PLATTS
McGRAW HILL FINANCIAL

# MEGAWATT DAILY

Monday, February 8, 2016

## NEWS HEADLINES

### Xcel plans to acquire gas assets in Colorado

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- JV would focus on gas plays in Wyoming, Colo., Utah

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### WEC expects to spend big on gas delivery

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- WEC took over $8 billion Chicago gas main replacement program

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### Washington lawmakers eye Colstrip retirement

- Bill would let Puget Sound retire two units at Montana plant
- Units face clean-up costs ranging up to $100 million

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### ISO New England generation fleet to grow: COO

- By 2019-2020, 9.4 GW expected to be added
- About 4.1 GW of total is wind, other renewables

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### Renewables pressure SP15 forwards

- SP15 package typically trades at a premium to NP15
- Solar PV drives negative real-time prices

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- **Cold boosts Mass Hub to upper $30s/MWh**
- **ERCOT power rises with for-Monday premium**
- **PJM WH rises to low $30s/MWh**

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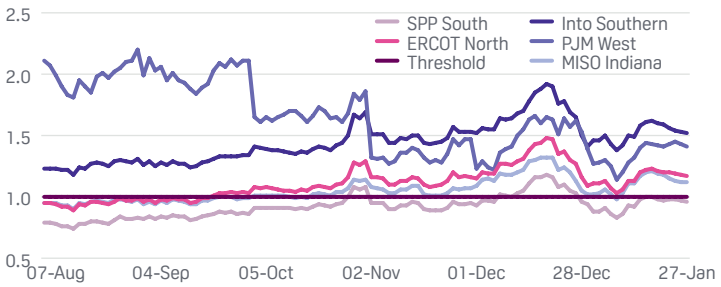
## REGIONAL DAY-AHEAD PRICE CHANGES

| | Day-ahead peak prices | | | Regional weather trends | | |
|---|---|---|---|---|---|---|
| | 06-Feb | Daily chg | Prior 7-day avg | 06-Feb | Daily chg | 7-day forecast |
| **ISO Price Locations** | | | | | | |
| CAISO NP 15 | 25.03 | -2.19 ▼ | 28.39 | 59.8 | 2.8 ▲ | 61.5 |
| ERCOT North Hub | 18.00 | 0.55 ▲ | 18.60 | 48.0 | 2.3 ▲ | 53.7 |
| ISONE Internal Hub | 26.65 | -3.34 ▼ | 23.86 | 30.5 | -3.3 ▼ | 28.6 |
| MISO Indiana Hub | 22.78 | -2.03 ▼ | 23.56 | 31.5 | 4.1 ▲ | 27.1 |
| NYISO Zone G | 25.59 | 1.42 ▲ | 24.83 | 34.5 | -0.5 ▼ | 29.7 |
| PJM West Hub | 25.52 | -4.72 ▼ | 25.87 | 35.2 | 1.1 ▲ | 32.8 |
| SPP South Hub | 21.45 | 0.59 ▲ | 21.30 | 38.5 | 3.3 ▲ | 38.9 |
| **Bilateral indexes** | | | | | | |
| Into Southern | – | – | 20.96 | 45.6 | 1.3 ▲ | 48.0 |
| Palo Verde | 20.00 | 0.00 — | 20.98 | 57.7 | 3.0 ▲ | 60.8 |
| COB | 20.75 | 0.00 — | 20.65 | 44.5 | -0.1 ▼ | 46.5 |
| Mid-C | 19.36 | 0.00 — | 19.54 | 44.5 | -0.1 ▼ | 46.5 |

Source: Platts

## COAL-TO-GAS POWER PRICE RATIOS AT MAJOR TRADING HUBS




The Platts coal-to-gas power price ratios are used to asses the regional competitiveness between coal and gas generation at the major power trading hubs. The ratio is defined as the coal $/MWh dispatch price divided by the gas $/MWh dispatch price; gas generation is more competitive than coal when the ratio is a ratio greater than one and vice versa. All price data is for prompt month fuel contracts.

Source: Platts daily OTC coal prices and M2MS gas prices

## PLATTS PEAK DAILY DEMAND (GW)

| | | | | | | Daily change | | Five day forecast | | | | | Season | | Season average | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ISO | 02-Feb | 03-Feb | 04-Feb | 05-Feb | 06-Feb | Chg | % Chg | 07-Feb | 08-Feb | 09-Feb | 10-Feb | 11-Feb | Min | Max | 2016 | 2015 | Chg | % Chg |
| BPA-Puget | 8.50 | 8.05 | 7.70 | 7.72 | 7.18 | -0.54 | -6.99 | 6.91 | 7.06 | 7.09 | 7.05 | 7.17 | 5.61 | 9.40 | 7.93 | 7.68 | 0.25 | 3.26 |
| IESO | 21.17 | 20.90 | 21.09 | 21.98 | 20.01 | -1.97 | -8.96 | 20.60 | 22.41 | 22.34 | 22.80 | 23.53 | 19.98 | 24.01 | 21.92 | 22.26 | -0.34 | -1.53 |
| CAISO | 29.84 | 29.36 | 28.67 | 30.10 | 28.39 | -1.71 | -5.68 | 30.10 | 33.77 | 33.69 | 32.39 | 30.80 | 22.70 | 30.71 | 28.37 | 28.73 | -0.36 | -1.25 |
| ERCOT | 37.02 | 41.88 | 47.42 | 39.01 | 35.12 | -3.89 | -9.97 | 34.25 | 38.34 | 37.98 | 37.21 | 38.41 | 34.30 | 49.28 | 42.42 | 42.20 | 0.22 | 0.52 |
| SPP | 33.68 | 35.88 | 36.97 | 27.24 | 24.45 | -2.79 | -10.24 | 24.19 | 28.53 | 30.96 | 28.12 | 25.75 | 27.90 | 37.52 | 32.75 | 30.43 | 2.32 | 7.62 |
| MISO | 82.03 | 85.19 | 88.50 | 85.06 | 75.83 | -9.23 | -10.85 | 74.35 | 85.04 | 91.91 | 97.48 | 85.47 | 72.69 | 97.75 | 86.44 | 87.09 | -0.65 | -0.75 |
| PJM | 100.93 | 97.26 | 103.75 | 110.19 | 99.62 | 0.57 | -9.59 | 95.69 | 109.33 | 113.80 | 119.44 | 119.67 | 89.83 | 130.53 | 109.03 | 110.05 | -1.02 | -0.93 |
| NYISO | 20.51 | 20.40 | 20.26 | 20.95 | 18.74 | -2.21 | -10.55 | 18.79 | 22.03 | 21.62 | 22.09 | 23.85 | 15.86 | 23.41 | 20.97 | 21.71 | -0.74 | -3.41 |
| NEISO | 16.51 | 16.70 | 16.07 | 17.14 | 16.04 | -1.10 | -6.42 | 15.61 | 19.17 | 18.02 | 17.99 | 19.49 | 12.26 | 19.44 | 17.17 | 17.99 | -0.82 | -4.56 |
| AESO | 10.51 | 10.51 | 10.50 | 9.91 | 9.49 | -0.42 | -4.24 | 9.66 | 9.72 | 9.61 | 9.76 | 10.04 | 10.01 | 11.00 | 10.63 | 10.60 | 0.03 | 0.28 |

Seasons are defined as: Summer (June – August), Fall (September – November), Winter (December – February), and Spring (March – May).

Source: Platts

NEWS

# Xcel plans to acquire gas assets in Colorado

Colorado utility Xcel Energy filed an application last week with the state's Public Utility Commission asking permission to develop its own gas reserves to lock in low prices for the generation and heating fuel.

Xcel Energy hopes to enter into a joint venture with Wexpro Development, an exploration-and-production company focused on gas plays in Wyoming, Colorado and Utah, to help Xcel develop its own gas fields.

If the PUC approves the deal, Xcel and Wexpro would be 50/50 partners on acquiring and developing gas assets in the Rocky Mountain region.

"Xcel's Colorado operations purchases between 135 and 140 Bcf per year," said Mark Stutz, an Xcel spokesman, in an interview Friday. "We are planning to produce 25% to 50% of that amount in the future if the proposal receives regulatory approval."

The proposal's purpose is to help Xcel lock in the current, nearly rock-bottom gas prices for the long-term. Stutz said it is a way to ensure long-term hedging over gas prices.

"Over the past decade the price of natural gas has changed," read the proposal Xcel submitted to the PUC. "It has ranged on the NYMEX day-ahead from a low of under $2.50/MMBtu to a high of over $13/MMBtu. Because the fundamentals underlying the supply and demand balance in natural gas markets vary significantly in the short and long term, there is significant price volatility in the gas market.

"Natural gas prices are today at the lower end of the historical price range, and customers are benefiting from these lower costs," the filing continued.

"However, natural gas prices are not expected to remain at today's prices … Demand is expected to increase significantly over the next two to three years in several sectors including power generation, LNG exports, transportation and industrial. Falling production and rising demand will put upward pressure on prices over the long term.

"While the company's seasonal hedging strategy is intended as protection against short-term price volatility, it does not have the capacity to provide protection from structural changes in the market that can lead to sustained price increases over the long term. A long-term hedge through an investment in gas reserves provides protection to customers' exposure to the risk of increasing prices."

## End-users pursuing direct access to reserves

This would not mark the first time an end-user of gas partnered with a producer in Colorado. In 2012, Nucor Corporation, one of the nation's largest steel producers, inked a $3.64 billion deal with Encana. Through the JV, fields in the dry Piceance Basin will help supply Nucor's industrial gas through at least 2025.

Stutz said it will simplify Xcel operations in Colorado and benefit customers by having direct access to reserves.

"Right now we have to implement a six-month buying plan to build up gas in storage, then remove it throughout the heating season and then start all over again," Stutz said.

"Those prices will change from year to year, but if we can lock-in assets at current rates we can ensure a cheaper supply for our customers indefinitely."

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### Xcel also plans to boost renewables

The gas reserves proposal was just one of 10 applications Xcel filed in the past few weeks with the Colorado PUC.

Other proposals included rate plans, increasing solar and wind power and testing of new technology, specifically batteries to store wind and solar power during periods of low demand.

Xcel wants to add 1,000 MW of solar and wind power to the grid by the year's end.

And while the utility continues to close down aging, coal power plants, Stutz assured that gas will continue to play a vital role in the state's grid.

"The sun doesn't shine and the wind doesn't always blow so we'll continue to rely on gas," he added.

— *Brandon Evans*

## WEC expects to spend big on gas delivery

WEC Energy Group is preparing to spend heavily on its natural gas delivery business over the next decade, with that segment comprising more than half of the Wisconsin-based company's projected $1.5 billion annual capital investment.

Through its $9.1 billion acquisition of Integrys Energy Group last year, WEC has taken over an estimated $8 billion gas main replacement program in Chicago that was riddled with controversy when it was directed by Integrys' Peoples Gas subsidiary.

Illinois Attorney General Lisa Madigan and others have questioned why the program's initial $2.5 billion cost estimate has increased. WEC has pledged to hold the line on the program's costs.

Chicago aside, Gale Klappa, WEC chairman and CEO, reminded analysts during the company's Thursday fourth-quarter earnings call that WEC has "a significant amount of natural gas delivery network investment in Wisconsin as well. And, for that matter, expansions in Minnesota, and growth in Michigan with the natural gas utility there."

Over the next decade, WEC also plans to spend about $400 million/year to upgrade its electric utility networks and approximately $300 million annually on its electric generating fleet and corporate infrastructure.

### CPP may call for more gas, renewables spending

While most of the company's major generation projects are over for now, Klappa said additional gas-fired and renewable generation may be necessary during the "back half" of the 10-year period, especially if the US Environmental Protection Agency's new Clean Power Plan withstands pending legal challenges.

"We may be looking at the need for investment in our fleet, either through additional renewables and additional natural gas-fired generation," he said.

Recently, the company's 280-MW Valley power plant in downtown Milwaukee completed an approximately $60 million conversion from coal to gas.

### WEC sees rebound in retail sales

For 2016, WEC also is forecasting a slight rebound in retail electricity sales that declined by 0.1% in 2015.

"In 2015, our largest customers, excluding the iron ore mines, consumed approximately 0.4% less electricity than they did in 2014," Klappa said.

"However — and this is an important point — we did see improvement in some significant sectors of the state's economy, including food processing, paper production and plastics. In addition, we continue to see an uptick in customer growth across our system." The company's We Energies subsidiary now is serving 6,500 more electric and about 8,500 more gas customers than a year ago.

As a result, WEC expects a modest increase of 0.1% in weather-normalized electricity deliveries, excluding the iron ore mines, in 2016, added Pat Keyes, the company's chief financial officer.

By individual customer classes, WEC expects residential deliveries to fall by 0.1% this year, affected positively by continued modest growth in housing starts but offset by energy conservation, Keyes said.

Sales also are expected to decline by 0.3% for small commercial and industrial customers.

But sales are projected to increase by 1.2%, excluding the mines, in the large commercial/industrial segment, he said.

Meanwhile, Wisconsin weather-normalized retail gas deliveries, excluding gas used for power generation, are targeted to rise by 0.5%.

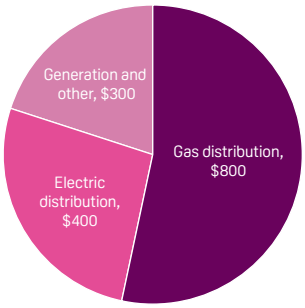
We Energies also has begun a $60 million fuel flexibility project at its 1,230-MW Oak Creek baseload coal plant in Wisconsin. The initial portion of the project, aimed at doubling an existing 750,000-ton-capacity coal stockpile to allow the plant to burn more less expensive Powder River Basin coal, is scheduled for completion in early 2017.

Klappa is retiring as CEO on May 1 and will be succeeded by Allen Leverett, currently president of the WEC Industrial Group.

— *Bob Matyi*

**WEC ENERGY GROUP ESTIMATED ANNUAL CAPEX**

(Millions)




Source: WEC Energy Group

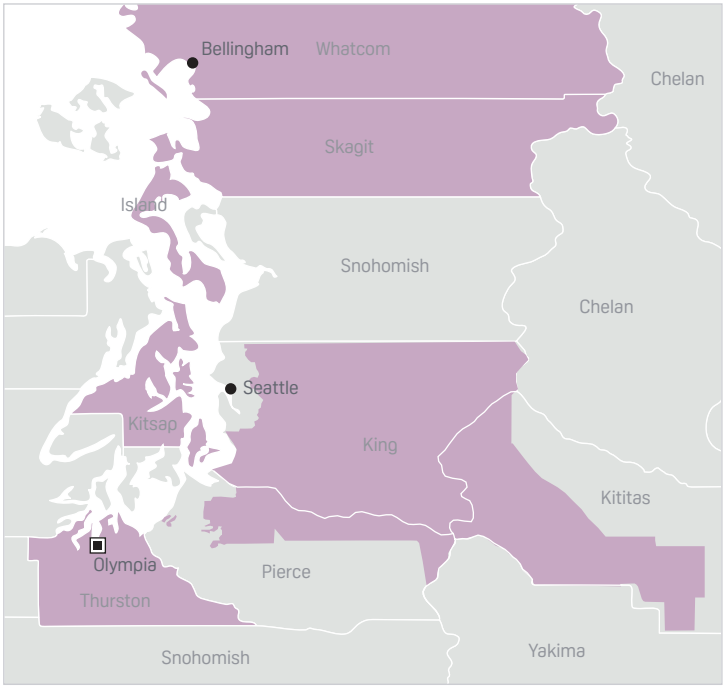
## Washington lawmakers eye Colstrip retirement

Washington lawmakers are considering a bill that would create a process for Puget Sound Energy to retire two coal-fired units at the Colstrip plant in Montana and buy Talen Montana's share of a third unit.

The bill — S.B. 6248 — cleared a major legislative deadline Thursday when it was passed out of the state Senate's Energy, Environment & Telecommunications Committee. The legislation must pass the full chamber within two weeks or it will die.

Bellevue, Washington-based PSE and Talen each own half of Colstrip Unit 1 and Unit 2, which are each 307 MW. The units came online in the mid-1970s and like other old coal-fired units have been challenged by low natural gas prices. Talen also owns a 222-MW stake

**PUGET SOUND ENERGY SERVICE TERRITORY**




Source: Puget Sound Energy

in Unit 3, which started operations in 1984. Talen has tried to sell its Montana assets but has been unable to find a buyer.

The two older units at the 2,094-MW plant face growing clean-up costs, ranging from $65 million to $100 million, according to a report released February 1 by the Washington Utilities and Transportation Commission.

The UTC has been pressing PSE on its Colstrip ownership stake, partly because of the clean-up liability issues and the economic viability of the older units. Last year, the Washington Legislature considered but did not pass a bill that would have allowed PSE to buy all of Talen's share in Colstrip before retiring the two older units.

### Bill emerges from stakeholder talks

The latest legislation grew out of discussions by a broad group of stakeholders that include industrial customers, the Washington ratepayer advocate's office, Montana lawmakers and the Sierra Club, among others. The UTC supports the legislation.

The legislation would grant PSE an exemption from Washington's greenhouse gas emissions performance standard, which effectively bars utilities from acquiring new sources of coal-fired generation. Although PSE's capacity stake in Colstrip would fall under the plan, it would see increased production by buying Talen's stake in the more efficient Unit 3.

The legislation also requires PSE to present its plan to retire the two units, buy Talen's share in Unit 3 and fund the clean up for the retired units. The plan must also include a proposal for replacing about 80 MW in lost capacity.

### IPPs seek solicitation

The Northwest and Intermountain Power Producers Coalition wants the bill to be changed so that PSE must issue a solicitation for replacement power, Robert Kahn, the trade group's executive director, said Friday. Washington does not require utilities to issue solicitations when they acquire new resources.

Kahn also said the bill is a "head scratcher" because PSE will end up with increased coal-fired production when environmental policy and the power markets are heading in the opposite direction.

The Sierra Club generally supports the bill, but several "problematic" changes were made at the last minute on Thursday, according to Doug Howell, a Sierra Club senior campaign representative.

First, the revised bill set a December 2022 retirement date, which the Sierra Club believes is too late given the growing clean-up liability at the plant and the poor economic performance for the two older units, he said.

Second, the bill would let PSE walk away from the deal if the Clean Power Plan were invalidated or if Washington placed limits on imports of coal-fired generation.

The Sierra Club believes it is worth it to support PSE's purchase of Talen's stake in Unit 3 if that leads to the retirement of the two older units, Howell said. "This is the only process that will get us there," he said.

Some Montana lawmakers have opposed moves by Washington to provide a path for retiring the two Colstrip units, saying it would drive up power prices in the state.

The mine-mouth Colstrip plant is owned by Talen Montana (529 MW), PSE (667 MW), Portland General Electric (296 MW), Avista (233 MW), PacifiCorp (148 MW) and NorthWestern Energy (222 MW). A utility-supported bill is pending in Oregon that would require Portland General Electric to exit the Colstrip plant by 2035.

— *Ethan Howland*

## ISO New England generation fleet to grow: COO

As ISO New England market participants awaited Monday's beginning of the independent system operator's 10th Forward Capacity Auction for the planning year 2019-2020, they learned that almost 9.4 GW of generation is already expected to be added by that time.

During the New England Power Pool Participants Committee meeting, Vamsi Chadalavada, the ISO's executive vice president and COO, reported that while total capacity, which includes demand response, is projected to decrease by 396 MW in 2016, it is expected to increase by almost 9.8 GW the following three years.

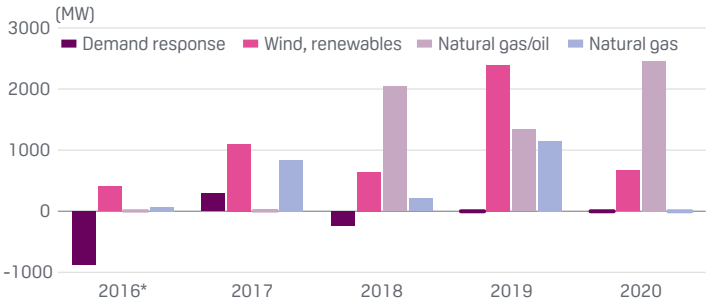
However, about 4.1 GW of that total is wind and other renewables, and wind is an intermittent resource of which only a fraction may be available at peak demand periods.

As a point of reference, ISO New England's peak load in January was 19,412 MW on January 19.

The 396-MW decrease in capacity in 2016 is caused by an 890-MW decrease in demand response capacity, mitigated somewhat by 82 MW of new natural gas or dual-fuel capacity and 402 MW of new capacity from wind and other renewables.

By the end of 2020, capacity will have grown by a net amount (including decreases in demand response) of 12.5 GW, of which 5.2 GW is expected to be wind or other renewables and 8.1 GW is projected to be natural gas or dual-fuel.

### ISO NEW ENGLAND PROJECTED CAPACITY CHANGES




*2016 includes 12 MW of generation that has gone into service already.
Source: ISO New England

January's power prices reinforced the conventional wisdom that reliance on natural gas can result in significant volatility.

ISO New England's real-time average locational marginal price jumped about 67% from December to January, Chadalavada reported, but those prices were well below January 2015 numbers. Chadalavada's report only covered January 1 through January 27, but that average was $35.73/MWh, compared with December's $20.40/MWh.

The big driver for that price hike was a 114% increase in the region's average natural gas prices, Chadalavada said, to an average of about $4.85/MMBtu.

Also, the Participants Committee unanimously voted to endorse generation interconnection tariff revisions designed to reduce the time to interconnect new generators, require wind generators to provide reactive power and meet North American Electric Reliability Corp. modeling and performance requirements.

— *Mark Watson*

## Renewables pressure SP15 forwards

ANALYSIS The Q3 2016 on-peak package at SP15 has defied its historical relationship to NP15 since April 2015, likely because of expectations for even stronger renewable output this summer in the southern part of California.

Typically the SP15 package has traded at a premium to NP15, fueled by more extreme summer weather in Southern California compared to up north. That price relationship flipped in April of last year, which persisted until January 11.

During the period SP15 was at a discount to NP15, the spread averaged negative $0.50/MWh. In contrast, the spread averaged $1.53/MWh over the same period that preceded the 2015 Q3 package.

With gas the marginal fuel source in Cal-ISO, natural gas prices at PG&E Citygate and SoCal should be key drivers of power price changes in those regions. Gas-fired power comprised about 44% of the generation in Cal-ISO in 2015.

However, with the corresponding gas forwards at PG&E Citygate and SoCal not showing any atypical movements, the reason for the depressed prices at SP15 is more likely summer expectations for renewables output.

### Solar PV drives negative real-time prices

The state's solar PV facilities are most heavily concentrated in Southern California and can exert significant downward pressure on local power prices.

Increasing solar PV has driven up the occurences of prices going negative in the real time market during on-peak hours. SP15 in 2015 saw negative prices across 767 hours during the on-peak period. In contrast, NP15 only experienced negative on-peak real-time prices across 402 total hours.

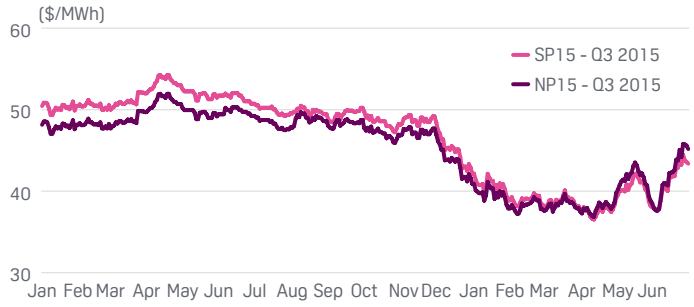
This year, SP15 has seen real-time prices go negative across 40 total hours so far, while NP15 has only seen negative prices across 17 total hours.

Based on historic growth trends, solar PV generation over the third quarter this year could average as high as 64.0 GWh/d, which would represent a 16.8 GWh/d, or 35%, build over average output during the third quarter of 2015.

### Renewables buildout continues

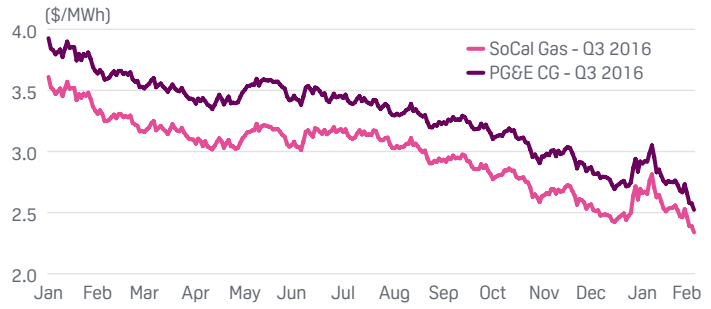
Renewables have seen consistent growth in the California electricity market. In 2015, market share from renewables averaged

### Q3 2015 PACKAGES, ON-PEAK



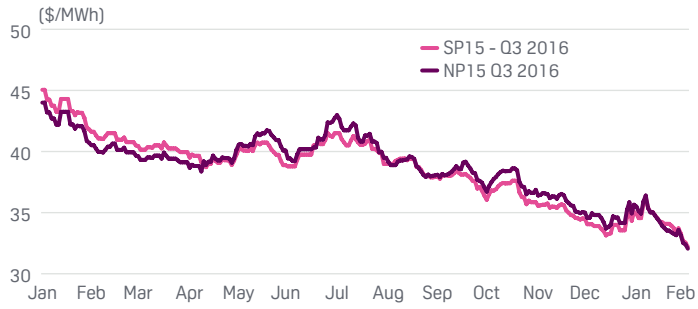

Source: Platts M2MS Forward Curve

### Q3 2016 GAS PACKAGES




Source: Platts M2MS Forward Curve

### Q3 2016 PACKAGES, ON-PEAK




Source: Platts M2MS Forward Curve

18%, up nearly 8 percentage points from 2010.

A large portion of this growth is because of continued deployment of solar PV, which saw generation increase by 38% from 2014 to 2015. Generation averaged 39.4 GWh/d in 2015. Output so far this year is averaging 27.4 GWh/d, 18% higher than during the same period in 2015.

Given the significant impact solar has on SP15 real-time prices, the market is likely anticipating further downward pressure this summer as the resource continues to see surging output.

— *Jonathan Nelson*

## FERC rejects NRG complaint over FTRs

Changes the Midcontinent Independent System Operator made to its financial transmission rights auction process were in line with the ISO's tariff, the US Federal Energy Regulatory Commission said last week, denying a complaint filed by NRG Power Marketing.

Transmission users in MISO are assessed a congestion charge based on their nodal injections and withdrawals where there is a difference in the cost of energy, less transmission losses, at two different locations in the network called commercial pricing nodes.

Such charges are volatile so MISO conducts FTR auctions on an annual and monthly basis to help market participants manage day-ahead congestion cost risk between generation and load.

Following the integration of Entergy and others into MISO's footprint in late 2013, the ISO held a partial-year FTR allocation to give market participants an opportunity to purchase FTRs for a new zone added as a result of the creation of MISO South. All of the commercial pricing nodes in the MISO South region were redefined as a single node.

NRG-PML, in a complaint (EL16-3) filed in October, said the collapsing of the nodes rendered worthless all of the FTRs it purchased during the 2013 annual FTR auction and the October 2013 multi-period monthly FTR auction that had receipt and delivery points in what would become the MISO South region. This represented an estimated $13.5 million in lost value for the company, the NRG Energy subsidiary said.

NRG-PML alleged that MISO took such action because the grid operator realized that it had oversold the FTRs. The company charged that MISO's "collapsing of the [commercial pricing nodes] was unlawful as MISO exercised its authority in an unreasonable and unduly discriminatory manner by specifically targeting holders of FTRs sourcing and sinking in MISO South for elimination, while holding other holders of FTRs harmless."

But FERC, in an order last week, sided with MISO, which argued that the collapse of the nodes in MISO South was the foreseeable outcome of the partial-year FTR allocation held shortly after the October 2013 MPM auction.

### FERC says MISO's actions were appropriate

"In purchasing FTRs prior to the partial-year FTR allocation with sources and sinks in the region that would become MISO South, NRG should have recognized that such pre-integration FTRs as a congestion hedge on the pre-integration MISO transmission system would not provide value as FTRs between sources and sinks in the new [auction revenue rights] zones following the Entergy integration," FERC said.

The commission found that "MISO took appropriate action to redefine the [commercial pricing nodes] of the pre-integration FTRs sourcing and/or sinking in what is now MISO South to maintain post-integration the specific value that they were intended to provide based on congestion caused by the associated impacts on the pre-integration MISO system."

FERC added that consolidating the nodes "was not unduly discriminatory, since MISO made adjustments to all pre-integration FTRs with source and/or sink points in MISO South to maintain the product originally sold. These adjustments potentially affected the value of all FTRs with source or sink points in MISO South."

Further, the commission pointed to a working group meeting and at least four stakeholder meetings that NRG-PML was present for in which discussions included the new tariff provisions and how FTRs would be treated and allocated after the MISO South integration. Those meetings were held prior to the two auctions in which NRG-PML purchased the disputed FTRs.

"If NRG disputed MISO's understanding of its tariff, NRG should have filed a complaint prior to the 2013 annual auction and the October 2013 multi-period monthly auction," FERC said in the order.

— *Jasmin Melvin*

## NYSEG eyes role in distributed energy program

New York State Electric and Gas is moving forward with a program to develop its role as the coordinator of communities and distributed energy resource developers.

The New York Public Service Commission's REV initiative, or reforming the energy vision, calls on utilities to act as "distribution system platform providers" to synchronize the development of the distributed resources.

NYSEG's demonstration project is the first step in the development of the platform, Laney Brown, director of smart grid planning and programs for NYSEG, said Friday in an interview.

"The interesting thing about the demonstration is that it explores the elements that it will take to develop the platform," she said.

The platform can be many different things with technical components and customer components and ways for market participants to have access to customers, Brown said. The first phase also explores the revenue streams for the utility as the platform provider.

"There are many, many ways to look at a platform," she said.

While community leaders, local businesses and residential customers often have the motivation to increase the amount of renewable energy, they face barriers to adopting additional resources such as cost, access to financing, lack of information and lack of trust of energy services providers, NYSEG said in its implementation plan submitted to the PSC on Thursday.

"With these barriers in mind, NYSEG asked, what can the utility do to be an enabler of community energy goals," the utility said.

### NYSEG identifies three roles as platform provider

NYSEG identified three roles it needs to play to support the development of more distributed resources.

It must identify projects that support community goals and

priorities. It must act as sales agent for the distributed energy projects through its long-established relationship with customers and it must be the market coordinator.

NYSEG has teamed with Taitem Engineering, a full service consulting engineering firm based in Ithaca, New York, to implement the program.

Together they will coordinate with community stakeholders to identify distributed energy resources that are of interest to the community. The products will be marketed directly to customers and NYSEG will aggregate the customer demand for projects and solicit competitive offers from service providers.

"This project is both testing ideas about how the utility can create value in the distributed energy space and helping the utility to think outside the box," Sara Culotta, project manager, Taitem Engineering, said Friday in an interview.

The first phase is community engagement that involves teamwork across a broad spectrum of players. "That is new for a utility that is very commodity product orientated. We're learning all sorts of things we hadn't thought of before," Culotta said.

The utility and Taitem are asking what the community needs, what would get in the way and what the realities are on the ground, Culotta said. "We intend for this project to build bridges between players and functions that in the past have operated in silos," she said.

### PSC opts for demonstration projects first

The PSC's decision to do many demonstration projects on a small scale on a local level was the smart way to develop a sustainable business models to implement REV, Culotta said.

NYSEG through discussions with the community has identified an initial list of products and service options that could be offered. They include standardized residential solar PV with the possible addition of battery storage. A standardized PV offering would reduce the product variability and reduce the development cost, NYSEG said.

The list also includes community net metered solar PV or distributed wind, commercial solar also with the possibility of adding battery storage, distributed wind located in rural areas and several energy efficiency measures.

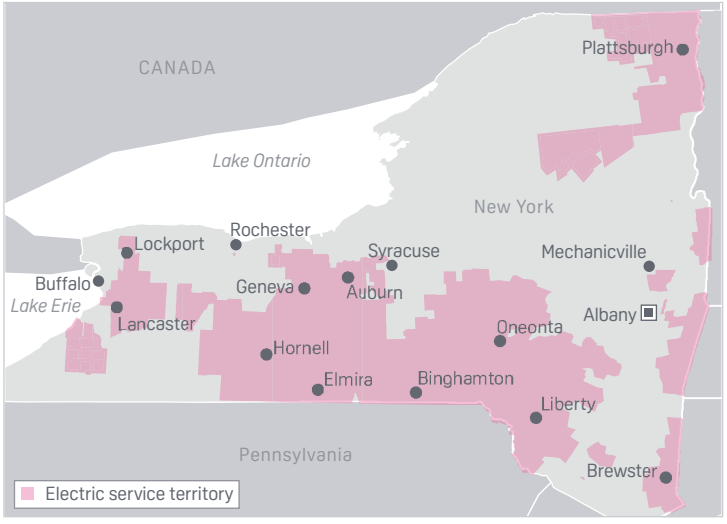
The utility is open to other options, however. One or two resources will be developed initially and if the model is successful, more products and services will be offered and the program expanded to other areas in the service territory.

The product offerings should be developed by mid-2016.

NYSEG expects the program to create more value for the community, customers and market participants compared with standard product or service offerings. It should increase DER penetration at a lower cost and lower the cost of DERs to individual customers.

— *Mary Powers*

### NEW YORK STATE ELECTRIC AND GAS SERVICE TERRITORY




Source: New York State Electric and Gas

### DAILY CSAPR ALLOWANCE ASSESSMENTS, FEB 5 ($/st)

| | $/st | 2015 Range | $/st | 2016 Range |
|---|---|---|---|---|
| Nox Annual | 90.00 | 65.00-95.00 | 90.00 | 65.00-95.00 |
| NOx Seasonal | 260.00 | 220.00-300.00 | 260.00 | 220.00-300.00 |
| $SO_2$ Group 1 | 2.00 | 1.00-5.00 | 2.00 | 1.00-5.00 |
| $SO_2$ Group 2 | 5.00 | 3.00-7.00 | 5.00 | 3.00-7.00 |

### RGGI CARBON ALLOWANCE FUTURES, FEB 4 ($/allowance)

| ICE | Settlement | Volume |
|---|---|---|
| Dec16 V15 | 8.25 | 0 |
| Dec17 V15 | 8.48 | 0 |
| Dec18 V15 | 8.72 | 0 |
| Dec16 V16 | 8.25 | 275 |
| Dec17 V16 | 8.48 | 0 |
| Dec18 V16 | 8.72 | 0 |
| Dec16 V17 | 8.25 | 0 |
| Dec17 V17 | 8.48 | 0 |

The Regional Greenhouse Gas Initiative is a carbon cap-and-trade program for power generators in nine Northeast and Mid-Atlantic US states. One RGGI allowance is equivalent to one short ton of $CO_2$. The volume listed is the number of futures contracts traded. Each futures contract represents 1,000 RGGI allowances.

## Texas PUC mulls next steps for ORDC review

The Texas Public Utility Commission staff's review of the Operating Reserve Demand Curve continued Thursday with a stakeholder-position summary memo and proposal of next steps, both of which will be topics of discussion for the commission.

One option: just let it go.

The ORDC was implemented June 1, 2014, as a price adder that reflects the value of available reserves to improve scarcity pricing and provide incentives for sufficient generation capacity to stay or develop in ERCOT.

On October 8, the PUC asked ERCOT and PUC staff to review the ORDC in response to an October 7 memo from Commissioner Ken Anderson, who noted that on August 13, ERCOT's physical responsive capability approached Energy Emergency Alert Level 1, which would have allowed ERCOT to call on all available power supplies, including

power from other grids. However, ORDC reserves remained relatively high, which meant scarcity pricing had not arisen.

ERCOT and stakeholders produced a report reviewing ORDC parameters and stakeholders recommendations for them, but no consensus was reached. Several load-serving entities and groups of users of electricity favored no action, while some generating companies favored changes designed to increase the price adder at various levels of reserves.

On Thursday, PUC staff filed a memo in the relevant Project No. 45572 summarizing the positions and offering a variety of next steps.

"If, after consideration of the ERCOT analysis and stakeholder recommendations, the Commission considers its review of the ORDC complete, Staff will take no specific action at this time," the memo states.

### Alternatives: workshop, rulemaking process

Alternatively, the commission or staff could conduct a workshop to discuss the merits and implications of the various ORDC proposals.

The PUC could also seek written comments from stakeholders either in response to such a workshop or in response to initial comments filed at ERCOT, the staff memo states.

The commission could also ask ERCOT to conduct further analysis of each proposal, to establish a more accurate value of lost load or to run various hypothetical analyses.

Another option would be for the PUC to begin a rulemaking to amend PUC Substantive Rule 25.505(g), which provides a "safety valve" that cuts the $9,000/MWh systemwide offer cap from $9,000/MWh to $2,000/MWh if annual peaker net margin exceeds three times the cost of new entry.

Peaker net margin is the amount of annual net revenue that would be provided to a hypothetical natural gas-fired peaking generator based on actual prices during the course of a year.

"A rulemaking proceeding would allow Staff to fully evaluate potential amendments to the rule in light of the ORDC," the staff memo states.

— *Mark Watson*

## OUTAGES

### GENERATION UNIT OUTAGE REPORT

| Plant/Operator | Cap | Fuel | State | Status | Return | Shut |
|---|---|---|---|---|---|---|
| **Northeast** | | | | | | |
| Halton-1/TransCanada | 226 | g | Ont. | MO | Unk | 01/26/16 |
| Lake Superior/Brookfield | 120 | g | Ont. | PMO | Unk | 11/04/14 |
| Lennox-3/OPG | 525 | g | Ont. | MO | Unk | 01/13/16 |
| Pickering-4/OPG | 515 | n | Ont. | MO | Unk | 01/08/16 |
| **PJM & MISO** | | | | | | |
| Beaver Valley-2/FNO | 1008 | n | Penn. | PMO | Unk | 02/03/16 |
| Prairie Island-2/NMC | 604 | n | Minn. | MO | Unk | 12/17/15 |
| Salem-2/PSEG | 1130 | n | NJ | MO | Unk | 02/05/16 |
| **Southeast & Central** | | | | | | |
| Limestone-1/NRG | 830 | c | Texas | MO | Unk | 11/30/15 |
| Martin Lake-2/Luminant | 750 | c | Texas | MO | Unk | 02/01/15 |
| Martin Lake-3/Luminant | 750 | c | Texas | MO | Unk | 06/18/15 |
| Sequoyah-1/TVA | 1152 | n | Tenn. | MO | Unk | 12/26/15 |
| Watts Bar-2/TVA | 1179 | n | Tenn. | MO | Unk | 01/04/15 |
| **West** | | | | | | |
| Alamitos-6/AES | 495 | g | Calif. | PMO | Unk | 02/01/16 |
| Belden Hydro/PG&E | 119 | h | Calif. | PMO | Unk | 10/28/15 |
| Colgate-2/PCWA | 176 | h | Calif. | MO | Unk | 01/18/16 |
| Elk Hills/Occidental | 552 | g | Calif. | MO | Unk | 01/31/16 |
| Etiwanda-4/Reliant | 320 | g | Calif. | PMO | Unk | 01/25/16 |
| Gilroy/Calpine | 120 | g | Calif. | PMO | Unk | 01/10/16 |
| Harbor/Harbor Cogen | 109 | g | Calif. | MO | Unk | 01/31/16 |
| Helms-2/PG&E | 407 | h | Calif. | PMO | Unk | 01/31/16 |
| Huntington Beach-2/AES | 226 | g | Calif. | PMO | Unk | 02/01/16 |
| Kerckhoff-1/PG&E | 153 | h | Calif | PMO | Unk | 11/02/15 |
| La Paloma-3/La Paloma | 256 | g | Calif. | PMO | Unk | 02/03/16 |
| Moss-2/Dynegy | 510 | g | Calif. | PMO | Unk | 01/27/16 |
| Ormond Beach-1/RRI | 741 | g | Calif. | PMO | Unk | 02/01/16 |
| Ormond Beach-2/RRI | 775 | g | Calif. | PMO | Unk | 02/01/16 |
| Redondo-8/AES | 496 | g | Calif. | PMO | Unk | 02/01/16 |
| Solano-3/SMUD | 128 | w | Calif. | MO | Unk | 02/01/16 |
| Sutter/Calpine | 525 | g | Calif. | MO | Unk | 01/24/16 |
| Solano-3/SMUD | 128 | w | Calif. | MO | Unk | 02/01/16 |
| Sutter/Calpine | 525 | g | Calif. | MO | Unk | 01/24/16 |

Daily generation outage references: O=unplanned maintenance outage; RF=refueling outage; PMO=planned maintenance outage; Unk= unknown; OA=offline/available. Fuels: Nuclear=n; Coal=c; Natural gas=g; Hydro=h ; Wind=w

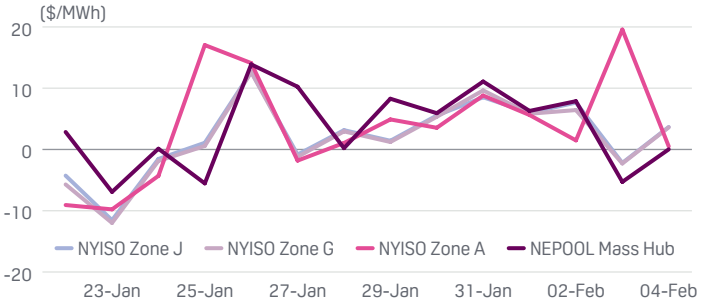
Sources: Generation owners, public information and other market sources.

## NORTHEAST POWER MARKETS

### NORTHEAST DAY AHEAD POWER PRICES ($/MWh)

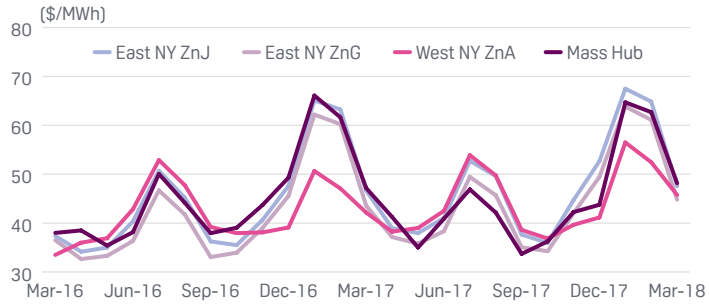
| Hub/Index | Symbol | 06-Feb | Marginal heat rate | Spark spread @7K | Spark spread @12K | Price change Chg | Price change % Chg | Prior 7-day Average | Month Min | Month Max | Yearly change Feb-16 | Yearly change Feb-15 | Yearly change Chg | Yearly change % Chg |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **On-Peak** | | | | | | | | | | | | | | |
| ISONE Internal Hub | IINIM00 | 26.65 | 8888 | 5.66 | -9.33 | -3.34 | -11.1 | 23.86 | 20.90 | 29.99 | 24.47 | 130.09 | -105.62 | -81.2 |
| ISONE NE Mass-Boston | IINNM00 | 26.75 | 8923 | 5.76 | -9.22 | -3.24 | -10.8 | 23.88 | 20.94 | 29.99 | 24.53 | 130.42 | -105.89 | -81.2 |
| ISONE Connecticut | IINCM00 | 26.43 | 9805 | 7.56 | -5.92 | -3.60 | -12.0 | 23.87 | 20.88 | 30.03 | 24.44 | 128.57 | -104.13 | -81.0 |
| NYISO Zone G | INYHM00 | 25.59 | 11095 | 9.44 | -2.09 | 1.42 | 5.9 | 24.83 | 22.91 | 27.64 | 25.00 | 120.15 | -95.15 | -79.2 |
| NYISO NYC Zone | INYNM00 | 25.84 | 11205 | 9.70 | -1.83 | 1.42 | 5.8 | 25.26 | 23.13 | 29.02 | 25.45 | 121.40 | -95.95 | -79.0 |
| NYISO West Zone | INYWM00 | 13.73 | 9010 | 3.06 | -4.56 | -3.13 | -18.6 | 19.04 | 13.73 | 21.89 | 17.82 | 74.56 | -56.74 | -76.1 |
| NYISO Capital Zone | INYCM00 | 27.94 | 14177 | 14.14 | 4.29 | 3.30 | 13.4 | 23.94 | 22.01 | 27.94 | 24.47 | 130.76 | -106.29 | -81.3 |
| **Off-Peak** | | | | | | | | | | | | | | |
| ISONE Internal Hub | IINIP00 | 31.80 | 11037 | 11.63 | -2.77 | 8.18 | 34.6 | 15.48 | 5.31 | 31.80 | 15.98 | 108.12 | -92.14 | -85.2 |
| ISONE NE Mass-Boston | IINNP00 | 31.73 | 11014 | 11.56 | -2.84 | 8.26 | 35.2 | 15.44 | 5.30 | 31.73 | 15.94 | 108.21 | -92.27 | -85.3 |
| ISONE Connecticut | IINCP00 | 31.50 | 12412 | 13.73 | 1.05 | 7.97 | 33.9 | 15.42 | 5.33 | 31.50 | 15.90 | 106.80 | -90.90 | -85.1 |
| NYISO Zone G | INYHP00 | 22.05 | 10116 | 6.79 | -4.11 | 6.28 | 39.8 | 16.54 | 13.73 | 22.05 | 16.12 | 93.79 | -77.67 | -82.8 |
| NYISO NYC Zone | INYNP00 | 22.23 | 10196 | 6.97 | -3.93 | 6.34 | 39.9 | 16.68 | 13.85 | 22.23 | 16.25 | 94.21 | -77.96 | -82.8 |
| NYISO West Zone | INYWP00 | 10.39 | 6575 | -0.67 | -8.57 | -0.69 | -6.2 | 12.50 | 8.12 | 13.45 | 10.72 | 61.74 | -51.02 | -82.6 |
| NYISO Capital Zone | INYCP00 | 24.79 | 12976 | 11.42 | 1.86 | 8.45 | 51.7 | 16.91 | 14.87 | 24.79 | 17.01 | 103.28 | -86.27 | -83.5 |

### NORTHEAST AVG. DAY-AHEAD/REAL-TIME PEAK PRICE SPREAD



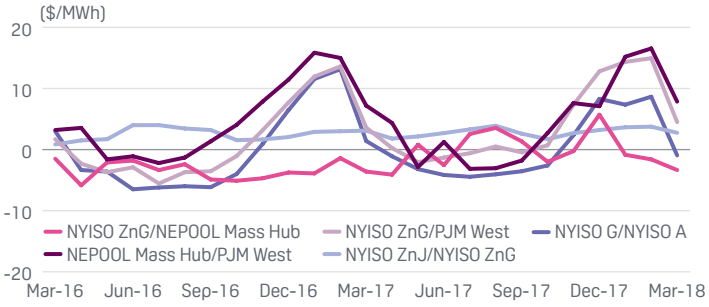

Source: Platts

### NORTHEAST PLATTS M2MS FORWARD CURVE: ON-PEAK




Source: Platts

### NORTHEAST PLATTS M2MS LOCATIONAL SPREADS: ON-PEAK




Source: Platts

## Cold boosts Mass Hub to upper $30s/MWh

New England day-ahead power prices jumped Friday with cooler weather expected in the region to boost demand, at the same time there was less available generation.

Mass Hub on-peak climbed nearly $10 to about $38.50/MWh on the IntercontinentalExchange. Mass Hub on-peak weekend was around $26.25/MWh. Mass Hub on-peak balance-of-the-week was at about $43/MWh, indicating possible further upward momentum for day-ahead prices.

New England ISO forecast Friday's peak at 16,560 MW, 16,140 MW Saturday and 15,960 MW Sunday. Monday's peak was projected near 18,000 MW while at the same time available generation was expected to drop about 5% compared with the previous day.

Boston high temperatures Monday were expected around 30 with lows in around 21.

New York ISO day-ahead locational marginal prices were mixed Friday as load was expected to pull back over the weekend.

NYISO Zone G Hudson Valley on-peak was up close to $1.50 to be above $25.50/MWh, while Zone J New York City on-peak also climbed about $1.50 to close to $25.75/MWh. However, Zone A West on-peak dropped more than $3 to be near $13.75/MWh.

So far this month Zone A West on-peak has averaged below $20/MWh, 75% lower than the February 2015 average.

The New York ISO predicted peak demand Friday near 19,742 MW for the evening ramp. Morning peakload ramped up to about 20,300 MW, which was about 1,500 MW higher than expected. Saturday's peakload was projected at 18,677 MW, 18,285 MW Sunday and 20,567 MW Monday.

High temperatures across New York Monday were predicted in the upper 20s to upper 30s with lows at about 12 to upper 20s.

Northeast forward power prices surged Friday with a rise in NYMEX gas futures along with colder weather heading to the region firming spot power markets. March NYMEX gas futures were up 9.1 cents to $2.063/MMBtu.

Mass Hub mini on-peak March jumped $1.50 to $38/MWh on the IntercontinentalExchange around 2:30 pm EST. Mass Hub mini on-peak April increased 50 cents to $38.50/MWh. Mass Hub mini on-peak July-August added nearly 50 cents rising to $46.75/MWh.

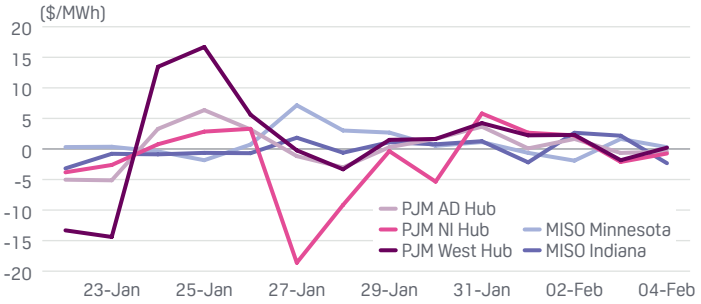
New York Zone G on-peak April gained 75 cents to $33/MWh. New York Zone G on-peak July-August edged up 25 cents to $43.75/MWh.

## PJM/MISO POWER MARKETS

### PJM/MISO DAY AHEAD POWER PRICES ($/MWh)

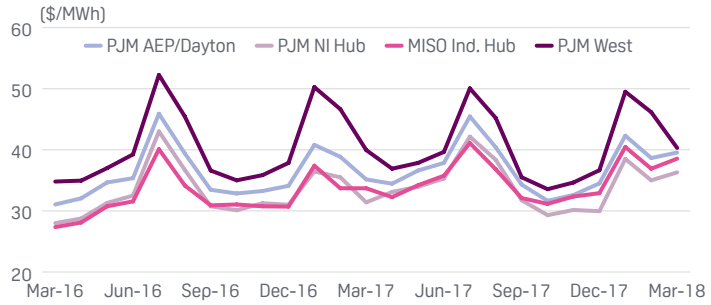
| Hub/Index | Symbol | 06-Feb | Marginal heat rate | Spark spread @7K | Spark spread @12K | Price change Chg | Price change % Chg | Prior 7-day Average | Month Min | Month Max | Yearly Change Feb-16 | Yearly Change Feb-15 | Yearly Change Chg | Yearly Change % Chg |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **On-Peak** | | | | | | | | | | | | | | |
| PJM AEP Dayton Hub | IPADM00 | 24.67 | 13487 | 11.87 | 2.72 | -5.27 | -17.6 | 25.19 | 22.29 | 29.94 | 25.48 | 54.61 | -29.13 | -53.3 |
| PJM Dominion Hub | IPDMM00 | 26.21 | 12632 | 11.69 | 1.31 | -4.89 | -15.7 | 26.33 | 23.17 | 31.10 | 26.41 | 92.05 | -65.64 | -71.3 |
| PJM Eastern Hub | IPEHM00 | 35.36 | 19342 | 22.56 | 13.42 | 7.56 | 27.2 | 25.57 | 20.61 | 35.36 | 26.31 | 111.35 | -85.04 | -76.4 |
| PJM Northern Illinois Hub | IPNIM00 | 23.64 | 11322 | 9.02 | -1.42 | -5.34 | -18.4 | 24.58 | 20.24 | 28.98 | 24.61 | 47.67 | -23.06 | -48.4 |
| PJM Western Hub | IPWHM00 | 25.52 | 16448 | 14.66 | 6.90 | -4.72 | -15.6 | 25.87 | 22.99 | 30.24 | 26.07 | 80.41 | -54.34 | -67.6 |
| MISO Indiana Hub | IMIDM00 | 22.78 | 13434 | 10.91 | 2.43 | -2.03 | -8.2 | 23.56 | 22.67 | 25.60 | 24.18 | 44.15 | -19.97 | -45.2 |
| MISO Minnesota Hub | IMINM00 | 15.67 | 7617 | 1.27 | -9.02 | -5.54 | -26.1 | 21.21 | 15.67 | 25.76 | 20.99 | 31.46 | -10.47 | -33.3 |
| **Off-Peak** | | | | | | | | | | | | | | |
| PJM AEP Dayton Hub | IPADP00 | 23.35 | 12784 | 10.56 | 1.43 | -0.56 | -2.3 | 19.61 | 15.44 | 23.91 | 19.72 | 38.47 | -18.75 | -48.7 |
| PJM Dominion Hub | IPDMP00 | 24.98 | 12274 | 10.73 | 0.56 | -0.23 | -0.9 | 20.93 | 15.97 | 25.21 | 20.61 | 81.16 | -60.55 | -74.6 |
| PJM Eastern Hub | IPEHP00 | 39.02 | 21552 | 26.35 | 17.29 | 18.78 | 92.8 | 19.17 | 14.29 | 39.02 | 21.09 | 86.97 | -65.88 | -75.7 |
| PJM Northern Illinois Hub | IPNIP00 | 21.90 | 10633 | 7.48 | -2.82 | -0.83 | -3.7 | 18.17 | 13.24 | 22.73 | 18.40 | 31.49 | -13.09 | -41.6 |
| PJM Western Hub | IPWHP00 | 23.64 | 14961 | 12.58 | 4.68 | -0.11 | -0.5 | 20.02 | 15.73 | 23.75 | 19.88 | 66.55 | -46.67 | -70.1 |
| MISO Indiana Hub | IMIDP00 | 20.07 | 11792 | 8.16 | -0.35 | -0.34 | -1.7 | 18.69 | 17.16 | 20.41 | 19.04 | 32.92 | -13.88 | -42.2 |
| MISO Minnesota Hub | IMINP00 | 16.16 | 7899 | 1.84 | -8.39 | -2.88 | -15.1 | 16.98 | 14.50 | 19.04 | 17.23 | 23.10 | -5.87 | -25.4 |

### PJM/MISO AVG. DAY-AHEAD/REAL-TIME PEAK PRICE SPREAD



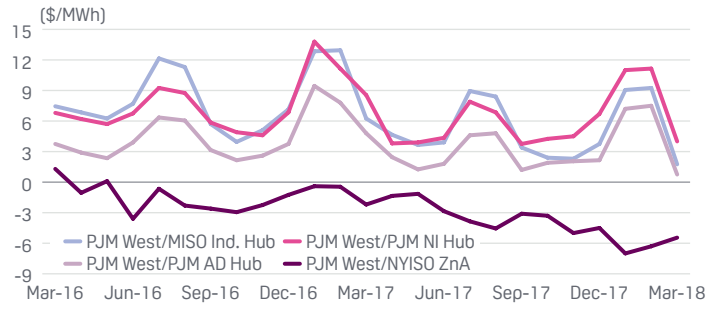

Source: Platts

### PJM/MISO PLATTS M2MS FORWARD CURVE: ON-PEAK




Source: Platts

### PJM/MISO PLATTS M2MS LOCATIONAL SPREADS: ON-PEAK




Source: Platts

## PJM WH rises to low $30s/MWh

Mid-Atlantic day-ahead power prices firmed Friday with cool weather forecast for the start of the week.

PJM West Hub on-peak climbed more than $3 to about $32/MWh and off-peak also gained more than $3 rising to mid-$20s/MWh. PJM West Hub on-peak weekend packages were in the mid-$20s/MWh. PJM West Hub on-peak balance-of-the-week traded above $38/MWh, as the cool weather was forecast to stick around for a few days.

The PJM Interconnection expected peak load Friday near 106,795 MW, 98,320 MW Saturday, 95,474 MW Sunday and 106,922 MW Monday.

Midwest day-ahead power prices retreated Friday even though higher demand was in the outlook.

Indiana Hub on-peak fell close to $2.50 to mid-$20s/MWh for Monday delivery. Indiana Hub off-peak was off $1.50 to lower $20s/MWh. Indiana Hub on-peak balance-of-the-week were valued around $29.50/MWh on ICE.

The Midcontinent ISO projected peakload Friday near 88,420 MW, 78,320 MW for Saturday, 75,970 MW Sunday and then 87,350 MW Monday and then higher on Tuesday near 90,140 MW.

Day-ahead power prices in the western portion of PJM headed up with cool weather.

NI Hub on-peak rose close to $2.50 to upper $20s/MWh. NI Hub on-peak weekend was around $24/MWh.

AD Hub on-peak was up close to $3 to low $30s/MWh and weekend on-peak was at about $24/MWh.

Mid-Atlantic forward power prices were slightly higher Friday as NYMEX gas futures firmed, along with cold weather bolstering spot power markets. March NYMEX gas futures were up 9.1 cents to $2.063/MMBtu.

PJM West Hub on-peak March climbed about 75 cents to $34.75/MWh on the IntecontinentalExchange around 2:30 pm EST. PJM West Hub off-peak March added more than 50 cents to $27.25/MWh. PJM West Hub April rose 50 cents close to $34.75/MWh. PJM West Hub on-peak July-August gained 50 cents to $48.50/MWh.

AD Hub on-peak March increased $1 to $31.25/MWh and off-peak March was up about 50 cents to $25/MWh.

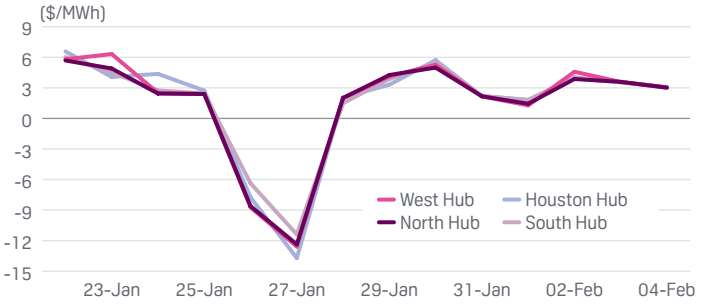
Indiana Hub on-peak March tacked on about 50 cents to $27/MWh. Indiana Hub on-peak July-August added more than 25 cents to be near $36.75/MWh.

## SOUTHEAST POWER MARKETS

### SOUTHEAST & CENTRAL DAY-AHEAD POWER PRICES ($/MWh)

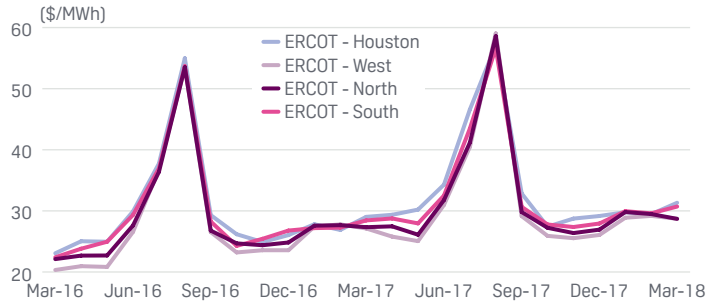
| Hub/Index | Symbol | 06-Feb | Marginal heat rate | Spark spread @7K | Spark spread @12K | Price change Chg | Price change % Chg | Prior 7-day Average | Month Min | Month Max | Yearly change Feb-16 | Yearly change Feb-15 | Yearly change Chg | Yearly change % Chg |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **On-Peak** | | | | | | | | | | | | | | |
| MISO Texas Hub | IMTXM00 | 21.89 | 10821 | 7.73 | -2.39 | -4.48 | -17.0 | 23.01 | 21.54 | 26.37 | 23.78 | 26.66 | -2.88 | -10.8 |
| MISO Louisiana | IMLAM00 | 22.07 | 10878 | 7.87 | -2.28 | -3.28 | -12.9 | 21.81 | 20.76 | 25.35 | 22.41 | 31.33 | -8.92 | -28.5 |
| SPP North Hub | ISNOM00 | 17.35 | 8425 | 2.93 | -7.36 | -2.26 | -11.5 | 18.78 | 16.03 | 22.00 | 19.22 | 24.44 | -5.22 | -21.4 |
| SPP South Hub | ISSOM00 | 21.45 | 11202 | 8.05 | -1.53 | 0.59 | 2.8 | 21.30 | 20.83 | 24.42 | 22.15 | 27.33 | -5.18 | -19.0 |
| ERCOT Houston Hub | IERHM00 | 17.95 | 8865 | 3.78 | -6.35 | 0.48 | 2.7 | 18.75 | 17.47 | 20.67 | 18.68 | 27.04 | -8.36 | -30.9 |
| ERCOT North Hub | IERNM00 | 18.00 | 8939 | 3.90 | -6.16 | 0.55 | 3.2 | 18.60 | 17.45 | 20.74 | 18.64 | 26.76 | -8.12 | -30.3 |
| ERCOT South Hub | IERSM00 | 17.88 | 8861 | 3.76 | -6.33 | 0.39 | 2.2 | 18.62 | 17.49 | 20.59 | 18.58 | 27.06 | -8.48 | -31.3 |
| ERCOT West Hub | IERWM00 | 18.01 | 9271 | 4.41 | -5.30 | 0.66 | 3.8 | 18.54 | 17.35 | 20.79 | 18.59 | 26.93 | -8.34 | -31.0 |
| **Off-Peak** | | | | | | | | | | | | | | |
| MISO Texas Hub | IMTXP00 | 20.14 | 10051 | 6.11 | -3.91 | -0.38 | -1.9 | 18.66 | 16.84 | 20.52 | 19.14 | 24.47 | -5.33 | -21.8 |
| MISO Louisiana | IMLAP00 | 20.02 | 10050 | 6.08 | -3.88 | -0.50 | -2.4 | 18.10 | 16.51 | 20.52 | 18.52 | 25.84 | -7.32 | -28.3 |
| SPP North Hub | ISNOP00 | 14.69 | 7211 | 0.43 | -9.76 | -3.11 | -17.5 | 14.51 | 11.54 | 17.99 | 15.68 | 18.78 | -3.10 | -16.5 |
| SPP South Hub | ISSOP00 | 18.67 | 9816 | 5.36 | -4.15 | -0.17 | -0.9 | 17.49 | 15.97 | 20.57 | 18.96 | 22.98 | -4.02 | -17.5 |
| ERCOT Houston Hub | IERHP00 | 13.13 | 6556 | -0.89 | -10.90 | 1.02 | 8.4 | 11.62 | 9.03 | 15.08 | 12.26 | 18.37 | -6.11 | -33.3 |
| ERCOT North Hub | IERNP00 | 13.16 | 6643 | -0.71 | -10.61 | 1.03 | 8.5 | 11.62 | 9.02 | 15.22 | 12.30 | 18.28 | -5.98 | -32.7 |
| ERCOT South Hub | IERSP00 | 13.14 | 6601 | -0.79 | -10.75 | 1.12 | 9.3 | 11.50 | 8.94 | 14.86 | 12.17 | 18.37 | -6.20 | -33.8 |
| ERCOT West Hub | IERWP00 | 12.69 | 6520 | -0.93 | -10.67 | 0.66 | 5.5 | 11.48 | 8.96 | 15.25 | 12.20 | 18.34 | -6.14 | -33.5 |

### ERCOT AVG. DAY-AHEAD/REAL-TIME PEAK PRICE SPREAD



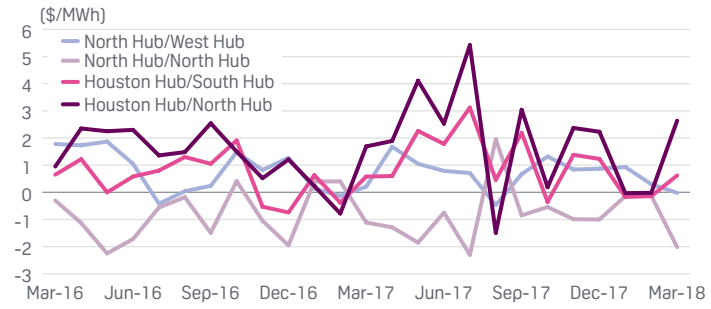

Source: Platts

### ERCOT PLATTS M2MS FORWARD CURVE: ON-PEAK




Source: Platts

### ERCOT PLATTS M2MS LOCATIONAL SPREADS: ON-PEAK




Source: Platts

## ERCOT power rises with for-Monday premium

Electric Reliability Council of Texas dailies edged higher Friday as higher spot gas prices outweighed an expected decrease in load.

ERCOT North Hub day-ahead on-peak was up $1 to around $19/MWh for Monday delivery on the IntercontinentalExchange.

Spot natural gas at Houston Ship Channel for Saturday-Monday delivery rose 4.1 cents to $2.031/MMBtu on ICE. Temperatures in the Northeast were expected to drop to below normal levels Monday through Friday, while temperatures in the Southeast were expected to dip 3-12 degrees below normal levels Saturday through Thursday.

ERCOT forecast system load to peak around 47,775 MW Friday at 8 am CST. On Monday, demand was expected to peak around 42,800 MW at 8 am. Projected hourly demand was forecast to average 37,300 MW during peak hours.

Wind generation was above projections Friday morning, with actual output exceeding projections by as much as 2,298 MW at 11 am. Wind reached peak levels at 11,548 MW at 7 am.

North Hub balance-of-the-day on-peak for Friday traded 750 MW at about $15.25/MWh, down about $2.75 from Thursday's day-ahead price. Real-time day-ahead on-peak was up about $1.25 to about $19/MWh. 1,100 MW traded on-screen and about 400 MW in block volume was cleared on the exchange.

In the Southeast, dailies pushed higher Friday as gas demand in both the Southeast and Northeast were expected to rebound through the weekend and into the middle of next week.

Into Southern day-ahead on-peak was up by about $5 to the mid-$20/MWh for Monday delivery.

Spot natural gas at Transco Zone-3 rose 4.3 cents to $2.073/MMBtu on ICE.

ERCOT forward prices pushed up Friday as NYMEX March gas futures settled 9.1 cents higher to $2.063/MMBtu.

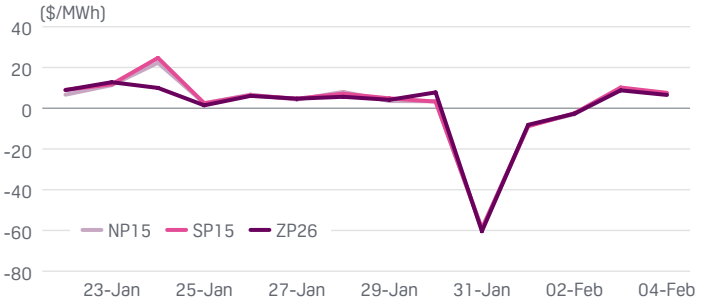
ERCOT North Hub March on-peak rose $1 to about $21.75/MWh on ICE at around 2:30 pm EST. April on-peak was up 75 cents to about $22.50/MWh. June on-peak was up 75 cents to about $27.25/MWh. In the back-half, July-August on-peak rose $2 to about $45.25/MWh as on-peak heat rates traded for 100 MW at 19.25 MMBtu/MWh down from the previous day's trade of 19.3 MMBtu/MWh. September on-peak gained 75 cents to about $26.50/MWh. October on-peak was up 75 cents to about $24.25/MWh.

## WEST POWER MARKETS

### WESTERN DAY-AHEAD POWER PRICES ($/MWh)

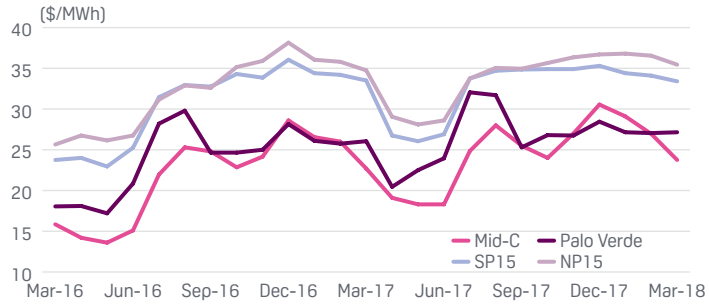
| Hub/Index | Symbol | 06-Feb | Marginal heat rate | Spark spread @7K | Spark spread @12K | Price change Chg | Price change % Chg | Prior 7-day Average | Month Min | Month Max | Yearly change Feb-16 | Yearly change Feb-15 | Yearly change Chg | Yearly change % Chg |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **On-Peak** | | | | | | | | | | | | | | |
| NP15 | ICNGM00 | 25.03 | 11404 | 9.67 | -1.31 | -2.19 | -8.0 | 28.39 | 25.03 | 31.42 | 28.91 | 32.66 | -3.75 | -11.5 |
| SP15 | ICSGM00 | 24.12 | 11840 | 9.86 | -0.33 | -2.73 | -10.2 | 26.36 | 24.12 | 31.55 | 27.72 | 31.60 | -3.88 | -12.3 |
| ZP26 | ICZGM00 | 23.85 | 11704 | 9.59 | -0.60 | -2.74 | -10.3 | 25.96 | 23.85 | 30.74 | 27.29 | 31.70 | -4.41 | -13.9 |
| COB | WEABE20 | 20.75 | 10427 | 6.82 | -3.13 | 0.00 | 0.0 | 20.65 | 20.75 | 22.25 | 21.30 | 22.98 | -1.68 | -7.3 |
| MEAD | AAMBW20 | 21.00 | 10244 | 6.65 | -3.60 | 0.00 | 0.0 | 22.18 | 21.00 | 24.50 | 22.46 | 25.53 | -3.07 | -12.0 |
| MID-C | WEABF20 | 19.36 | 10044 | 5.87 | -3.77 | 0.00 | 0.0 | 19.54 | 19.36 | 21.62 | 20.28 | 18.87 | 1.41 | 7.5 |
| Palo Verde | WEACC20 | 20.00 | 9938 | 5.91 | -4.15 | 0.00 | 0.0 | 20.98 | 20.00 | 22.75 | 21.17 | 24.20 | -3.03 | -12.5 |
| **Off-Peak** | | | | | | | | | | | | | | |
| NP15 | ICNGP00 | 24.69 | 11115 | 9.14 | -1.97 | 0.02 | 0.1 | 23.57 | 22.15 | 26.22 | 24.70 | 26.81 | -2.11 | -7.9 |
| SP15 | ICSGP00 | 24.78 | 12095 | 10.44 | 0.19 | -0.12 | -0.5 | 23.59 | 21.84 | 26.45 | 24.80 | 26.97 | -2.17 | -8.0 |
| ZP26 | ICZGP00 | 24.36 | 11889 | 10.02 | -0.23 | -0.10 | -0.4 | 23.18 | 21.52 | 25.94 | 24.36 | 26.45 | -2.09 | -7.9 |
| COB | WEACJ20 | 21.25 | 10678 | 7.32 | -2.63 | 0.00 | 0.0 | 20.03 | 19.00 | 21.25 | 20.58 | 15.71 | 4.87 | 31.0 |
| MEAD | AAMBQ20 | 18.50 | 9024 | 4.15 | -6.10 | 0.00 | 0.0 | 19.68 | 18.50 | 22.50 | 20.13 | 22.86 | -2.73 | -11.9 |
| MID-C | WEACL20 | 19.00 | 9857 | 5.51 | -4.13 | 0.00 | 0.0 | 18.98 | 19.00 | 20.17 | 19.42 | 10.88 | 8.54 | 78.5 |
| Palo Verde | WEACT20 | 18.00 | 8944 | 3.91 | -6.15 | 0.00 | 0.0 | 19.14 | 18.00 | 22.25 | 19.50 | 21.33 | -1.83 | -8.6 |

### CAISO AVG. DAY-AHEAD/REAL-TIME PEAK PRICE SPREAD



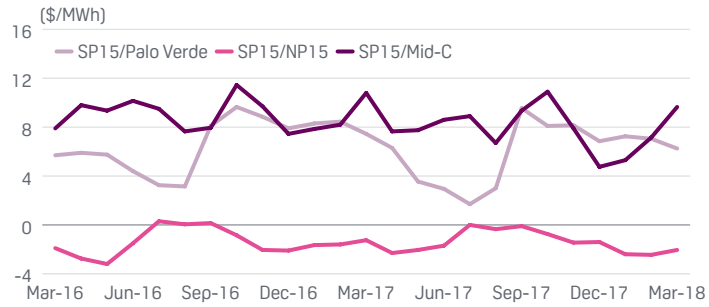

Source: Platts

### WESTERN PLATTS M2MS FORWARD CURVE: ON-PEAK




Source: Platts

### WESTERN PLATTS M2MS LOCATIONAL SPREADS: ON-PEAK




Source: Platts

## Mid-C edges up to low $20s/MWh

West day-ahead power prices were mixed, with on-peak dailies rising with higher demand projections for early in the week while off-peak packages, which include all day Sunday, fell under pressure from lower spot gas.

In California, SP15 day-ahead on-peak climbed $3.25 to nearly $28.75/MWh for Monday delivery on the IntercontinentalExchange. Day-ahead off-peak, which included all-day Sunday, dropped $1 to $23.75/MWh.

PG&E city-gate spot gas retreated 3.9 cents to $2.191/MMBtu for flow Saturday-Monday and SoCal city-gate spot gas shed 3.6 cents to $2.179/MMBtu.

California ISO projected demand to rise from a peak load near 25,825 MW Sunday to around 29,175 MW Monday and 29,650 MW Tuesday.

Temperature highs in Sacramento were forecast 10 degrees above normal Sunday and Monday, averaging in the lower 70s. Lows were expected within normal range in the upper 30s to lower 40s, however.

In the Southwest, Palo Verde day-ahead on-peak jumped 50 cents to about $20.75/MWh, while off-peak eased 25 cents to about $17.75/MWh.

Spot gas prices at Opal gave up 2 cents to $1.940/MMBtu.

In the Northwest, Mid-Columbia dailies rose, with day-ahead on-peak adding about $2.50 to $21.75/MWh. Day-ahead off-peak rose $2.75 to around $21.75/MWh.

West forward power prices saw gains Friday afternoon, supported by strength in the NYMEX front-month gas contract.

Mid-Columbia March on-peak jumped 50 cents to nearly $16/MWh on the IntercontinentalExchange around 2:30 pm EST. March off-peak climbed 75 cents to about $13.75/MWh, while April on-peak edged 25 cents higher to around $14.25/MWh. The second quarter on-peak package added almost 50 cents to $14.50/MWh.

Palo Verde March on-peak gained 75 cents to more than $18/MWh, near flat to where prices opened the week February 1. April on-peak was up 25 cents, also trading near $18/MWh.

SP15 March and third quarter on-peak financial futures added 25 cents apiece to roughly $23.75/MWh and $32.50/MWh, respectively.

NYMEX March gas futures were 9.1 cents over the previous day at $2.063/MMBtu. PG&E city-gate March gas basis eased 1 cent to 17 cents/MMBtu, while SoCal March gas basis moved up 1.6 cents to negative 9.2 cents/MMBtu.

## BILATERALS

### SOUTHEAST & CENTRAL DAY-AHEAD BILATERAL INDEXES ($/MWh)

| Hub/Index | Symbol | 08-Feb | Marginal heat rate | Spark spread @7K | Spark spread @12K | Price change Chg | Price change % Chg | Prior 7-day Average | Month Min | Month Max | Yearly change Feb-16 | Yearly change Feb-15 | Yearly change Chg | Yearly change % Chg |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **On-Peak** | | | | | | | | | | | | | | |
| Florida | AAMAV20 | 29.50 | 12241 | 12.63 | 0.58 | 6.75 | 29.7 | 22.21 | 21.25 | 29.50 | 23.08 | 41.84 | -18.76 | -44.8 |
| GTC, Into | WAMCJ20 | 29.00 | 13959 | 14.46 | 4.07 | 7.50 | 34.9 | 21.32 | 20.25 | 29.00 | 22.21 | 44.66 | -22.45 | -50.3 |
| Southern, Into | AAMBJ20 | 28.25 | 13598 | 13.71 | 3.32 | 6.75 | 31.4 | 20.96 | 20.00 | 28.25 | 21.83 | 42.99 | -21.16 | -49.2 |
| TVA, Into | WEBAB20 | 27.75 | 13167 | 13.00 | 2.46 | 5.50 | 24.7 | 21.75 | 21.00 | 27.75 | 22.50 | 45.90 | -23.40 | -51.0 |
| VACAR | AAMCI20 | 29.25 | 13417 | 13.99 | 3.09 | 6.00 | 25.8 | 22.61 | 21.00 | 29.25 | 23.13 | 54.95 | -31.82 | -57.9 |
| **Off-Peak** | | | | | | | | | | | | | | |
| Florida | AAMAO20 | 21.00 | 8714 | 4.13 | -7.92 | 1.50 | 7.7 | 18.14 | 15.50 | 21.00 | 18.50 | 36.04 | -17.54 | -48.7 |
| GTC, Into | WAMCC20 | 25.00 | 12034 | 10.46 | 0.07 | 5.50 | 28.2 | 19.43 | 15.75 | 25.00 | 20.13 | 37.21 | -17.08 | -45.9 |
| Southern, Into | AAMBC20 | 24.00 | 11552 | 9.46 | -0.93 | 4.50 | 23.1 | 19.00 | 15.50 | 24.00 | 19.63 | 36.45 | -16.82 | -46.1 |
| TVA, Into | AAJER20 | 23.25 | 11032 | 8.50 | -2.04 | 3.25 | 16.3 | 19.11 | 16.25 | 23.25 | 19.63 | 36.46 | -16.83 | -46.2 |
| VACAR | AAMCB20 | 23.50 | 10780 | 8.24 | -2.66 | 3.25 | 16.0 | 19.25 | 16.00 | 23.50 | 19.78 | 43.33 | -23.55 | -54.3 |

Note: Off-peak is for Saturday-Monday delivery.

### WESTERN DAY-AHEAD BILATERAL INDEXES ($/MWh)

| Hub/Index | Symbol | 08-Feb | Marginal heat rate | Spark spread @7K | Spark spread @12K | Price change Chg | Price change % Chg | Prior 7-day Average | Month Min | Month Max | Yearly change Feb-16 | Yearly change Feb-15 | Yearly change Chg | Yearly change % Chg |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **On-Peak** | | | | | | | | | | | | | | |
| Mid-C | WEABF20 | 21.78 | 11418 | 8.43 | -1.11 | 2.42 | 12.5 | 19.88 | 19.36 | 21.78 | 20.49 | 18.87 | 1.62 | 8.6 |
| John Day | WEAHF20 | 22.75 | 11927 | 9.40 | -0.14 | 2.50 | 12.3 | 20.86 | 20.25 | 22.75 | 21.46 | 19.46 | 2.00 | 10.3 |
| COB | WEABE20 | 22.00 | 11224 | 8.28 | -1.52 | 1.25 | 6.0 | 20.97 | 20.75 | 22.25 | 21.40 | 22.98 | -1.58 | -6.9 |
| NOB | WEAIF20 | 21.75 | 11402 | 8.40 | -1.14 | 0.75 | 3.6 | 21.39 | 21.00 | 24.00 | 21.96 | 20.93 | 1.03 | 4.9 |
| Palo Verde | WEACC20 | 20.50 | 10276 | 6.54 | -3.44 | 0.50 | 2.5 | 20.88 | 20.00 | 22.75 | 21.07 | 24.20 | -3.13 | -12.9 |
| Mona | AARLQ20 | 20.00 | 10471 | 6.63 | -2.92 | 0.75 | 3.9 | 20.46 | 19.25 | 24.50 | 20.68 | 22.66 | -1.98 | -8.7 |
| Four Corners | WEABI20 | 20.00 | 10230 | 6.31 | -3.46 | -0.25 | -1.2 | 20.82 | 20.00 | 24.00 | 21.11 | 24.53 | -3.42 | -13.9 |
| Pinnacle Peak | WEAKF20 | 20.50 | 10276 | 6.54 | -3.44 | -0.25 | -1.2 | 21.32 | 20.50 | 23.75 | 21.43 | 24.63 | -3.20 | -13.0 |
| Westwing | WEAJF20 | 21.00 | 10526 | 7.03 | -2.94 | 0.50 | 2.4 | 21.39 | 20.50 | 24.00 | 21.54 | 24.76 | -3.22 | -13.0 |
| MEAD | AAMBW20 | 20.00 | 9828 | 5.75 | -4.42 | -1.00 | -4.8 | 22.07 | 20.00 | 24.50 | 22.11 | 25.53 | -3.42 | -13.4 |
| **Off-Peak** | | | | | | | | | | | | | | |
| Mid-C | WEACL20 | 21.61 | 11329 | 8.26 | -1.28 | 2.61 | 13.7 | 19.73 | 19.00 | 21.61 | 19.97 | 10.88 | 9.09 | 83.6 |
| John Day | WEAHL20 | 22.50 | 11796 | 9.15 | -0.39 | 2.50 | 12.5 | 20.75 | 20.00 | 22.50 | 20.97 | 11.46 | 9.51 | 83.0 |
| COB | WEACJ20 | 22.00 | 11224 | 8.28 | -1.52 | 0.75 | 3.5 | 20.78 | 19.00 | 22.00 | 20.93 | 15.71 | 5.22 | 33.2 |
| NOB | WEAIL20 | 20.75 | 10878 | 7.40 | -2.14 | 0.25 | 1.2 | 20.43 | 18.00 | 21.50 | 20.47 | 13.08 | 7.39 | 56.5 |
| Palo Verde | WEACT20 | 17.50 | 8772 | 3.54 | -6.44 | -0.50 | -2.8 | 19.21 | 17.50 | 22.25 | 19.00 | 21.33 | -2.33 | -10.9 |
| Mona | AARLO20 | 18.50 | 9686 | 5.13 | -4.42 | 0.00 | 0.0 | 19.18 | 18.50 | 21.25 | 19.09 | 19.49 | -0.40 | -2.1 |
| Four Corners | WEACR20 | 18.25 | 9335 | 4.56 | -5.21 | 0.25 | 1.4 | 19.21 | 18.00 | 22.00 | 19.09 | 21.01 | -1.92 | -9.1 |
| Pinnacle Peak | WEAKL20 | 18.50 | 9273 | 4.53 | -5.44 | 0.00 | 0.0 | 19.00 | 18.50 | 20.00 | 18.94 | 21.68 | -2.74 | -12.6 |
| Westwing | WEAJL20 | 18.25 | 9148 | 4.29 | -5.69 | -0.25 | -1.4 | 19.54 | 18.25 | 22.75 | 19.38 | 21.69 | -2.31 | -10.7 |
| MEAD | AAMBQ20 | 18.25 | 8968 | 4.00 | -6.17 | -0.25 | -1.4 | 19.86 | 18.25 | 22.50 | 19.66 | 22.86 | -3.20 | -14.0 |

Note: West off-peak includes all day Sunday.

### WESTERN NEAR-TERM BILATERAL MARKETS ($/MWh)

| Package | Trade date | Range |
|---|---|---|
| **Mid-C** | | |
| Bal-week | 02/05 | 21.00-21.50 |
| Bal-week | 02/03 | 18.75-19.25 |
| Bal-week | 02/02 | 17.50-18.00 |
| Bal-week | 02/01 | 19.50-20.00 |
| Bal-month | 02/05 | 19.00-19.50 |
| Bal-month | 02/04 | 18.75-19.25 |
| Bal-month | 02/03 | 19.00-19.75 |
| Bal-month | 02/02 | 18.00-18.50 |
| Bal-month | 02/01 | 19.25-19.75 |
| Bal-month (off-peak) | 02/05 | 18.00-18.50 |
| Bal-month (off-peak) | 02/04 | 17.25-17.75 |
| Bal-month (off-peak) | 02/03 | 17.75-18.25 |
| Bal-month (off-peak) | 02/02 | 16.75-17.25 |
| Bal-month (off-peak) | 02/01 | 17.50-18.25 |
| Next-week | 02/05 | 19.00-19.50 |
| Next-week | 02/04 | 19.50-20.00 |
| Next-week | 02/03 | 19.00-19.50 |
| Next-week | 02/02 | 18.75-19.25 |
| Next-week | 02/01 | 18.00-18.50 |
| Next-week (off-peak) | 02/05 | 18.25-18.75 |

| Package | Trade date | Range |
|---|---|---|
| **Palo Verde** | | |
| Bal-month | 02/05 | 18.50-19.00 |
| Bal-month | 02/04 | 18.50-19.00 |
| Bal-month | 02/03 | 19.00-19.50 |
| Bal-month | 02/02 | 18.75-19.25 |
| Bal-month | 02/01 | 20.25-20.75 |

### SOUTHEAST NEAR-TERM BILATERAL MARKETS ($/MWh)

| Package | Trade date | Range |
|---|---|---|
| **Southern, into** | | |
| Bal-week | 02/05 | 28.75-29.25 |
| Bal-week | 02/01 | 20.25-20.75 |
| Bal-month | 02/03 | 25.00-25.50 |
| Next-week | 02/05 | 25.25-25.75 |
| Next-week | 02/04 | 25.25-25.75 |
| Next-week | 02/03 | 25.25-25.75 |
| Next-week | 02/02 | 23.25-23.75 |
| Next-week | 02/01 | 28.75-29.25 |

## PLATTS M2MS FORWARD CURVE, FEB 5 ($/MWh)

**Prompt month: Mar 16**

| | On-peak | Off-peak |
|---|---|---|
| **Northeast** | | |
| Mass Hub | 38.00 | 27.50 |
| N.Y. Zone G | 36.50 | 25.25 |
| N.Y. Zone J | 37.35 | 26.45 |
| N.Y. Zone A | 33.50 | 16.70 |
| Ontario* | 14.95 | 9.40 |
| *Ontario prices are in Canadian dollars | | |
| **PJM & MISO** | | |
| PJM West | 34.80 | 27.35 |
| AD Hub | 31.05 | 25.25 |
| NI Hub | 28.00 | 21.15 |
| Indiana Hub | 27.35 | 22.25 |

| | On-peak | Off-peak |
|---|---|---|
| **Southeast & Central** | | |
| Southern Into | 24.65 | 20.70 |
| ERCOT North | 22.10 | 16.65 |
| ERCOT Houston | 23.05 | 17.20 |
| ERCOT West | 20.35 | 13.75 |
| ERCOT South | 22.40 | 16.55 |
| **Western** | | |
| Mid-C | 15.85 | 13.55 |
| Palo Verde | 18.05 | 16.50 |
| Mead | 18.00 | 17.55 |
| NP15 | 25.65 | 21.45 |
| SP15 | 23.75 | 20.80 |

## ISO DAY-AHEAD LMP BREAKDOWN FOR FEB 6 ($/MWh)

| Hub/Zone | Average | Cong | Loss | Change | Avg $/Mo | Marginal heat rate |
|---|---|---|---|---|---|---|
| **Northeast** | | | | | | |
| **On-peak** | | | | | | |
| ISONE Internal Hub | 26.65 | 0.00 | 0.10 | -3.34 | 24.47 | 8888 |
| ISONE Connecticut | 26.43 | 0.00 | -0.12 | -3.60 | 24.44 | 9805 |
| ISONE NE Mass-Boston | 26.75 | 0.00 | 0.20 | -3.24 | 24.53 | 8923 |
| NYISO Capital Zone | 27.94 | -13.60 | 0.98 | 3.30 | 24.47 | 14177 |
| NYISO Hudson Valley Zone | 25.59 | -10.68 | 1.55 | 1.42 | 25.00 | 11095 |
| NYISO N.Y.C. Zone | 25.84 | -10.75 | 1.74 | 1.42 | 25.45 | 11205 |
| NYISO West Zone | 13.73 | -0.80 | -0.42 | -3.13 | 17.82 | 9010 |
| **PJM & MISO** | | | | | | |
| **On-peak** | | | | | | |
| PJM AEP-Dayton Hub | 24.67 | -0.34 | 0.10 | -5.27 | 25.48 | 13487 |
| PJM Dominion Hub | 26.21 | 1.47 | -0.17 | -4.89 | 26.41 | 12632 |
| PJM Eastern Hub | 35.36 | 10.37 | 0.08 | 7.56 | 26.31 | 19342 |
| PJM Northern Illinois Hub | 23.64 | -0.73 | -0.55 | -5.34 | 24.61 | 11322 |
| PJM Western Hub | 25.52 | 0.66 | -0.06 | -4.72 | 26.07 | 16448 |
| MISO Indiana Hub | 22.78 | 0.85 | 0.82 | -2.03 | 24.18 | 13434 |
| MISO Minnesota Hub | 15.67 | -4.06 | -1.38 | -5.54 | 20.99 | 7617 |
| MISO Louisiana Hub | 22.07 | 0.83 | 0.13 | -3.28 | 22.41 | 10878 |
| MISO Texas Hub | 21.89 | 0.74 | 0.04 | -4.48 | 23.78 | 10821 |
| **Southeast & Central** | | | | | | |
| **On-peak** | | | | | | |
| SPP North Hub | 17.35 | -0.82 | -0.96 | -2.26 | 19.22 | 8425 |
| SPP South Hub | 21.45 | 1.90 | 0.43 | 0.59 | 22.15 | 11202 |
| ERCOT Houston Hub | 17.95 | – | – | 0.48 | 18.68 | 8865 |
| ERCOT North Hub | 18.00 | – | – | 0.55 | 18.64 | 8939 |
| ERCOT South Hub | 17.88 | – | – | 0.39 | 18.58 | 8861 |
| ERCOT West Hub | 18.01 | – | – | 0.66 | 18.59 | 9271 |
| **Western** | | | | | | |
| **On-peak** | | | | | | |
| CAISO NP15 Gen Hub | 25.03 | -0.50 | -0.48 | -2.19 | 28.91 | 11404 |
| CAISO SP15 Gen Hub | 24.12 | -1.08 | -0.81 | -2.73 | 27.72 | 11840 |
| CAISO ZP26 Gen Hub | 23.85 | -0.97 | -1.20 | -2.74 | 27.29 | 11704 |

| Hub/Zone | Average | Cong | Loss | Change | Avg $/Mo | Marginal heat rate |
|---|---|---|---|---|---|---|
| **Off-Peak** | | | | | | |
| ISONE Internal Hub | 31.80 | 0.00 | 0.23 | 8.18 | 15.98 | 11037 |
| ISONE Connecticut | 31.50 | 0.00 | -0.08 | 7.97 | 15.90 | 12412 |
| ISONE NE Mass-Boston | 31.73 | 0.00 | 0.16 | 8.26 | 15.94 | 11014 |
| NYISO Capital Zone | 24.79 | -14.06 | 0.76 | 8.45 | 17.01 | 12976 |
| NYISO Hudson Valley Zone | 22.05 | -11.04 | 1.04 | 6.28 | 16.12 | 10116 |
| NYISO N.Y.C. Zone | 22.23 | -11.12 | 1.14 | 6.34 | 16.25 | 10196 |
| NYISO West Zone | 10.39 | -0.68 | -0.26 | -0.69 | 10.72 | 6575 |
| **Off-Peak** | | | | | | |
| PJM AEP-Dayton Hub | 23.35 | -0.51 | 0.35 | -0.56 | 19.72 | 12784 |
| PJM Dominion Hub | 24.98 | 1.48 | -0.01 | -0.23 | 20.61 | 12274 |
| PJM Eastern Hub | 39.02 | 15.97 | -0.46 | 18.78 | 21.09 | 21552 |
| PJM Northern Illinois Hub | 21.90 | -1.15 | -0.46 | -0.83 | 18.40 | 10633 |
| PJM Western Hub | 23.64 | 0.34 | -0.21 | -0.11 | 19.88 | 14961 |
| MISO Indiana Hub | 20.07 | 0.20 | 0.66 | -0.34 | 19.04 | 11792 |
| MISO Minnesota Hub | 16.16 | -2.06 | -1.00 | -2.88 | 17.23 | 7899 |
| MISO Louisiana Hub | 20.02 | 0.95 | -0.15 | -0.50 | 18.52 | 10050 |
| MISO Texas Hub | 20.14 | 0.87 | 0.05 | -0.38 | 19.14 | 10051 |
| **Off-Peak** | | | | | | |
| SPP North Hub | 14.69 | -1.26 | -0.64 | -3.11 | 15.68 | 7211 |
| SPP South Hub | 18.67 | 2.02 | 0.07 | -0.17 | 18.96 | 9816 |
| ERCOT Houston Hub | 13.13 | – | – | 1.02 | 12.26 | 6556 |
| ERCOT North Hub | 13.16 | – | – | 1.03 | 12.30 | 6643 |
| ERCOT South Hub | 13.14 | – | – | 1.12 | 12.17 | 6601 |
| ERCOT West Hub | 12.69 | – | – | 0.66 | 12.20 | 6520 |
| **Off-Peak** | | | | | | |
| CAISO NP15 Gen Hub | 24.69 | 0.00 | -0.65 | 0.02 | 24.70 | 11115 |
| CAISO SP15 Gen Hub | 24.78 | 0.00 | -0.56 | -0.12 | 24.80 | 12095 |
| CAISO ZP26 Gen Hub | 24.36 | 0.00 | -0.98 | -0.10 | 24.36 | 11889 |

## WEEKEND BILATERAL INDEXES FOR FEB 6-7 ($/MWh)

| | Saturday Index | Sunday Index |
|---|---|---|
| **Southeast On-peak** | | |
| VACAR | 22.75 | 22.75 |
| Southern, into | 22.00 | 22.00 |
| GTC, into | 22.75 | 22.75 |
| Florida | 23.25 | 23.25 |
| TVA, into | 22.25 | 22.25 |
| **Southeast Off-Peak*** | | |
| VACAR | 23.50 | 23.50 |
| Southern, into | 24.00 | 24.00 |
| GTC, into | 25.00 | 25.00 |
| Florida | 21.00 | 21.00 |
| TVA, into | 23.25 | 23.25 |
| **West On-peak**** | | |
| Mid-C | 19.36 | 21.75 |
| John Day | 20.25 | 22.75 |
| COB | 20.75 | 22.00 |
| NOB | 21.00 | 21.75 |
| Palo Verde | 20.00 | 19.00 |
| Westwing | 20.50 | 19.50 |
| Pinnacle Peak | 20.75 | 19.00 |
| Mead | 21.00 | 20.00 |
| Mona | 19.25 | 18.50 |
| Four Corners | 20.25 | 18.50 |
| **West Off-Peak**** | | |
| Mid-C | 19.00 | 21.50 |
| John Day | 20.00 | 22.25 |
| COB | 21.25 | 22.00 |
| NOB | 20.50 | 19.75 |
| Palo Verde | 18.00 | 16.00 |
| Westwing | 18.50 | 17.00 |
| Pinnacle Peak | 18.50 | 18.00 |
| Mead | 18.50 | 16.50 |
| Mona | 18.50 | 18.50 |
| Four Corners | 18.00 | 18.00 |

*Southeast off-peak prices are for a Saturday-Monday package.
**West Saturday prices are for a Friday-Saturday package and Sunday prices are for Sunday only.

## WEEKLY BILATERAL INDEXES FOR WEEK ENDING FEB 6 ($/MWh)

| | Index | Change | Low | High |
|---|---|---|---|---|
| **Southeast On-peak** | | | | |
| VACAR | 21.90 | -2.85 | 21.00 | 23.25 |
| Southern, into | 20.55 | -1.65 | 20.00 | 21.50 |
| GTC, into | 20.85 | -2.10 | 20.25 | 21.50 |
| Florida | 21.80 | 0.15 | 21.25 | 22.75 |
| TVA, into | 21.45 | -1.45 | 21.00 | 22.25 |
| **Southeast Off-Peak** | | | | |
| VACAR | 17.75 | -4.71 | 16.00 | 20.25 |
| Southern, into | 17.07 | -4.14 | 15.50 | 19.50 |
| GTC, into | 17.29 | -5.85 | 15.75 | 19.50 |
| Florida | 17.07 | -0.82 | 15.50 | 19.50 |
| TVA, into | 17.39 | -3.93 | 16.25 | 20.00 |
| **West On-peak** | | | | |
| Mid-C | 20.28 | 1.51 | 17.00 | 21.30 |
| John Day | 21.25 | 1.46 | 18.50 | 22.50 |
| COB | 21.30 | 1.32 | 19.00 | 22.25 |
| NOB | 22.00 | 1.92 | 17.75 | 24.00 |
| Palo Verde | 21.17 | 0.54 | 18.50 | 22.75 |
| Westwing | 21.63 | 0.50 | 20.00 | 24.00 |
| Pinnacle Peak | 21.58 | 1.08 | 19.75 | 23.75 |
| Mead | 22.46 | 0.58 | 19.75 | 24.50 |
| Mona | 20.79 | 0.83 | 18.50 | 24.50 |
| Four Corners | 21.29 | 1.04 | 18.00 | 24.00 |
| **West Off-Peak** | | | | |
| Mid-C | 19.17 | 0.98 | 17.25 | 19.50 |
| John Day | 20.21 | 0.96 | 18.75 | 21.25 |
| COB | 20.35 | 1.17 | 19.00 | 21.25 |
| NOB | 19.96 | 0.78 | 17.50 | 21.50 |
| Palo Verde | 19.21 | 0.60 | 17.50 | 22.25 |
| Westwing | 19.43 | 0.72 | 17.50 | 22.75 |
| Pinnacle Peak | 18.93 | 0.39 | 18.00 | 20.00 |
| Mead | 19.79 | 0.47 | 17.75 | 22.50 |
| Mona | 19.04 | 0.36 | 17.50 | 21.25 |
| Four Corners | 19.11 | 0.65 | 17.50 | 22.00 |

## NORTHEAST POWER MARKETS

### NYISO SUPPLY MIX (GWh/d)

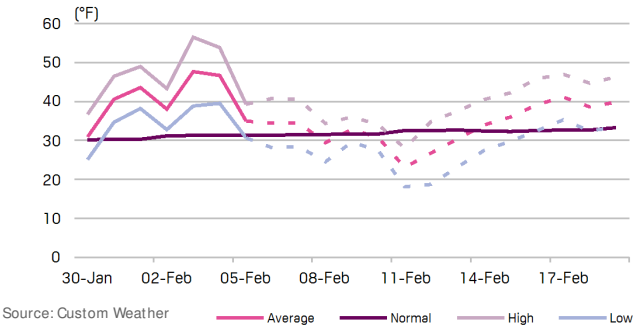
| | | | | | | | Daily change | | Season | | Season average | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | 31-Jan | 1-Feb | 2-Feb | 3-Feb | 4-Feb | % Share | Chg | % Chg | Min | Max | 2016 | 2015 | Chg | % Chg |
| Total Generation | 327.34 | 363.77 | 345.77 | 366.55 | 358.9 | 86% | -7.65 | -2.0% | 311.78 | 411.65 | 356.99 | 388.17 | -31.18 | -8.0% |
| Gas | 128.48 | 127.07 | 112.25 | 115.97 | 121.53 | 29% | 5.56 | 5.0% | 82.53 | 174.64 | 122 | 144.01 | -22.01 | -15.0% |
| Coal | 14.74 | 15.25 | 16.23 | 15.07 | 15.02 | 4% | -0.05 | 0.0% | 5.69 | 32.84 | 18.05 | 26.62 | -8.57 | -32.0% |
| Nuclear | 117.73 | 131.92 | 127.9 | 131.71 | 134.67 | 32% | 2.96 | 2.0% | 94.43 | 134.67 | 128.62 | 132.83 | -4.21 | -3.0% |
| Other | 130.96 | 143.45 | 166.17 | 164.17 | 147.16 | 35% | -17.01 | -10.0% | 107.34 | 218.25 | 154.51 | 188.56 | -34.05 | -18.0% |

### ISONE SUPPLY MIX (GWh/d)

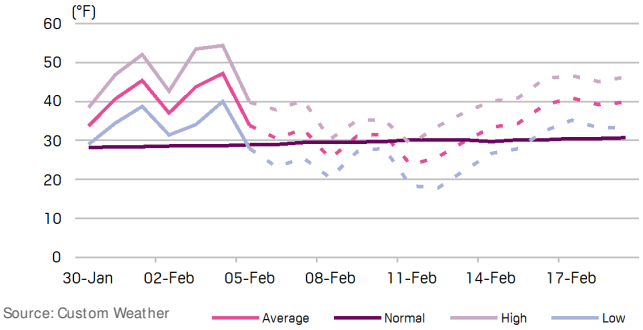
| | | | | | | | Daily change | | Season | | Season average | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | 31-Jan | 1-Feb | 2-Feb | 3-Feb | 4-Feb | % Share | Chg | % Chg | Min | Max | 2016 | 2015 | Chg | % Chg |
| Total Generation | 263.91 | 279.91 | 276.26 | 289.68 | 278.88 | 85% | -10.8 | -4.0% | 242.61 | 319.72 | 285.49 | 305.36 | -19.87 | -7.0% |
| Gas | 107.3 | 106.36 | 103.38 | 105.42 | 95.59 | 29% | -9.83 | -9.0% | 85.39 | 152.29 | 117.54 | 113.03 | 4.51 | 4.0% |
| Nuclear | 93.29 | 97.5 | 97.8 | 97.8 | 97.8 | 30% | 0 | 0.0% | 67.05 | 97.8 | 93.2 | 97.24 | -4.04 | -4.0% |
| Coal | 14.66 | 16.81 | 21.06 | 21.75 | 19.09 | 6% | -2.66 | -12.0% | 11.76 | 51.22 | 23.94 | 31.62 | -7.68 | -24.0% |
| Wind | 6.87 | 13.73 | 4.21 | 12.59 | 10.13 | 3% | -2.46 | -20.0% | 1.42 | 16 | 7.59 | 6.34 | 1.25 | 20.0% |
| Other | 89.97 | 95.06 | 103.82 | 107.38 | 105.56 | 32% | -1.82 | -2.0% | 76.34 | 142.12 | 101.96 | 123.98 | -22.02 | -18.0% |

Seasons are defined as: Summer (June - August), Fall (September - November), Winter (December - February), and Spring (March - May). Source: Platts

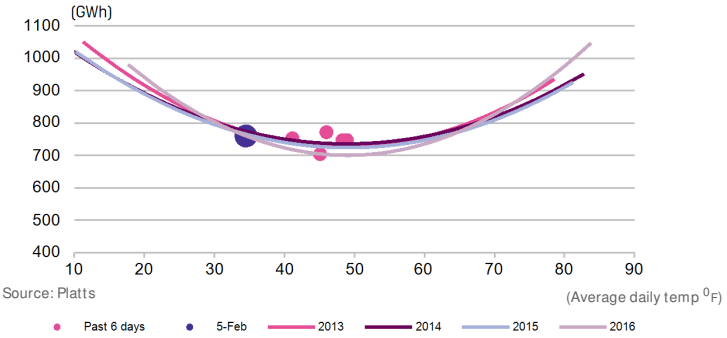
### NYISO TEMPERATURE



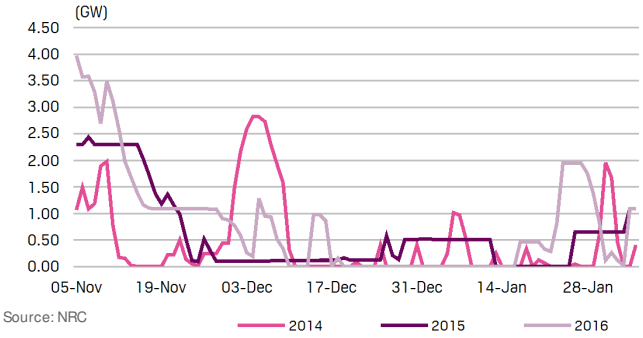

### ISONE TEMPERATURE



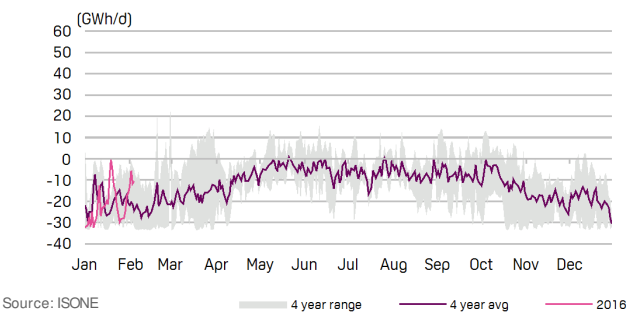

### ISONE & NYISO LOAD PER DEGREE



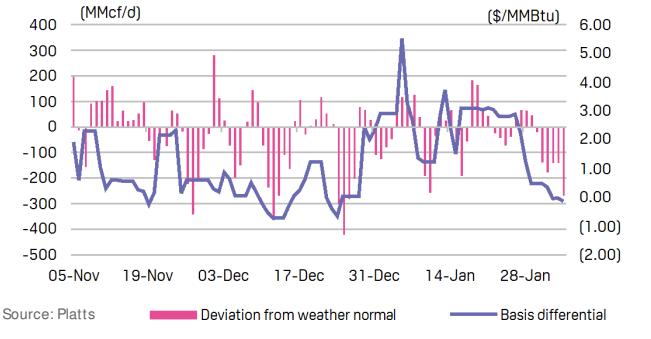

### ISONE & NYISO NUCLEAR GENERATION OUTAGES




### ISONE- NYISO INTERTIE TRANSMISSION E-W




### ISONE POWER BURN VS. GAS BASIS



## PJM/MISO POWER MARKETS

### PJM SUPPLY MIX (GWh/d)

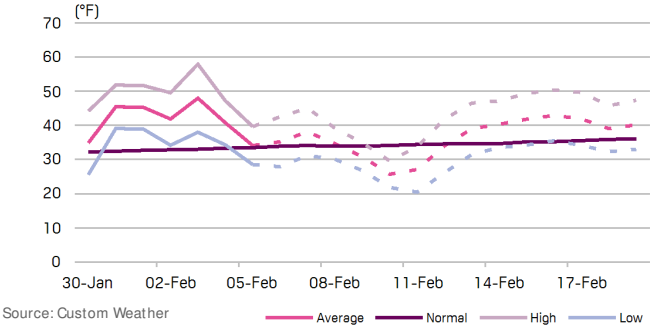
| | | | | | | | Daily change | | Season | | Season average | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | 31-Jan | 1-Feb | 2-Feb | 3-Feb | 4-Feb | % Share | Chg | % Chg | Min | Max | 2016 | 2015 | Chg | % Chg |
| Total Generation | 1,882.58 | 2,037.06 | 2,109.83 | 2,102.28 | 2,116.62 | 100% | 14.34 | 1.0% | 1,642.42 | 2,739.68 | 2,127.18 | 2,385.25 | -258.07 | -11.0% |
| Gas | 401.54 | 436.2 | 415.58 | 435.76 | 445.13 | 21% | 9.37 | 2.0% | 374.44 | 535.97 | 436.37 | 376.02 | 60.35 | 16.0% |
| Coal | 725.13 | 801.71 | 856.96 | 838.78 | 850.09 | 40% | 11.31 | 1.0% | 574.61 | 1,181.8 | 857.36 | 1,035.03 | -177.67 | -17.0% |
| Nuclear | 732.15 | 751.29 | 770.44 | 789.73 | 775.39 | 37% | -14.34 | -2.0% | 715.98 | 801.11 | 778.19 | 780.96 | -2.77 | 0.0% |
| Other | 63.69 | 60.07 | 96.46 | 34.17 | 44.52 | 2% | 10.35 | 30.0% | -109.27 | 288.66 | 85.99 | 218.17 | -132.18 | -61.0% |

### MISO SUPPLY MIX (GWh/d)

| | | | | | | | Daily change | | Season | | Season average | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | 31-Jan | 1-Feb | 2-Feb | 3-Feb | 4-Feb | % Share | Chg | % Chg | Min | Max | 2016 | 2015 | Chg | % Chg |
| Total Generation | 1,627.84 | 1,774.53 | 1,828.24 | 1,842.35 | 1,773.15 | 103% | -69.2 | -4.0% | 1,601.6 | 2,182.36 | 1,854.52 | 1,958.37 | -103.85 | -5.0% |
| Gas | 286.42 | 351.82 | 315.72 | 331.86 | 346.85 | 20% | 14.99 | 5.0% | 262.94 | 514.84 | 366.88 | 311.18 | 55.7 | 18.0% |
| Coal | 757.61 | 898.82 | 855.67 | 819.36 | 876.96 | 51% | 57.6 | 7.0% | 700.66 | 1,203.53 | 896.5 | 1,078.24 | -181.74 | -17.0% |
| Nuclear | 280.98 | 285.37 | 292.93 | 293.01 | 302 | 17% | 8.99 | 3.0% | 169.98 | 310.07 | 287.58 | 288.63 | -1.05 | 0.0% |
| Wind | 99.72 | 45.07 | 204.19 | 221.17 | 97.78 | 6% | -123.39 | -56.0% | 15.37 | 253.95 | 133.01 | 124.35 | 8.66 | 7.0% |
| Other | 139 | 162.24 | 140.74 | 158.9 | 102.56 | 6% | -56.34 | -35.0% | 84.87 | 258.8 | 145.61 | 140.15 | 5.46 | 4.0% |

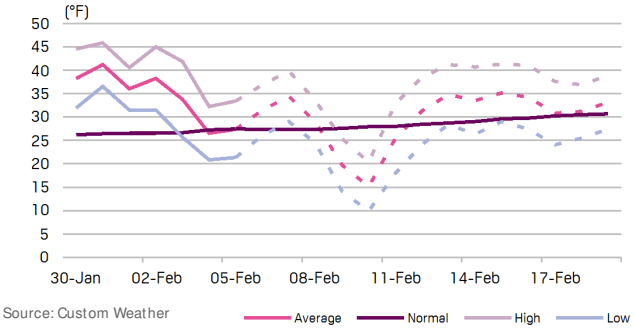
Seasons are defined as: Summer (June - August), Fall (September - November), Winter (December - February), and Spring (March - May). Source: Platts

### PJM TEMPERATURE



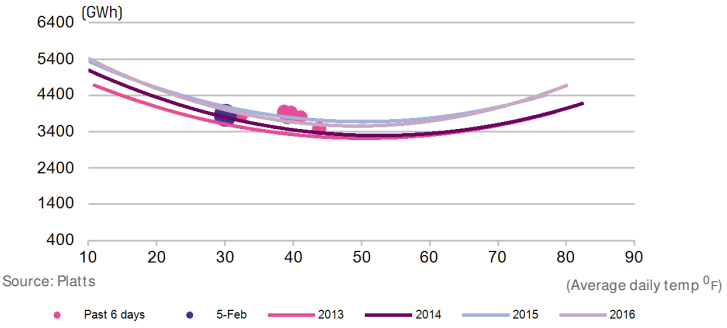

Source: Custom Weather

### MISO TEMPERATURE



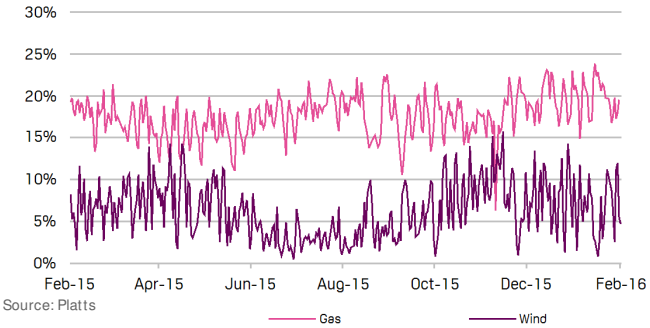

Source: Custom Weather

### PJM & MISO LOAD PER DEGREE



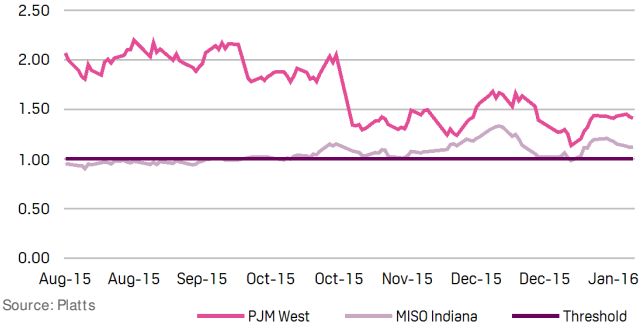

Source: Platts

### MISO GENERATION MARKET SHARE - GAS VS. WIND



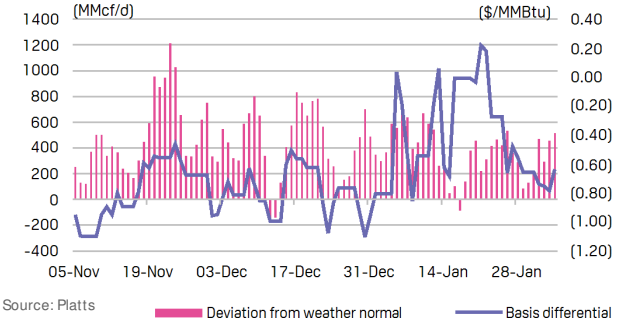

Source: Platts

### PJM/MISO COAL-TO-GAS DISPATCH PRICE RATIOS




Source: Platts

### PJM POWER BURN VS. GAS BASIS




Source: Platts

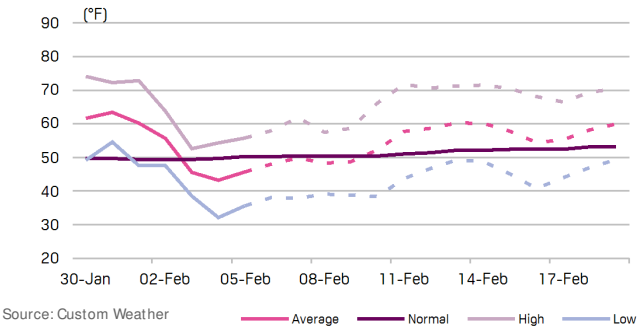
## SOUTHEAST POWER MARKETS

### ERCOT SUPPLY MIX (GWh/d)

| | | | | | | | Daily change | | Season | | Season average | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | 31-Jan | 1-Feb | 2-Feb | 3-Feb | 4-Feb | % Share | Chg | % Chg | Min | Max | 2016 | 2015 | Chg | % Chg |
| Total Generation | 727.61 | 803.06 | 789.43 | 866.95 | 784.42 | 100% | -82.53 | -10.0% | 727.61 | 1,005.05 | 856.55 | 886.08 | -29.53 | -3.0% |
| Gas | 267.02 | 271 | 292.04 | 354.8 | 360.61 | 46% | 5.81 | 2.0% | 258.26 | 461.61 | 329.54 | 331.62 | -2.08 | -1.0% |
| Coal | 330.38 | 355.15 | 345.15 | 371.69 | 343.17 | 44% | -28.52 | -8.0% | 330.38 | 413.59 | 368.34 | 384.76 | -16.42 | -4.0% |
| Nuclear | 123.33 | 123.33 | 123.33 | 123.33 | 123.33 | 16% | 0 | 0.0% | 87.57 | 123.33 | 109.11 | 123.25 | -14.14 | -11.0% |
| Wind | 150.17 | 216.32 | 233.17 | 112.04 | 69.85 | 9% | -42.19 | -38.0% | 30.87 | 300.07 | 140.46 | 94.58 | 45.88 | 49.0% |
| Other | -143.29 | -162.74 | -204.26 | -94.92 | -112.53 | -14% | -17.61 | 19.0% | -242.3 | 45.82 | -90.89 | -60.24 | -30.65 | 51.0% |

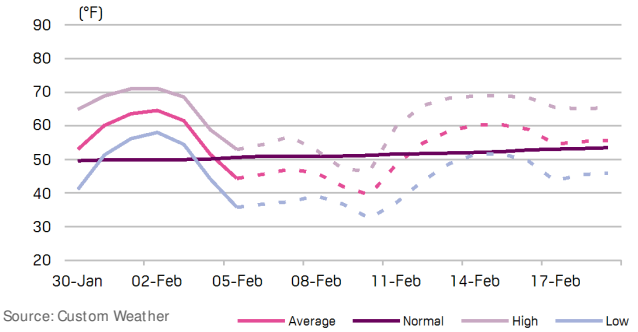
Seasons are defined as: Summer (June - August), Fall (September - November), Winter (December - February), and Spring (March - May). Source: Platts

### ERCOT TEMPERATURE



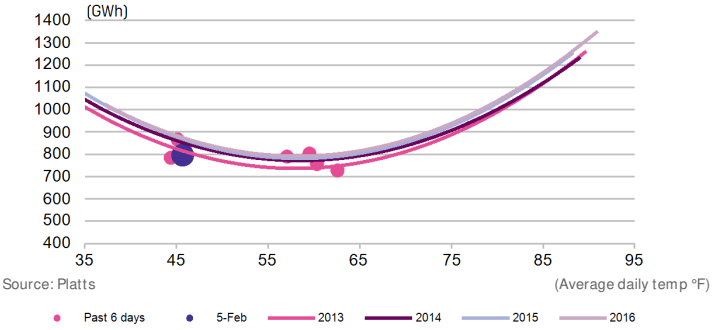

Source: Custom Weather

### SOUTHEAST TEMPERATURE



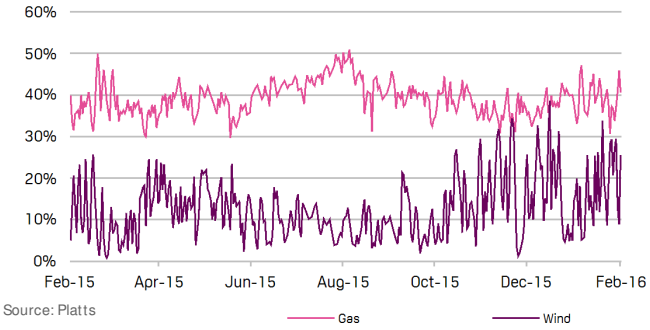

Source: Custom Weather

### ERCOT LOAD PER DEGREE



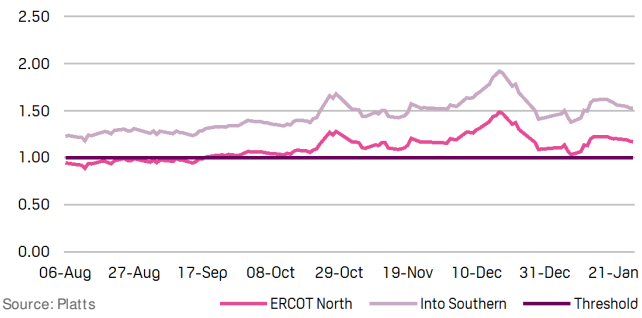

Source: Platts

### ERCOT GENERATION MARKET SHARE - GAS VS. WIND



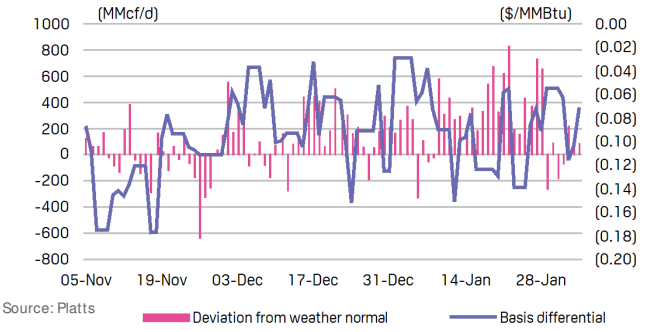

Source: Platts

### SOUTHEAST COAL-TO-GAS DISPATCH PRICE RATIOS




Source: Platts

### ERCOT POWER BURN VS. GAS BASIS




Source: Platts

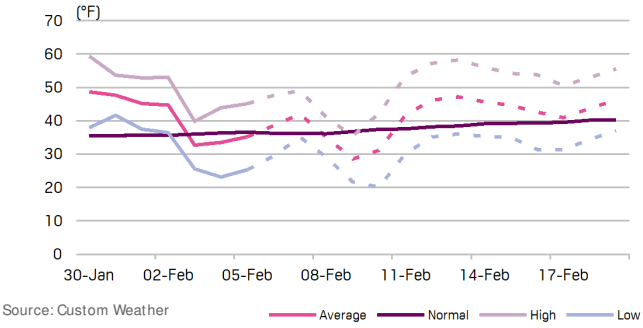
## SPP POWER MARKETS

### SPP GENERATION MIX (GWh/d)

| | | | | | | | Daily change | | Season | | Season average | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | 31-Jan | 1-Feb | 2-Feb | 3-Feb | 4-Feb | % Share | Chg | % Chg | Min | Max | 2016 | 2015 | Chg | % Chg |
| Total Generation | 593.33 | 661.84 | 669.63 | 726.79 | 737.56 | -- | 10.77 | 1.0% | 57.85 | 812.42 | 685.8 | 645.06 | 40.74 | 6.0% |
| Coal | 297.63 | 346.65 | 281.03 | 344.7 | 388.87 | 53% | 44.17 | 13.0% | 28.36 | 449.54 | 347.16 | 375.28 | -28.12 | -7.0% |
| Natural Gas | 71.25 | 96.05 | 90.08 | 154.39 | 185.56 | 25% | 31.17 | 20.0% | 13.51 | 241.62 | 139.11 | 127.21 | 11.9 | 9.0% |
| Wind | 137.52 | 131.01 | 211.06 | 140.45 | 75.18 | 10% | -65.27 | -46.0% | 9.73 | 211.06 | 111.95 | 79.73 | 32.22 | 40.0% |
| Nuclear Power | 62.41 | 62.39 | 62.38 | 62.39 | 62.4 | 8% | 0.01 | 0.0% | 5.2 | 62.52 | 61.44 | 60.01 | 1.43 | 2.0% |
| Hydro | 24.51 | 25.71 | 25.08 | 24.86 | 25.5 | 3% | 0.64 | 3.0% | 1.03 | 33.4 | 25.91 | 2.79 | 23.12 | 829.0% |
| Diesel | 0 | 0.03 | 0 | 0 | 0.05 | -- | 0.05 | 0.0% | 0 | 0.77 | 0.24 | 0.05 | 0.19 | 380.0% |

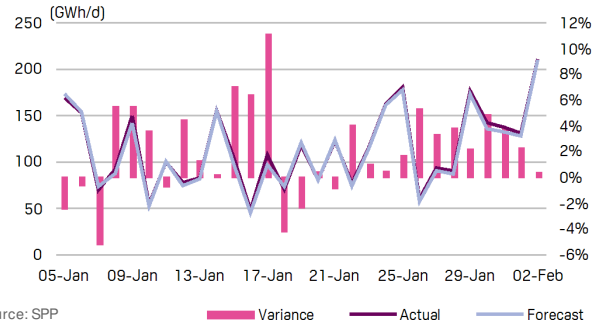
Seasons are defined as: Summer (June - August), Fall (September - November), Winter (December - February), and Spring (March - May). Source: SPP

### SPP TEMPERATURE



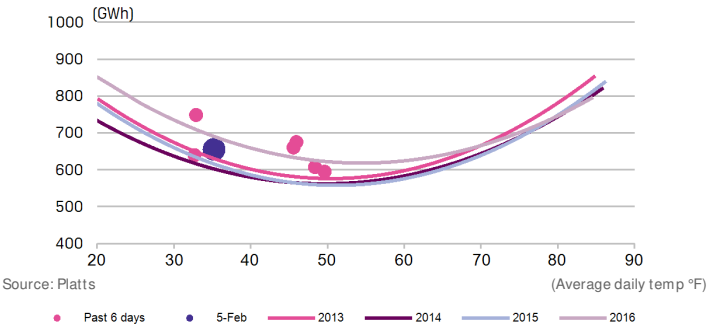

Source: Custom Weather

### SPP ACTUAL WIND GENERATION VS. FORECAST



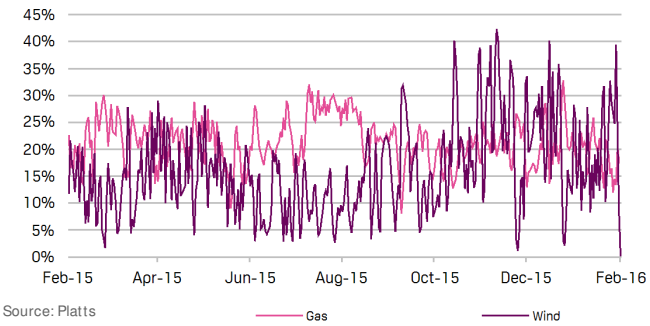

Source: SPP

### SPP LOAD PER DEGREE



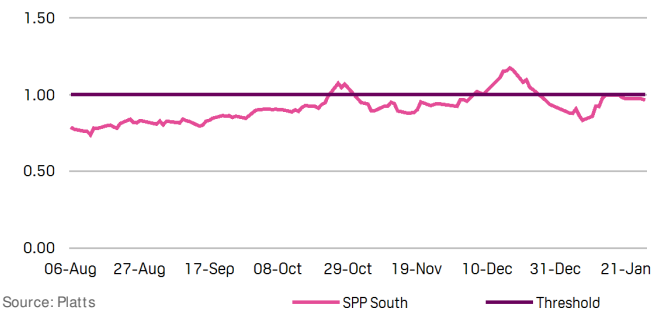

Source: Platts

### SPP GENERATION MARKET SHARE - GAS VS. WIND



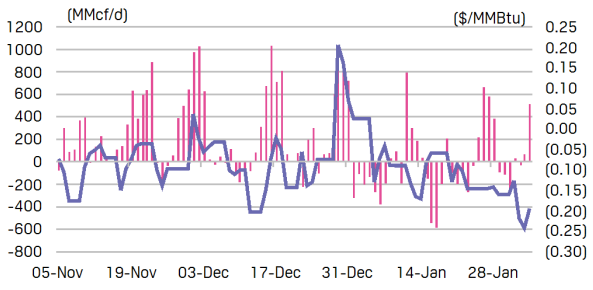

Source: Platts

### SPP COAL-TO-GAS DISPATCH PRICE RATIOS




Source: Platts

### SPP POWER BURN VS. GAS BASIS




Source: Platts

## WEST POWER MARKETS

### CAISO GENERATION MIX (GWh/d)

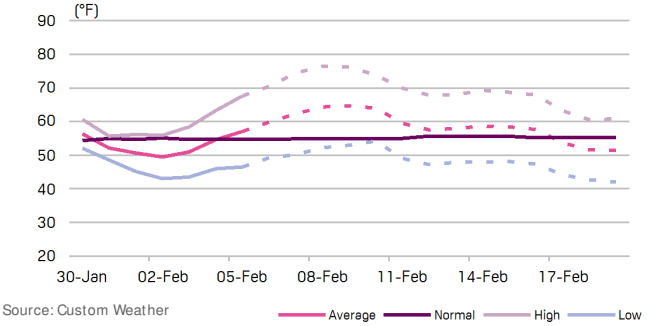
| | | | | | | | Daily change | | Season | | Season average | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | 31-Jan | 1-Feb | 2-Feb | 3-Feb | 4-Feb | % Share | Chg | % Chg | Min | Max | 2016 | 2015 | Chg | % Chg |
| Total Generation | 543.33 | 597.93 | 610.91 | 600.88 | 588.38 | -- | -12.5 | -2.0% | 524.92 | 651.87 | 591.95 | 581.1 | 10.85 | 2.0% |
| Thermal Power | 161.47 | 205.48 | 250.6 | 251.98 | 242.71 | 41% | -9.27 | -4.0% | 148.99 | 315.07 | 244.1 | 239.49 | 4.61 | 2.0% |
| Nuclear Power | 54.58 | 54.72 | 54.68 | 54.73 | 54.71 | 9% | -0.02 | 0.0% | 10.67 | 54.76 | 52.98 | 51.45 | 1.53 | 3.0% |
| Hydro | 47.61 | 44.14 | 48.52 | 47.54 | 48.4 | 8% | 0.86 | 2.0% | 26.39 | 48.52 | 37.37 | 32.82 | 4.55 | 14.0% |
| Power Imports | 179.15 | 162.34 | 158.85 | 164.07 | 155.87 | 26% | -8.2 | -5.0% | 137.85 | 203.43 | 166.26 | 181.34 | -15.08 | -8.0% |
| Solar PV | 20.16 | 38.55 | 34.77 | 42.82 | 42.88 | 7% | 0.06 | 0.0% | 6.72 | 42.88 | 27.86 | 23.79 | 4.07 | 17.0% |
| Solar Thermal | 0.08 | 1.65 | 3.66 | 3.76 | 2.94 | -- | -0.82 | -22.0% | 0 | 3.76 | 1.44 | 1.22 | 0.22 | 18.0% |
| Wind | 46.21 | 57.57 | 26.36 | 3.47 | 6.98 | 1% | 3.51 | 101.0% | 2.62 | 70.96 | 27.01 | 14.86 | 12.15 | 82.0% |
| Bio + Geo | 34.07 | 33.48 | 33.46 | 32.51 | 33.9 | 6% | 1.39 | 4.0% | 32.51 | 37.19 | 34.94 | 36.13 | -1.19 | -3.0% |

### BPA GENERATION, LOAD, and TRANSMISSION (GWh/d)

| | | | | | | | Daily change | | Season | | Season average | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | 31-Jan | 1-Feb | 2-Feb | 3-Feb | 4-Feb | % Share | Chg | % Chg | Min | Max | 2016 | 2015 | Chg | % Chg |
| Total Generation | 316.14 | 326.59 | 296.75 | 293.7 | 291.8 | -- | -1.9 | -1.0% | 33.1 | 359.55 | 292.77 | 333.88 | -41.11 | -12.0% |
| Hydro | 228.53 | 223.84 | 226.89 | 221.9 | 189.21 | 65% | -32.69 | -15.0% | 20.4 | 236.66 | 191.93 | 259.08 | -67.15 | -26.0% |
| Thermal Power | 57.58 | 58.13 | 66.27 | 65.66 | 63.71 | 22% | -1.95 | -3.0% | 10.77 | 101.89 | 78.16 | 55.57 | 22.59 | 41.0% |
| Wind power | 30.03 | 44.62 | 3.59 | 6.15 | 38.87 | 13% | 32.72 | 532.0% | 0.03 | 94.39 | 22.68 | 19.23 | 3.45 | 18.0% |
| Load | 160.56 | 168.39 | 167.06 | 169.66 | 160.58 | -- | -9.08 | -5.0% | 21.84 | 203.27 | 165.96 | 158.54 | 7.42 | 5.0% |
| Net Exports | 155.63 | 157.94 | 129.72 | 124.06 | 130.85 | -- | 6.79 | 5.0% | 11.26 | 180.26 | 126.82 | 175.07 | -48.25 | -28.0% |

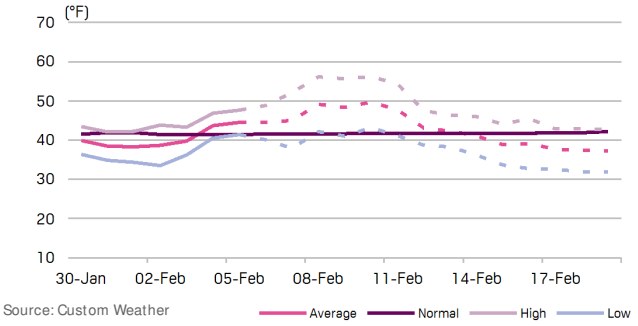
Seasons are defined as: Summer (June - August), Fall (September - November), Winter (December - February), and Spring (March - May). Source: CAISO & BPA

### CAISO TEMPERATURE



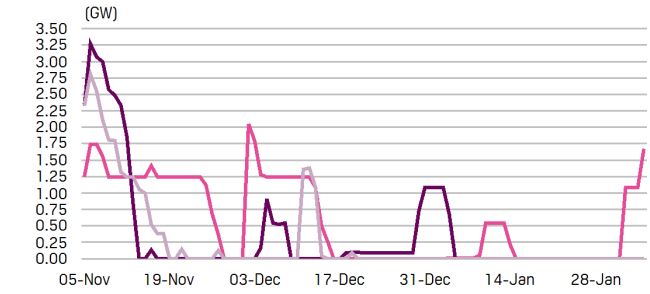

Source: Custom Weather

### BPA TEMPERATURE



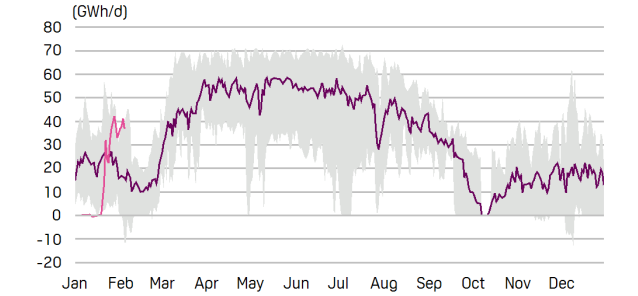

Source: Custom Weather

### WESTERN NUCLEAR GENERATION OUTAGES



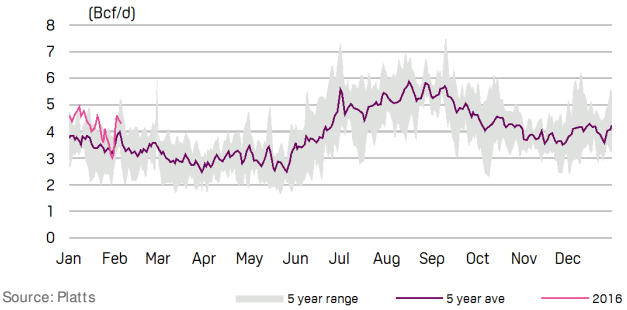

Source: NRC

### BPA DC LINE TRANSMISSION FLOWS N-S



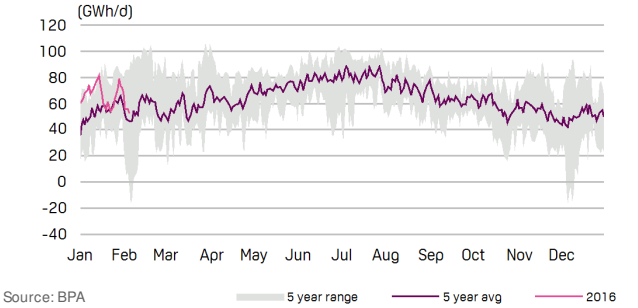

Source: BPA

### YEAR-TO-DATE WEST POWER BURN




Source: Platts

### BPA AC LINE TRANSMISSION FLOWS N-S




Source: BPA