

FERC Presentation to Wind Energy Science, Engineering and Policy Collaborative at Iowa State University

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Disclaimer

My comments today represent my opinion and do not represent the opinions of the Federal Energy Regulatory Commission or any Commission members

Agenda

- Legislative and policy history of FERC
- Overview of some recent initiatives related to wind

What FERC Does (Electric)

- Regulate the transmission and wholesale sales of electricity in interstate commerce
- Protect the reliability of the high voltage interstate transmission system through mandatory reliability standards
- Monitor energy markets
- Regulate conduct of regulated entities
- Administer accounting and financial reporting regulations

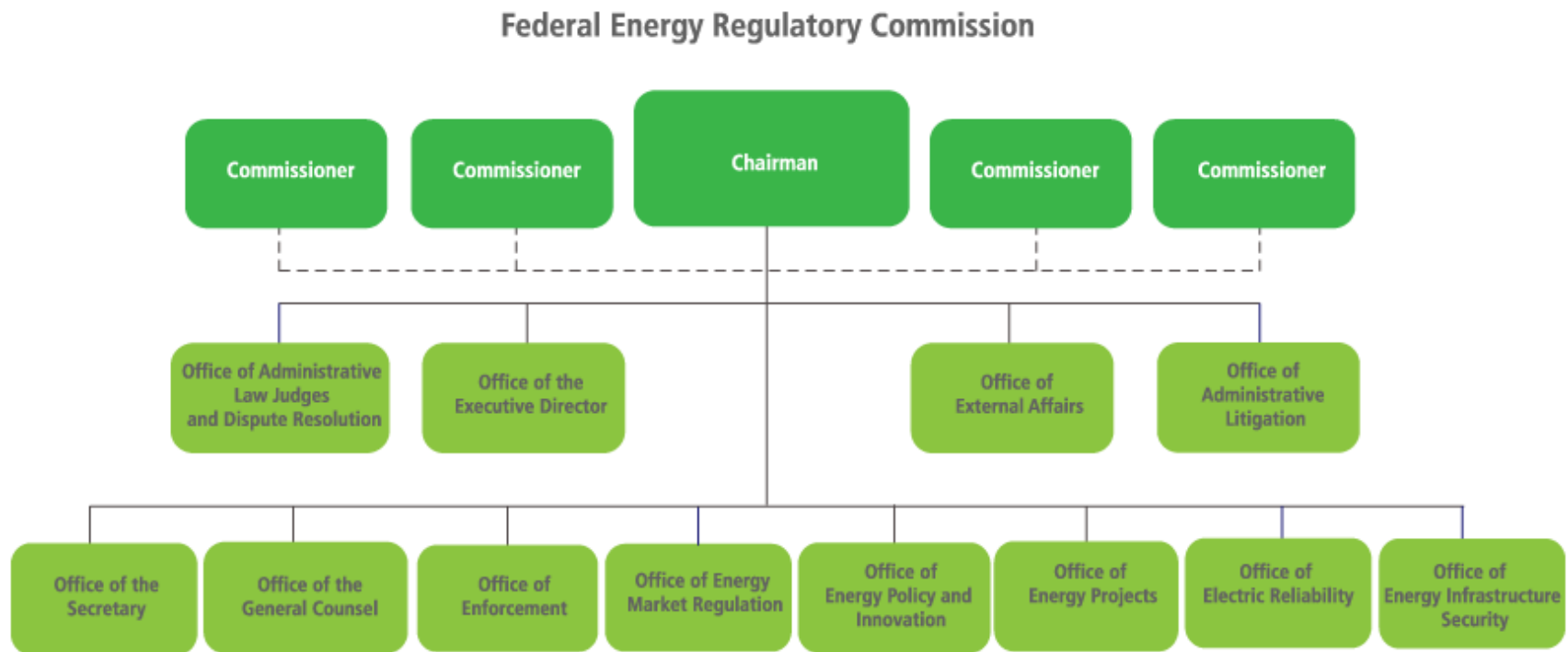
What FERC Does Not Do (Electric)

- Regulate retail electricity sales/distribution
- Approve physical construction of electric generation or (most) transmission
- Regulate municipal power systems, federal marketing agencies (like TVA, Bonneville, etc.) and most rural electric cooperatives
- Regulate the safety or construction of nuclear power plants
- Regulate reliability problems related to local distribution facilities

FERC Structure

- Independent agency
- Five Commissioners appointed by the President and confirmed by the Senate to serve five year terms
- One Commissioner designated as Chairman by President
- Chairman is both a voting Commission member and administrator of a multi-disciplinary professional staff
 - Lawyers
 - Economists
 - Engineers
 - Industry specialists
 - Accountants
 - Support staff

Organization Chart



Selected FERC-Related Statutes

- **Federal Power Act of 1935**
 - Sections 205/206: rates, terms and conditions of transmission and wholesale sale of electricity by public utilities (“just and reasonable”)
 - Sections 210/211: interconnection and wheeling by transmitting utilities
 - Section 215 (added by EAct 2005): certification of the Electric Reliability Organization; review and enforcement of reliability standards applicable to registered entities
- **Public Utility Regulatory Policies Act (PURPA) of 1978**
 - Section 210: obligates utilities to purchase power from qualifying cogeneration (combined heat/power) and small power production (renewable or waste-fired) facilities
 - Some relief from PURPA obligations established in EAct 2005, but purchase obligation remains for many small PURPA facilities, or PURPA facilities in areas not eligible for relief

Brief History of FERC (electricity)

1920

Congress established the Federal Power Commission (FPC) to coordinate hydroelectric projects under federal control

1928

Congress voted to give the FPC funds to permanently hire staff for first time

1930

Congress established a five-member, bipartisan commission to run the FPC.

1935

The Federal Power Act of 1935 gives the FPC the authority to regulate the sale and transportation of electricity

Brief History of FERC (electricity)

1940 to 1967

Various statute amendments and court cases establishing expanded role in regulating electricity

1977

Congress reorganized the FPC as FERC

Through this period (and into the 1990s), electric service is typically sold as a bundled product

- Energy, transmission, and distribution bundled into one product with one price
- Very limited ability for independent entities to either gain access to the transmission system to move power, or to sell power to a utility
- Despite all of this, some early power pools (which resemble centralized markets in some ways) do emerge, even before transmission open access

Brief History of FERC (electricity)

1978

Public Utility Regulatory Policies Act of 1978 (PURPA) establishes, for the first time, clear rights of some independent power producers (so-called “qualifying facilities” or QFs) to sell power to utilities

1992

Energy Policy Act of 1992 gave FERC authority to order open access

Also expanded authority over transmission

Brief History of FERC (electricity)

1996

Landmark Order No. 888 issued, restructuring/unbundling electricity industry

Requires transmission owners to offer nondiscriminatory, comparable transmission service to all qualified customers (“open access” rule) through adoption of a version of a standardized open access transmission tariff

Order No. 888 fosters development of a more robust bilateral power market

Previous wholesale energy sales were mainly between utilities, but now more independent sellers participating

Quasi-market power pools continue to develop

Brief History of FERC (electricity)

1998 - 2007

Commission establishes and modifies standards for market-based regulation of sales of electric energy, capacity, and ancillary services

Previously, such products were regulated on a cost-of-service basis

- Utilities recovered their costs and earned a regulated rate-of-return on generation investments

Under market-based regulation

- Just and reasonable rates are ensured by requiring a demonstration by the utility that the market conditions are competitive and potential market power is mitigated
- Multi-pronged tests for conditions such as vertical market power, horizontal market power, barriers to entry, etc.

Brief History of FERC (electricity)

1999

Landmark Order No. 2000 issued, fostering participation in centralized markets, by establishing guidelines that a transmission entity must meet to qualify as an “RTO” market

Followed by creation of ISO and RTO markets in Southwest (SPP), mid-US (MISO), New York (NYISO), and New England (ISO-NE)

Markets already existed, but continued to develop, in the mid-Atlantic (PJM) and California (CAISO)

2003-2005

Landmark Orders No. 2003 and 2006 issued standardizing rights/procedures for generators interconnecting to the transmission system

Brief History of FERC (electricity)

2007

Order No. 890 issued, adjusting some open access rules previously established in Order No. 888

2011

Order No. 1000 issued, addressing regional transmission planning and cost allocation (see slides below for more details)

2011 to present

Various orders issued addressing issues such as

- Ancillary services (Orders No. 755 and 784)
- Integration of variable energy resources (Order No. 764)
- Small generator interconnection (Order No. 792)
- Priority rights on generator tie lines (Order No. 807)

General Electricity Market Structure Trends

General Electricity Market Trends – 1900s

Except for limited participation in power pools, energy trading in the 1900s was primarily bilateral

- Utilities typically generated much or most of their own energy, except for limited economy purchases
- Purchases were case-by-case, with separate purchased power agreements
- Transmission service had to be arranged specifically for each purchase

General Electricity Market Trends – 2000s

Since roughly 2000, following Orders No. 888 and 2000, trading has trended toward centralized markets

- In the centralized market areas (CAISO, ISO-NE, MISO, NYISO, PJM, SPP), auctions are held every 5 minutes to clear the real-time power market
- Resource dispatch is optimized (minimizing production cost) subject to constraints on resources and the transmission system
- The optimization produces both resource dispatch (primal solution variables) and spot (locational) prices (the shadow prices on local power balance constraints)
- Transactions take place under a general market contract (like trades in a stock exchange), and transmission service is managed as part of the dispatch (no separate transmission service request)
- These market areas also have day-ahead markets, which are used to optimize resource scheduling, and provide a hedging function

Recent Initiatives Related to Wind

Flexible Ramping

- Problem to be solved
 - Planned and unplanned changes in load and generation create resource/load mismatches that must be managed
 - As additional variable energy resources are integrated into the power system, additional challenges in this area are anticipated
 - Such mismatches are addressed (among other things) by dispatchable resources with the ability to change output or “ramp”
 - However, ramp capability is limited
- Proposals related to ramping
 - Various proposals seek to ensure sufficient ramp capability is available when needed
 - Flexible ramping constraint
 - Flexible ramping product
 - Flexible capacity (can’t discuss; CAISO proposal is on rehearing)

Flexible Ramping Constraint

Currently CAISO is the only centralized market to enforce a flexible ramping constraint within its 15-minute real-time market optimization

- Approved in October 2012
- Ensures the dispatch of resources provide sufficient ramping capability for subsequent five-minute real-time dispatch
- In the upward direction only
- Compensation is based on the opportunity cost of the marginal unit that is re-dispatched to provide ramping capability (if re-dispatch occurs)

Flexible Ramping Product

What is it?

- A step beyond the simple flexible ramping constraint discussed on previous slide
- Pre-positions resources during commitment and dispatch to respond to unexpected ramping needs in upward and downward directions
- Product designed to ensure a high confidence that the system can respond to unexpected changes in net load without leaning on regulating reserves

Flexible Ramping Product (cont.)

What is it not

- Operating reserves (i.e., spinning and non-spinning reserves)
 - These are in the upward direction only, while ramping products will be in both the upward and downward directions
- Regulating reserves
 - Ramping products are procured to be used on a longer time scale and do not require automatic generation control

Flexible Ramping Product (cont.)

Pricing

- The ramping product is co-optimized along with energy and other ancillary services
- The quantity of ramp procured is based on market operator forecasts or non-forecasted needs
- If procurement of the quantity set by the market operator causes a re-dispatch of the system, the shadow price sets the price for all units providing ramp
 - The shadow price is equal to highest opportunity cost among the units being held for ramping

Flexible Ramping Product (cont.)

Where is it being used?

- Commission accepted MISO's proposal in 2014
 - MISO's product is for both its day-ahead and real-time markets
 - MISO expects to implement its product in 2016
- CAISO currently developing a product
 - As we understand it, CAISO's product will be for both its day-ahead and real-time markets

Variable Energy Resources (VERs) Integration – Order 764

Issued June 22, 2012

Intra-hourly Scheduling: Requires transmission providers to offer customers the option of scheduling transmission service at 15-minute intervals

Power Production Forecasting: Requires generators using variable energy resources to provide transmission owners with meteorological and operational data to support power production forecasting

Reserve Service Rates: Provides guidance on the development of charges for the generation set aside to manage VER variability

- Charges for generation imbalance charged to generators instead of usual practice of charging to load

Transmission Planning and Cost Allocation – Order 1000

Issued July 21, 2011

Regional planning and cost allocation: required for all public utility transmission providers (though with regional discretion within a set of principles)

Public policy requirements: Includes a provision that requires consideration of transmission development that supports public policy requirements established by state or federal laws or regulations (e.g., renewable portfolio standards)

- This could include planning transmission to bring locationally constrained generation to load and also assigning costs associated with this transmission development

Small Generator Interconnection Procedure (SGIP) and Agreement (SGIA) Reform – Order 792

Issued November 21, 2013

SGIP includes different “tracks” for processing generator interconnection requests

- Full study track
 - Relatively time-consuming and expensive
- Fast track
 - Fast and streamlined
 - Available only for eligible resources
 - Allows approval of interconnection if the request passes a series of technical screens

Order No. 792 largely focused on improving and expanding access to the fast track process

SGIP/SGIA Reform – Order 792 (cont.)

Higher fast track eligibility threshold – For some resources, increased threshold of eligibility from 2 MW to up to 5 MW (depending on system and generator characteristics)

New “supplemental review” – Three additional screens for resources that fail initial screens; if pass all three, can still interconnect via fast track

- Minimum load screen: Aggregate generating capacity on a section (including proposed resource) must be less than 100% of minimum load
- Voltage/power quality screen
- Safety/reliability screen

SGIP/SGIA Reform – Order 792 (cont.)

New “pre-application report” –

- Low cost report available from transmission provider (\$300 default fee)
- Includes all readily available information about interconnection location (without the transmission provider doing any analysis)
- Should help developers identify parts of the grid where integration costs will be low

Changes related to interconnection of storage –

- Clarified definition of Small Generating Facility in the *pro forma* SGIP and SGIA to explicitly include storage devices
- Allows netting of storage/generation to determine threshold capacities for SGIP and/or fast track (with transmission provider agreement)

Generator Tie Lines – Order 807

- Problem to be solved
 - The Commission has historically required open access over generator tie lines, in the same way it requires open access over other transmission
 - Typically this means that a generator owner that gets even a single request for service over its gen tie line would be obligated to develop and file an open access transmission tariff with the Commission
 - However, generation owners could (through a waiver request) reserve excess capacity for its own future user, provided it demonstrated plans and milestones
 - The Commission had processed scores of requests for such waivers, but a third-party has actually requested transmission service in only four instances
 - Generator developers indicated that they needed time at the beginning of their projects, as they brought on various phases of generation, to focus on their core business (generation) and not get burdened with becoming a transmission provider

Generator Tie Lines – Order 807 (cont.)

- Issued March 19, 2015
- Preserves open access while re-balancing burdens and encouraging generation development
- Shifts paradigm for interconnection/transmission service over generator tie lines
 - From: a tariff-based process where generator tie lines are treated much the same as other transmission, where owners have to file a tariff whenever a third party makes a request for service
 - To: a process based on either mutual agreements between parties or Commission authority under sections 210 and 211 to order interconnection and transmission service
- Provides a blanket waiver of the requirement to file an open access transmission tariff (and related requirements) to various entities
 - Many details, but generally must not be involved in owning/administering electric transmission facilities, other than generator tie lines

Generator Tie Lines – Order 807 (cont.)

- Priority rights: In 210/211 context, the Commission will continue to consider it to be in the public interest to grant priority rights to the ICIF owner when such owners can demonstrate that they have specific plans with milestones to use such capacity
- Safe harbor: Establishes a rebuttable presumption, for the first five years after commercial operation, that the owner has plans to use the capacity on its generator tie lines for its own future projects (no demonstration needed)