RTO Insider
Your Eyes and Ears on the Organized Electric Markets
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SPECIAL REPORT: 2016 Year in Review / 2017 Preview

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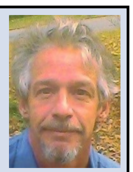

Beginning today, *RTO Insider* will be sending a daily email highlighting our most recent content. The author will be Contributing Editor Ted Caddell, one of our voices on Twitter (the funniest one). Let us know what you think!

Cost Trends Favor Renewables Despite Coming Policy Shifts

By Rich Heidorn Jr.

President-elect Donald Trump may trash the Clean Power Plan and walk away from the Paris Agreement on climate change. Congress may undo the coal mining and fracking regulations the Obama administration issued on its way out the door. Rick Perry may neuter the climate scientists in the Department of Energy.

But while President Obama's energy legacy is uncertain, there appears no reversing the generation shifts that have occurred since his first election in 2008.

Cheap natural gas and the falling cost of solar and wind power are likely to continue driving electric industry investments over the next four years regardless of whether the Trump administration is able to reverse Obama-era federal policies. And as they have in the face of Congressional inaction over climate change, many states will continue their own efforts to reduce carbon emissions.

Renewables produced 17% of electricity generation in the first half of 2016, up from 9% in all of 2008.

Natural gas added 70.1 GW of capacity between 2008 and 2015, 42% of the total, according to a report by the American Public Power Association. Wind was second with almost 56 GW (33%), while solar added 13 GW (7.8%). Coal added 19.1 GW (11.4%) of

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Cost Trends Favor Renewables Despite Coming Policy Shifts

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new capacity but also retired 42.9 GW over that period for a net reduction of 23.8 GW.

New Bosses for Federal Agencies

It's clear that environmentalists will be playing defense for the next four years.

Trump's nominees for cabinet posts, including fellow climate change skeptics Rick Perry as secretary of energy and Oklahoma Attorney General Scott Pruitt as EPA administrator, are certain to face tough questions at their confirmation hearings, but the out-of-power Democrats will be unable to block them by themselves. Because of Democrats' change of the Senate filibuster rule in 2013, Trump will need only a simple majority in the upper house to win approval for any administration position or any judge excluding the Supreme Court — not the 60 votes to end debate as before.

How much Trump's appointees will try to turn back the clock is uncertain. While Perry and Pruitt have joined Trump in rejecting a scientific consensus that carbon emissions are warming the planet, Trump claimed after the election to have an "open mind" on the issue. (See *Trump Sends Conflicting Signals on Climate Change*.)

Perry, who had called for the Energy Department's abolition as a presidential candidate, will be expected by Republicans to sharply reduce its spending, particularly the controversial loan guarantee program. But the department also has supported carbon-capture projects essential to making "clean coal" more than a slogan. And while Perry was a friend to the oil and gas industry as Texas governor, he also presided over the state's transmission buildout to support its wealth of wind power.

FERC

Although FERC has not traditionally been marked by partisan divisions, the agency will be reshaped by Trump's election with Commissioner Norman Bay, a Democrat, likely to lose the chairmanship to a Republican. Commissioner Colette Honorable also is likely be replaced by a Republican after her term expires in June. The five-member commission has been all Democrats since the departures of Republicans Philip Moeller and Tony Clark. The president gets to appoint members of his party to three of the five seats and pick the chairmanship. (See *CPP, FERC's Bay, Honorable Among Losers in Trump Win*.)

Because Republicans maintained their control of the Senate, Sen. Lisa Murkowski (Alaska) will remain chair of the Energy and Natural Resources Committee, the gatekeeper for FERC nominees.

Clean Power Plan

Pruitt is expected to lead the effort to dismantle the Clean Power Plan, though it's uncertain how the new administration will accomplish its goal. (See *CPP, FERC's Bay, Honorable Among Losers in Trump Win*.)

One question is whether the D.C. Circuit Court of Appeals, which heard arguments on legal challenges to the rule in September, will act before Trump is sworn in. (See *Analysis: No Knock Out Blow for Clean Power Plan Foes in Court Arguments*.)

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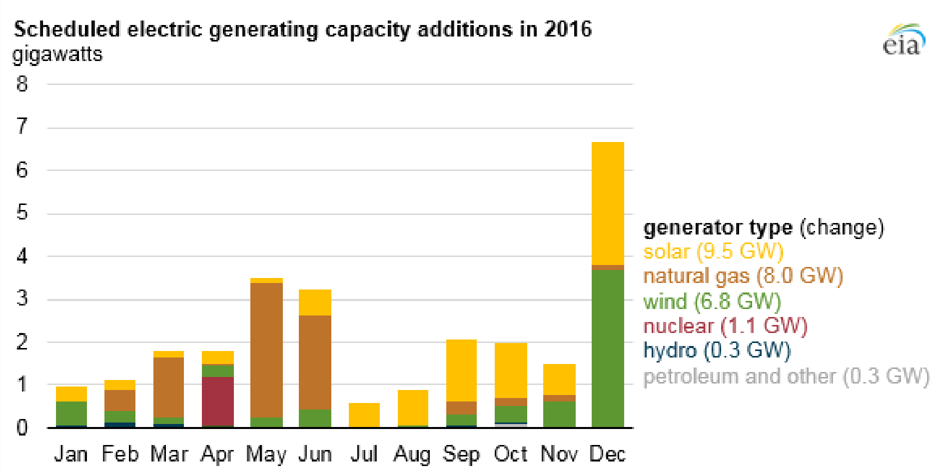


CAISO News

CAISO Expansion in Question as EIM Grows

By Robert Mullin

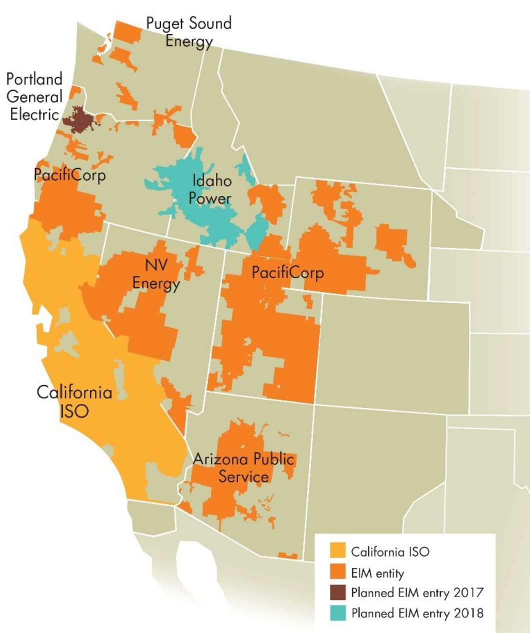
CAISO rang in 2016 with a strong push to expand its operation into PacifiCorp's sprawling six-state service territory, but the project hit a stumbling block by mid-year as skeptics called on the ISO to slow its regionalization effort.

A 2015 state law requires the grid operator and state energy agencies to explore ISO expansion to help California meet its 50% renewable energy mandate.

The ISO last year kicked off a set of initiatives considered to be "central" policy elements of expanding into a region with dozens of balancing areas subject to multiple state and municipal rules.

Those efforts — still ongoing — dealt with the complex and often contentious issues of allocating transmission costs, maintaining adequate regional resources and accounting for greenhouse gas emissions. (See CAISO Refines Cost Allocation Proposal for Expanded BA and CAISO Kicks Off Effort to Track GHGs Under Regionalization.)

But the most challenging initiative was the effort to develop governing principles that would assuage concerns about California dominating the policies and management of a Western RTO.



Energy Imbalance Market | *CAISO*

Particularly contentious is California's requirement that the state's utilities track carbon emissions from generation serving their loads in order to ensure compliance with emissions caps. CAISO's provision of generation data is key to that effort, which means that every generator in an expanded ISO would be subject greenhouse gas reporting requirements in order to track deliveries to California — regardless of whether the unit is located in a coal-heavy state disinclined to impose such a requirement.

When industry participants across the West expressed concerns that an initial governance proposal threatened to compromise the energy policies of "non-California," CAISO returned in July with a revised document that emphasized the preservation of state authority. (See *Governance Plan Fails to Dispel Western RTO Concerns* and *Revised Western RTO Governance Plan Highlights State Authority*.)

By late July, critics within California — fearing the loss of CAISO as an instrument of the state's renewable and emissions goals — were calling for a slowdown in regionalization, saying that the ISO was moving too quickly to get a governance plan to the State Legislature before the end of its summer session. (See *Governance Plan Critics Urge Slowdown of Western RTO Development*.) Gov. Jerry Brown heeded their concerns, directing state agencies to take more time to develop a proposal. (See *Governor Delays CAISO Regionalization Effort*.)

While the ISO plans to submit a governance plan to lawmakers this winter, President-elect Donald Trump's vow to cancel the Clean Power Plan is another roadblock for CAISO-led regionalization. Under the CPP, interior West states such as Utah and Wyoming would confront the requirement of sharply reducing carbon emissions from coal-fired generation, an objective made less costly by access to low- and zero-emission electricity made available through a regional market. With the Trump administration likely to pull the rug from under the CPP, coal-heavy interior West states contemplating an RTO will be less motivated to give ground to California's environmental mandates in order to gain the emissions benefits of membership.

That, in turn, could prevent California legislators from signing off on a governance plan that risks the state's ability to meet its goals.

"California will want to protect its environmental objectives," retiring California Public Utilities Commissioner Mike Florio, a strong supporter of regionalization, told *RTO Insider*.

Ann Rendahl, commissioner with the Washington Utilities and Transportation Commission, said the success of regionalization will depend on how California's lawmakers deal with the governance issue.

"It's really in the hands of California," Rendahl said.

EIM Accelerates Growth

The future looks brighter for the Energy Imbalance Market, the West's only real-time energy market. Unlike in the ISO, members are not required to turn over control of their transmission and generator day-to-day participation is voluntary.

The market last year extended its north-south reach with the integration of Arizona Public Service and Puget Sound Energy, expanding membership to four balancing authority areas, in addition to CAISO. The two utilities began transacting in the market in October after what officials called a largely uneventful implementation. (See *Smooth EIM Transition for Arizona Public Service, Puget Sound Energy*.)

"I've been through three sets of transitions, and I would say that each one is getting smoother," Mark Rothleder, the ISO's vice president of market quality and renewable integration, said during an Oct. 5 meeting of the EIM's governing body.

Another transition is scheduled for October 2017 when Portland General Electric will join the market, the last fall entry before the ISO moves to a spring implementation schedule to avoid overlap with annual market software updates.

The benefits of NV Energy's December 2015 integration into the EIM became evident in early 2016, after CAISO officials observed that the increased transfer capacity between the ISO and PacifiCorp East unified what had previously been a fractured market; California had found a

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CAISO NEWS

FERC OKs New CAISO Load-Serving Entity Definition

By Robert Mullin

FERC approved a CAISO Tariff revision expanding the definition of a "load-serving entity" to include organizations that purchase wholesale electricity to serve their own needs (ER17-218).

The ISO's rules previously recognized as LSEs only those entities that sell electricity or serve load to end users, a description that covers utilities, federal power marketing agencies and community-choice aggregators.

The original definition also made a special provision for the State Water Project (SWP), a California agency that directly engages the wholesale market to cover its own energy requirements. The revision eliminates that subcategory, with SWP now covered under the newly expanded definition.

The ISO sought to broaden the definition to accommodate the San Francisco Bay Area Rapid Transit District (BART), which, like the SWP, serves its own load but did not meet the standard definition of an LSE. (See *CAISO Issues Revised Proposal to Expand LSE Definition*.)

BART's transmission contract rights on Pacific Gas and Electric's network, which predate the existence of the ISO, expire at the end of 2016. When those rights automatically convert to CAISO service, the agency will be exposed to congestion charges.

The definition change will permit BART to receive a free congestion revenue rights allocation in the ISO's annual process in order to hedge the transmission costs of serving its load. The revised Tariff language also makes clear that BART — and any other entity choosing to serve its own load — will be subject to resource adequacy obligations.

"We find that the revised definition is a reasonable approach to encompass entities, such as BART, that are currently excluded but that nonetheless should be considered a load-serving entity, and avoids the need for CAISO to add carve-outs to the definition, as it initially did for State Water Project," the commission said in its Dec. 30 ruling.

The revision also alters a provision requiring that any LSE must be authorized to serve load under California state or local law — deleting the reference to California. The change was intended to acknowledge the current membership of Nevada-based Valley Electric Association and to prepare the ISO for additional out-of-state members through regional expansion.

CAISO Expansion in Question as EIM Grows

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real-time export market for its surplus solar and avoided curtailing a significant amount of renewable generation. (See *CAISO EIM Boosts Market for Renewables in Q1*.)

Last year also saw announcements from four utilities that said they intend to join the EIM.

In April, Idaho Power signed an implementation agreement that would make it the sixth BAA to join the market in spring 2018. Inclusion of the utility will bring an additional 4,800 miles of transmission into the market while improving trading access to an area of Wyoming that renewable developers — including EIM pioneer PacifiCorp — seek to tap for wind projects intended to serve the West Coast. (See *Idaho Power Inks Agreement to Join EIM*.)

Seattle City Light is slated to become the first publicly owned utility to join the EIM after signing an implementation agreement in December. (See *Seattle City Light Signs EIM Membership Agreement*.) City Light's membership is contingent on satisfying the concerns of the Seattle City Council, which asked the company to flesh out the findings of an EIM benefits study showing the hydropower-rich utility could earn an additional $4 million to $23 million annually as an exporter of the flexible ramping capability needed to smooth out intermittent renewables. (See *Council OKs Seattle City Light Bid to Explore Joining the EIM*.)

The Sacramento Municipal Utility District said in October that it would begin negotiations to join the EIM, with some of the six other members of the Balancing Authority of Northern California — all publicly owned — to follow, depending on the outcome of cost-benefit assessments. (See *Sacramento Utility to Join EIM; Other BANC Members May Follow*.)

CAISO and El Centro Nacional de Control de Energía (CENACE), Mexico's grid operator, announced an agreement in October to explore having the Baja California Norte region join the market as the first non-U.S. participant. (See *Mexico's Grid Operator to Explore Participation in the EIM*.) While the region has no transmission connections with the rest of Mexico's grid, it does boast 800 MW of transfer capacity with California through two 230-kV links at the Imperial Valley and Otay Mesa substations, and also offers promising potential for wind energy development.

2016 also saw the EIM begin to chart a course more independent of the ISO with the appointment of the market's governing body and a clearer outline of governance. (See *CAISO Board Appoints Western Energy Imbalance Market Governing Body*.) At the body's first meeting, Chairwoman Kristine Schmidt noted that a decade ago, nobody in the industry would have believed that the West would produce an organized real-time market.

"We're now seeing a regional market take shape in the West," Schmidt said.

In December, EIM and CAISO leaders approved a guidance document that provides solutions to the overlapping authority between the ISO's Board of Governors and the EIM governing body resulting from the EIM's delegation of a portion of its authority over Federal Power Act Section 205 filings to CAISO. (See *EIM Leaders OK Governance 'Guidance' Proposal*.)

The document outlines how ISO staff should interact with the EIM, providing a schedule for notifying the governing body about ISO initiatives and laying out the processes by which body members and EIM participants will provide feedback on proposed policy changes.

"I think this is an important step forward," CAISO board member David Olsen said. "It really helps to clarify the scope of responsibility of the EIM board."

CAISO NEWS

CAISO Seeks Primary Frequency Response Market

By Robert Mullin

CAISO has kicked off an initiative to explore how it can procure resources equipped to automatically respond to disturbances in grid frequency.

The effort will examine implementation of a new market mechanism to compensate resources for providing primary frequency response — sending power into the grid within moments of a potentially destabilizing frequency event.

The new initiative is in response to NERC reliability standard BAL-003-1, which requires each balancing authority area (BAA) to carry sufficient capability to respond to a frequency event.

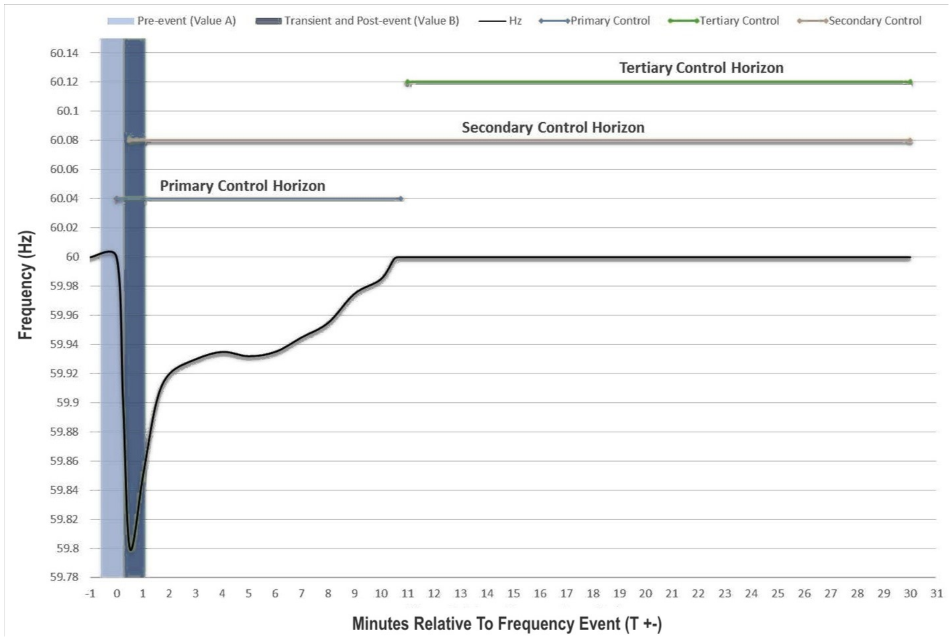
System operators seek to maintain the grid at a frequency of 60 Hz to maintain network stability. An uncontrolled drop in frequency creates the danger of cascading blackouts.

Under NERC's standard, primary frequency response is the ability to respond to a deviation within about 20 to 52 seconds of occurrence. Such a rapid reaction requires that the resource automatically detect under-frequency and autonomously ramp its output without receiving a market signal or manual instructions from the ISO.

While the initiative is primarily intended to help CAISO meet NERC's requirement, the ISO hopes the effort will head off an issue expected to become more problematic as California moves to fulfill its ambitious renewable energy mandate.

"The ISO expects frequency response will worsen as nonconventional technologies increase," Cathleen Colbert, senior market design and regulatory policy developer at CAISO, said during a Dec. 22 stakeholder call to discuss the initiative.

Nonconventional technologies typically have little or no inertial response to momentary changes on the grid; conventional generators have the ability to automatically vary their turbines' rotational speed and output based on the pull of load. That built-in capability functions as a kind of damper for frequency excursions.



CAISO is seeking stakeholder input on developing a market mechanism to compensate resources for responding to frequency dips during the "primary" control horizon — just moments after the onset of the event. | *CAISO*

"The goal of introducing a primary frequency service would be, in the short term, to continue to support compliance with NERC's frequency response requirement, which, without changes, will be more difficult in the long term as the generation mix changes to accommodate a renewable portfolio standard of 50% renewables by 2030," the ISO said in an issue paper describing the initiative.

Last month, FERC proposed revising the *pro forma* generator interconnection agreements to require all newly interconnecting facilities, including renewable generators, to have primary frequency response capability (RM16-6). (See *FERC: Renewables Must Provide Frequency Response*.)

CAISO's initiative will focus on whether the ISO should compensate resources for capital expenses associated with the equipment necessary to provide the service. It will also examine making payments for opportunity costs related to holding frequency response capacity in reserve and for operating expenses associated with providing response during an event.

Approved by FERC in 2014, BAL-003-1 requires each BAA to achieve specific performance measures to meet its "frequency response obligation" (FRO), which is calculated as the BAA's portion of the overall obligation for the interconnection — referred to as the "IFRO." (See *FERC OKs Rules on Geomagnetic Disturbances, Frequency Response*.)

The IFRO represents the minimum response needed to halt a decline in frequency resulting from the loss of two of the interconnection's largest generators — the response necessary to head off reaching the "under-frequency load shedding" threshold of 59.5 Hz.

Based on an assessment of its generation and load relative to the rest of the Western Interconnection, CAISO says that its share

"The ISO expects frequency response will worsen as nonconventional technologies increase."

Cathleen Colbert, CAISO

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CAISO NEWS

CAISO Seeks Primary Frequency Response Market

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of the region's IFRO stands at about 23% — translating into 196 MW/0.1 Hz next year.

In 2015, CAISO determined that it would likely come up short of its obligation under NERC's requirements, which took effect Dec. 1. To address the shortfall, the ISO filed Tariff revisions enabling it to enter annual contracts to acquire "transferred frequency response" — the transfer of frequency response performance across BAAs within an interconnection.

At the same time, the ISO committed to FERC that it would evaluate whether it could develop a market mechanism to cultivate a diverse set of resources to help the ISO meet the frequency response criteria.

The ISO is proposing a set of guiding principles for developing a primary frequency response market, which include:

- Creating an environment in which the ISO fleet is positioned to provide sufficient frequency response;
- Eliminating barriers to entry in order to allow all technologies to participate;
- Producing price signals that incentivize adequate response; and
- Ensuring compensation for frequency response-related capital investments if the capability becomes an interconnection requirement.

Stakeholders are being asked to consider whether the ISO's existing ancillary services market generates sufficient compensation to enable the ISO to meet the NERC's new reliability requirements.

The most significant argument in favor of developing a new market structure is that the ISO does not currently procure primary frequency response but must still meet NERC's standard. The existing ancillary services market covers only the requisition of frequency regulation that qualifies as NERC's "secondary" and "tertiary" control mechanisms following a frequency event — both of which respond to an explicit ISO market signal.

In addition to contracting for transferred response, the ISO relies on unloaded frequency response capability acquired through the current ancillary services procurement, Colbert said. However, resources procured during that process may not have the capability for a sufficiently fast response.

Additionally, the ISO has observed a "deteriorating trend" in its frequency response performance over the past two years when comparing its average capability with its obligation.

"We believe we have received guidance [from FERC] to explore other options," Colbert said.

Stakeholders must submit comments on the issue paper by Jan. 12, 2017.

CAISO NEWS

FERC Denies Rehearing on Berkshire Market-Based Rate Ruling

By Robert Mullin

FERC denied Berkshire Hathaway Energy's request to rehear a ruling prohibiting the company's subsidiaries from selling electricity at market-based rates in four neighboring balancing authority areas in the West.

The commission's June 9 decision restricted Berkshire-owned utilities PacifiCorp and NV Energy and 19 other affiliates from offering power at market rates in the PacifiCorp East (PACE), PacifiCorp West (PACW), Idaho Power and NorthWestern Energy areas based on concerns about horizontal market power. (See *Berkshire Market-Based Rate Sales Restricted in 4 BAAs*.)

In its Dec. 21 order, the commission rejected Berkshire's contention that the June ruling had denied the company due process because of FERC's failure to convey "newly announced standards for determining market power" ahead of the company's initial "change in status" filing, which was triggered by the 2013 acquisition of NV Energy (ER10-2475, *et al.*).

"We clarify that the June 9 order did not create new criteria for obtaining or retaining market-based rate authority," the commission said. "Rather, in the June 9 order, the commission identified areas where the [Berkshire companies'] analysis fell short of existing requirements and, where appropriate, provided suggestions for meeting the requirements."

The commission did approve the Berkshire subsidiaries' revised market-based rate tariffs filed in compliance with the June order and clarified that the companies are entitled to propose new cost-based rates for making sales into the four areas, rather than being limited to relying on default cost-based rates.

The commission also terminated the Section 206 proceeding on the matter.

In its June 9 order revoking market-based rate authority, the commission found that the Berkshire companies failed to provide reliable delivered price test (DPT) analyses rebutting the presumption of market power in the four balancing authorities.

FERC policy allows companies to submit a DPT after failing the indicative "pivotal supplier" and "wholesale market power" screens for initially assessing horizontal market power within a balancing area.

The DPT offers a company the chance to provide more granular market power assessment that factors in native load commitments to determine a supplier's "available economic capacity" — energy available for offer in the open market.

The commission's decision to revoke Berkshire's market-based rate authority ultimately rested on what the commission called a "flawed" DPT analysis from the company. The commission pointed to Berkshire's failure to calculate unique season and load levels for each of the four areas, instead relying on assumptions based on data for only the PACE area.

In its July 11 request for rehearing, Berkshire countered the commission's findings by arguing that each of its 57 "unique" DPT analyses "was prepared in accordance with the commission's previously announced requirements and each was similar in form and substance to" analyses the commission had previously approved. (See *Berkshire Contests Market-Based Sales Restriction in West*.)

"The [Berkshire companies] failed to provide any historical transmission data, eTag or otherwise, to corroborate the results of their DPTs as required by section 33.3(c)(6) of the commission's regulations," the commission responded in its Dec. 21 order. Furthermore, based on its own review of transmission data, the commission said it was unable to corroborate the DPTs.

The commission also noted its longstanding policy of requiring companies to compare actual trade patterns with DPT results.

"This is not a new standard or a higher threshold test; it is the obligation the commission has required for DPTs since 1997," the commission said.

The commission also rejected Berkshire's contention that it had failed to follow past practice by not allowing the company opportunity to correct mistakes in its original submittal.

"The [Berkshire companies] were given many opportunities to correct errors in their DPT," the commission said, citing a Dec. 9, 2014, order describing "multiple deficiencies" in the supporting data for the tests. The commission pointed out that FERC staff met the Berkshire representatives to discuss that order.

The commission additionally dismissed Berkshire's claim that the commission failed to make a "definitive finding" that the company possesses market power in all four regions before revoking market-based rate authority, as required under FERC Order 697. After failing the initial market power screens, Berkshire, not FERC, had the burden of proof, the commission said.

"If the commission cannot revoke market-based rate authority in areas where sellers fail to rebut the presumption of market power created by a failure of the indicative screens, then sellers could deliberately submit inadequate evidence for the commission to analyze and thus be allowed to keep their market-based rate authority in perpetuity," the commission said.

ERCOT NEWS

ERCOT Looks to Incorporate DG, Improve Ancillary Services, RMR in 2017

By Tom Kleckner

Fifteen years after it first opened, ERCOT's competitive electric market is pretty much running on cruise control. It has ample low-cost electricity to meet Texas' growing demand and continues to add renewable resources. And 2016 will go on record as having the lowest prices ever.

Sure, protocols always need tweaking, the ISO's reliability-must-run practices still draw stakeholder complaints and there are congestion concerns in Houston, West Texas and the Rio Grande Valley. But otherwise, ERCOT enters 2017 with a grid those in power see as the envy of others.

"Nobody has a competitive market like ours," Texas Public Utility Commission Chair Donna Nelson said during a July meeting. The PUC has regulatory oversight of ERCOT, and Nelson often trades quips during open meetings with her two fellow commissioners over the market's success.

Load-weighted average wholesale prices for 2016 were less than $25/MWh, far below the 2008 high of $77.19/MWh. Average prices have stayed below $41/MWh in seven of the last eight years. Not surprisingly, customer complaints to the PUC fell to 4,835 complaints, down from 6,973 the previous year, according to the Texas Coalition for Affordable Power.

The ISO, which boasts more than 18,000 MW of installed wind capacity, set a new record for wind energy production Christmas morning with 16,022 MW.

With 7 million smart meters, the Texas Interconnection is also one of the more advanced grids around. "We've got a retail market that offers customers choice in a way that's more mature and more fulfilled than any other retail market in the world," ERCOT CEO Bill Magness said in November.

DER Focus

Much of the focus in 2017 will be on accommodating distributed energy resources and determining how those smaller power sources can be aggregated to predictably meet demand.

In preparation for the new year, ERCOT staff have been working to map the system's smaller (less than 1 MW) registered distributed generation units and on a white paper addressing DER's reliability. Both efforts are picking up on the work of the Distributed Resource Energy and Ancillaries Market (DREAM) Task Force, a two-year effort that ended last year with a report that made eight recommendations.

The ISO estimates it has 900 MW of DG in its competitive areas (which doesn't include the cities of Austin or San Antonio). It expects DG to grow at 10% annually, which is why staff wants to account for the DER on the system in both competitive and noncompetitive areas.

"With an 80,000-MW system, that's not a huge penetration at this point," Magness said. "These resources don't raise a long-term reliability issue — they're not waving a red flag — but we expect to see a lot more, whether for environmental reasons or people wanting energy independence. If you don't know you have a large cluster of DG, your load forecasts are not going to be right."

Magness likes to joke about the Austin moving company that has the motto, "If we can get it loose, we can move it."

"If we can see it, we can integrate it," he says.

Ancillary Services

ERCOT is also looking to improve its visibility into ancillary services and inertia data. Its existing ancillary services framework was lifted from a market design developed in the 1990s, and staff and stakeholders have been working since 2013 to unbundle the services and improve the market's ability to handle DG, fast-acting storage devices, smart-grid technologies and other new developments.

A staff proposal to separate responsive reserve service into fast-frequency response, primary frequency response and contingency reserve service categories did not receive sufficient stakeholder support to move forward. A Brattle Group report on these "future" ancillary services determined they would offer economic benefits "on the order of 10 times the [estimated $12 million to $15 million in] implementation costs."

ERCOT currently spends about $500 million annually on these services.

The ISO could also face an RMR rulemaking (Project No. 46369) in 2017 from the PUC. The commission held a workshop on the practice in December, gathering feedback from market participants on how it might limit a practice that even Magness has acknowledged can be a "blunt instrument."

Reliant Energy's Bill Barnes, who failed to gain enough support this summer for a protocol change that would price RMR units at the end of the dispatch queue, said during the workshop that the process "indicates the market has failed to retain and attract sufficient resources to meet ERCOT's reliability criteria. The best solution to RMR is to not have any." (See "Board Rejects RMR Mitigated-Offer Appeal, Lets Stakeholder Process Move Forward," *ERCOT Board of Directors Briefs*.)

Barnes, the PUC staff and other stakeholders discussed modifying the RMR-evaluation timeline, the ERCOT board's approval of RMR agreements potential changes to the review methodology.

Currently, RMR units are subject to the same offer mitigation as other units.

The ISO this year should complete much of its technology "refresh," a four-year, $48 million initiative updating its computer technology. The final three of the 11 refresh projects — remote access and two telecom efforts — are scheduled to begin in 2017. By the end of 2017, ERCOT will have updated its database servers and core network.

The project has already spent 40% of its budget, Magness said in December, and it is expected to come in under or at the $48 million target.

ISO-NE News

New England to Charge Ahead on Clean Energy Makeover in 2017

By William Opalka

New England policymakers hope to reach agreement in 2017 on revised market rules to accommodate state clean energy policies, as three states seek to complete renewable procurements and Massachusetts readies for a new solicitation.

Although Donald Trump's election threatens federal initiatives to reduce carbon emissions, New England is moving ahead with its plans to decarbonize through power purchase agreements, infrastructure improvements and potentially tighter emission caps under the Regional Greenhouse Gas Initiative.

Massachusetts, Connecticut and Rhode Island, which issued a joint solicitation combining their purchasing power, hope to file PPAs with state regulators in the spring, now that a temporary injunction sought by a small developer who challenged the program has been lifted. (See New England States Move Toward Renewables Contracts.)

While the initial contracts are for a modest 460 MW, Massachusetts is expected to issue another request for proposals for 2,800 MW in the spring. The state's Energy Diversity law, enacted last summer, directs its electric distribution utilities to enter contracts for 1,600 MW of offshore wind and 1,200 MW of renewables, likely Canadian hydropower, over the next decade. (See Massachusetts Bill Boosts Offshore Wind, Canadian Hydro.)

Separately, Connecticut has selected 25 small clean energy and energy efficiency projects totaling 402 MW to negotiate PPAs with the state's two electric distribution companies.

Transmission

In December, the region saw the nation's first offshore wind farm — Deepwater Wind's 30-MW project off Rhode Island's Block Island — begin commercial operation. But without other, larger offshore projects to count on, importing Canadian hydropower appears to be the quickest solution for the states seeking to maintain momentum in emissions reductions.

Delivering that power will require major new transmission lines. The New Hampshire Site Evaluation Committee is expected to rule on the application by Northern Pass developer Eversource Energy in September. Opponents want the entire 192-mile route of the 1,090-MW line buried. The developers have proposed only 60 miles underground.

Two other transmission projects would import Canadian hydropower via cable buried under Lake Champlain. TDI New England's Clean Power Link received a presidential permit in December to allow construction. Anbaric's 400-MW Vermont Green Line is awaiting approval. All three transmission projects are expected to respond to the Massachusetts solicitation.


Block Island Wind Farm | *Deepwater Wind*

IMAPP

Meanwhile, the New England Power Pool's Integrating Markets with Public Policy (IMAPP) initiative, launched last summer, is trying to find ways wholesale market rules can accommodate state policies without compromising reliability or dramatically increasing costs.

Meeting these goals has proved a daunting challenge. Officials had hoped to develop an action plan by the beginning of December that could be presented to ISO-NE for action in early 2017, but now they don't expect to do so until late in the first quarter at the earliest.

Proposals within the IMAPP collaborative have included various methods of pricing carbon. A carbon adder would be technology-neutral and provide market signals to both supply and demand while also creating a revenue stream for the states. There is also a proposal for a two-tiered Forward Capacity Market, with one reserved for clean energy resources. (See Markets vs. Climate Goals the Subject at NECA Conference.) Any market rule changes would require FERC approval.

Also considering rule changes is RGGI, which is conducting its quadrennial Program Review. Falling prices in the nine-state compact's CO_2 allowance auctions have renewed calls from environmentalists to tighten emission limits. Allowance prices dropped to $3.55 in December, the lowest in three years and about 53% lower than a year ago. Many stakeholders say the states should reduce the cap on emissions by 5% annually from the current 2.5%. (See RGGI Carbon Auction Prices Drop 22%.)

Although New England has been a national leader in reducing carbon emissions, it would still need an additional 25% cut from 2015 levels to meet the 2030 targets under the federal Clean Power Plan. The CPP would cap emissions from new and existing

Continued on page 10

ISO-NE NEWS

New England to Charge Ahead on Clean Energy Makeover in 2017

Continued from page 9

sources at 29.1 million tons in 2030. In a report by ISO-NE, carbon emissions showed a slight uptick to 40.3 million tons in 2015 compared to 2014, likely caused by the closure of the Vermont Yankee nuclear plant.

Have Capacity Prices Peaked?

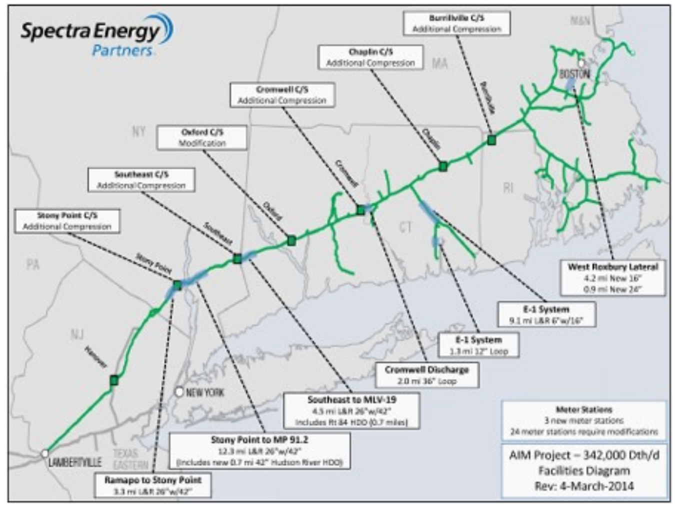
One worrisome development that seems to have abated is the concern about steeply rising prices in the capacity market.

Clearing prices in last February's FCA fell to $7.03/kW-month from 2015's $9.55/kW-month, a 26% drop and the first decline in four years. (See Prices Down 26% in ISO-NE Capacity Auction.)

ISO-NE is seeking 34,075 MW for delivery year 2020/21. About 34,505 MW of existing and 5,958 MW of new resources are qualified to participate.

Natural Gas Infrastructure

As expected, 2016 proved crucial in efforts to expand the region's natural gas infrastructure, with two major gas pipelines projects falling by the wayside.



Algonquin Incremental Project

The 342,000-dekatherm Algonquin Incremental Market project was completed in December, but it mostly serves local distribution companies' heating customers and did little to aid generators.

Kinder Morgan halted its Northeast Energy Direct project in the spring, citing its inability to secure enough commitments from New England power generators to reserve capacity. (See Kinder Morgan Board Suspends Work on Northeast Energy Direct Pipeline.)

The Massachusetts Supreme Judicial Court effectively killed Spectra Energy's Access Northeast when it ruled against a subsidy by electric ratepayers. (See Mass. Supreme Court Vacates EDC-Pipeline Contract Order.)

The state's legislature appears reluctant to codify the requirement. Other states that were ready to commit to shared costs for infrastructure were dependent on the Bay State taking a leading position.

Without ratepayer-mandated support in Massachusetts, the region's largest state, major pipeline construction appears to be at a standstill.

ISO-NE NEWS

FERC Orders Hearing in Dispute over Capacity Rules, Maine Interface

By William Opalka

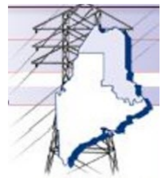
FERC ordered hearing and settlement procedures in a dispute over capacity obligations in an area of Northern Maine separate from ISO-NE (ER17-192).

The dispute concerns the Northern Maine Independent System Administrator, whose transmission system is not directly connected with the rest of New England and whose market participants are not subject to ISO-NE's jurisdiction and do not participate in the New England Power Pool.

At issue is the ISA's request to eliminate a requirement that market participants prove the deliverability for resources located outside Northern Maine but within the New Brunswick balancing authority area, of which the ISA is a part.

NMISA said the deliverability assurance requirement in its market rules is no longer needed because its rebuild of Line 691 and planned spring 2017 upgrade of the Tinker transformer at the New Brunswick-Northern Maine interface will eliminate the transmission constraint into the area.

The request was protested by ReEnergy Biomass Operations, which owns the 37-MW Fort Fairfield and 39-MW Ashland generating plants in Aroostook County, within the NMISA control area.



ReEnergy contends that even after completion of the upgrade, as much as 140 MW of load in Northern Maine could be reliant on 98 MW of available transmission capacity from New Brunswick. It said the upgrade was required to support 74 MW of existing firm reservations, meaning the upgrade would only add 24 MW of additional firm transmission capacity. Eliminating the deliverability requirement would impact reliability and distort price signals, it added.

NMISA disputes ReEnergy's calculations, saying its 140-MW load estimate includes Eastern Maine Electric Cooperative, which should not be counted because it is not connected to New Brunswick via the Emera Maine-New Brunswick interface.

It said that the total Emera Maine capacity requirement for summer 2016, including reserve margin, was 124 MW, below the 129-MW total summer transfer capability from New Brunswick to Northern Maine once the upgrade is complete.

The authority said ReEnergy opposes the changes because it wants to maintain a competitive advantage in the area. If the requirement were maintained, market participants would be incented to hoard firm transmission capacity, preventing other resources from competing in the market, it said. The authority's position was backed by the Maine Public Utilities Commission, which also said it feared reduced competition and higher prices if the rule remained.

FERC's Dec. 22 order accepted NMISA's proposed change subject to refund but suspended it, saying it needed more information to resolve the factual dispute over how much capacity will be provided by the upgrade.

"NMISA has not demonstrated that the Tinker upgrade located at the New Brunswick-Northern Maine interface will relieve the constraint at this interface, or that capacity located inside and outside of the Northern Maine transmission system is capable of meeting Northern Maine's peak load capacity requirements before and after the Tinker upgrade," the commission said.

MISO News

MISO Changes to Queue, Auction, Cost Allocation to Dominate 2017

By Amanda Durish Cook

MISO's 2017 will likely be filled with capacity auction changes, cost allocation debates, an updated interconnection queue and multiple transmission studies.

The RTO filed its proposed forward capacity auction for its retail-choice areas Nov. 1 and requested a March 1 effective date (ER17-284). (See *MISO Files Forward Capacity Auction Plan with FERC*.)

MISO spent much of 2016 reconciling the forward capacity market with the existing prompt capacity auction and utilities' forward resource adequacy plans and bilateral contracts. "There was a rush to the finish line to file the Competitive Retail Solution," Resource Adequacy Subcommittee Chair Gary Mathis said. "We'll hopefully find out in early springtime" if the proposal passed FERC's muster.

Assuming FERC approval, work to implement the forward auction alongside the prompt auction will continue through 2017 before the first bifurcated auction in April 2018 for the 2018/19 planning year.

Interconnection Queue Changes

MISO expects a FERC decision any day on its second attempt to reduce uncertainty and the amount of time it takes for projects to clear the interconnection queue. The late October filing proposes fewer restudies, optional "off-ramps" with fee refunds for withdrawing projects, a smaller initial milestone payment and subsequent milestone payments based on a percentage of upgrade costs. "It's currently a two- to three-year process and is challenged by restudies," said Jennifer Curran, MISO vice president of system planning and seams coordination.

If all goes as planned, queue changes will take effect in January. Although the new process has yet to be approved, MISO has begun to prepare for the transition, with all projects expected to follow the new rules after February 2017's batch of interconnection applicants.

FERC rejected MISO's first proposal in spring, telling the RTO it placed too much blame for the queue's bottleneck on "speculative" projects and said its proposed milestone payments to move along the

Jennifer Curran, MISO vice president of system planning and seams coordination | © *RTO Insider*

queue were prohibitively high (ER16-675).

Cost Allocation

MISO also will set aside some of 2017 to revise its cost allocation formulas for market efficiency projects and sub-345-kV economic projects. The RTO hopes to complete the revisions in 2017 and implement them by 2018, when Entergy's integration transition period, which limits cost sharing in MISO South, expires. (See *MISO Stakeholders Propose Changes to Market Efficiency Cost Allocation Process*.)

"We all know cost allocation is a money issue where consensus is not likely to spring up like a flower," outgoing MISO Director Judy Walsh said at the December Advisory Committee meeting.

"I think we've seen a lot of movement; no one is going to get what they want, but we are on a path," Xcel Energy's Carolyn Wetterlin replied.

North-South Bottleneck

MISO is also planning a study that will examine the benefits of building new transmission to supplement the constrained transmission interface linking the RTO's North/Central and South regions. In January, FERC approved a seven-year settlement that stipulates MISO's north-to-south flows using SPP's transmission be restricted to 3,000 MW and 2,500 MW south to north. (See *MISO Proposes Study to Measure Benefits of New North-South Tx*.)

There's "nothing so stark as the North-South constraint" to MISO system planners, Curran told the Markets Committee of the Board of Directors last spring.

The RTO will also embark on an ambitious long-term transmission overlay study looking at system needs under three future scenarios, with varying assumptions on carbon reduction targets, natural gas prices, coal generator retirements and renewables growth.

Beginning Jan. 31, the Economic Planning Users Group will review an initial set of transmission needs to design preliminary overlays, said Lynn Hecker, MISO manager of expansion planning. Long-term transmission needs are expected to be identified at the end of 2017. (See "Long-Term Overlay Study Scoped; MISO Asks for More Responses," *MISO Planning Advisory Committee Briefs*.)

Competitive Transmission Development

Late last month, MISO selected LS Power subsidiary Republic Transmission over 10 other bids to build the Duff-Coleman 345-kV transmission project, the RTO's first competitive project under FERC Order 1000. The work in Southern Indiana and Western Kentucky includes the construction of two substations and a 28.5-mile line connecting them. Republic will be delivering quarterly updates to MISO throughout 2017 on the $49.8 million project. (See *LS Power Unit Wins MISO's First Competitive Project*.)

While that work progresses, MISO stakeholders are expected to spend the first half of 2017 identifying improvements to the RTO's competitive developer selection process.

IT Refresh Coming

MISO, which estimates it will spend about $1.1 billion on information technology between 2015 and 2019, has hired consultants for another study to assess its aging system software. Results of the study will be reveal how well the RTO's software can accommodate the effects of a changing resource mix, increased intermittent and behind-the-meter generation and increased combined cycle units.

Continued on page 13

MISO NEWS

LS Power Unit Wins MISO's First Competitive Project

By Amanda Durish Cook

MISO has selected LS Power's Republic Transmission to build the RTO's first competitive transmission project.

St. Louis-based Republic and partner Big Rivers Electric, a generation and transmission cooperative in Henderson, Ky., beat out 10 other qualified developers for the Duff-Coleman 345-kV transmission project in Southern Indiana and Western Kentucky. Hoosier Energy will acquire a share of Republic in exchange for providing maintenance and operations for a segment of the project located in Indiana.

Priti Patel, regional executive for MISO North and executive director of MISO's Competitive Transmission Administration, said Republic's $49.8 million proposal was "the clear and decisive winner" among the 11 proposals, which ranged from $34 million to $55.7 million. MISO had estimated the project at $58.9 million. (See *11 Developers Vie for MISO Duff-Coleman Project*.)

"Republic Transmission's project proposal exhibited the best balance of high-quality design and competitive cost, best-in-class project implementation and top-tier plans for operations and maintenance," Patel said. She said the proposal carried the highest sense of certainty, the most details, the lowest risk and a low cost. "It comes down to providing the greatest value," Patel added. "That encompasses more than just cost."

Republic will be required to deliver quarterly status reports to MISO. The company also must execute a binding developer agreement using commitments from its bid proposal and competitive requirements from the MISO Tariff.

"With the evaluation and selection phases of the competitive developer selection process now over, we look forward to working closely with Republic Transmission, stakeholders and the Organization of MISO States to ensure the success of this project," said Patel.

The project, approved as part of the 2015 MISO Transmission Expansion Plan, is expected in service no later than Jan. 1, 2021. Construction includes a pair of substations and a 28.5-mile 345-kV connecting line in Southern Indiana and Western Kentucky.

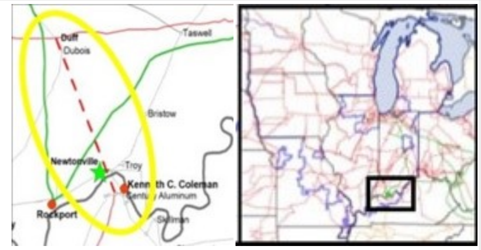
'Decisive' Winner

MISO used four FERC-approved criteria to weigh the proposals: cost and design, project implementation, operations and maintenance and participation in the planning process.

Alongside Tuesday's announcement, MISO published a 135-page selection report that said all competitive bidders "demonstrated the necessary breadth and scope of capabilities, and the financial wherewithal, to design, finance, construct, operate and maintain the project." However, MISO said Republic's proposal scored a 95 out of 100 possible points, while other proposals scored between 41 and 80 points.

Proposed route lengths varied from 28 to 36 miles. All proposals scored an 'acceptable' or better rating from MISO. Republic's proposal scored a 'best' due to a "well-thought-out" route; "ample" right-of-way width; a specific operations-and-maintenance plan; and a "strong cost cap" with a 9.8% return on equity for the life of the project.

Brian Pederson, a senior manager in MISO's competitive transmission unit, said the report seeks to explain the analysis behind the RTO's selection, be transparent "within the bounds of the Tariff confidentiality provisions" and encourage future participation in the Order 1000 competitive process.



Duff-Coleman project | *MISO*

Review Begins

Pederson said MISO will convene a new Competitive Transmission Task Team reporting to the Planning Advisory Committee to suggest potential improvements and lessons learned from the first solicitation.

"In January, we want to focus on attaining stakeholder feedback," Pederson said during MISO's Dec. 14 Planning Advisory Committee. By mid-2017, he envisions stakeholders and MISO finalizing Tariff revisions to the competitive developer selection process.

MISO will also use 2017 to continue to refine the minimum design requirements required of competitive projects in Business Practices Manual 029. The RTO is expected to sunset its Minimum Design Requirements Task Team and funnel final design requirement changes through the Planning Subcommittee in January. Changes to BPM 029 should become effective in the spring. The new rules establish a more detailed set of ratings that projects must meet. (See "MISO Releases Minimum Requirements for Competitive Tx Projects," *MISO Planning Subcommittee Briefs*.)

The RTO has also committed to reaching out to the bidders of the 10 rejected proposals to explain its decision in one-on-one meetings during January and February.

MISO Changes to Queue, Auction, Cost Allocation to Dominate 2017

Continued from page 12

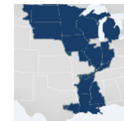
The RTO also plans to begin work on six projects in 2017 to improve its market systems in its ongoing Market Roadmap process. (See *MISO to Study Aging Software; Market Improvements Planned for 2017*.)

MISO Looks Back at 15

MISO took time last month to reflect on its 15th anniversary of becoming an RTO. At the December board meeting, CEO John Bear noted that the RTO has grown from 21 employees in 2000 to about 900 in 2016.

"The beginning tested our tolerances. Without regular money coming in, it's hard to see a path forward," said Steve Kozey, senior vice president of compliance services and one of those hired in 2000. "In February 2002, when FERC approved our Tariff and MISO could start recovering costs on a regular basis, employees let out a sigh of relief because they knew from then on out, they could count on a paycheck each month."

MISO NEWS



FERC OKs MISO Use of PJM Cost Estimates for Mitigation

By Amanda Durish Cook

MISO can use PJM's technology-specific reference levels for market mitigation in its 2017/18 capacity auction, FERC has decided.

The commission's Dec. 28 order said MISO's use of PJM's numbers "strikes a fair balance between reducing the burden of demonstrating and verifying facility-specific reference levels, and allowing a market participant to select the default technology-specific avoidable costs that best reflect its actual avoidable costs" (ER16-833-003).

Reference levels are intended to represent the non-fuel costs of operating different types of generation resources. Similar to a cost-based offer in the energy market, they will be used as a resource's capacity offer when a capacity seller fails MISO's market power tests.

MISO's proposal was in response to FERC's December 2015 ruling that the RTO's use of estimated opportunity costs for exporting power into PJM resulted in excessive mitigated cost levels. (See *FERC Orders MISO to Change Auction Rules*.)

The commission ordered MISO to set the initial reference for offers into the capacity auction at $0/MW-day. Because the commission said the $0 default might generate more requests from capacity suppliers to establish facility-specific reference levels, the commission called for the technology-specific defaults to reduce the need to verify costs on a unit-by-unit basis (EL15-70, *et al.*).

MISO's staff and Independent Market Monitor agreed to base the mitigation levels on PJM's avoided cost numbers because the generation technologies in the two RTOs are similar and PJM's values are already FERC-approved. (See *MISO Moves Forward on Auction Design; Seasonal Filing Delayed Again*.)

MISO's approach diverges from PJM on several points, including use of the monthly Consumer Price Index to update values rather than the Handy-Whitman index. Because PJM's figures do not include defaults for wind and nuclear generators, MISO developed its cost estimates based on data from the Energy Information Administration and the Nuclear Energy Institute, respectively.

MISO also will not include the 10% "adder" PJM uses to offset the uncertainty of estimating costs three years into the future. The commission rejected NRG Energy's request that MISO be required to use the adder. Unlike PJM's three-year forward auction, FERC said, MISO's prompt auction does not require the same safeguard.

FERC also mandated separate values for multi-unit and single-unit nuclear resources, despite Exelon's comments that the two values were not materially different.

FERC ordered MISO to review the reference levels every three years, rejecting the RTO's proposal to update values only after PJM updated its own numbers. FERC said MISO's review of its avoidable costs "should not be contingent upon the review schedule of another regional transmission organization."

FERC's order also approved MISO's proposal that market participants intending to retire or suspend a unit must use either retirement- or mothball-based default avoidable costs, respectively. FERC said market participants wishing to take advantage of the retirement-specific values must have already submitted a notification of retirement to MISO. However, since MISO only included retirement-based and not mothball-based values for nuclear and wind units, FERC ordered the RTO to provide wind and nuclear mothball-based avoidable costs or explain why they should be exempted.

NYISO NEWS

Can 2017 Top 2016 for Breaking Ground in New York?

By William Opalka

Nine Mile Point nuclear power plant | *Nuclear Regulatory Commission*

Upstate nuclear power plants will start earning additional revenue for their carbon-free attributes in April as New York becomes the first state in the nation to offer the industry a lifeline.

The zero-emission credit program, adopted Aug. 1, was but one of a dizzying blitz of policy initiatives from New York regulators in 2016.

The nuclear supports were included in the Clean Energy Standard, which mandates 50% renewables by 2030. The Public Service Commission also admitted that the retail electric and gas markets have failed and needs to be revamped. And under the path-breaking Reforming the Energy Vision, the PSC began proceedings to develop a new utility revenue model and ways to value distributed energy resources. With NYISO, the PSC also moved forward on $1 billion in transmission projects.

Those are just a few of the initiatives that will continue into 2017 and beyond, many of them under the very large umbrella of REV.

ZECs

The PSC proposed the ZEC program in February to prevent the closure of nuclear plants whose revenues have suffered under low natural gas prices. The additional revenue was crucial to Exelon's agreement to purchase Entergy's James A. FitzPatrick plant, which the company had threatened to retire.

The PSC upheld the ZEC and CES programs on rehearing late last month, but the ZECs still face two court challenges. Opponents say the estimated $7.6 billion over 12 years of payments are merely props to save upstate jobs and that the program interferes with the wholesale market. Others contend the money would be better spent on a faster transition to renewable energy. (See *NYPSC Rejects Challenge to Clean Energy Standard, Nuke Subsidy*.)

Crackdown on ESCOs

The PSC in 2016 continued a crackdown on energy service companies, culminating in a December decision that the retail-choice market couldn't be reformed on the margins, instead needing a top-to-bottom overhaul. (See *NY Regulators Call for Overhaul or End to Mass-Market Retail Choice*.)

The proceeding, which will begin with a procedural conference Jan. 26, is an apparent change in strategy for the PSC, which lost a court challenge to its February order requiring retailers to guarantee savings for most mass-market customers. (See *New York ESCO Order Vacated by Court*.)

The PSC also banned ESCOs in December from signing up low-income customers, upping the ante from a previous order that set a moratorium on sign-ups. The ECSOs have yet to respond to the latest salvo.

PSC staff also released a report that starts a two-phase process to change the way DER are valued. The move is intended to replace the crude instrument of net metering with more sophisticated, granular metrics for weighing the value rooftop solar and other distributed energy resources provide to the system and the costs they impose. (See *NYPSC Vision for DER: From Net Metering to 'Value Stack'*.)

The PSC says DER can improve system efficiency if their value is properly reflected in retail and wholesale markets and if utilities are incented to consider them as alternatives to traditional capital investments. NYISO plans to release a "road map" on integrating these resources into the wholesale markets in early January.

And to more fully integrate renewable energy resources into the New York grid, proceedings are underway for two public policy transmission projects under FERC Order 1000.

One, the Western Energy Connection, will add 1,000 MW of transmission capacity for hydro, gas and renewable generation, including the dam at Niagara Falls. In June, NYISO identified 10 proposed upgrades as finalists, submitting their findings to the PSC. (See *NYISO Identifies 10 Public Policy Tx Projects*.) The commission in October ordered further review and project selection by NYISO.

A second project will expand transmission corridors in central New York and the Lower Hudson Valley to provide easier power flows from the wind energy areas to the load centers near New York City. The PSC just closed a comment period on whether that project should proceed. (See *NY Transco Chief: Tx Buildout 'A Marathon, not a Sprint'*.)

NYISO Strategic Plan

NYISO's Strategic Plan for 2017-2021, released Dec. 15, says the grid operator will integrate the public policy goals of New York state to switch to cleaner and more DER while adding technological innovations to grid operations.

In addition to maintaining reliability, an important focus will be responding to changes resulting from REV, the ISO said.

In addition to the DER "roadmap," the ISO will pursue greater fuel assurance through gas and electric coordination; capacity market improvements, including reduced reliance on reliability-must-run agreements; the demand curve reset; and improvements to its real-time commitment/real-time dispatch forward horizon coordination.

NYISO NEWS

NYPSC Rejects Challenge to Clean Energy Standard, Nuke Subsidy

By William Opalka

The New York Public Service Commission turned aside numerous challenges to its adoption of a Clean Energy Standard and its subsidy for upstate nuclear power generators, rejecting 17 petitions for rehearing and/or reconsideration.

Most of the petitions were dismissed by the commission. Several others, regarding "eligibility issues" for some resources, warrant further investigation by the PSC but do not warrant rehearing, the Dec. 15 order said (15-E-0302).

The commission granted a petition by Exelon seeking the elimination of a condition related to its acquisition of the James A. FitzPatrick nuclear plant, noting that the sale has already been approved. (See *FERC Approves FitzPatrick Sale to Exelon*.)

The CES mandates New York to acquire 50% of its energy from clean resources by 2030 and seeks to further that goal by providing zero-emission credits to support nuclear plants, which were in danger of closing.

Generators and some environmental advocates said the ZEC program — which some critics say will cost more than $7 billion over its 12-year lifespan — goes beyond the authority granted to the PSC by state law. (See *CES Under Attack on Multiple Fronts in Rehearing Requests*.)

The commission disagreed, saying "the ZEC requirement the commission adopted in the CES order is the best way to preserve the affected zero-emissions attributes while staying within the state's jurisdictional boundaries."

Complaints that the ZEC program intrudes on wholesale markets under FERC jurisdiction were similarly dismissed. "As explained in the CES order, neither the ZEC requirement nor any other aspect of the CES program inappropriately intrudes on the wholesale market or interferes with interstate commerce," the PSC said.

Owners of existing resources, including hydropower developers, said the CES order failed to properly measure their environmental benefits under the state-operated market for renewable energy credits. New large-scale hydropower projects are ineligible for ZEC payments under the order. Some smaller hydropower, wind and biomass resources built before 2015 that are eligible for smaller REC payments under previous state programs said they were in danger of closing because of extraordinarily low natural gas prices.

Staff has been directed to further study eligibility requirements, the order states, instead of waiting for a triennial review as established in the CES order in August.

The commission also dismissed petitions that claimed that state procedures were violated during the compressed time frame under which the ZEC program was open for public comment.

The commission's order won't be the final word on the subject, however, as two court challenges remain pending. (See *Federal Suit Challenges NY Nuclear Subsidies* and *Environmental Group Files Second Challenge to NY Nuke Subsidy*.)

NYISO Members OK End to Con Ed-PSEG Wheel

By William Opalka

RENSSELAER, N.Y. — The NYISO Management Committee on Wednesday approved an agreement with PJM to end the 1,000-MW Con Ed-PSEG wheel next year while maintaining an operational base flow (OBF) of 400 MW that will be reduced to zero by 2021.

Consolidated Edison said it would not renew its contract with PJM when the current agreement expires next spring because it is no longer needed to deliver upstate power into New York City. But the OBF is needed to maintain system reliability in northern New Jersey, says PJM. (See "Con Ed-PSEG 'Wheel' to Reach 0 MW Baseflow by 2021," *PJM PC/TEAC Briefs*.)

The vote was unanimous with five abstentions, one from Public Service Enterprise Group.

"We don't agree with PJM that the operational baseflow is needed," PSEG's Ken Carretta said.

NYISO COO Rick Gonzales declined to respond to that objection, which was raised repeatedly. "I'm not going to opine on what PJM has determined," he said.

The wheeling service was implemented by modeling 1,000 MW flowing from NYISO to PJM over the JK (Ramapo-Waldwick) interface and from PJM to NYISO over the ABC (Hudson-Farragut and Linden-Goethals) interface.

Under draft language for the NYISO-PJM Joint Operating Agreement, the wheel will be temporarily replaced by an operational base flow — "an equal and opposite megawatt offset of power flows" over the Waldwick and ABC phase angle regulators to account for natural system flows over the JK and ABC interfaces.

Last week's modifications more definitively set the size of the OBF and fixes the start and end date. "The initial 400-MW OBF, effective on May 1, 2017, is expected to be reduced to zero megawatts by June 1, 2021," it says.

An annual review of the baseflow will be conducted starting next year, which then gives the grid operators two years' notice to end it, unless they establish an earlier date.

PJM has said that the 2021 deactivation target materialized because it was the date that planning analyses determined the OBF was unnecessary. "With the projects that are expected to go into service, we aren't seeing any operational need for an OBF," PJM's Paul McGlynn said at the Dec. 15 Transmission Expansion Advisory Committee meeting.

The revised JOA was reviewed Thursday at PJM's Markets and Reliability Committee meeting. PSEG's Alex Stern confirmed that PJM would clarify in the meeting minutes that the JOA can't supersede the PJM transmission operators' agreement.

A joint filing is expected at FERC next month with implementation starting May 1.

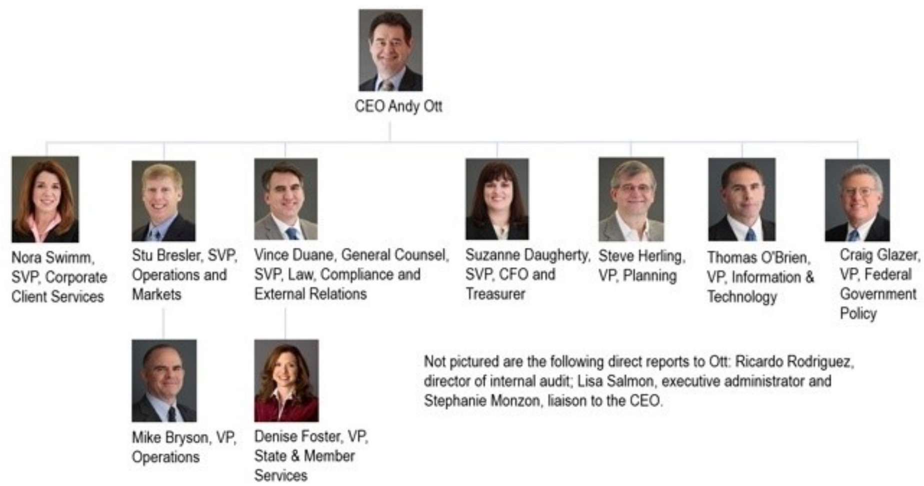
Con Ed decided in April to end the wheel following a dispute with PJM over the allocation of transmission upgrade costs. (See *Con Ed-PSEG 'Wheel' Ending Next Spring*.)

— PJM correspondent Rory D. Sweeney contributed to this article.

PJM NEWS

PJM Capacity Debates, Angst over State Subsidies to Continue in 2017

By Rory D. Sweeney



PJM organization chart | *Information provided by PJM*

After its first full year under new CEO Andy Ott, and the last year of its transition to 100% Capacity Performance, PJM heads into 2017 amid continued ferment over the capacity market and angst over the impact of state subsidies to generators.

When Mike Kormos — Ott's main challenger to replace former CEO Terry Boston — left PJM in March, Ott quickly restructured his executive staff, eliminating Kormos' chief operations officer position and elevating deputy Stu Bresler to control of both the Markets and Operations divisions. The move put Bresler in charge of Kormos' former deputy, Mike Bryson. Ott also expanded the authority of General Counsel Vince Duane. (See *Ott Restructures PJM Divisions, Leadership*.)

Ott's reorganized team faced a series of challenges to the competitive electric model that rules in most PJM states. While the 20th anniversary of retail choice was celebrated in Pennsylvania, the competitive model came under attack elsewhere. (See *Crafters of Pa.'s Deregulation Law Look Back After 20 Years*.)

Public Policy vs. Markets

PJM has long dealt with state mandates and federal tax credits for renewable generation. The newer challenge is subsidies ordered by state policymakers fearful of losing in-state coal and nuclear generation — and their thousands of jobs — that are imperiled by environmental costs and low natural gas prices.

Michigan legislators voted in December to continue its 10% cap on retail choice. (See *Michigan Energy Bill Preserves RPS, 10% Retail Choice Cap*.) In Ohio, state regulators approved power purchase agreements to subsidize FirstEnergy's and American Electric Power's money-losing fossil fuel generation. The deals, which some critics valued as high as $6 billion, collapsed after FERC said they would be subject to its stringent review. FirstEnergy ultimately won state backing for $612 million in state support over eight years and said it would be exiting competitive generation. AEP is hoping to persuade Ohio legislators to reverse customer choice and reregulate the industry. (See *PUCO Rejects FirstEnergy's $558M Rider, OKs $132.5M*; *AEP Ohio Rate Plan Excludes Merchant Generation*.)

Illinois followed New York's lead in approving zero-emission credits to support Exelon's two ailing nuclear plants in the state. (See *Illinois Lawmakers Clear Nuke Subsidy*.)

"The future of PJM markets is at issue," Independent Market Monitor Joe Bowring said. "The PJM capacity markets cannot work with significant new subsidies. Subsidies suppress both the capacity price and the energy price. Both capacity market and energy market revenues are essential to providing incentives for new entry and for maintaining existing resources."

PJM outlined its concerns and defended its performance with a 45-page report in May. (See *PJM Study Defends Markets, Warns State Policies can Harm Competition*.)

In an interview with *RTO Insider* last month, Ott said he didn't see the state initiatives as existential threats to competition. "I don't see a concern being raised within PJM [about whether] it delivered value," he said. "There has been a lot of benefit to competition. [It] seems to be more the question: How do we manage the entry and exit to make sure it's being done in a reliable manner?"

Ott pointed out that between 4,000 and 5,000 MW of new generation has entered each of the past four capacity auctions. It's "not only a swap in fuel, but a swap in technology," he said, that is driving down costs and forcing legacy assets to consider retirement.

The tension between state policymakers and federally regulated wholesale markets is but one of the issues of 2016 likely to continue making news in 2017.

Planned transmission upgrades to the Artificial Island nuclear complex were put on hold in August after rising costs and complaints over cost allocation, another frustrating delay in what was to be PJM's first competitive project under FERC Order 1000. (See *PJM Board Halts Artificial Island Project, Orders Staff Analysis*.)

Following a technical conference in February, FERC ordered changes to PJM's rules on financial transmission rights and auction revenue rights and rejected the RTO's first attempt at a fix. (See *FERC Finds PJM ARR/FTR Market Design Flawed; Rejects Proposed Fix*.)

It all sets up for an eventful 2017. Here's some of the issues likely to dominate PJM stakeholder meetings in the new year:

The Case for Capacity Performance

No issue is likely to consume more stakeholder attention than continued debate over PJM's new CP rules. After acquiring 80% CP resources in the 2015 and 2016 Base Residual Auctions, PJM will be requiring 100% CP for the 2017 auction, eliminating base capacity.

Ott defends the need for the increased per-

Continued on page 18

PJM NEWS

FERC Approves PJM Rate Increase

By Rory D. Sweeney

Rejecting criticism over employee salaries and a lack of detail on other spending, FERC approved PJM's requested rate increase, saying it was "adequately supported" (ER17-249).

The Dec. 22 order allows PJM to increase its composite rate from $0.3349/MWh to $0.36/MWh for 2017 and 2018, with a 2.5% annual increase in subsequent years through 2024, when the charge will reach $0.41/MWh. The first increase is effective Jan. 1.

Consumer advocacy group Public Citizen protested PJM's filing, arguing that the increase was requested without first considering ways to reduce costs, such as limiting salary increases. (See *Public Advocacy Group Files FERC Complaint over PJM Rate Increase*.)

The commission said that the financial statements questioned by Public Citizen are "subject to adequate independent review" by stakeholders on the Finance Committee and noted the committee may reject unjustified expenditures and direct refunds to ratepayers.

Public Citizen also complained that the RTO provided no support for its spending on outside services, which the group said may include expenses related to political advocacy. FERC did not address the advocacy question but noted PJM testimony that outside labor services "includes building and ground maintenance, utilities, outside legal fees and cybersecurity monitoring" and said it provided sufficient detail justifying the expenses.

"PJM has implemented cost-control measures, including reducing the number of full-time equivalent contractors, renegotiating telecommunications and utility contracts, expanding PJM's vendor pool to increase supplier competition, increasing PJM employees' share of medical insurance costs and modifying PJM's retirement benefits," FERC wrote. "PJM further supported the increased compensation levels, documenting that compensation levels were in line with industry averages, and identifying increased staffing requirements."

The commission acknowledged PJM's concerns that it needed to restore its depleting financial reserves.

"Nearly two-thirds of the estimated 7.5% increase in the 2017 stated rate proposed by PJM is to restore the reserve to its prescribed level of 6% of annual revenues, with a 2.5% annual increase in 2019 through 2023 and a 0.7% increase in 2024, while 2018 will see no increase," the order read.

PJM Capacity Debates, Angst over State Subsidies to Continue in 2017

Continued from page 17

formance requirements and nonperformance penalties under CP, although he conceded that changes to the market — such as what the minimum offer price should be — need to be considered. "[We were] seeing a lot of new units coming in, but not every one of them was coming in with firm fuel," he said, referring to the previous rules, under which forced outage rates peaked at 25% during the 2014 polar vortex — the event that led to the tougher rules.

A coalition of cooperatives and municipal utilities has been campaigning for several months for a holistic review of the capacity construct, questioning whether the current model is sufficiently flexible to respond to state initiatives. (See "Stakeholders Remain Skeptical of Campaign to Revisit CP," *PJM Markets and Reliability Committee Briefs*.)

Others have called for more specific rule changes, including extending the life of base capacity, incorporating seasonal capacity products and relaxing some of the construct's strict performance rules. (See *FERC Wants More Detail on PJM's Seasonal Capacity Plan*.)

Bowring has continued his call to eliminate demand response as a capacity resource, saying PJM should limit its role to the demand side of the capacity calculations.

Security in All its Forms

A major focus for PJM in the coming year will be analyzing its security. It has completed a multiyear effort to develop a security strategy focused on cyber and physical protections, Ott said. "We're already one of the leaders in the space, but continuous [improvement] is important to provide value to our customers," he said. (See "Preview of Security Committee Receives Tepid Response," *PJM Markets and Reliability and Members Committees Briefs*.)

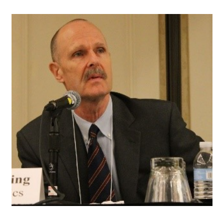
The transition in fuel sources for generating units is receiving consideration as well. The rapid expansion of gas-fired and retreat of coal-fired generation has made PJM "more diverse than we've ever been," Ott said, but he added, "Is there a point where we become concerned about being over dependent" on gas? The RTO has undertaken a fuel-security study to find out, the results of which are scheduled to be released by the end of the first quarter, Ott said.

Fixing FTRs and ARRs

FERC's order requiring changes in PJM's FTR/ARR market design and rejecting the RTO's proposed correction sent PJM back to devise a new strategy, which it submitted in a Nov. 14 compliance filing (EL16-6, ER16-121). The order called for shifting the costs of balancing congestion onto load and allocating ARRs in a way that doesn't consider extinct generators.

PJM filed for the changes to be implemented by June 1 while the Monitor requested rehearing, saying the commission erred in requiring load to shoulder the congestion costs. (See *Monitor Says FERC Erred in PJM FTR Ruling, Seeks Rehearing*.)

Renewed Turf Battle

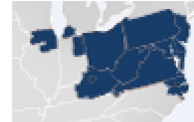


Bowring

Last year also saw a renewal of tensions between the Monitor and PJM management as Bowring took exception to the RTO's attempt to constrain his unit's role in the review of cost-based offers. (See *PJM Attempting to Usurp Market Mitigation Role, Monitor Says*.)

The disagreement is part of a larger dispute over fuel-cost policies, which Bowring defends as a major part of the Monitor's role. "Fuel-cost policies are core to defining and evaluating competitive offers, which equal short-run marginal costs," he said.

PJM NEWS



FERC Wants More Detail on PJM's Seasonal Capacity Plan

By Rory D. Sweeney

FERC has issued a deficiency notice requesting more information from PJM on its proposal to incorporate more seasonal resources under Capacity Performance (ER17-367).

PJM has until Jan. 22 to respond to the Dec. 23 notice, which asks for more detail and specific examples about its plan to integrate seasonal resources into capacity auctions and incorporate them into operational protocols. The proposal would relax the current prohibition on seasonal resources aggregating across locational deliverability areas.

In October, PJM angered some stakeholders when staff announced at the annual meeting of the Organization of PJM States Inc. that it was filing its proposal despite a lack of stakeholder consensus. (See PJM to Seek FERC OK for Seasonal Capacity Proposal.)

"The proposed [Open Access Transmission Tariff] revisions appear unclear as to how PJM will determine which Seasonal Capacity Performance Resource offers clear an auction and which do not, and how PJM will ensure least-cost capacity procurement," the commission wrote.

It asked if offers will be put in auctions individually or paired with a resource from the opposite season with an aggregated offer price. FERC also asked how PJM's optimization algorithm will compare seasonal and annual resources, at what price the algorithm would stop clearing seasonal resources and how it will break ties if multiple seasonal resources submit identical offer prices.

The RTO's proposal would allow resources to aggregate beyond LDA borders, with unmatched resources moving up to the next LDA level until a match is found.

FERC wanted more detail on how PJM's cross-LDA aggregation concept would affect operational procedures, noting that the current proposal allows a seasonal resource to clear an auction, be counted toward the reliability requirement of an LDA other than the lowest level one in which it's located and receive a clearing price less than that of the lowest-level LDA.

The commission also asked how a resource could be subject to a performance assessment hour in the LDA where it's located, but receive the clearing price and help with the reliability requirement for the LDA in which it cleared the auction. It wanted to know how PJM plans to apply performance-related charges and credits and what rates will apply.

FERC also asked if PJM intends for fixed resource requirement capacity plans that include seasonal resources to have equal quantity of summer and winter resources.

The commission wondered why PJM created a way for summer demand response to offer into auctions, but not for winter resources. "Why does PJM propose to exclude a winter-period demand resource from participating as a seasonal Capacity Performance resource?" it asked.

FERC also showed interest the differences between seasonal resources, asking PJM to opine on whether resources from one season or the other make a bigger difference on system reliability. It asked about any documentation PJM has on the topic.

PJM Considering Expansion of Spot-in Tx Solution to All Borders

By Rory D. Sweeney

VALLEY FORGE, Pa. — PJM proposed modifying an initiative on spot-in transmission by expanding it to all borders.

The proposal came despite reservations from Vitol's Joe Wadsworth, who had won approval for a problem statement and issue charge specific to transactions between NYISO and PJM. (See PJM, NYISO Still Seeking Spot-in Tx Solution.)

PJM held a special session of the Market Implementation Committee on Wednesday, where stakeholders also debated implementing unlimited service along the NYISO-PJM seam. The seam is unique among PJM's physical interfaces because all transactions are economically evaluated via NYISO's clearing engine. Imports over other seams are price-takers that are paid PJM's real-time LMP.

John Dadourian of Monitoring Analytics, PJM's Independent Market Monitor, reiterated the IMM's previous criticism of the unlimited service proposal, saying any market changes should apply uniformly across all borders to avoid any unintended market consequences. The Monitor is "not interested in creating a different methodology for handling [such transactions] at different borders," he said.

Unlimited service, however, is opposed by other grid operators worried that extensive cross-border transfers could create constraints on the transmission lines of uninvolved operators. They cite language from joint operating agreements and discussions before the North American Energy Standards Board that call for limiting such transfers.

The proposal also potentially introduces new costs that NYISO has insisted also be shared by PJM.

As an alternative, PJM and Wadsworth have considered moving PJM's earliest request time for spot-in service to 10 a.m. from the current 9 a.m. The delay would allow potential market participants to know if their NYISO bid has been approved before requesting service into PJM.

The Monitor asked that this proposal also be expanded to apply across all borders, which Wadsworth opposed but eventually agreed to "in the spirit of considering different solutions."

While Wadsworth called the alternative proposal "not great," PJM pointed out that such service has been available in excess of 959 MW every hour since July 2015.

"I don't want to end up in a situation where we were five years ago, where we're precluded from implementing a good solution for one seam just because it doesn't work for all seams," he said.

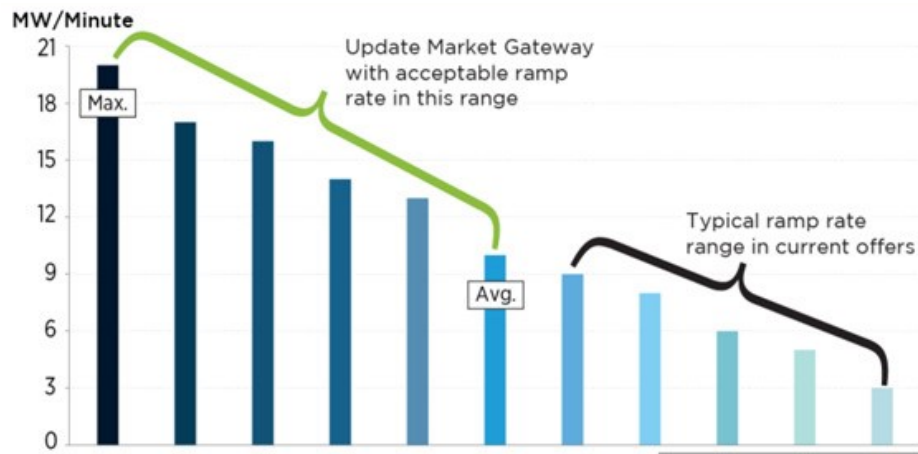
The modified problem statement and issue charge will be presented for approval at the Jan. 11 MIC meeting.

PJM NEWS

FERC Rejects Rehearing on Capacity Performance Penalty Exemption

FERC rejected a request to rehear its order blocking Tariff changes that would have exempted PJM capacity resources from nonperformance charges under certain circumstances.

The commission's Dec. 22 order said the challenge by the PJM Utilities Coalition — American Electric Power; Buckeye Power; Dayton Power and Light; Duke Energy Kentucky; East Kentucky Power Cooperative; and Virginia Electric and Power — "does not offer any information or arguments that are new to this proceeding and primarily reiterates arguments advanced in PJM's prior pleading" (ER16-1336-001).



Historical average ramps | *PJM*

The changes, approved by stakeholders following months of debate, would have exempted a capacity resource from penalties if it was following PJM's dispatch instructions and operating at an acceptable ramp rate during periods of high load. The changes were designed to discourage generators from self-scheduling prior to a performance assessment hour in order to avoid nonperformance charges — behavior that PJM said would pose operational challenges and reliability risks.

The commission rejected the change in May, saying PJM had not shown that its operational concerns justified the proposal, which it said undercut Capacity Performance rules designed to ensure resources are available during a crisis. (See *FERC Rejects Ramp Rate Exception in PJM Capacity Rules*.)

The commission reiterated its conclusion in rejecting rehearing, saying "the existing incentives in the threat of a nonperformance charge and risk of losses due to self-scheduling were robust enough for resource owners to both properly maintain their units and follow PJM dispatch."

— Rich Heidorn Jr.

FERC Upholds PJM Advocates' Funding

By Rich Heidorn Jr.

FERC upheld its order approving funding for PJM's state consumer advocates, rejecting contentions by Talen Energy and Essential Power that the commission exceeded its authority (ER16-561-001).

The commission in February approved PJM members' vote granting the Consumer Advocates of the PJM States (CAPS) an initial annual budget of $450,000 to fund the advocates' stakeholder activities through a charge to electric customers. Former Commissioner Tony Clark dissented from the vote, saying CAPS should be funded through the appropriations of state legislatures. (See *FERC Approves PJM Funding of Consumer Advocates*.)

Talen and Essential sought rehearing, saying the order exceeded the commission's authority under Section 205 of the Federal Power Act because CAPS's participation in the stakeholder process was not a jurisdictional service nor a practice that has a "direct effect" on jurisdictional rates.

In its Dec. 21 order, the commission said its authority came under Section 205's direction to ensure just and reasonable rates. "The Supreme Court has held that this jurisdiction extends to rules and practices that directly affect wholesale rates. … The PJM stakeholder process is a practice that directly affects wholesale rates, and thus approval of a proposal that would enhance that process falls within the commission's jurisdiction. … For example, stakeholder input is an essential element of a just and reasonable regional transmission planning process, a process that the courts have agreed is one that directly affects jurisdictional rates."

The commission cited the Independent Market Monitor's comment that "PJM consumers have been systematically underrepresented" in the stakeholder process, and that the funding was "a meaningful first step to obtain needed balance."

In response to the complainants' contention that the funding violated cost causation rules, the commission repeated its conclusion that funding CAPS benefits PJM's ratepayers by increasing its responsiveness to customers and other stakeholders. "We disagree with Talen/Essential Power that making the stakeholder process more inclusive, transparent and robust through CAPS's participation is not a legitimate reason to accept a tariff funding mechanism for CAPS," FERC said.

FERC also rejected Talen and Essential's complaint that the funding constituted "compelled speech" in violation of the First Amendment. "By contributing to funding CAPS's participation in the stakeholder process, neither Talen/Essential Power nor any other stakeholder becomes identified with CAPS's views in a way that causes them to become an instrument for fostering public adherence to them," FERC said. "On the contrary, all stakeholders remain free to express their views within the stakeholder process and to support or oppose any position that CAPS advances."

PJM NEWS

MRC/MC Briefs

PJM, IMM Win Approval for Reinstatement of Capacity-Replacement Rules

WILMINGTON, Del. — Just a month after approving changes that PJM and its Independent Market Monitor felt stripped away important market protections, the Markets and Reliability Committee approved new revisions to reinstate them.

The new revisions are similar to an amendment the Monitor and PJM had proposed for the original changes developed by Citigroup Energy. The amendment never received a stakeholder vote, however, because Citigroup's proposal passed the MRC in November with enough support to avoid considering alternatives. (See "PJM, IMM Partner on Capacity-Replacement Revision," *PJM Market Implementation Committee Briefs*.)

At issue is how quickly after a bid clears an Incremental Auction that the bidder can take credit for the purchase and flatten its position. Citigroup's Barry Trayers said the change was necessary to allow his company to reconcile its books sooner and avoid excessive credit requirements.

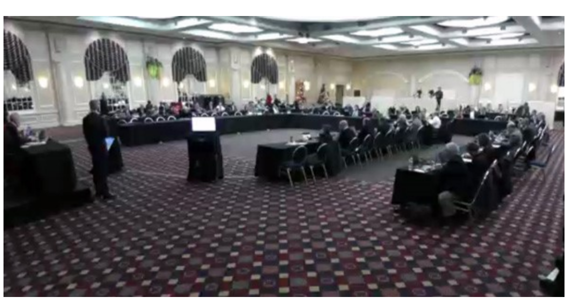
PJM said the change to Manual 18 widened a loophole that allows participants to arbitrage price differences between the BRA and IAs by reselling the replaced capacity. The IMM had filed a complaint with FERC on the change, which several stakeholders credited for convincing them to reconsider their initial support.

The revisions were approved by a sector-weighted vote of 4.39 out of 5, winning near unanimous support from all sectors except for Other Suppliers. The IMM has since filed to withdraw its complaint with FERC.

The approved revisions included a friendly amendment from Mike Cocco of Old Dominion Electric Cooperative that requires PJM to respond to requests for early replacement capacity within 15 days.

Trayers attempted to defend his original changes, reading from a statement that carefully outlined his intentions and explained that the new revisions would reinstate the obstacles he had attempted to address in the first place. Trayers said an anomaly that can result in double counting of PJM participants' capacity balances would require them to maintain collateral after they no longer have a position to collateralize. "The proposal here today would reinstate double counting," he said.

Although Citigroup does not participate in the BRA or IAs, it provides receivables financing by purchasing the offsetting capacity positions and the future payment obligations of PJM, Trayers said. The change approved in November "does not alter the responsibility of all capacity market participants to meet their obligations with true physical capacity," he said.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Task Force on Uplift Directed to Vote Again

Members directed the Energy Market Uplift Senior Task Force to seek consensus on ways to reduce uplift and address cost allocation concerns by revoting on five proposals that had previously received the most support.

While two proposals on uplift and volatility have received majority support, none of the more than 20 proposals on allocation has received such an endorsement.

Although the task force couldn't agree on a path forward, PJM's Dave Anders said the voting process indicated "overwhelming support for making a change." He said several proposals successfully address the cost allocation issue but met resistance from stakeholders pushing for "backtesting" to determine how each package of changes would affect billings.

Anders said backtesting has been done on a few packages, but it would be "extremely complicated" for others. He urged members to focus on overall market design rather than how much each package is going to cost participants. But some stakeholders said they would oppose any reconsideration of the packages without some sort of backtesting.

Monitor Joe Bowring called for action. "There are some participants who have benefited from a delay, continue to benefit from a delay. It's time to decide," he said.

Others, including FirstEnergy's Jim Benchek and Carl Johnson of the PJM Public Power Coalition, also urged the process forward.

"If we come out of this with nothing else, I would like to go to FERC with something that causes them to take action," Johnson said. "I'm not sure it matters what we suggest to FERC. What matters is getting a [Section] 205 [of the Federal Power Act] action in front of them."

After PJM committed to providing as much backtesting as possible, members approved directing the task force to revote on the top five packages. Its next meeting is Jan. 25.

Stakeholders Remain Skeptical of Campaign to Revisit CP

American Municipal Power's Ed Tatum took to the MRC floor for what he noted was his "fourth first read" on a problem statement calling for a holistic review of PJM's capacity construct.

For several months, Tatum has represented a coalition of stakeholders requesting a review. His arguments have often been met with ambivalence and a reluctance to tinker with the complex market, which is still incorporating the introduction of Capacity Performance requirements. (See *No End in Sight for PJM Capacity Market Changes*.)

The coalition took a month off after receiving substantial feedback in October, but Tatum said it decided to return to the MRC after being contact by RTO officials. "We got a call from PJM, and we answered the phone," he said. The feedback resulted in several changes to the proposed problem statement and issue charge, including transferring the focus from addressing potential state public-policy action to generalized governmental action.

Stakeholders suggested a variety of potential revisions that might help gain their support, including word choice.

"I don't mean to sound like a broken record … but [consider] approaching this from less of a defensive posture and thinking that the states are out to get us, because I don't think that's actually what's going on," EnerNOC's

Continued on page 22

PJM NEWS

PJM Credit Adder Fails upon Heightened Review

By Rory D. Sweeney

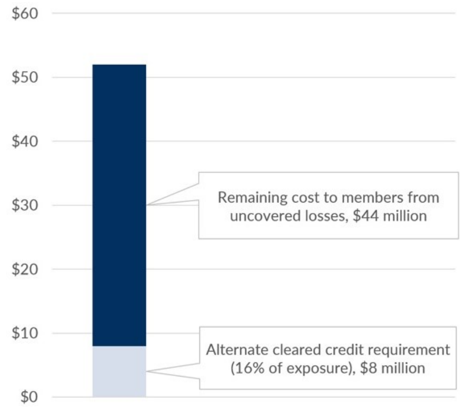
WILMINGTON, Del. — A proposed revision to credit requirements for financial transmissions rights participants received significant stakeholder debate before the Markets and Reliability Committee and withered under the scrutiny.

The proposal was supported by FTR holders who complained that the “undiversified credit adder” applied to net counterflow portfolios caused over-collateralization of some FTR portfolios. The proposal, approved by the Credit Subcommittee, eliminates the adder in exchange for increasing the historical adjustment factor in underlying credit calculations for historically counterflow paths from 10% to 25%.

The adder was created following the $52 million credit default by Tower Research Capital’s Power Edge hedge fund in 2007. Members agreed to review it following a 2013 survey of issues of concern to the Credit Subcommittee.

Exelon’s Sharon Midgley had complained at the Dec. 14 Market Implementation Committee meeting that the change would increase her company’s credit costs, but the committee approved the change 88-34. (See “Credit Limit Changes Pass Despite Exelon Objections,” *PJM Market Implementation Committee Briefs*.)

That changed in the sector-weighted vote at the MRC on Dec. 22, where it won a majority of only one sector (69% of Other Suppliers), scoring only a 1.25 out of 5.



Under current rules, collateral held by PJM would have covered all of the $52 million in FTR net counterflow portfolio losses in 2007-8. Under a proposed rule change, only $8 million of the losses would have been covered, leaving PJM members to reimburse $44 million, according to stress tests by the RTO. | *PJM*

Exelon’s Jason Barker criticized how the credit increases would be implemented, saying it would be taking large “chunks” of credit from overcollateralized portfolios and “peanut-buttering” it over other undercollateralized ones. “We think that the balance is certainly off,” he said.

“From a customer perspective, I think it’s difficult to take the chance as we know the facts today,” said Susan Bruce of the PJM Industrial Customer Coalition. “I’m not in a position to take a chance, but I’m willing to talk more about this.”

PJM’s Stu Bresler said the RTO “doesn’t have a dog in the fight” over whether members are willing to accept potential defaults. But he said it does have a long-term concern.

“Even if the members are willing to accept additional risk … we have to consider the effect and potential ramifications,” he said. “I think it goes beyond reputation. It goes to the confidence to participate in the markets if [a default] were to occur again.”

Opponents of the changes, including the Independent Market Monitor, preferred to maintain the current protections against events like the Tower default. “I’d prefer that something like that never occur again,” American Municipal Power’s Ed Tatum said. “I haven’t seen an upside for the stakeholders but for those who are performing these transactions.”

Bruce Bleiweis of DC Energy called the proposed changes “good policy” that “right-sizes” credit portfolios. He also questioned whether the incident that precipitated the changes could occur again given rule changes that have been implemented in the interim.

“We don’t think that’s an accurate stress test because we don’t think that the Tower portfolio would have occurred,” he said. Tower wouldn’t have taken the position because its bid collateral would be more than $35 million today, he theorized.

MRC/MC Briefs

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Katie Guerry said. “I don’t think that’s a fair representation.”

James Wilson of Wilson Energy Economics suggested reviewing the ISO-NE and NEPOOL documents founding the Integrating Markets and Public Policy (IMAPP) process which he said are more focused on trying to accommodate state policies.

PJM’s markets don’t reflect the costs of carbon emissions and some states might want to address it, he said. “To the extent that you accept that [carbon is harmful], then PJM’s markets aren’t efficient because they don’t reflect this externality, and what the states are doing is pushing things toward a more efficient result,” he said.

Others asked the coalition to better define its intended scope. “You’re saying, ‘Take everything we do here every day and change it,’” Gabel Associates’ Mike Borgatti said. “If we’re talking all of it, I’m not sure where I’d want to start.”

The Industrial Customers’ Susan Bruce questioned the problem statement’s timeline. “This is a lot of stuff, and to look at having deliverables [by] the third quarter of 2017, that’s ambitious.” she said.

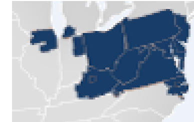
Tatum acknowledged the additional feedback but expressed concern that the focus seems to be moving away from the proponents’ original intent. He solicited stakeholder help in making supportable revisions, but Exelon’s Jason Barker said the proponents needed to better clarify their goals. “We’re stepping on a slippery slope is all Exelon is saying,” he said.

Stakeholders Balk at Applying Tougher External Capacity Rules to Past Auctions

Stakeholders expressed concern that a PJM proposal tightening eligibility requirements for external capacity resources might violate FERC prohibitions on retroactive ratemaking.

Continued on page 23

PJM NEWS



MRC/MC Briefs

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The proposal, which won 68% support in a vote of the Underperformance Risk Management Senior Task, would require external resources to have firm transmission service with rollover rights from their native region and to meet "specific operational and market modeling requirements" to ensure that the resources can deliver energy without imposing congestion costs on PJM members.

Stakeholders expressed concern over PJM's intention to apply the tightened requirements to capacity resources that have cleared in prior auctions. The proposal would allow existing resources that fall short to either build the transmission upgrades required to qualify under the new rules or to be relieved of their requirements without penalty.

"I think everybody should pay an awful a lot of attention to how this is being handled as far as grandfathering or not grandfathering" resource contracts, said consultant Roy Shanker. Calling it "horrible policy," he said the proposal creates the potential to disqualify a cleared resource and reduce the amount of capacity cleared without adjusting the clearing price.

Other stakeholders, including Johnson and Barker, joined Shanker in voicing concern that it could result in retroactive ratemaking. They suggested that the rules be implemented going forward from the next BRA.

Bowring opposed "PJM's continued inadequate approach to ensuring that capacity imports be substitutes for internal capacity resources," including grandfathering existing long-term contracts with external resources and extending the current exceptions for two additional BRAs.

PJM had indicated it would seek votes of the MRC and Members Committee in January.

ARR Enhancements, Manual Revisions Unanimously Endorsed

Changes to the residual auction revenue rights process received little discussion and were endorsed with one objection and two abstentions. (See "Stakeholders Debate ARR Changes," *PJM Market Implementation Committee Briefs*.)

Members also endorsed by acclimation revisions to manuals 10, 13 and 14D that were largely administrative in nature. The Manual 13 changes were the result of a periodic review and included updating the Mid Atlantic Dominion primary reserve requirement from a static 1,700 MW to 150% of the area's largest single contingency. It includes a note permitting the use of deliverable resources outside of the area to satisfy the requirement.

"It really just aligns it with the [rules for the] RTO," PJM's Chris Pilong said.

The Manual 14D changes align it with the planned changes to Manual 13 and include revisions to the fuel-limitation reporting section to update seasonal reporting procedures, add a periodic reporting process and remove details on real-time reporting. The reporting focuses on fuel-inventory and environmental-limitations issues. "The reason for the change to both manuals is to better clarify the reporting process," PJM's Augustine Caven said.

— Rory D. Sweeney

SPP NEWS

SPP Seeks to Manage Wind Riches, Improve Order 1000 Process

Z2, Combined Cycle Modeling also on To-Do List for 2017

By Tom Kleckner

SPP and its stakeholders enter 2017 seeking ways to integrate the massive amounts of renewables in the RTO's interconnection queue, while also completing the painful Z2 project, improving the Order 1000 competitive transmission process and implementing more sophisticated combined cycle modeling.

Expiring tax credits and reduced costs for renewable energy has led to a rush of generation projects that threaten to overwhelm RTO transmission planners.

Wind Rush

"We're embarking on an era we've never seen before," Mike Wise, chair of SPP's Strategic Planning Committee, said during the RTO's Board of Directors/Members Committee meeting in December. "We're trying to figure out, one, how do we deal with the issue and, two, how do we take advantage of the issue at the same time?"

David Osburn, general manager of the Oklahoma Municipal Power Authority, agreed with Wise, saying, "It wasn't very long ago we were arguing about how much wind might be on the system, and we've already blown through that."

Whether or not the pun was intended, Osburn made his point. SPP has been able to add more wind to its system than many would have thought possible a few years ago, and now it looks to be facing the same issue with solar power.

SPP currently has 15,728 MW of installed wind energy with another 21,535 MW in the interconnection queue — adding up to more than half of the balancing authority's coincident peak load (50,622 MW in July). The system set a new record for wind generation Friday with 12,141 MW, and for some hours in April, almost half of the generation came from wind sources. SPP expects to set new records in April 2017, with wind exceeding 60% penetration. (See related story, *SPP Coal Generation Continues Decline; Wind, Load Records Set*, p.25, and *Wind Growth Causes SPP to Take 2nd Look at Tx Projects*.)

3,000 MW of Solar Coming

The RTO currently only has 215 MW of solar energy on the system, but more than 3,000 MW of solar is planned. That has Board Chair Jim Eckelberger sounding the alarm.

"That's what wind looked like 10 years ago, and solar is getting cheaper and cheaper and cheaper," he said. "We're going to have quite a need to refocus on the mechanics of the market to make this work, or negative pricing is really to going to have a long-term change in the way electricity is used in our footprint."

SPP says all that wind generation has a high impact on system congestion. Wind energy also causes headaches for grid operators by not showing up during high demand — or by providing too much power during periods of low demand. Wind power on the margin resulted in 160 hours of negative clearing prices in 2016. SPP staff notes some wind farms are voluntarily curtailing their production because of low prices.

"We have to figure out a way to either use the wind, control for the wind or figure out a way to allow other folks in this country to get access to this wind," Wise said. "This is really a dilemma … a growing dilemma."

The problem is, when the wind picks up in SPP, it's also picking up in neighboring MISO and ERCOT, dampening demand for imports.

But SPP can point to studies that show UHVAC networks and HVDC links could deliver surplus wind power to markets in the east, helping them meet renewable portfolio standards.

The Strategic Planning Committee created the Export Pricing Task Force last summer to evaluate the business case for exports and create a rate structure "to address the recovery of the incremental transmission and the underlying facilities necessary" to support exports. The group met twice in 2016 but has scheduled monthly meetings for this year. Its charter calls for making recommendations by the end of July.

If all the pending wind projects are brought online, SPP Manager of Operations Analysis and Support Casey Cathey told the committee, the lack of an export strategy might force the SPP Reliability Coordinator to allow more wind energy to sink within the balancing authority, while at times increasing curtailments.

Iowa wind turbines after harvest | *Theodore Scott via Creative Commons*

Cathey's team is also responsible for the 2017 Variable Generation Integration Study, which stressed the SPP system to a point of instability in analyzing the effect of high-wind/low-load scenarios on reliability. A workshop has been scheduled for Feb. 14-15 in Little Rock to discuss the study's results.

"It's going to fall on SPP to really figure out what we're doing in the future and how we're going to resolve this issue," Wise said to the board and members. "I encourage all the great thinkers at your companies to be attentive to the issue … and help us come up with solutions, because this is not an easy task."

Z2 Project Lingers

Accommodating and planning for more wind generation is not the only difficult task facing SPP in 2017. Members and stakeholders continue to work on improving the troublesome Z2 crediting process for network upgrades, which was a bone of contention for much of this past year.

Under Attachment Z2 of the SPP Tariff, staff was to assign financial credits and obligations for sponsored upgrades. However, staff had not applied the credits for years dating back to 2008, complicating the task of trying to accurately compensate project sponsors and claw back money from members who owed debts for the upgrades.

Staff and members agreed on a process to compensate everyone properly, but it wasn't until November that staff was able to compile the historical data from 2008 through August 2016. Members will be invoiced almost $95 million in lump sum payments, with another $15 million billed in 20 installments through August 2021.

SPP CEO Nick Brown said last January that

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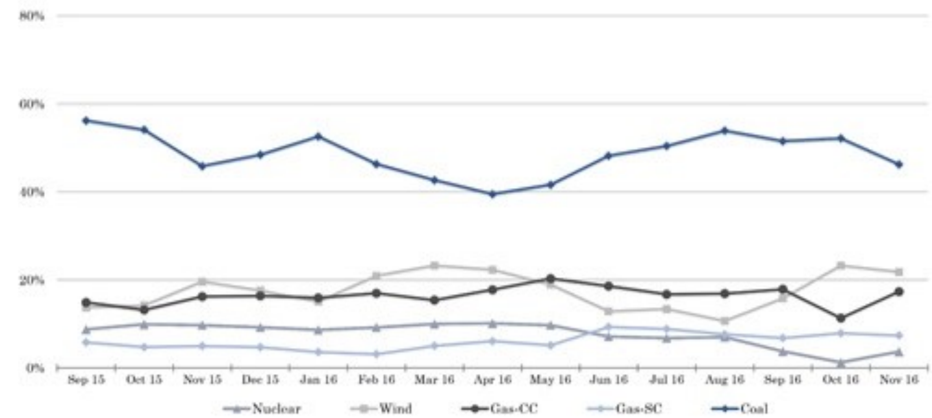
SPP NEWS

SPP Coal Generation Continues Decline; Wind, Load Records Set

By Tom Kleckner

Coal-powered generation continues to decline in SPP's market, accounting for only half the RTO's total energy production this fall (September-November), according to the Market Monitoring Unit's recently released State of the Market report.

Wind production and lower gas prices have combined to reduce the use of coal resources, which accounted for 60% of SPP's energy production just two years ago. At the same time, wind energy has increased its share of production from 13% in fall 2014 to 20% in 2016.



Generation by fuel type by percent (real time) | *SPP Market Monitoring Unit*

Not surprisingly, coal resources only set real-time prices 37% of the time this fall, compared to 52% in 2015. Cheaper gas units (combined cycle and simple cycle) were marginal 53% of the time, with wind resources setting the price 9% of the time.

After record low prices in the spring, gas prices rose in the fall, with the average cost of $2.61/MMBtu at the Panhandle Hub, compared to $2.25/MMBtu in 2015. The real-time balancing market's average LMP was $25.10/MWh, up from $19.98/MWh a year ago; the day-ahead market saw an increase from $20.73/MWh last year to $24.43/MWh this fall.

The report also noted virtual transactions have "steadily increased from year to year," driven primarily by financial-only market participants. Financial players completed 2.1 million virtuals this fall, with resource and load owners accounting for just over 62,000.

SPP saw "marked" increases of 12.6% and 13.7% of load in October and November, respectively, bettering the previous high month of 10.8% last March. Virtual transactions as a percentage of load have increased from 7.1% two years ago to 11.7% in 2016.

The RTO filed the report with both FERC and the Arkansas Public Service Commission.

SPP Sets New Wind Generation, Winter Load Marks

SPP set a new record for wind generation Friday when the footprint cracked the 12,000-MW threshold for the first time, producing 12,141 MW. The latest record was its sixth in 2016 for wind generation, breaking the previous high of 11,305 MW on Nov. 17.

The RTO also set a new winter load peak of 40,323 MW on Dec. 19, marking the first time its winter load surpassed 40,000 MW.

SPP Seeks to Manage Wind Riches, Improve Order 1000 Process

Continued from page 24

Z2 would be "the focus of the organization this year." That will still be the case this year, as the Z2 Task Force will meet before January's Markets and Operations Policy Committee to evaluate staff and stakeholder proposals to improve the process. SPP has proposed using incremental long-term congestion rights as one replacement for Z2 credits.

At the same time, the legal and regulatory battles over Z2 have just begun. In November, the Kansas Electric Power Cooperative became the first SPP member to pursue legal action over the Z2 revenue-crediting process when it filed a complaint with FERC. KEPCo said in its Nov. 22 filing that SPP's direct cost assignment of approximately $6.2 million to it violated the RTO's Tariff, the filed rate doctrine and the Federal Power Act. The complaint seeks relief from directly assigned Z2 obligations and a refund for payments already made.

Order 1000

Staff and members are also working to improve the RTO's competitive bidding process under FERC Order 1000. The first go-round last year resulted in one competitive project being bid out, only to have it pulled for re-evaluation shortly thereafter.

The Competitive Transmission Process Task Force hopes to change that by offering recommendations this year to improve the process. The group has already modified documents and templates while reviewing the entire competitive bidding process. Two Tariff revision requests have already begun to wind their way through the stakeholder-approval process, and more could be on the way if the MOPC and board approve changes to the scoring criteria in January.

Enhanced Combined Cycle Modeling

SPP will see one of its first major projects since the Integrated Marketplace come to a conclusion March 1 when software allowing multiple configurations of combined cycle units goes live. With the new functionality, market participants can register and submit separate offers for each configuration, leading to a more economic commitment and dispatch of the resources.

Participants completed structured testing of the software in December. The technology also played a role in SPP's successful timeline changes for coordinated gas-electric scheduling practices in September as a result of FERC Order 809.

Dynegy Files Mitigation Plan for Purchase of ENGIE Plants

FERC Cites Market Power in PJM, ISO-NE

By William Opalka

Dynegy says it will sell generation in PJM and ISO-NE if necessary to address FERC market power concerns over the company's acquisition of ENGIE's power generation unit.

The commission conditionally approved the sale Dec. 22 but said the company had to mitigate its market power in the two regions' capacity markets (EC16-93).

The commission's order found the $3.3 billion acquisition for 9 GW of generation assets will not have an adverse effect on competition in NYISO, MISO or CAISO, nor in the PJM or ISO-NE energy or ancillary services markets.

But FERC said it was concerned the transactions could harm capacity market competition in PJM's Commonwealth Edison locational deliverability area and ISO-NE's Southeast New England (SENE) capacity zone. FERC said that existing market power concerns in ISO-NE would be exacerbated by the acquisition absent mitigation.

The sale also includes the sale of the France-based ENGIE's plants in ERCOT, which are not subject to FERC jurisdiction.

Dynegy and partner Energy Capital Partners proposed to buy 17 fossil fuel plants of ENGIE subsidiary GDF Suez North America (GSENA) and named the joint venture Atlas Power Finance. In June, Dynegy said it would pay $750 million to buy out ECP's 35% stake. (See *Dynegy Buying out Energy Capital's Stake in ENGIE Deal*.)

FERC found that the acquisition would increase the Herfindahl-Hirschman Index for the "highly concentrated" ComEd LDA — currently 2,021 points — by 49 points.

Although Atlas Power would not currently be a pivotal supplier in ComEd, the planned retirements of the Will County Generating Station (May 2020) and Exelon's Quad Cities nuclear plant (June 2018) would reduce capacity available to bid in the 2020/21 Base Residual Auction by 2,223 MW in the LDA.

"Factoring in the 2,223 MW of planned retirements leaves an insufficient supply of unforced capacity available to meet the ComEd LDA minimum annual resource requirement, which means that Atlas Power's capacity is needed," FERC said. "With all other factors held constant, we calculate that Atlas Power will be pivotal in the ComEd LDA for the 2020/2021 Base Residual Auction."

In its Dec. 27 response, Dynegy said changes in circumstances in Illinois since the transaction was first proposed make mitigation no longer necessary. It cited the sale of its 50% interest in the 1,350-MW Elwood gas generation plant approved by FERC in November and Illinois' enactment of a subsidy to support nuclear power, which led Exelon to cancel its plans to close the Quad Cities plant. (See *Illinois Lawmakers Clear Nuke Subsidy*.)

FERC in its merger order invited Dynegy to describe how the Elwood transaction would impact the mitigation analysis. The commission only said the Illinois legislation "may affect" Quad Cities' status.

If the commission still requires mitigation, Dynegy proposed divesting generation units equal to or above the 327 MW it is acquiring in ComEd and using cost-based capacity market offer caps until generation is divested.

New England

In SENE, FERC said GSENA was pivotal before the transaction with approximately 1,273 MW of qualified capacity. After the acquisition, Dynegy's assets in the SENE capacity zone will grow to 1,497 MW.

"Applicants argue that because GSENA is pivotal prior to the proposed transactions and Atlas Power will remain pivotal after the proposed transactions, the proposed transactions will have no adverse effect on competition. We disagree," the commission wrote. "Being pivotal implies that a seller has the ability to unilaterally increase the market price, and the seller's incentive to do so increases as it becomes more pivotal."

FERC said mitigation was necessary through either a plant sale or a commitment to keep certain plants operating.

"Specifically, we are concerned with a seller's ability to exercise market power in the ISO-NE Forward Capacity Auction when its resources enter or exit the market, and thus, applicants should tailor mitigation to address that concern. For example, applicants may consider, among other steps, divestiture of generation units or a commitment to keep resources in the ISO-NE capacity market for a specified period of time."

Dynegy responded that it will divest generation equal to or above the 224 MW it is acquiring in SENE and would limit capacity bids in interim capacity auctions to no greater than the FCA clearing price until any divestiture. It also promised not to retire any units until the sales are completed.

The company asked for expedited approval by Jan. 30.

Public Citizen had protested the transaction because of two FERC investigations into allegations of Dynegy misconduct in a PJM 2015 capacity auction and a separate audit. (See *Dynegy: No Evidence of Misconduct in Auction*.) FERC said those issues were beyond the scope of its review of the acquisition's effect on the public interest.

Dynegy would acquire a 50% interest in the Bellingham Energy Center. | *NextEra Energy Resources*

Plant	MW	Owner
Dighton	164	Dynegy
Wheelabrator North Andover	29.7	Energy Capital Partners
Wheelabrator Saugus	30.1	Energy Capital Partners
Bellingham (50% share)	138.8	GSENA
ANP Bellingham	501.1	GSENA
ANP Blackstone	484.5	GSENA
Milford Power	149	GSENA
Total MW	**1,497.2**	

Plant	MW	Owner
Lee Energy Facility	623.5	Dynegy
Kendall	1,137.7	Dynegy
Elwood	1,350	Dynegy
Kincaid	1,108	Dynegy
Calumet Energy Power Station	327	GSENA
Total MW	**4,546.2**	

Dynegy generation in Southeast New England (left) and ComEd, post GDF Suez NA acquisition | *Dynegy*

Company Briefs

Algonquin Completes $2.4B Merger With Empire District Electric

Liberty Utilities, a subsidiary of Canadian-based Algonquin Power and Utilities, has completed its $2.4 billion acquisition of Empire District Electric, which provides services in Missouri, Kansas, Oklahoma and Arkansas.

Algonquin offered $34/share for Empire stock, which was a 21% premium above the closing price the day before the deal was announced in February. The deal was conditioned upon Algonquin not passing the premium along to ratepayers.

More: *The Joplin Globe*

PPL Initiative Converts Old Utility Poles to Fuel

PPL

PPL Electric Utilities has rolled out a program in Pennsylvania to use wood waste from its broken and worn-out utility poles for fuel.

Under the program, the poles are dropped off at service centers and are picked up by waste-to-fuel energy facilities that are not affiliated with PPL.

The program is reusing 100% of the wood, which keeps about 1,600 tons of wooden materials out of landfills each year, according to the company.

More: *Lehigh Valley Business*

PECO Proposes Prepayment Program for Energy Bills

PECO Energy is asking Pennsylvania regulators for permission to pilot a program in 2018 that would allow 1,000 of its 1.6 million customers to prepay their electricity or natural gas bills.

Instead of getting a monthly bill, consumers would spend down the upfront balance that they paid. Customers with a zero or negative balance would be given a five-day grace period, along with daily reminders to load more funds.

Consumer advocates are pushing back against the program, saying it's a way for PECO to circumvent a state law banning it from turning off power for people living at 250% of the federal poverty level.

More: *WHYY*

Ill. Supreme Court to Hear Clean Line's Appeal on Rock Island

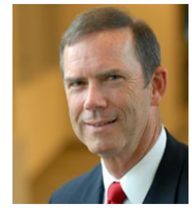
The Illinois Supreme Court has agreed to hear an appeal by Clean Line Energy Partners of an Aug. 10 appellate court decision that effectively halted construction of the Rock Island Clean Line, which would have carried electricity from Iowa wind farms to eastern Illinois and beyond.

The appellate court found the project didn't meet the requirements of a public utility under Illinois law. The ruling blocked regulatory approval and eminent domain, which developer Clean Line Energy Partners needed to complete the route through five counties.

The Supreme Court could rule as early as mid-2017.

More: *WNIJ*

Bill Levis to Retire from PSEG Power in Q3 2017



Public Service Enterprise Group announced Wednesday that Bill Levis, president and COO of PSEG Power, will retire in the third quarter of 2017. Levis is also a member of PSEG's Executive Officer Group.

Levis joined PSEG in 2007 after having worked at Exelon in nuclear operations. He previously held positions with Ontario Hydro and Carolina Power and Light.

PSEG will not be announcing a successor until closer to the retirement date.

More: *PSEG*

3 Oil and Gas Firms Announce Plans to File for Bankruptcy

Oil and gas producers Bonanza Creek and Memorial Production Partners and oilfield services provider Forbes Energy Services all announced last week their plans to file for bankruptcy soon.

Bonanza Creek plans to file by Jan. 5 with a plan to eliminate $850 million in debt and provide $200 million in new equity. Memorial said it would file for Chapter 11 in coming weeks with a plan to eliminate $1.3 billion of debt. Forbes Energy said it reached a prepackaged plan with lenders and would file in Houston by Jan. 23, 2017.

As of Dec. 14, 114 oil and gas producers had filed for bankruptcy in 2016, with more filings expected next year.

More: *Reuters*

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FEDERAL BRIEFS

Obama's New Energy Rules Depend on Trump Admin

Last week the Department of Energy unveiled sweeping energy efficiency standards affecting five types of products. But because there's a 45-day waiting period before these regulations can be published in the *Federal Register*, their future hinges upon whether the Trump administration follows through.

The regulations apply to portable air conditioners, swimming pool pumps, walk-in coolers and freezers, commercial boilers and uninterruptible power supplies.

Taken together, they would save U.S. consumers $15 billion to $35 billion in the long run, Andrew DeLaski, head of the Appliance Standards Awareness Project, said in a blog.

More: *The Washington Post*

NRC Cites Diablo Canyon for Low-to-Moderate Safety Risk

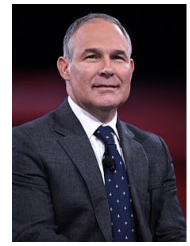
The Nuclear Regulatory Commission has cited the Diablo Canyon nuclear power plant in Central California for a low to moderate safety risk that has possibly been ongoing since October 2014.

During a test in May, workers found that an emergency cooling system for one of the plant's two reactors wasn't working, and the problem was traced to an improperly installed switch. A second emergency core cooling system was available if needed.

Pacific Gas and Electric, the plant operator, corrected the problem and plans to appeal the commission's finding.

More: *The Orange County Register*; *Santa Maria Times*

Democrats Seek Information on Pruitt's Energy Sector Ties



Pruitt

Six Democrats on the Senate's Environment and Public Works Committee are raising concerns about the energy industry ties of Scott Pruitt, President-elect Donald Trump's pick to head EPA.

The senators wrote to Pruitt on Tuesday requesting information related to his director status at the Rule of Law Defense Fund, a nonprofit that received $175,000 in 2014 from a central arm of the Koch brothers' network. Democrats also are concerned that Pruitt reportedly used oil and gas industry talking points in past criticism of the Obama administration's environmental rules.

America Rising Executive Director Brian Rogers, whose conservative group has launched a pro-Pruitt campaign targeting red-state Democrats, characterized the senators' letter as a "partisan fishing expedition."

More: *Politico*

STATE BRIEFS

CALIFORNIA

Gov. Jerry Brown Nominates Two Advisers for PUC Spots

Rechtschaffen

Gov. Jerry Brown has nominated Cliff Rechtschaffen and Martha Guzman Aceves to serve six-year terms on the state Public Utilities Commission effective next month. The appointees, subject to confirmation by the State Senate, would replace Mike Florio and Catherine Sandoval, whose terms expire in February.

Rechtschaffen has served as the governor's senior adviser on climate and energy issues for more than five years. Guzman Aceves, Brown's deputy legislative affairs secretary, has focused on energy and environmental issues.

In a press release, Consumer Watchdog condemned Rechtschaffen's appointment, claiming that legal declarations show that in 2011 he fired Conservation Chief Derek Chernow and Department of Conservation and Department of Oil, Gas and Geothermal Resources head Elena Miller when the two refused to loosen oil drilling standards in the state at the request of Occidental Petroleum. Occidental subsequently contributed $500,000 to Brown's ballot measure campaign for Proposition 30, the press release said.

More: *Los Angeles Times*; *Consumer Watchdog*

SoCalGas: 'Small Amount' of Methane Detected at Aliso Canyon

A "small amount" of methane has been seeping since Saturday near a plugged storage well at the Aliso Canyon storage facility that previously was the site of a nearly four-month leak that emitted 109,000 metric tons of methane, according to Southern California Gas officials.

Recent rain storms triggered the latest release of methane that was trapped in the soil following the massive leak detected on Oct. 23, 2015, SoCalGas spokesman Chris Gilbride said.

Sam Atwood, a spokesman for the South Coast Air Quality Management District, said the agency is not detecting elevated methane levels in the community near the facility.

More: *Los Angeles Daily News*

MICHIGAN

PSC Approves Invenergy's Pine River Wind Farm

State regulators have approved a 65-turbine, 161.3-MW wind farm to be built by

Continued on page 29

STATE BRIEFS

Continued from page 28

Invenergy in Gratiot and Isabella counties under a build-transfer contract with DTE Electric.

The Pine River wind farm has an estimated installed cost of $1,615/kW, which is significantly lower than the $2,116/kW assumed by DTE's approved 2008 Amended Renewable Energy Plan, according to regulatory filings. The project also includes the benefit of the federal production tax credit.

By the end of 2018, Invenergy plans to start commercial operation.

More: *reNews*

MINNESOTA

Sen. Katie Sieben Appointed to PUC

Gov. Mark Dayton has appointed state Sen. Katie Sieben to a six-year term on the Public Utilities Commission beginning Jan. 23. Her senate term ends when the new Legislature is sworn in on Jan. 3.

Current commission Chair Beverly Jones Heydinger will be vacating a commission seat. Commissioner Nancy Lange has been appointed chair, and Sieben will take Lange's seat.

Since 2007, Sieben has represented south Washington County communities and Hastings in the Senate. From 2003 to 2007, she served in the House.

More: *Hastings Star Gazette*

Commerce Department Accepting Applications for Solar Program

The Commerce Department is accepting applications for the fourth year of the Made in Minnesota Solar Incentive Program from Jan. 1 through Feb. 28.

The 10-year program, which is available to residents who install solar PV or solar thermal systems using solar modules or collectors certified as manufactured in the state, was established in 2013 to expand the state's solar industry. In its first three years, it supported nearly 1,100 solar projects statewide.

Applicants for PV systems are randomly selected to receive an annual incentive payment for 10 years based on electricity production. The program offers a one-time rebate of 25% of the installed cost of solar thermal systems.

More: *Solar Industry*

NEBRASKA

Study Finds Competition Would Lead to Savings

Customers would save money if private electric companies could compete with the state's public electric utilities, according to a study paid for by groups seeking to open the state to competition.

The Wind is Water Foundation, which has a close relationship with Americans for Electricity Choice, paid for the study, which found lost savings opportunities as cheap electricity generated by natural gas and wind in other states undercuts sales of less cost-effective power made by the state's coal-fired and nuclear plants.

The public power companies pointed out that last year the statewide average electric rate was the 15th lowest in the nation.

More: *The Columbus Telegram*

NORTH CAROLINA

Dominion Customers on Hook for $4.3M in Coal Ash Cleanup Costs

State regulators issued an order just before Christmas finding that Dominion North Carolina Power could recover $4.3 million for coal ash cleanup from its customers. The order may be significant for Duke Energy Carolinas, as it excavates millions of tons of coal ash at its shuttered W.S. Lee and H.B. Robinson coal plants and reburies it in lined landfills.

Dominion's total rate increase comes to about $34.7 million, with coal ash accounting for a small part. The costs for ash remediation will be amortized over five years.

Duke Energy is expected to seek a rate increase in the state in late 2017 or early 2018. The company estimates it will cost its two utilities $3.5 billion to comply with the state's Coal Ash Management Act and has warned that the figure is subject to revision.

More: *Triad Business Journal*

OHIO

Kasich Vetoes 'Voluntary' Renewable Energy Standards Bill

Gov. John Kasich vetoed legislation Tuesday that would have extended a two-year freeze on renewable energy standards by making the standards voluntary for investor-owned utilities in 2017 and 2018.

In vetoing Substitute House Bill 554, Kasich said that a wide range of energy generation options had helped grow jobs within the state over the past six years and that the bill risked undermining that progress.

Dozens of businesses and renewable energy advocates asked the legislature not to extend the freeze. Solar panel manufacturer First Solar said that if the bill passed, the company would have to consider leaving the state.

More: *cleveland.com*

VERMONT

Feds: Malware on Burlington Electric Laptop not Tied to Russia

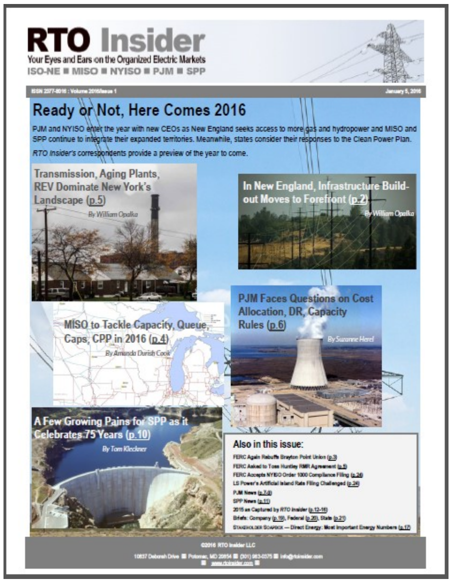
Federal officials say the Burlington Electric Department erred last week when it said it found malware planted by Russian hackers on one of its laptops.

U.S. officials said the software found on the laptop, known as Neutrino, does not appear to be connected with Grizzly Steppe, which U.S. officials have identified as the Russian hacking operation. The FBI is continuing to investigate how the malware got onto the laptop.

Russia was accused of launching a cyberattack on Ukraine's electric grid in 2015, which it has denied. That attack destabilized Kiev's power grid, causing a blackout in part of the Ukrainian capital.

More: *The Washington Post*

2016 AS CAPTURED BY *RTO INSIDER* (click to download issue)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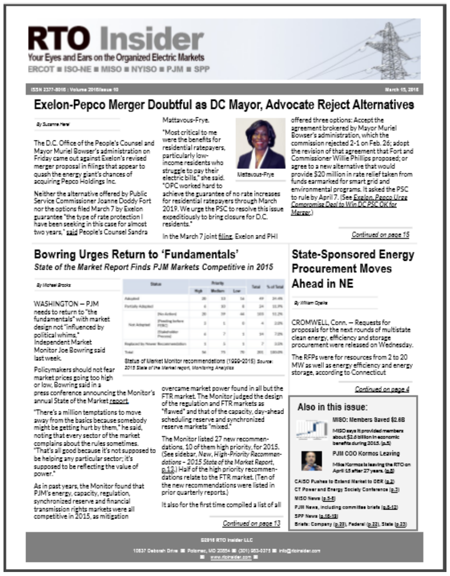

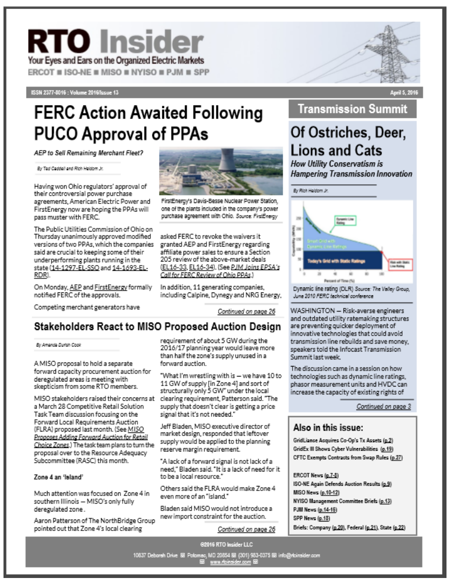

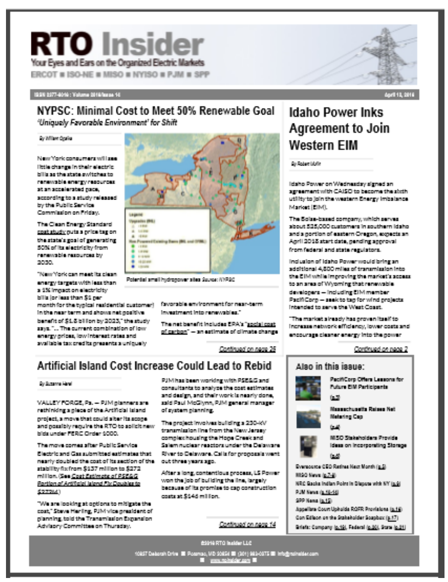

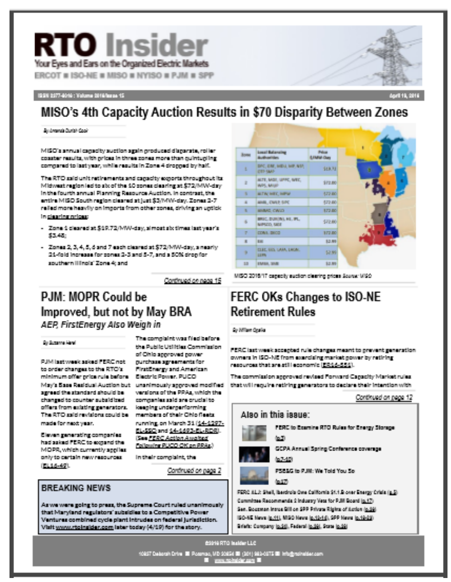

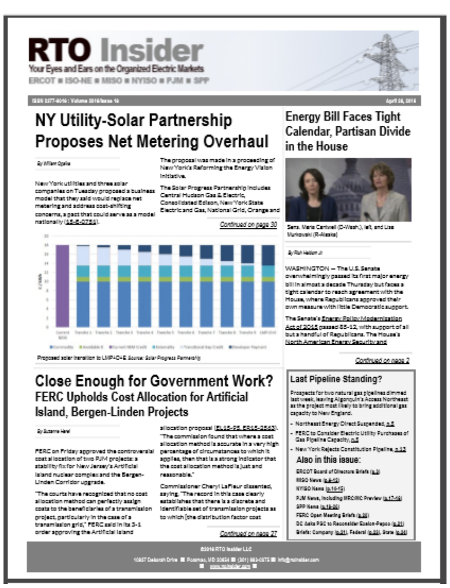

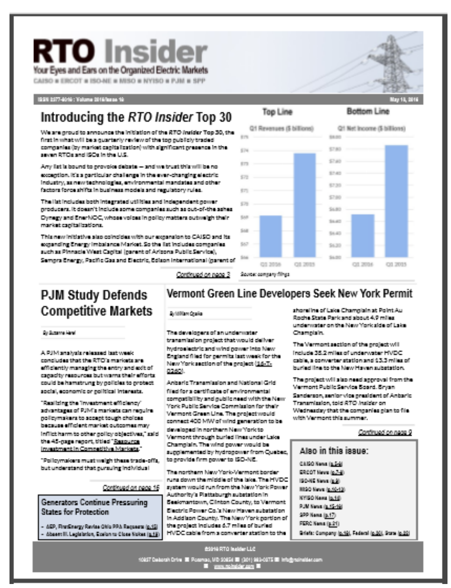

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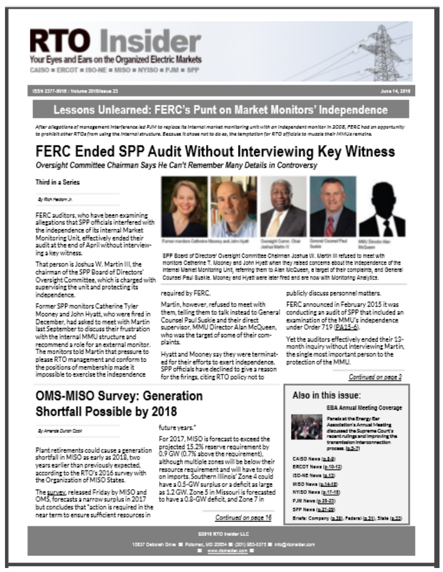

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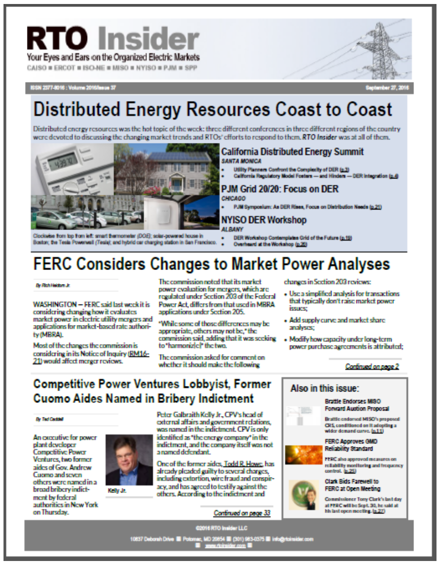
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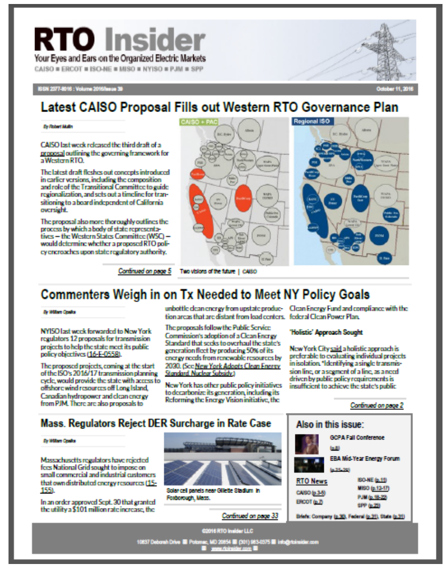
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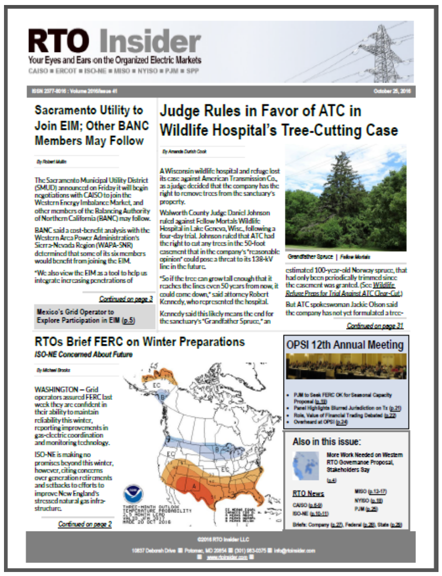
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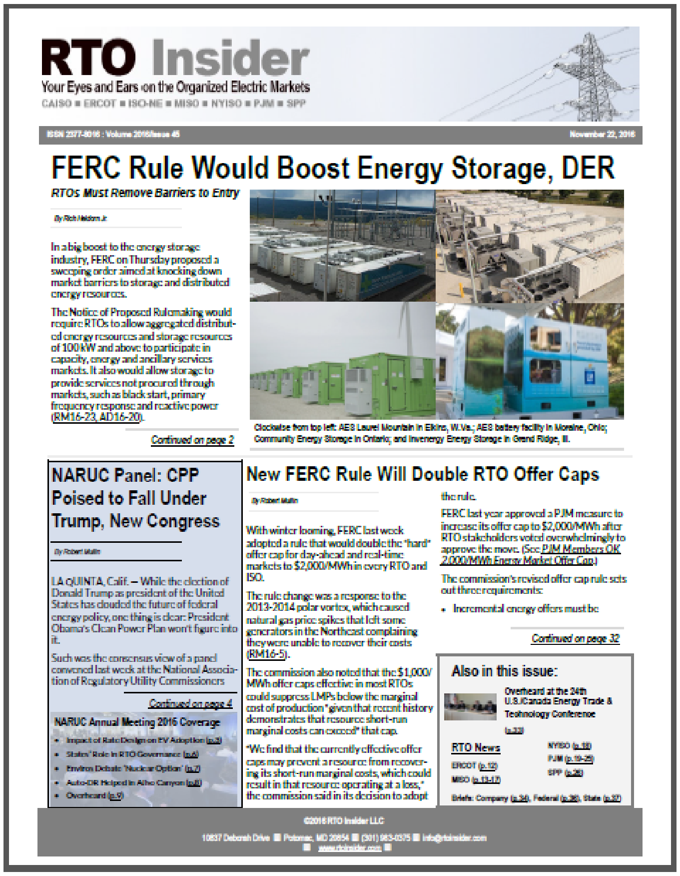

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ISSN 2377-8016 : Volume 2016/Issue 45 November 22, 2016

FERC Rule Would Boost Energy Storage, DER

RTOs Must Remove Barriers to Entry

By Rich Heidorn Jr.

In a big boost to the energy storage industry, FERC on Thursday proposed a sweeping order aimed at knocking down market barriers to storage and distributed energy resources.

The Notice of Proposed Rulemaking would require RTOs to allow aggregated distributed energy resources and storage resources of 100 kW and above to participate in capacity, energy and ancillary services markets. It also would allow storage to provide services not procured through markets, such as black start, primary frequency response and reactive power (RM16-23, AD16-20).

Continued on page 2

Clockwise from top left: AES Laurel Mountain in Elkins, W.Va.; AES battery facility in Moraine, Ohio; Community Energy Storage in Ontario; and Invenergy Energy Storage in Grand Ridge, Ill.

NARUC Panel: CPP Poised to Fall Under Trump, New Congress

By Robert Mullin

LA QUINTA, Calif. — While the election of Donald Trump as president of the United States has clouded the future of federal energy policy, one thing is clear: President Obama's Clean Power Plan won't figure into it.

Such was the consensus view of a panel convened last week at the National Association of Regulatory Utility Commissioners

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- Impact of Rate Design on EV Adoption (p.3)
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- Enviros Debate 'Nuclear Option' (p.7)
- Auto-DR Helped in Aliso Canyon (p.8)
- Overheard (p.9)

New FERC Rule Will Double RTO Offer Caps

By Robert Mullin

With winter looming, FERC last week adopted a rule that would double the "hard" offer cap for day-ahead and real-time markets to $2,000/MWh in every RTO and ISO.

The rule change was a response to the 2013-2014 polar vortex, which caused natural gas price spikes that left some generators in the Northeast complaining they were unable to recover their costs (RM16-5).

The commission also noted that the $1,000/MWh offer caps effective in most RTOs could suppress LMPs below the marginal cost of production "given that recent history demonstrates that resource short-run marginal costs can exceed" that cap.

"We find that the currently effective offer caps may prevent a resource from recovering its short-run marginal costs, which could result in that resource operating at a loss," the commission said in its decision to adopt the rule.

FERC last year approved a PJM measure to increase its offer cap to $2,000/MWh after RTO stakeholders voted overwhelmingly to approve the move. (See PJM Members OK 2,000/MWh Energy Market Offer Cap.)

The commission's revised offer cap rule sets out three requirements:

- Incremental energy offers must be

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ISSN 2377-8016 : Volume 2016/Issue 46 December 6, 2016

NY Regulators Call for Overhaul or End to Mass-Market Retail Choice

By William Opalka

Eighteen years after opening retail electric and gas choice, New York regulators concluded Friday that the initiative has failed, launching a proceeding that could bar energy service companies (ESCOs) from operating in the state.

"After considerable experience with the offering of retail service to mass-market customers by ESCOs, the [New York Public Service Commission] has determined that the retail markets serving mass-market customers are not providing sufficient competition or innovation to properly serve consumers," the commission wrote in its notice (98-M-1343). "Despite efforts to realign the retail market, customer abuses and overcharging persist, and there has been little innovation, particularly in the provision of energy efficiency and energy management services."

The commission has attempted to revamp consumer protections in the program, including a guarantee of savings for customers not enrolled with green energy suppliers, but it has been thwarted by the courts. (See New York ESCO Order Vacated by Court.) A companion proceeding to impose a moratorium on sign-ups for low-income customers has also been challenged. (See Marketers Seek Rehearing on NY Low-Income Moratorium.)

Two-Track Process

The notice sets out a two-track process, one an evidentiary process to determine "whether ESCOs should be completely prohibited from serving their current products to mass-market customers" or whether reforms could save it. Evidentiary hearings will follow written submissions from energy marketers, consumers and PSC staff on a list of 20 questions posed in the notice. Responses are due April 7, 2017.

The commission defines "mass-market" customers as residential and small commercial customers — those whose bills do not include a demand rate element.

Among the questions is whether the commission currently has authority to penalize ESCOs for abuses and whether it should revisit its decision to exempt them from Article 4 of the Public Service Law.

Continued on page 23

MISO IMM Suggests Deliberate Over-Forecasting by Wind Operators

By Amanda Durish Cook

CARMEL, Ind. — Some wind generators appear to be deliberately over-forecasting their output to inflate their revenues, according to MISO Independent Market Monitor David Patton, who called for rule changes to discourage gaming.

Patton said wind units on average produced 146 MW less than their MISO dispatch instructions in 2015 and 2016 (excluding economic curtailments and manual redispatch), a higher deviation than any other resource class in the RTO.

Patton told the Market Subcommittee on Nov. 29 that much of the problem lies with MISO's day-ahead margin assurance payment (DAMAP), which guarantees day-ahead profit when real-time dispatch is less than the day-ahead schedule. MISO uses wind operators' forecasts to determine their dispatch level.

Two-thirds of MISO's $7.5 million in DAMAP payments to wind resources in 2015 and 2016 was because of over-forecasting and only $2.5 million was spent on curtailment, Patton said. "Most of our wind DAMAP payments are unjustified," he said.

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President-elect Trump is sending conflicting signals on his policy on global warming, as he considers climate change deniers for top energy posts while claiming an "open mind" and meeting with former Vice President Al Gore (above). (p.3)

Illinois Lawmakers Clear Nuke Subsidy

By Rory D. Sweeney and Rich Heidorn Jr.

Illinois legislators on Thursday approved a bill to keep Exelon's Clinton and Quad Cities nuclear plants operating for another decade.

The "Future Energy Jobs Bill" was approved by the state Senate by a 32-18 vote, an hour

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Third Quarter is a Charm for *RTO Insider* Top 30 (p.4)

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ISSN 2377-8016 : Volume 2016/Issue 47 December 13, 2016

Trump Transition Bodes Ill for Clean Power Plan

Ryan: Energy Bill Dead

By Rich Heidorn Jr.

President-elect Donald Trump last week selected a climate change skeptic as EPA administrator, while his transition team probed the Department of Energy's climate research and sought ways for the department to aid struggling nuclear power plants. Meanwhile, Congressional Republicans quashed hopes for a bipartisan energy bill.

The big news in another whirlwind week was Trump's selection of Oklahoma Attorney General Scott Pruitt, a leader of the 29-state legal challenge to the Clean Power Plan, as EPA administrator.

Pruitt

Pruitt issued a statement through the transition team vowing to save the "billions of dollars drained from our economy due to unnecessary EPA regulations."

"I intend to run this agency in a way that fosters both responsible protection of the environment and freedom for American businesses," he added.

In May, Pruitt coauthored an article in the *National Review* that said the science of global warming "is far from settled."

The article also criticized the CPP, saying "this EPA regulation, one of the most ambitious ever proposed, will shutter coal-fired power plants, significantly increase the price of electricity for American consumers and enact by executive fiat the very same cap-and-trade system for carbon emissions that Congress has rejected."

Oklahoma's Energy Economy

Oklahoma would be required to cut carbon emissions from power plants by almost one-third under the CPP. About one-quarter of all jobs in the state rely directly or indirectly on the energy industry — mostly gas and oil.

In 2014, *The New York Times* reported that Pruitt had sent letters to EPA and other federal officials — on state government stationary and signed by him — that had been authored by oil and gas companies.

EPA headquarters | © *RTO Insider*

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Entergy, Consumers Announce Closure of Palisades Nuke

Palisades nuclear plant | *Entergy*

By Tom Kleckner

Citing market conditions that have changed "substantially" and the availability of "more economic alternatives," Entergy announced Thursday it intends to shut down its Palisades nuclear plant on Oct. 1, 2018.

Entergy said a power purchase agreement between the plant, located in Covert Township, Mich., and Consumers Energy would be terminated four years early in 2018. Consumers will pay Entergy $172 million for terminating the PPA. According to Entergy, the termination will also save Consumers customers $172 million in costs over four years.

The companies entered the 15-year PPA in 2007, when Entergy bought the plant from Consumers parent CMS Energy for $380 million. However, the agreement's prices exceed

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Increased Transfer Capacity Reducing EIM Congestion

May Aid Companies' Return to Market-Based Rates

By Robert Mullin

Increased transfer capacity is keeping a lid on congestion in the Western Energy Imbalance Market (EIM) and limiting participants' ability to wield market power within their balancing authority areas, according to CAISO's internal Market Monitor.

Gabe Murtaugh, a senior economist with the ISO's Department of Market Monitoring, told a Dec. 7 Market Performance and Planning Forum that the increased capacity could help Arizona Public Service, NV Energy and PacifiCorp in reapplying to FERC for market-based rate authority. Citing market power concerns, FERC has limited the three companies to cost-based offers. (See CAISO Monitor Proposes Fixes for EIM Market Power Concerns.)

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ISSN 2377-8016 : Volume 2016/Issue 48 December 20, 2016

EPA: Poor Fracking Practices Have Harmed Drinking Water

Data Gaps Make Quantification Impossible

By Rich Heidorn Jr.

In a widely anticipated report, EPA said last week that fracking has harmed drinking water resources under some circumstances but that data gaps have made it impossible to quantify the scope of the problem.

The agency said it identified cases of impacts on drinking water at each stage in the fracking water cycle: acquiring water for use in fracking; mixing the water with chemical additives; injecting the water and chemicals into the production well to create and increase fractures; collecting wastewater after injection; and disposing or reusing wastewater.

"Impacts cited in the report generally occurred near hydraulically fractured oil and gas production wells and ranged in severity, from temporary changes in water quality to contamination that made private drinking water wells unusable," EPA said.

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Generalized depiction of factors that influence whether spilled hydraulic fracturing fluids or additives reach drinking water resources, including spill characteristics, environmental fate and transport, and spill response activities. | *EPA*

Michigan Energy Bill Preserves RPS, 10% Retail-Choice Cap

'Backup Plan,' IRPs Respond to Capacity Concerns

By Amanda Durish Cook and Rich Heidorn Jr.

Following a dramatic all-night session, Michigan lawmakers Thursday approved legislation that increases the state's renewable portfolio standard, preserves its limited retail choice and assigns state regulators to referee battles over net metering and capacity charges.

Gov. Rick Snyder, who had been pushing revisions to the state energy policies since 2015, personally helped broker a compromise over retail choice, meeting with legislators overnight into early Thursday morning, then shaking hands on the Senate floor after its members voted 33-4 for the package (SB 437, SB438). The House approved the bills 79-28 and 76-31 earlier Thursday afternoon, the last day of the state's two-year legislative session. (See Michigan Senate Increases RPS; Keeps 10% Retail Choice Cap.)

Snyder

The first major change in Michigan energy

Continued on page 32

ERCOT Sees Increased Load Growth, Shrinking Reserves

By Tom Kleckner

ERCOT's electricity demand continues to grow more rapidly than expected, and while reserve margins are projected to shrink slightly, the Texas ISO says it still has sufficient capacity to support system reliability.

"Based on the information we have today and current planning criteria, we continue to see sufficient planning reserve margins through most of the 10-year planning horizon," ERCOT's senior director of system planning, Warren Lasher, said Thursday.

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FERC Issues NOPRs on Interconnection, Fast-Start (p.23)

CAISO Welcomes GridLiance; Seattle Signs EIM Pact (p.3-4)

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Cost Trends Favor Renewables Despite Coming Policy Shifts

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Last month, state attorneys general from West Virginia and other anti-CPP states suggested Trump immediately issue an executive order directing EPA not to enforce the rule. Their counterparts from states supporting the CPP have vowed to fight a move to remand the CPP back to EPA before a court ruling.

State, Corporate Actions

Regardless of what happens with the CPP, utilities, major corporations and some states are likely to continue their efforts at decarbonizing the generation mix.

D.C. and several states increased their renewable portfolio standards in 2016: D.C. (50% by 2032); Oregon (50% by 2040); Rhode Island (38.5% by 2035); and New York (50% by 2030). In Ohio, Republican Gov. John Kasich last month vetoed a bill that would have made its RPS (12.5% by 2025) voluntary, saying the bill "amounts to self-inflicted damage to both our state's near- and long-term economic competitiveness."

According to the American Wind Energy Association, more than 80 companies, including General Motors, Amazon and Microsoft, have pledged to move to 100% renewable power. In addition to the "halo effect" of promoting their green credentials, the companies are also motivated by costs. For example, storage and information management company Iron Mountain signed a 15-year power purchase agreement for wind last year that it says will save it up to $500,000 in power costs annually.

Even some of the nation's biggest coal-burning utilities are shuttering coal-fired plants and replacing them with natural gas and renewables. In announcing its third-quarter earnings in November, for example, American Electric Power said it would add 5,400 MW of wind and 3,400 MW of solar through 2033 through long-term PPAs (along with 3,000 MW of natural gas). No new coal.

Below is a status report on the changing generation mix since 2008 and prospects for the future.

Solar

2016 was a watershed year for solar, which for the first time will be the No. 1 source of new generation, according to the Energy Information Administration. EIA reported that the U.S. added more than 26 GW of utility-scale capacity last year, with solar (9.5 GW), natural gas (8 GW), and wind (6.8 GW) responsible for 93%. There were no new coal plants.


AWEA

The U.S. trends are representative of those worldwide. Solar PV prices have fallen by about 70% since 2010 and are now cheaper than wind, natural gas or coal in emerging markets, Bloomberg New Energy Finance reported in December. In August, a contract in Chile priced at $29.10/MWh, about half the cost of coal.

BNEF says worldwide fossil-fuel use for electricity may peak within the next decade. "Renewables are robustly entering the era of undercutting" fossil fuel prices, BNEF chairman Michael Liebreich said.

Wind

U.S. nameplate wind capacity has tripled to more than 75 GW since 2008.

SPP and ERCOT broke wind generation records repeatedly through 2016, and SPP says it could manage wind penetration of 60%. (See related stories, *SPP Seeks to Manage Wind Riches, Improve Order 1000 Process*, p.24, and *ERCOT Looks to Incorporate DG, Improve Ancillary Services, RMR in 2017*, p.8.)

The first offshore wind farm, the 30-MW Deepwater Wind farm off Block Island, R.I., went into commercial operation in October.

Although offshore wind remains more than twice as expensive as land-based turbines, costs are expected to drop with more development and production economies. Massachusetts lawmakers have authorized the purchase of 1,600 MW of offshore wind by 2027. (See *Massachusetts Bill Boosts Offshore Wind, Canadian Hydro*.)

Last month, Norway's Statoil bid $42.5 million for the right to develop almost 80,000 acres off Long Island, enough space to install up to 1 GW of turbines. The company said it will initially develop 400 to 600 MW. The Bureau of Ocean Energy Management has now leased more than 1.2 million acres and plans another lease auction off North Carolina in 2017.

Coal

Trump's promises to "save" the coal industry won him votes in Appalachia, but there is scant evidence that any policy shift will bring jobs there.

Attorneys at LeClairRyan say Trump's promise to remove the Obama administration's moratorium on new coal leases on federal lands will help producers in the Powder River Basin of Wyoming and Montana.

Congressional Republicans are likely to invoke the Congressional Review Act in a

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Cost Trends Favor Renewables Despite Coming Policy Shifts

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bid to reverse the Interior Department's Dec. 19 rule requiring coal companies to restore their land to its condition before mining began, an effort to prevent mining debris from contaminating streams. The act, which has only been used once in the past, could target any regulations finalized after May 30, according to the Congressional Research Service. (Also at risk of a CRA reversal is a Nov. 15 Interior rule requiring oil and gas producers to use "currently available technologies and processes" to cut methane flaring in half at oil and gas wells on federal and Native American lands.)

But none of these policy changes will be enough to reverse coal's decline.

U.S. coal production is its lowest in three decades and three of the country's biggest producers, Alpha Natural Resources, Arch Coal and Peabody Energy, have filed for bankruptcy.

More than 21 GW of coal generation retired in 2015 and 2016, largely as result of the Mercury and Air Toxics Standards, and EIA says another 14 GW is at risk of retirement by the end of 2028.

Nor is growth likely to come from exports, which fell for the third consecutive year in 2015. Through September 2016, exports dropped another 30% below the previous year.

The International Energy Agency predicts exports will continue to decline due to reduced demand from China and low-cost foreign supplies.

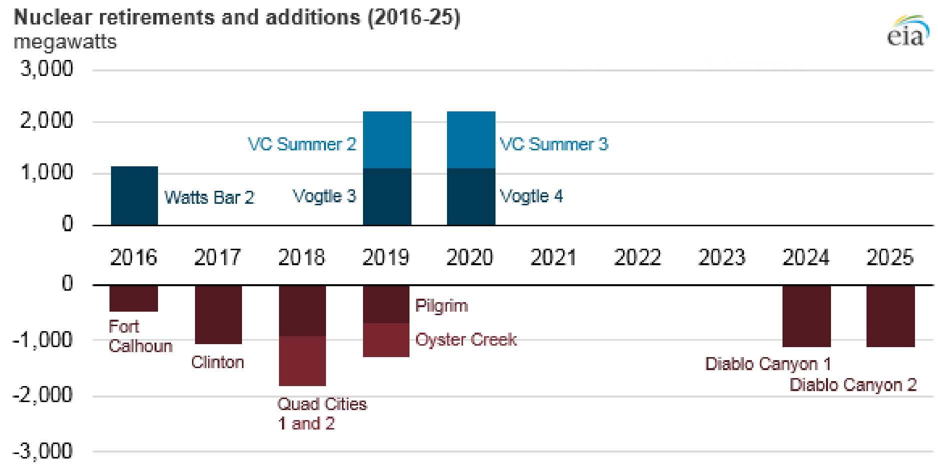
Prospects for new plants are fanciful. The levelized cost of a new coal generator with carbon sequestration — required under EPA rules finalized in 2015 — is about double the cost of new solar PV and wind, according to EIA.

Natural Gas

Coal has suffered from lower natural gas prices as well as competition from renewables. Since June 2008, Henry Hub prices have fallen from $12.69/MMBtu to an average of $2.49/MMBtu in 2016.

EIA said in December that natural gas production averaged 77.5 Bcfd in 2016, a drop of 1.3 Bcfd, and the first annual decline since 2005. EIA predicts production will rebound by 2.5 Bcfd in 2018.

Citing rising domestic demand, and increasing exports to Mexico and via LNG,



EIA sees Henry Hub spot prices rising to $3.27/MMBtu in 2017.

EPA's December report that improper fracking practices can cause groundwater contamination was blasted by industry and is unlikely to persuade the Trump administration to initiate tougher federal regulations. But it may provide ammunition for tougher state regulations that could increase production costs. (See *EPA: Poor Fracking Practices Have Harmed Drinking Water*.) Maryland is considering replacing a moratorium against fracking with regulations that industry says would be the most restrictive in the country.

Nuclear

The nuclear industry, which has seen five plants retire in the last five years, celebrated some wins in 2016, as state policymakers in New York and Illinois approved zero-emission credits to keep plants operating and the Tennessee Valley Authority completed its long delayed Watts Bar 2 nuclear plant.

But nobody is talking any longer about a nuclear power "renaissance."

The 1,150-MW Watts Bar 2 went into service in October, completing a project begun in 1973 and mothballed for decades.

Like Southern Co.'s Vogtle and SCANA's V.C. Summer nuclear plants under construction, the TVA project was marked by the same kind of delays and massive cost overruns that stopped new plant construction following the Three Mile Island and Chernobyl accidents.

The latest nuclear plant to go dark was the Fort Calhoun plant near Omaha, Neb. — at 478 MW the smallest in the U.S. — which closed in October, citing economic reasons. Fort Calhoun's output is expected to be replaced by wind and natural gas.

State-backed ZECs may save the Clinton, Quad Cities (Illinois) and James A. FitzPatrick (New York) plants from imminent retirement, assuming the initiatives survive court challenges. But there will be no preventing the retirements of Palisades (2018), Oyster Creek (2019), Pilgrim (2019) or Diablo Canyon (2025).

In addition to cheerleading the state-backed ZECs, the Nuclear Energy Institute has launched an initiative to spread use of best practices to make the industry more compatible. NEI said the first year of its "Delivering the Nuclear Promise" identified more than $600 million in projected savings in 2016.

"Effecting an overall change in mindsets and culture is a huge undertaking but absolutely indispensable to the survival and success of our industry," NEI Chief Operating Officer Maria Korsnick said. "We value the importance of safety and reliability and, while we maintain the high levels we have achieved, we also can focus on improving efficiency."

Watts Bar 2 dedication | *TVA*