



Written Testimony of
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Before the
Senate Committee on Energy and Natural Resources
“Smart Grid Initiatives and Technologies”

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PRESIDENT, NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION

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Good morning, Mr. Chairman and members of the committee.

On behalf of the over four hundred NEMA member manufacturers, thank you for the invitation to speak. I would also like to thank Commissioner Kelly and Chairman Wellinghoff of the Federal Energy Regulatory Commission for inviting us to host a grid technology demonstration day in April. Our companies represent the full spectrum of the grid, from transformers and switchgear to thermostats and advanced meters, with a burgeoning energy storage section. Research and innovation is a constant driver in our companies, and for now, the world still looks to the U.S. for energy innovations. However, uncertainty on standards obstructs adoption of many beneficial technologies and threatens our technology leadership position. I will speak on the current obstacles to and proposals for accelerating smart grid implementation.

Historically, utilities – NEMA member customers – have made piecemeal investments, often resulting in customized solutions. And in certain instances, manufacturers responded with proprietary systems. The regulators' objective has been to ensure just and reasonable cost, and until recently, standardized systems was not a major cost factor. The grid of the 1900's was designed for one purpose – to let electricity flow downstream from nearby generators to our homes, offices, and factories.

Today, we need the grid to do more. Our computers need reliable power; our climate policy requires green generation; we want to charge our cars with domestic electrons. Grids that were set up for steady one-way power flow must now become more nimble and adaptable, which

requires more communication among devices. Common sense suggests common languages simplify complex systems.

In the 2007 Energy Independence and Security Act, Congress recognized the need for interoperability standards and entrusted the National Institute of Standards and Technology (NIST) with coordinating this critical task. Congress also named NEMA to assist NIST in this work.¹

Smart thermostats are an example of a device whose adoption today is hampered by the lack of standards. A user-friendly smart thermostat could intelligently talk to the utility to minimize your electric bill, maximize comfort, or both. These devices are available today and are incorporated into many demand response pilot programs, but do not necessarily communicate using the same protocols. We need national standards so that a thermostat or any equipment made for San Francisco will also work in Syracuse.

The lack of adequate grid standards has already cost our nation dearly. After the 2003 blackout, a major obstacle to decoding the data was to determine if 2:00pm recorded on one device meant 2:01pm on another. Recommendation 24 from the blackout report notes that piecing together the events from the numerous logging devices would have been “significantly faster and easier” if the devices were synchronized. A standard for time synchronization would have shaved months of data analysis, and we may have even had enough data to prevent the grid’s problems from cascading across the country.²

Before we can create a common language, we must assemble a common alphabet. On the grid, this alphabet includes time, location, and measurement. We need agreement on how we will time stamp events and commands, as we learned from the 2003 blackout. We need a standard for locating devices and disturbances, both geographically and electrically. Finally, we need to agree on how to record current and voltage – these are the fundamental measurements of electrical power.

¹ PL 110-140 s. 1305

² US-Canada Power System Outage Task Force, “Final Report on the August 14, 2003 Blackout in the United States and Canada,” April 2004

For each of these areas, we can build on existing efforts. NIST, of course, maintains the official time for the United States. We already have widely-used standards for geographic information systems. And NIST and the Department of Energy (DOE) are working on the standards for sensors on the transmission system.³ For a smart grid framework, we as the industry need agreement to adapt or adopt existing methods for use on the entire electric system, from the plant to the plug.

Once we have agreement on a fundamental alphabet, we can begin the process of harmonizing the languages. For example, once we have agreement on time precision and accuracy, we will need to revise substations or meter protocols to be readily interpretable to and from a common framework. Each further revision will lead to systems that require less and less customization.

As DOE Secretary Chu has alluded, one way to get industry agreement is to lock the experts in a room until the right answer emerges. NEMA has extensive experience in accelerating standards for urgent needs. We administer more than 50 U.S. Technical Advisory Groups and hold 6 secretariats for the International Electrotechnical Commission. We have over 240 ANSI-approved standards, including 39 for power equipment products. Today, anyone who uses a wall outlet or a thermostat interacts with NEMA standards.^{4,5}

In the smart grid, NEMA is already at work. Our companies have proposed a “Levels of Intelligence” rating system, which will provide decision makers with an objective measure of the intelligence of the grid.⁶ We are polling our companies on the protocols in use today to draw a map from where we are now to where we want to go. And as directed by Congress, our staff have assisted NIST since day one to get the interoperability framework up and running.

³ North American Syncro Phasor Initiative, materials posted at <http://www.naspi.org/>

⁴ NEMA WD-6, “Dimensional Requirements for Wiring Devices,” revised 2008. Available at <http://www.nema.org/stds/wd6.cfm>.

⁵ NEMA DC-3, “Electrical Wall-Mounted Room Thermostats,” revised 2003. Available at <http://www.nema.org/stds/dc3.cfm>.

⁶ NEMA Emerging Technologies Task Force, “Standardizing the Classification of Intelligence Levels and Performance Of Electricity Supply Chains,” December 2003. Available at <http://www.nema.org/smartgrid>.

The government has stepped in before and recommended that the industry adopt a standard. In the 1960's, there were many competing methods for encoding the alphabet on magnetic and paper tapes. IBM, NCR, and RCA accounted for eight different schemes. One proposal was the American Standard Code for Information Interchange, or ASCII. In 1968, President Lyndon Johnson issued an executive order that directed the federal government to purchase only computers that complied with the ASCII standard "to minimize costly incompatibility."⁷

To establish a similar incentive today, Congress, NIST, or the DOE should direct accredited standards development organizations like NEMA to accelerate the priority standards of time, place, and quantity. Such an effort would be conducted in a consensus-based process, and NIST could then review and "bless" the final outcome. To create a further incentive to get the work done quickly, Congress should condition the release of the 50 percent smart grid matching fund on the development of NIST endorsed standards.⁸

NIST is our navigator, and the industry is ready to row. From traffic signaling to baggage screening, NEMA has developed the standards that enable commerce and demonstrate world leadership in technology adoption. If we want to accelerate our energy policy goals – independence, renewables, reliability – we will need a smart grid. If we get grid standards in place before we start building, we will save time and money.

NEMA and our member companies stand ready to deliver the standards that will make the smart grid a national reality. What we need today is a green light from the government to get the consensus process underway, and assurances that our efforts would be fruitful and adopted.

Thank you very much for the opportunity to testify.

Evan Gaddis

⁷ Lyndon B. Johnson, *Memorandum Approving the Adoption by the Federal Government of a Standard Code for Information Interchange*, March 11, 1968). The American Presidency Project, Accessed 2009-02-27 via Wikipedia. <http://www.presidency.ucsb.edu/ws/index.php?pid=28724>

⁸ The matching fund was codified in PL 110-140 s. 1306 and amended by PL 111-5 s. 7002