

National Legislation for Smart Grid

March 2008

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Recent Legislation of Interest



- Energy Independence and Security Act of 2007 (Public Law 110-140)
- Economic Stimulus Act of 2008 (Public Law 110-185)

EISA 2007



- Signed by President Bush December 19, 2007 (date of enactment)
- Smart Grid Title XIII, sets up Smart Grid Task Force (government) and Advisory Council (other stakeholders). US Department of Energy may revise this to be a smart grid subcommittee of an electricity committee
- Technology development under DOE
- Up to 50% cost sharing for regional demonstration projects under DOE
- Commercial or near commercial smart grid technology deployment eligible for 20% cost sharing grants under DOE
- Development of interoperability standards under National Institute of Standards and Technology to start 60 days after enactment
- States to consider rate recovery for smart grid investments, including stranded assets cost recovery (under Public Utilities Regulatory Policy Act)
- Senate intent is to jump start the smart grid and unify it beneath a national approach breaking down the numerous smart grid 'silos'
- Anticipates climate change legislation



Smart Grid Defined in Terms of Its Functionality

- Increased digital information and control technology
- Dynamic optimization of grid operations and resources
- Develop algorithms for electric transmission software applications
- Identify communications network capacity need to implement smart grid technologies
- R&D on wide area measurement and control
- Investigate advanced grid control room
- Deployment and integration of demand response, demand-side resources, and energy efficiency, including advanced metering infrastructure (AMI) to measure peak load reductions and energy efficiency savings from demand response, distributed generation and electricity storage

Functionality



- Investigate providing ancillary services from DR, DG, storage
- Development of communications and interoperability standards for grid infrastructure and appliances
- Integration of smart appliance and smart devices
- Deployment and integration of energy storage and peak shaving technologies, including plug-in electric hybrid vehicles
- Providing timely information and control options to customers
- Investigate transition to time based electric rates
- Use electric generation to substitute for petroleum in transportation
- With FERC propose PEHV interconnection protocols
- Lowering barriers to adoption of smart grid technology options



Smart Grid Interoperability Framework

- NIST to have primary responsibility for coordinating the framework— protocols and model standards, coordinating with DOE, Smart Grid Task Force and Advisory Council
- Stakeholders called for in legislation: Gridwise Architecture Council; Institute of Electrical and Electronic Engineers; North American Electric Reliability Corporation; National Electrical Manufacturers Association; open to others
- Scope: traditional generation and transmission; distributed resources; consumer appliances for voluntary demand response
- NIST to report on progress one year after enactment
- Federal Energy Regulatory Commission to start a rulemaking on grid interoperability standards and protocols when they think the development is far enough along



20% Grants Program

- To appliance manufacturers for adding smart grid features
- To manufacturers or owners of end use devices, such as motors, for adding smart grid features
- To utilities for smart grid T&D expenses
- To the utility for AMI related smart grid features
- To the user for smart grid software purchases
- To regional grid operators for purchasing smart grid enabled features
- To DG operators other than utilities, smart grid integration expenditures
- In the case of PHEVs, the smart grid functionality (not the battery)
- Other expenses as approved by DOE
- Details of grants program to be described one year from enactment

Standards Activities



- North American Electric Reliability Corporation reliability standards, when do they kick in and what are the consequences?
- American National Standards Institute C12 metering standards C12.22--Protocol Specification for Interfacing to Data Communication Networks
- IEEE-1547 on generator interconnection
- International Electrotechnical Commission 61850--Communication Networks and Systems in Substations, others in IEC for example, appliance controls
- Utility Communication Architecture, 'Open' HAN, Utility AMI, ZigBee, ...
- North American Energy Standards Board—a list of data they believe should be available on customers
- NIST
- National Electrical Manufacturers Association DC-3 Wall Mounted Thermostats?
- Standards: ANSI or IEC model (accredited SDO); published protocol (Distributed Network Protocol); or licensing agreement?

State Driven Requirements



- Title 24 2008 (California energy efficiency buildings code) proposed Programmable Communicating Thermostats for new residential and small commercial construction that must respond to grid emergency and price signals.
- New York and numerous other states have state plans for energy efficiency and demand response, these plans have targets, such as 15% savings by 2015
- A varying requirement from several states is for a 'portal' where customers and others can view usage information; HAN requirements may also vary by state

Issues Needing *National* Resolution



- Interfaces between 'islands of automation'—metering to switchyard, metering to HAN, HAN to appliances, for example
- 'Portal' requirements—the data, who has access to it, how often, what authority does the electricity customer have over it. Is the portal only for data access or it is also for control? If control, too, then the answers to these questions are also needed and they may be different
- What data is needed (and what is the cost/benefit of getting it) for *residential* customers participating in RTO *ancillary* markets? Recognize that an C&I meter solution may be an answer, but the cost would be higher. FERC could possibly help here

Economic Stimulus Act of 2008 (Public Law 110-185)



- Signed by President Bush February 13, 2008 (date of enactment)
- Provides a 50% first year bonus depreciation for business assets 'placed in service' in 2008 and for 'long lived property' 2009, as well
- Binding contract purchasing property must be signed during 2008
- ESA 2008 is based on the economic stimulus bill passed after 9-11 and works in a similar way, many utilities took advantage of the earlier act and should understand how ESA 2008 works
- The 50% depreciation dramatically increases the net present value, which is typically used for assessing utility investments.
- *As for any tax provision, utilities should consult their own tax experts before taking this deduction. Utilities have special provisions that are typically more flexible than other industries for 'placed in service' dates*

How It Works



- Applies to assets with a tax life of 20 years or less
- Distribution assets have a tax life of 20 years
- Long-lived property (as defined in ESA 2008) has a tax life of over 10 years, so AMI hardware would be eligible for the second year of bonus depreciation (2009).
- The shorter life property (such as software) would still be eligible for 50% bonus depreciation, but would have to be 'placed in service' in 2008 for the bonus
- The tax 'basis' is reduced by the 50% and the remaining asset value is depreciated the first and remaining tax years in accordance with the existing Internal Revenue Service rules

What's Elster Doing?



- The largest utility metering company in the world based on 2006 sales
- Offers AMI for electricity, gas, and water that operates with numerous other vendors' communications and data management systems
- 900,000 AMI meters in place in Canada, 400,000 in the USA, 50,000 in Latin America
- With partners offering compatible:
 - In home displays
 - 'PCTs'
 - Load control switches
 - Switchgear with metering
 - Transformer monitoring
 - Voltage and current sensing
- Elster has established the Advanced Grid Infrastructure initiative to foster collaboration on additional applications
- We are advocating North American developed AMI solutions in other world markets