



The Energy Policy Act of 2005:
Its impact on reliability, on electricity markets and
the role of the IEEE Energy Policy Committee

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Part 1

Key Provisions of the
Comprehensive Energy Bill





Key Provisions of the Comprehensive Energy Bill

➤ Benefits for Traditional and Alternative Fuel Sources

- \$14.6 billion in tax credits for nuclear, oil, gas, coal, and renewable industries
 - Of that, \$9 billion for energy infrastructure
- Calls for DOE inventory study on renewable energy resources focusing on surrounding terrain, population and load centers, nearby infrastructure, and barriers to providing adequate transmission





Key Provisions of the Comprehensive Energy Bill

➤ Nuclear Energy

- Extends through 2025 the Price-Anderson Act, which caps the industry's liability for catastrophic accidents
- Calls for DOE study on the cost, environmental impact, and security threat for a permanent disposal facility for nuclear waste



➤ Daylight Savings

- Extends daylight-saving time by one month to encourage energy conservation





Key Provisions of the Comprehensive Energy Bill

➤ Alternative Fuels

- Manufacturers of MTBE* receive no protection from lawsuits
- Increase usage of fuel ethanol to 7.5 billion gallons annually by 2012
- 30 percent credit for investments in alternative refueling stations
- \$2,000 credit for purchase of fuel cell and other alternative fuel vehicles



➤ Efficiency Programs Aimed At...

- Increasing efficiency of vehicles, buildings, and industrial processes
- Promoting hybrids, plug-in hybrids, advanced combustion engines, and weight and drag reduction technologies



(* Methyl Tertiary Butyl Ether (MTBE), an additive for unleaded gas.



Part 2

Key Provisions of the Electricity Title

- a. Establishment of Electric Reliability Standards and the ERO
- b. Transmission System Modernization
- c. New PURPA Standards
- d. Market Rules and Merger Reform





Key Provisions of the Electricity Title

➤ Establishment of Electric Reliability Standards and the ERO (Subtitle A)

- Give FERC authority to certify an Electric Reliability Organization (ERO)
- FERC maintains all authority over any ERO
- ERO will establish and enforce FERC-approved electric reliability standards
- FERC is given authority to establish a regional advisory body
- The regional advisory body will provide advice to FERC and the ERO regarding standards and fees





FERC Technical Conferences on ERO

➤ FERC held two Technical Conferences on Implementing ERO


November 18

- Process that the ERO will use in proposing the new mandatory reliability standards
- Regional entities' role in that process, and
- How existing reliability standards can be improved over time.
- EPC member Dr. Richard Wakefield spoke on behalf of IEEE-USA
- Excerpted from IEEE-USA policy paper "*Principles for a Restructured Electric Industry*"


December 9


- Standard development and enforcement processes





How IEEE-USA Helped to Get this Provision Passed


- Member of the "NERC Coalition"
- Reliability Conference in Washington DC in October of 2000
- Over one dozen letters to federal legislators and the Administration dating back to 2000
- Provided testimony before House and Senate Hearings
- Meetings with federal legislators and staff
- Grassroots lobbying effort





Key Provisions of the Electricity Title


- Transmission System Modernization
 - DOE will conduct a study of transmission congestion every three years
 - DOE is given authority to designate "national interest electric transmission corridors"
 - NIETC is defined as "Any geographic area experiencing transmission capacity constraints or congestion that adversely affects consumers."








Key Provisions of the Electricity Title

- Corridors are established based on the:
 - level of electric congestion in the area
 - economic vitality of development of the corridor
 - end markets served by the corridor
 - prices of electricity resulting from any electricity congestion








Key Provisions of the Electricity Title

> Transmission System Modernization continued...

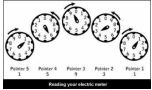
- FERC is given authority to issue permits for the construction of transmission facilities in the corridor
- FERC can only issue a permit if it finds that the state does not have authority to approve the siting of facilities or consider the interstate benefits expected to be achieved by the proposed construction
- Permit holders are given power to acquire the right-of-way of the permit location by the exercise of the right of eminent domain






Key Provisions of the Electricity Title

> New PURPA Standards

- Net metering must be made available to all customers who request it
- Smart metering will be made available only in those states that determine through a study to be appropriate. Smart metering includes:
 - Time-of-use metering
 - Critical peak metering
 - Real time metering
 - or other methods
- Interconnection services will be made available based on "IEEE Standard 1547 for Interconnecting Distributed Resources with Electric Power Systems"








Key Provisions of the Electricity Title

> PURPA Cogeneration Small Power Production Purchase and Sale Requirements:


- Mandatory Purchase and Sale Requirements repealed if the QF has nondiscriminatory access to:
 - Independently administered, auction-based day ahead and real time wholesale markets and
 - Wholesale markets for long-term sales of capacity and electric energy
 - Non-discriminatory transmission and interconnection services
 - Other access requirements
- FERC has the authority to reinstate mandatory purchase obligation if the competitive conditions are no longer met





Key Provisions of the
Electricity Title


> Market Rules and Merger Reform


- PUHCA 1935 is replaced with PUHCA 2005
- FERC authority over any selling, leasing, disposing, merging, consolidating, purchasing, or acquiring of any transmitting, electric, or gas utility having a value in excess of \$10 million





About the IEEE-USA


Part 3
IEEE-USA

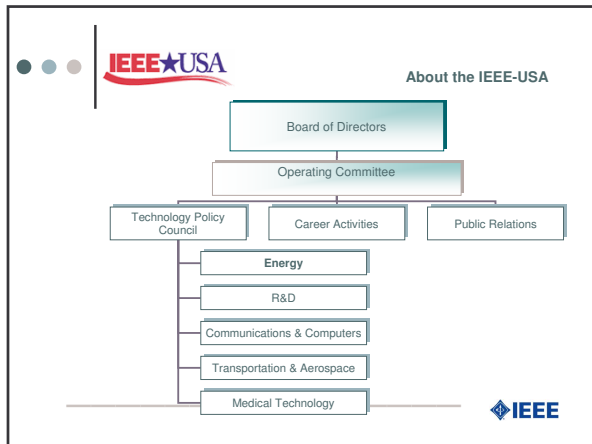





About the IEEE-USA

- IEEE-USA is an organizational unit of the Institute of Electrical and Electronics Engineers, Inc. created in 1973 to support the *careers* and *public policy interests* of IEEE's U.S. members.
- IEEE-USA's mission, as outlined in the IEEE Bylaws, is to recommend policies and implement programs specifically intended to serve and benefit the members, the profession, and the public in the United States in appropriate professional areas of economic, ethical, legislative, social and technology policy concern.





IEEE★USA About the IEEE-USA Energy Policy Committee


- A committee of the Technology Policy Council of the Institute of Electrical and Electronics Engineers-United States of America
- Reports to the IEEE-USA Board of Directors through the IEEE-USA Vice President-Technology Policy Activities (VP-TPA).
- The principal efforts of the EPC are directed toward the *energy* and *environmental* technology policy-related aspects of the activities of the executive and legislative branches of the United States government at all levels.

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IEEE★USA About the IEEE-USA Energy Policy Committee

- Made up mostly of power engineering professionals and professors from across the country
- Expertise in areas such as:
 - Power generation, transmission and distribution
 - Alternative Energy Resources
 - Nuclear Power
 - Power System Reliability
- Chaired by Dr. Fernando Alvarado, University of Wisconsin
 - Vice-Chair Tom Gentile of National Grid - USA

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About the IEEE-USA Energy Policy Committee


IEEE Societies Represented on EPC:

- o Power Engineering Society
- o Reliability Society
- o Power Electronics
- o Nuclear and Plasma Sciences
- o Industrial Electronics
- o Standards Coordinating Committee
- o Dielectrics & Electrical Insulation
- o Circuits & Systems
- o Council on Superconductivity
- o Industry Applications

Agencies with Members on EPC:

- o FERC
- o NERC
- o DOE
- o National Science Foundation
- o California Energy Commission






About the IEEE-USA Energy Policy Committee


Industry Organizations Members on the EPC:

- National Grid
- Dominion Electric
- Georgia Power
- Duke Power
- Con Ed
- KEMA Consulting
- Allegheny Power
- EPRI

Universities with Members on the EPC:


- Carnegie Mellon
- Princeton
- MIT
- University of California Berkeley
- Howard University
- Cornell
- Virginia Tech
- Rutgers
- Florida State University
- University of Wisconsin
- Iowa State University
- PSerc (a consortium)





Energy Policy Committee Position Statements


- Principles for a Restructured Electric Industry
- Advanced Nuclear Power R&D
- Energy Power Reliability Organization
- Fusion Energy Research and Development
- Hybrid Electric Vehicles and Electric Transportation
- Information Security in Electric Power
- Photovoltaic Technology Development
- Standards for Interconnection of Distributed Energy Resources
- Solar and Other Renewable Energy Technologies




 Energy Policy Committee
Web Resources


www.ieeeusa.org
www.ieeeusa.org/volunteers/committees/epc






Part 4
Issues of Concern to IEEE-USA



 Issues of Concern to IEEE-USA

➤ Designation of National Interest Electric Transmission Corridors

- DOE will hear recommendations from interested parties when designating corridors
- Given that the corridors will be determined partially by technical transmission capacity constraints and partially by market considerations, what types of organizations will make recommendations?
- Will the DOE be persuaded by economists or by engineers?





Issues of Concern to IEEE-USA

➤ Energy Efficiency

- Within one year after enactment of the Energy Policy Act, DOE will prepare a 5-year program addressing the following:
 - Advanced energy delivery technologies
 - Energy storage technologies, materials and systems
 - Technologies contributing to significant load reductions
 - Load management and control technologies
 - Development and use of advanced grid design, operation and planning tools, and
 - Supply of electricity to the power grid by small residential-based power generators.
- Opportunity for input from the IEEE-USA





Issues of Concern to IEEE-USA

➤ Development of Advanced Nuclear Power

- Within one year, DOE will submit to congress a report regarding a permanent waste disposal facility along with:
 - An estimate of the cost and a proposed schedule to complete an environmental impact statement and
 - A security threat analysis
- The Energy Policy Act includes no language pertaining to Yucca Mountain
- Opportunity for IEEE-USA input...






Issues of Concern to IEEE-USA

➤ Hybrid-electric Vehicles and Electric Transportation


- DOE will establish a program to improve "plug-in" hybrid and "combination" flexible fuel vehicles
- DOE will provide grants that give preference to proposals that:
 - achieve the greatest reduction in fuel consumption,
 - achieve more than 250 miles per gallon, and
 - have the greatest commercialization potential to the general public within 5 years
- IEEE-USA actively developing a position statement on plug-in hybrids






Issues of Concern to IEEE-USA

> Renewable Energy Technologies

- DOE will publish a report containing a detailed inventory of nation-wide renewable energy resources
- The report will include:
 - identification of any barriers to providing adequate transmission for remote sources of renewable energy resources to current and emerging markets &
 - recommendations for removing or addressing such barriers
- This report must be published within one year, allowing time for input by the IEEE-USA and other interested parties









Issues of Concern to IEEE-USA

President Bush's has called for US "energy independence." To help with this vision, Ken Vought, Section chair of the New York section, has taken the initiative to contact Melvin I. Olken, Editor-in-Chief, IEEE Power & Energy Magazine, IEEE (Scott Grayson), the IEEE-USA (represented by Bill Williams and Russ Lefebvre) and the Energy Policy Committee (represented by yours truly) to look at the possibility of formulating a comprehensive educational program targeted to all levels in support of this objective.


We seek your opinions, your vision and your interest in participating as a group.









Conclusions






Conclusions


- IEEE-USA EPC has focused its recent attention on improving the electric sector reliability in addition to ensuring fuel diversity and interconnection of the electric grid
- The Energy Policy Act calls for the establishment of electric reliability standards, transmission system modernization, new PURPA interconnection standards, and electricity market reform
- Calls for a massive increase in energy efficiency research, development of advanced nuclear power, mainstream deployment of hybrid-electric vehicles and electric transportation technologies, and substantial increases in renewable energy technology research and development
- Many provisions in the Energy Policy Act require completion of a study and submission of a report by FERC or DOE before the provisions can be fully implemented
- IEEE and IEEE-USA are taking advantage of opportunities to input their professional opinions and recommendations in these matters as opportunities arise
- The EPC may increase its public-education activities






Postscript:

The continuing deregulation debate







Background for the discussion


One issue that continues to have a polarizing and paralyzing effect on the committee is whether deregulation of electricity was (is) a good idea or not. The main points of "disagreement" are along the following lines:


- Is deregulation in the best interest of society?
- Is it working?
- What role should engineers have on the deregulation debate?
- What are the ethical issues for engineers?
- What are the legal issues and what role should we have in it?
- Does deregulation affect reliability?
- How do we move forward and retain our effectiveness?





The role of IEEE-USA in early deregulation efforts


- o From the beginning, when deregulation entered the picture, many in EPC would have argued against it, but the EPC took the position that we were not experts in this area and should neither oppose it nor support it.
- o IEEE-USA limited itself to warning Congress and others about pitfalls.
- o The outcome was a sentence in the '91-'92 legislation which allows FERC to place a 'hold' on anything they conclude threatens reliability




The 7 IEEE-USA principles for a deregulated industry

1. Reliability criteria of a single North American reliability organization should be the minimum applied by all systems
2. **Prices of all market products must be established in a manner that provides proper incentives for reliable behavior**
3. [I]ncentives for the effective planning, construction, operation and maintenance of [the] infrastructure should be incorporated into all market structures.
4. Long-term resource adequacy, as reflected by installed reserve margins, are necessary to assure that sufficient supply resources are developed.
 - The extent of reliance on organized forward markets, may [vary].
 - Information about forward commitments must be made available to operators.
 - Reactive power supply adequacy is fundamental.
5. **Compatibility must exist between the regulatory and institutional framework and technical fundamentals.**
6. Policymakers should establish a clear and stable framework for coordination among state and federal regulators.
7. Design of state administered retail rules should facilitate demand response.





Is deregulation in the best interest of society?

← Two viewpoints* →

- o No: deregulation has resulted in higher costs and decreased reliability. The cost of operating a market is huge.

- o Yes: deregulation has resulted in better incentives for cost savings, reliable operation and innovation, and is the best way to ensure a future supply of power

(*) All statements in these slides are either exact quotes or paraphrases of emails that I have received from committee members and others in the course of this discussion and do not necessarily represent my personal view.



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Is it working? If not, who is to blame?

Two viewpoints*

- There may not be enough incentives in place to improve the system for the future.
- There is a vast gulf between finance and economics, which creates a problem.
- [The problem] is that the price bid by the last generator selected sets the price received by all generators irrespective of their bids.
- The problem lies with profiteers who seek to maximize their returns and do not care about the system.

- Platts, 2 Mar '06: According to NY PSC, competition has restrained prices in New York
 - Commercial and industrial users have seen 15% to 18% reductions
 - Wholesale markets are stimulating new supply and transmission
 - Retail competition is flourishing
 - Incentives are needed for plants other than natural gas
 - Transmission developers must be given long-term transmission rights
- "The real bandits are the states and the wires companies. On [my] bill, 51% is for delivery, the energy supplier get 28.5%, and the state gets the remaining 20.5%. Check your bill before you blame the energy companies!"

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Ethical issues

Two viewpoints*

- Engineers should have the best interests of society in mind. They should impose a system that in their view results in lowest cost reliable operation of the electricity system.
- Engineers should have the best interests of society in mind. They should help create an environment that, through traditional American values of free enterprise and competition with minimal government intervention, leads to the lowest cost possible reliable electricity system

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Does deregulation affect reliability?

Two viewpoints*

- Deregulation is partly to blame for the blackout of August 2003
- Unrestrained greed was a big reason for the California meltdown of 2001.
- "no formal agreements for [...] rapid restoration" can result in long restoration times
- Lack of a properly working real time market contributed to the blackout
- Bad market design was to blame for the California meltdown of 2001.
- Market incentives for rapid restoration will be most effective in improving restoration

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Legal issues

← Two viewpoints →

- FP act: "All rates and charges made, demanded, or received by any public utility for or in connection with the transmission or sale of electric energy subject to the jurisdiction of the Commission, and all rules and regulations affecting or pertaining to such rates or charges shall be just and reasonable, and any such rate or charge that is not just and reasonable is hereby declared to be unlawful"
- DoJ: "FERC correctly has concluded that the market price in a competitive market is just and reasonable"
- The wholesale market seems to be doing what it should
- There are major jurisdictional issues
- Regulatory uncertainty has a paralyzing effect on progress

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SUPREME COURT OF THE UNITED STATES

NEW YORK ET AL. v. FERC ET AL.
Argued October 3, 2001—Decided March 4, 2002
Syllabus

1. FERC did not exceed its jurisdiction by including unbundled retail transmissions within the scope of Order No. 888's open access requirements. [...] the FPA unambiguously gives FERC jurisdiction over the "transmission of electric energy in interstate commerce," without regard to whether the transmissions are sold to a reseller or directly to a consumer, FERC's exercise of this power is valid. New York's attempts to discredit this straightforward statutory analysis by reference to the FPA's legislative history are unavailing. [...]
2. FERC's decision not to regulate bundled retail transmissions was a statutorily permissible policy choice. [...]

The vote was 5 to 4, with the 4 dissenting judges dissenting because they thought the ruling *did not go far enough*. In effect, this was a 9 to 0 vote on the issues at hand.

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Why can't we communicate better?

- Economists underestimate the externalities that result from poor market design and the complexity of doing things correctly
- Political figures underestimate difficulties of technology change, the impact of regulatory uncertainty and often wrongly assume that prices can be simply mandated
- Engineers fail to understand items as basic as the impact of "pay as bid" and assume that they can "impose optimality" on society

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● ● ● **IEEE★USA**

How do we best move forward?

← Two viewpoints →

- We try to reverse the clock and re-institute the regulated utility business
- We recognize the relevance of economics and policy making, and try to interject technology opinions to best support the progress of a partially deregulated industry

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Questions?
Comments?
Opinions?
