



MITSUBISHI ELECTRIC POWER PRODUCTS, INC.
THORN HILL INDUSTRIAL PARK
530 KEYSTONE DRIVE
WARRENDALE, PA 15086-7538 U.S.A.

Phone: (724) 772-2555 Fax: (724) 778-5146
Home Page: www.meppi.com

February 21, 2014

The Honorable Ernest Moniz
Secretary of Energy
U.S. Department of Energy
1000 Independence Ave., SW
Washington, DC 20585

Dear Secretary Moniz:

Mitsubishi Electric Power Products, Inc. ('Mitsubishi Electric') welcomes President Obama's decision to establish a Quadrennial Energy Review and is pleased that the initial phase of the QER will focus on America's energy delivery infrastructure. We see great value in the first phase of the QER as a process for developing an actionable energy roadmap. As a U.S.-based manufacturer of critical energy solutions, we offer our assistance to the Task Force as the QER process moves forward.

Mitsubishi Electric has dedicated substantial resources to the continuing transformation of domestic energy supply and the challenges of integrating renewable energy into the grid. Collaborations with our global headquarters in Japan and academic institutions such as the University of Pittsburgh have led to significant advances in power electronics technologies that improve grid capacity, control, and reliability.

Meanwhile, increasing cyber and physical risks have emerged that threaten the overall security and integrity of the power grid. Mitsubishi Electric is working internally and with other

stakeholders to enhance protection of critical grid assets such as large power transformers from both natural and man-made threats.

Mitsubishi Electric offers the following comments related to the important role of power electronics in a changing energy landscape and the need to adequately address electric grid vulnerabilities.

As the Task Force moves forward in its planning, we would appreciate the opportunity to meet and further discuss new grid technology solutions and security challenges affecting grid infrastructure.

About Mitsubishi Electric

For over 25 years, Mitsubishi Electric has provided generation, transmission, and distribution system solutions to leading utilities throughout North America. Mitsubishi Electric has factories in Pennsylvania and Tennessee.

Our Pittsburgh-area facility produces a range of electricity and transportation-related products including high-voltage circuit breakers, gas insulated substations, and rail propulsion systems. In 2013, Mitsubishi Electric opened a factory in Memphis that is manufacturing the largest sized transformers in the US market. Our sister factory in Japan has produced transformers since 1910 and we are pleased to bring this expertise to the U.S. with a Tennessee-based workforce.

On a global basis, Mitsubishi Electric Corporation produces a diverse line of environmentally sustainable technologies including solar panels, smart grid and energy management solutions, power electronics, and satellites that monitor greenhouse gas concentrations. Worldwide, Mitsubishi Electric companies employ over 120,000 people.

Power Electronics Technologies

Recognizing that there are challenges to the permitting and constructing of new transmission lines, power electronics technology is becoming an important tool for bridging the gap between

demand and existing capacity of the grid. The opportunities for beneficial deployment of power electronics have become more widespread given the influx of large-scale wind/solar generation, the rapid decommissioning of fossil-based plants, and the low-environmental impact of these technologies. Mitsubishi Electric is making substantial investments in further developing innovative power electronics technologies.

Technically known as Static Var Compensators (SVCs), High Voltage Direct Current (HVDC) and Flexible AC Transmission Systems (FACTS), power electronics technologies enable the grid to operate at optimal capacity and control.

Power electronics technologies deliver the following benefits:

- **Increased System Capacity:** power electronics provide increased system capacity on the grid by allowing maximum operational efficiency of existing transmission lines. More power can be transmitted more efficiently over long distances by applying power electronics technologies. The capacity of existing grid infrastructure can be increased by up to 40% in select locations through strategic power electronics deployment.
- **Seamless Renewable Power Integration:** due to the intermittent nature of wind/solar power, increased interconnection of such renewable resources present grid management challenges. Power electronics allow seamless interconnections to the transmission system for renewables and allow transmission over longer distances while providing needed voltage control and stability.
- **Enhanced System Controllability:** FACTS and HVDC enable improved system controllability by building “intelligence” into the transmission network via the ability to instantaneously respond to system disturbances and redirect power flows.
- **Fiscally & Environmentally Sound Investments:** in some cases, adding power electronics technologies is a quicker and less expensive option for upgrading transmission system

infrastructure than siting and building new transmission lines. Most power electronics projects are implemented at existing substations.

- **Improved Options for New Transmission Line Infrastructure:** for long distance transmission in excess of 200 – 300 km, HVDC can be more operationally efficient and less expensive when compared to traditional AC lines.

In addition, Mitsubishi Electric is developing next generation HVDC / Power Electronics for the movement and control of bulk power, vacuum technology for higher voltage breakers including DC, reduced maintenance or no maintenance equipment, smart and secure power equipment and control schemes.

Given the operational and environmental advantages that power electronics provide, regulatory policies should be structured to establish an environment that encourages greater deployment of these innovative yet evolving technologies.

Protecting Critical Grid Assets

The risk of geomagnetic disturbances (GMD) and solar storms is expected to increase over the next two years. At the same time, cyber and physical threats to critical grid assets such as large power transformers have increased as evidenced by the 2013 attack on the Metcalf substation in San Jose that severely damaged 17 transformers.

Government and industry have raised legitimate concerns regarding the readiness of the U.S. to respond to a major attack on critical grid infrastructure that could have substantial impact on the overall economy and energy security. While some progress has been made to adequately prepare and respond to a significant incident, Mitsubishi Electric believes that additional dialogue between government and industry is necessary to sufficiently anticipate and respond to this threat.

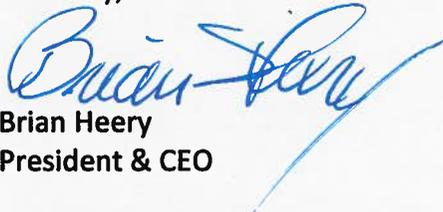
Mitsubishi Electric has introduced advanced transformer technology concepts to our utility partners intended to advance the progress that has been achieved and further mitigate the risk posed by any future strike on the electricity grid.

In addition to our long history of building transformers, we believe that the strategic location of our new large power transformer factory in Memphis is an important factor in the ability of the US to respond to a significant incident affecting the electricity grid. Built in 2013 and situated on over 100 acres with direct access to water and rail transportation, our Memphis factory is well-positioned to ship transformers of up to 500T on a significantly enhanced timetable.

Conclusion

Mitsubishi Electric appreciates the opportunity to provide these comments to the Quadrennial Energy Review and offers our full support to the work of the Task Force. We would welcome the opportunity to meet and further discuss the initiatives outlined in this letter. We would also be pleased to invite you and other QER Task Force participants to visit our Pittsburgh headquarters or Memphis large power transformer factory.

Sincerely,



Brian Heery
President & CEO

CC: Melanie Kenderdine
Karen Wayland