Resilience	Physical and Cyber Security	North American Integration	Employment and Workforce Development
<div style="border: 1px solid black; padding: 5px; display: inline-block;">IEEE Summary Report Sections</div>														
1. Effects of Renewable Intermittency on the Electric Power Grid and the Role of Storage	✓	✓	✓				✓	✓	✓					
2. Utility and other energy company business case issues related to microgrids and DG, especially rooftop photovoltaics	✓	✓	✓		✓	✓	✓	✓	✓	✓				
3. The technical implications of EV integration for the Grid, Bulk and Local Distribution	✓	✓	✓					✓		✓			✓	
4. Asset Management Challenges and Options, including the Implications and Importance of Aging Infrastructure	✓		✓					✓	✓		✓	✓	✓	
5. Recommendations for metrics for addressing Smart Grid issues including the Importance and Necessity of Protocols	✓	✓	✓	✓	✓		✓		✓	✓	✓	✓		
6. Skilled Workforce Issues														✓
7. Report Cards on the Condition & Performance of the Electric Grid												✓		

The IEEE leadership and membership has been active during all phases of QER development as well as in assisting in the execution of key initiatives, such as protocol standards. The IEEE appreciates the opportunity to submit information as part of the QER 1.2 Stakeholder Engagement Process. The IEEE is looking forward to continued involvement and participation in all aspects the DOE QER.

The IEEE leadership looks forward to continued dialogue and interaction with the DOE in supporting the many challenges facing our nation. Our pledge is to continue providing unbiased and independent technical leadership to the electrical power and energy industry worldwide

Sincerely,

Damir Novosel, President
IEEE Power & Energy Society

Veronika Rabl, Co-Chair
IEEE-USA Energy Policy Committee

CC:

- Dr. Ernest Moniz, United States Secretary of Energy, U.S. Department of Energy
- Melanie Kenderdine, Director of the Office of Energy Policy and Systems Analysis, U.S. Department of Energy
- Karen Wayland, Deputy Director for State and Local Cooperation, U.S. Department of Energy
- William Hederman, Deputy Director for Systems Integration & Senior Advisor to the Secretary, U.S. Department of Energy
- James A. Jefferies, President, IEEE-USA
- Patrick Ryan, Executive Director, IEEE Power & Energy Society
- Saifur Rahman, President-Elect, IEEE Power & Energy Society
- Thomas Pierpoint, IEEE PES QER Working Team, IEEE Power & Energy Society

Attachments to this letter:

- "Summary of IEEE Report to DOE QER on Priority Issues" dated 9/5/2014
- "IEEE Report to DOE QER on Priority Issues" dated 9/5/2014.

About IEEE

IEEE, a large, global technical professional organization, is dedicated to advancing technology for the benefit of humanity. Through its highly cited publications, conferences, technology standards, and professional and educational activities, IEEE is the trusted voice on a wide variety of areas ranging from aerospace systems, computers and telecommunications to biomedical engineering, electric power and consumer electronics. Learn more at www.ieee.org.