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07-23-09

'Smart Grid' & smart people needed to make renewables work

By Jon H. Harsch

In another example of the Obama administration repeating what FDR's New Deal did in the 1930's, a massive upgrade to the nation's electricity system is taking place. In 1935, FDR's Rural Electric Administration (REA) tackled the task of electrifying the nation – a task which began with creating standardized designs for distribution lines, mass production and construction techniques, system protection and wide area distributed power planning. That feat of engineering created the world's largest interconnected machine, now including more than 9,200 electric generating units with more than one million megawatts of generating capacity connected to more than 300,000 miles of transmission lines.

The problem today is that the nation's marvelous electricity system is antiquated. As well, it was specifically designed for one-way delivery, moving electricity from large central power stations to end users. It also lacks storage capacity.

For economic, environmental and national security reasons, the nation and the world are moving ASAP toward renewable energy – which requires a totally redesigned electricity system. To maximize renewable energy's many benefits, the new system must allow electricity to flow freely in all directions so that widely distributed solar, wind, biomass, geothermal, hydro and wave energy sources can feed excess electricity back into the system whenever a barn or warehouse roof, wind turbine or other source is generating more power than needed at that location. Because wind and solar in particular are intermittent power sources with peak generation out of phase with peak demand, there is a need for storage in the form of batteries, air or water pumped storage, or other systems.

To make all that happen, the key is a "Smart Grid." That's why the House Science & Technology Committee's Subcommittee on Energy & Environment held a hearing July 23rd on "Effectively Transforming Our Electric Delivery System to a Smart Grid." Witnesses from the U.S. Department of Energy (DOE), the Federal Energy Regulatory Commission (FERC), the National Institute of Standards and Technology (NIST), Southern California Edison (SCE), electricity management software company GridPoint, equipment manufacturer Cooper Power Systems, and the National Electrical Manufacturers Association (NEMA) spelled out the monumental challenge of designing and building the new electricity system.

The witnesses also explained that $4.5 billion in Recovery Act funding is already hard at work. Federal agencies and private industry are working together on creating hundreds of standards for new interoperable equipment and planning the next steps in creating the nation's new smart grid. The new equipment includes new residential "smart meters" that will enable homeowners to both monitor their usage and sell electricity back into the system. It also includes powerline fault indicators that communicate instantly with utility companies, eliminating the time, expense and longer outages involved when linemen drive from pole to pole looking for orange fault indicators on today's "dumb grid."

Rep. Roscoe Bartlett (R-MD), a renewables expert himself, pointed out that the new Smart Grid also needs to include protection against Electromagnetic Pulse (EMP) attacks which could shut down everything electrical. Paul De Martini, Vice President of Advanced Technology at Southern California Edison, agreed and noted that replacing large transformers knocked out by an EMP attack could take up to three years to replace.

Jeff Ross, Executive Vice President at software developer GridPoint pointed out another problem: programmable thermostats are terrific energy savers but "70 to 80% of consumers don't bother to program their programmable thermostats." Subcommittee Chair Brian Baird (D-WA) offered a low-tech solution: start shipping out thermostats which are pre-programmed with energy-saving default settings.

Testifying in House "Smart Grid" hearing July 23, L to R: Patricia Hoffman for DOE, Suedeen G. Kelly for FERC, Dr. George Arnold for NIST, Paul De Martini for Southern California Edison, Jeff Ross for GridPoint, and Michael A. Stoessl for Cooper Power Systems, and NEMA

To read witness statements or watch a webcast of the Smart Grid hearing, to go: http://science.house.gov/publications/hearings_markups_details.aspx?NewsID=2553

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