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Winter 2016-17
Energy Market Assessment

Item No. A-3
October 20, 2016

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Good morning Mr. Chairman and Commissioners. This presentation is the Office of Enforcement's 2016-2017 Winter Energy Market Assessment. The Winter Assessment is staff's opportunity to look ahead to the coming winter and share our thoughts and expectations about market preparedness, including an assessment of risks. Natural gas and power markets are well supplied going into the winter, with plentiful storage, a better-connected pipeline system, and the ability to draw greater imports from Canada through pipelines and higher imports of LNG into New England. However, U.S. natural gas production is down slightly from last year, and prices are likely to be moderately higher than last winter. Most forecasters expect winter temperatures across the Northern U.S. to be average, while most sectors of the gas market should see strong demand relative to last year's record warm winter. There are challenges though, specifically in regional markets like New England and California, where operational issues could create some regionalized gas and power risk.

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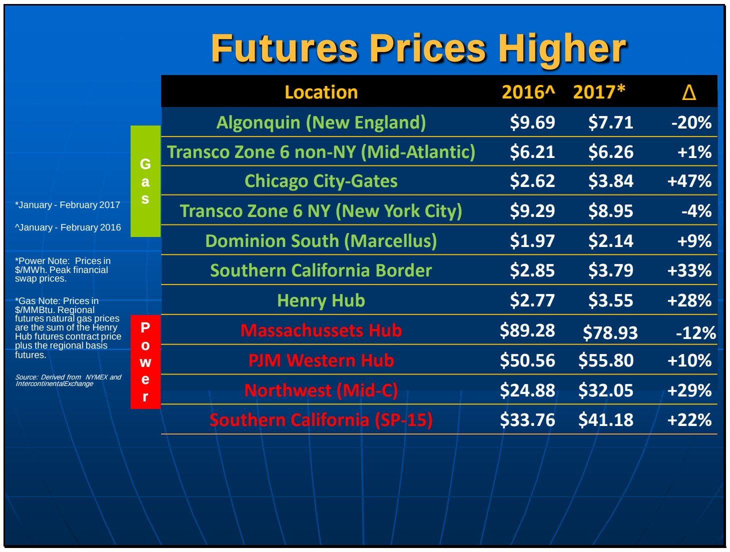

This slide shows natural gas and power prices at key trading hubs around the country. Going into the winter, natural gas prices are likely to be higher than last year. A warm summer and a small drop in natural gas production resulted in natural gas prices at the Henry Hub increasing from below $2.00/MMBtu in May to more than $3.00/MMBtu in October. An increase in the futures curves for both power and natural gas mirrors cash markets, with many points above year-ago levels and the strongest gains in the Midwest and West Coast markets. The table shows futures prices for power and natural gas at key regional markets for January and February 2017 and compares them to the previous winter futures. In Southern California, natural gas futures for SoCal Border for January and February are on average 33% higher than in early 2016, while SP-15 power prices rose 22%. The exception to these increases is in New England, where winter basis for both gas and power is down from 2016, due in part to new gas pipeline capacity that will allow more supply to flow into the market area. New York City prices are unchanged, as pipeline constraints into the city keep it the highest priced natural gas market in the U.S.

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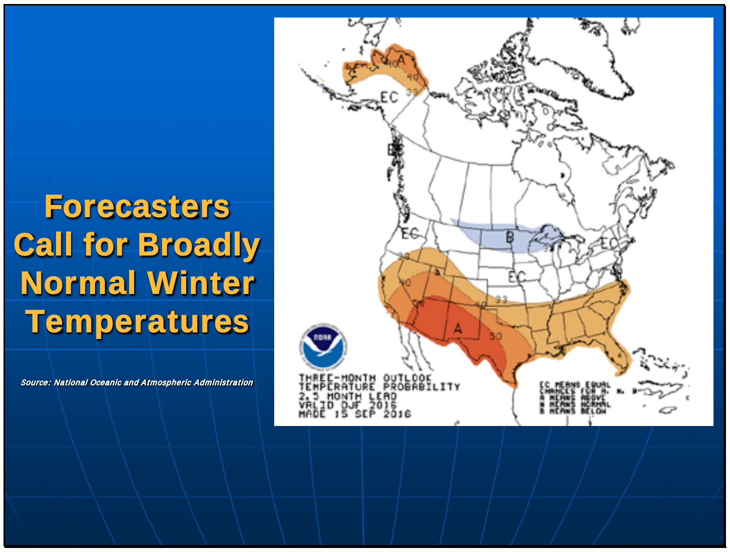

The weather outlook for this winter differs greatly from the warmer-than-normal summer, which boosted demand for natural gas, particularly by power generators. While seasonal weather forecasts taken months in advance can only give a broad explanation of potential patterns, NOAA is calling for a transition into La Nina conditions with normal temperatures throughout the Upper Midwest, New England, and Mid-Atlantic. NOAA models show broadly above average temperatures in the Gulf Coast and most of the Southwest, where weather conditions are expected to show a greater deviation above the median. In another prediction, AccuWeather is calling for a snowy, but warmer winter in the Northeast, with cooler temperatures in the Plains and warm, dry weather in the Southeast and Southwest.

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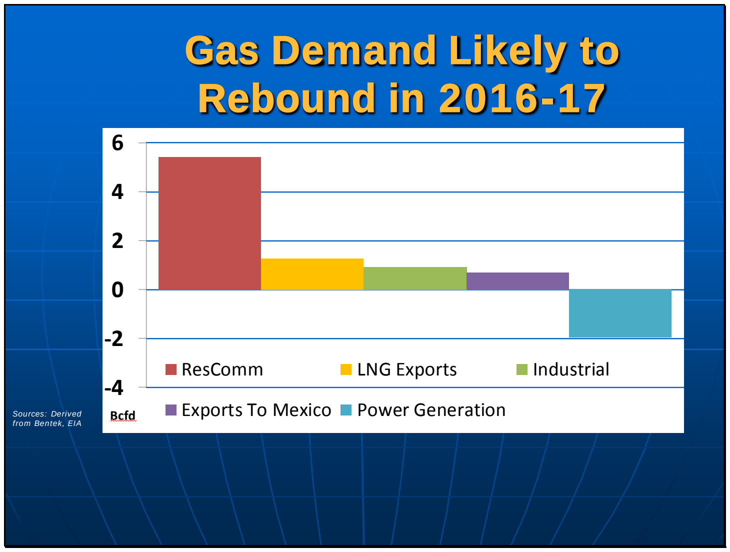

This slide shows expected changes in natural gas demand by major consuming sectors for the coming winter versus 2015-2016. Total U.S. natural gas demand could rise by more than 5 Bcfd from last winter, which was exceptionally mild. With normal winter temperatures forecasted for the Upper Midwest and Northeast, most analysts expect the residential and commercial sector to show the largest change in demand, adding between 5 and 6 Bcfd relative to last year. This would return residential and commercial demand to more typical winter levels, or slightly above the 5-year average. Industrial gas demand, which is also sensitive to weather, could add about 1 Bcfd this winter, year-over-year. Natural gas exports were a growth story in 2016 and will remain so into the winter. Exports to Mexico on pipelines from the U.S. and to international markets in the form of LNG, combined, could increase by more than 1.9 Bcfd this winter in comparison to last winter. The only sector likely to see a decrease in demand is in power generation, which could fall nearly 2 Bcfd from last winter, as higher natural gas prices make other generation fuels more economical, especially during times of large natural gas price spikes.

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As noted previously, U.S. exports have played a significant role in natural gas demand growth in 2016. The opening of the border-crossing NET Mexico Pipeline, as well as the expansion of several pipelines on the Mexican side, has enabled more export volumes from Texas, New Mexico, and Arizona. Flows from the U.S. to Mexico topped 4 Bcfd on several days this summer, marking an all-time high. This will fall back slightly during the winter in a typical seasonal drop due to lower Mexican power generation. LNG exports also emerged as a demand side driver in 2016 with the commissioning and commercial startup of Cheniere's Sabine Pass terminal in Louisiana. Since February, the company has exported more than 30 cargoes from the terminal for a cumulative volume of more than 110 Bcf. So far, the export volumes have had little measurable impact on gas prices and we do not expect a significant impact this winter.

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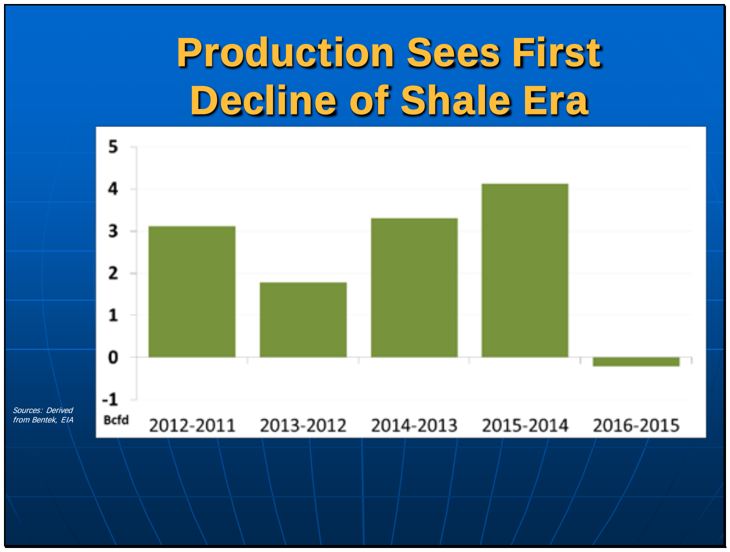

This slide shows year-to-year changes in U.S. natural gas production for the past five years. 2016 is the first year since the beginning of large-scale shale gas production to show a year-over-year decline. Lower gas and oil prices resulted in a 0.2 Bcfd decline in U.S. gas production for the first 9 months of 2016. This compares with a 4 Bcfd incremental gain during the same period of 2015. Changes in production vary by region. Appalachian Basin gas production—including output from the Marcellus and Utica shale plays— rose by nearly 3 Bcfd from 2015 levels, but losses in other regions offset those gains. Texas, with a 2.4 Bcfd drop year-over-year, saw the largest decline, while the Rockies, Midcontinent, and Louisiana also saw sizeable losses. This inevitable and necessary rebalancing of natural gas supply and demand in response to low prices has not impeded the ability of gas to get to markets. The expansion of the pipeline network has improved connections between supply basins and demand areas, particularly in Appalachia, which could enable producers to bring hundreds of drilled but uncompleted wells online this winter in Pennsylvania, Ohio, and West Virginia. This, among other factors, could lead to a recovery in production in the final months of 2016 and into 2017. Analysts expect the increase to continue going forward after the brief pause in production growth.

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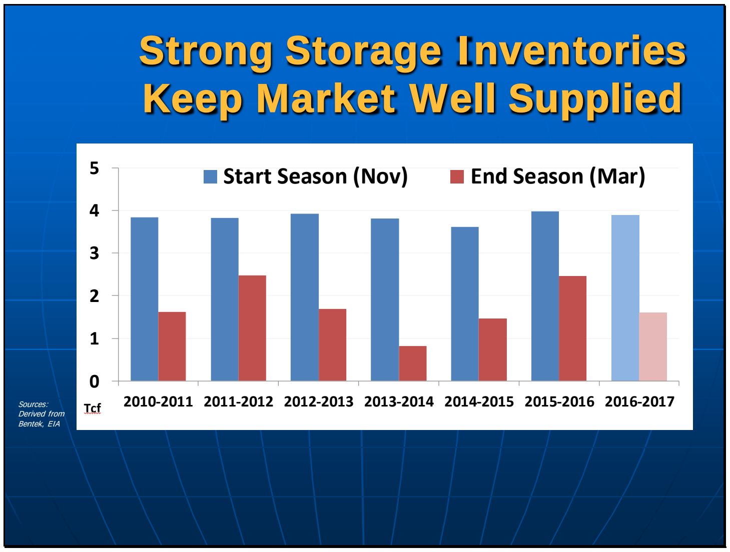

This slide shows U.S. natural gas storage balances for the past six years, with a forecast for the coming winter. Gas storage levels have remained above the five-year average throughout the summer after beginning the traditional refill season at record high levels at the end of last winter. As of October 7, storage sits at 3.76 Tcf, about 200 Bcf greater than the 5-year average and nearly 60 Bcf higher than at this time in 2015. Consequently, the market is likely to remain well supplied throughout this winter.

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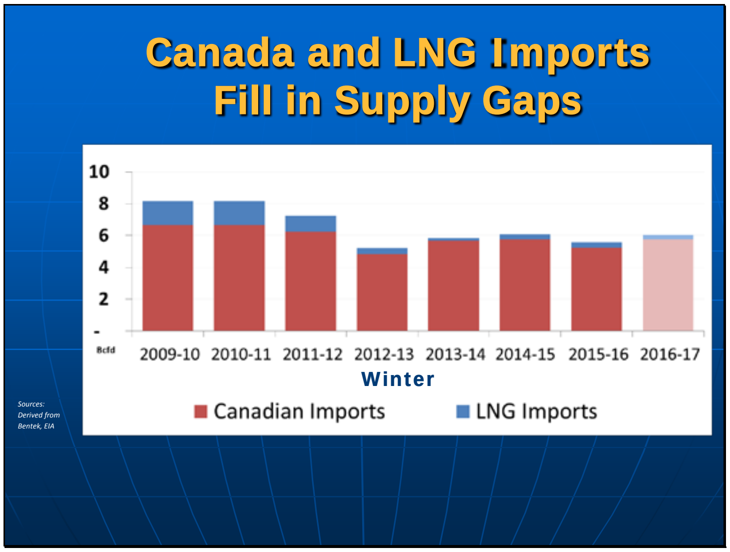

Though natural gas imports to the U.S. from Canada have generally been declining in recent years, cross-border flows are up year-to-date and should see year-over-year gains this winter. Output from Canadian fields is on pace to average more than 15 Bcfd in 2016, the highest annual average level since 2008. A high level of pipeline connectivity between Canada and the U.S. provides adequate potential to tap into this supply if conditions warrant. Additionally, LNG terminals along the East Coast received 19 cargoes last winter comprising more than 37 Bcf, with 17 of those shipments supplying the Everett and Northeast Gateway facilities serving New England. With global LNG prices significantly lower than in previous years, more spot cargoes could find their way to U.S. terminals should the need arise and prices allow.

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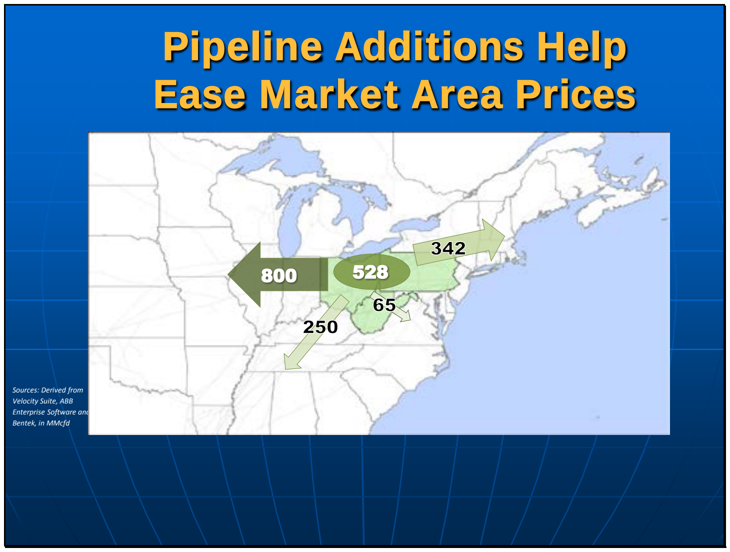

New pipeline capacity in and around the Appalachian Basin has allowed growing production to better reach markets. This slide shows pipeline capacity additions scheduled this winter. Roughly 6 Bcfd of new transport capacity was added to the region since early 2015, and another 2 Bcfd of new transport capacity will be added before the start of 2017, with much of that focused on carrying Marcellus gas to market areas. The pipeline expansions and additions include Spectra's Algonquin Incremental Market, which will add about 350 MMcfd of new transport capacity into the greater Boston and Massachusetts market. The added capacity should help mitigate the worst price spikes. New England natural gas prices have routinely reached winter peaks above $30/MMBtu and during the 2014 polar vortex soared to nearly $90/MMBtu. While those price levels may recur under extreme circumstances, staff estimates that on average the new transport capacity will lower New England basis significantly this winter. Under normal winter conditions, prices at Algonquin city-gates could be as much as $4 to $5/MMBtu less than they would be under the same conditions without the pipeline additions.

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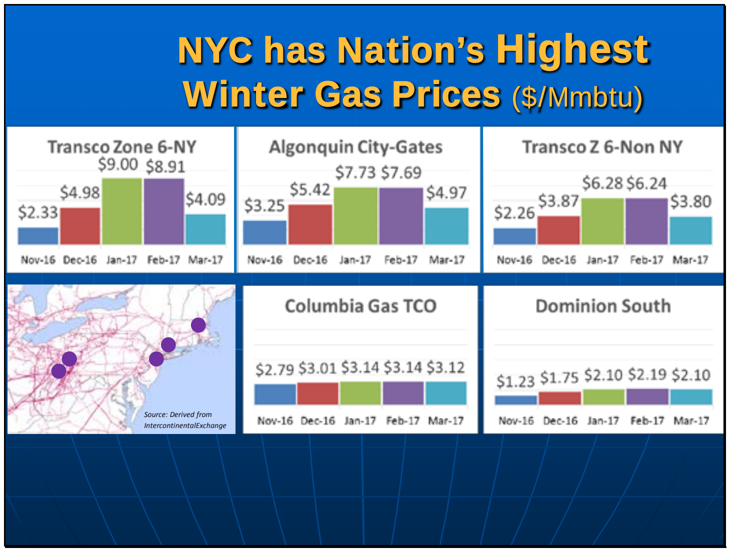

Futures markets are signaling expectations that New York City will have the highest natural gas prices in the country this winter. Peaking in January, basis futures for Transcontinental Gas Pipe Line Zone 6 - New York neared $9.00/MMBtu in trading October 12. Futures for Algonquin City-Gates in the greater Boston area are trading at a discount of more than $1.00 to New York City prices, while futures for Transco Non-New York, which covers an area between Virginia and New Jersey, are over $2.50 less than the New York price. Supply area prices in the Appalachian Basin are significantly lower than the market area, trading between $6 and $7 lower than New York at TCO and Dominion South, respectively. These basis futures reflect current market sentiment for prices over an average of the month, though prices on peak winter days could be considerably higher.

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As the Commission knows, one area that may face challenges outside the Northeast is Southern California. As discussed in a recent technical conference, the leak and subsequent closure of the Aliso Canyon natural gas storage field has created operational challenges for gas and power markets in the Southern California market. Aliso Canyon is vital to power generators in the LA Basin, which will have to pull more supply from interconnecting regional pipelines as testing and inspection of Aliso Canyon's 114 wells continues. As of October 7, state regulators have approved 27 wells to continue service, while taking 78 out of operation, limiting injection and withdrawal capability. SoCalGas' total inventory sits at 61.7 Bcf as of October 11, a significant reduction from the 122 Bcf in storage at this point last year. Low storage levels leave the region susceptible to upstream supply issues like freeze-offs or major pipeline operation problems. State regulators have said the prices in the region should be stable without additional capability from Aliso Canyon given normal winter conditions, but may face up to a 1 Bcfd shortage if winter weather reaches extremes, potentially causing price dislocations.

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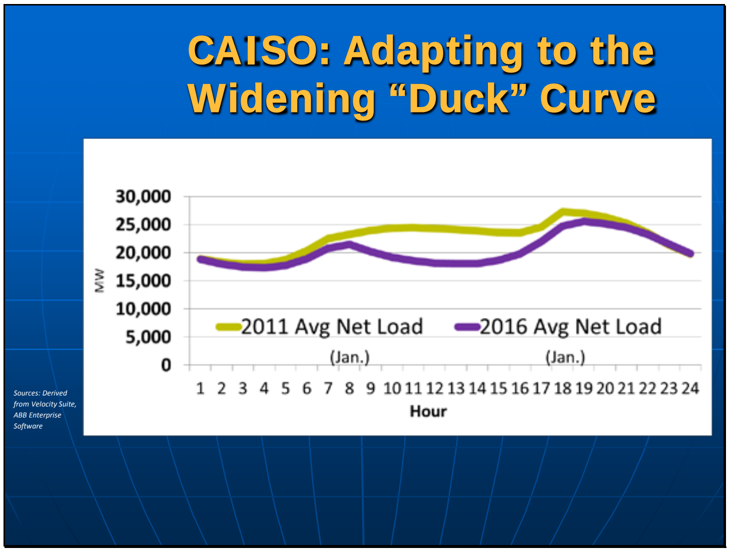

Barring extreme weather conditions, California officials have concluded that Aliso Canyon’s reduced capacity should not compromise Southern California's electric reliability in the coming winter. Moreover, CAISO should be able to re-dispatch generation off Southern California Gas Company’s system if gas supply becomes constrained during the winter; however, the Los Angeles Department of Water and Power has less flexibility to re-dispatch generation. Given the uncertainty of weather and system conditions, conservation and other mitigation measures are expected to help meet winter electricity needs. Nonetheless, Southern California may face additional challenges, especially during evening ramps. Electricity demand in winter months differs from other seasons, not only in the amount of demand but also in the pattern during the day.

CAISO experiences two pronounced demand ramps during the winter months, one in the morning and one in the evening. This graph shows how CAISO’s “duck” curve has changed between January 2011 and January 2016. The “duck” curve is widening, indicating that renewable generation serves more load during the middle of the day, but natural gas-fired generation is increasingly called upon to ramp up output in the afternoon and evening as solar generation declines and load increases. CAISO’s widening “duck” curve is in part due to increased solar generation.

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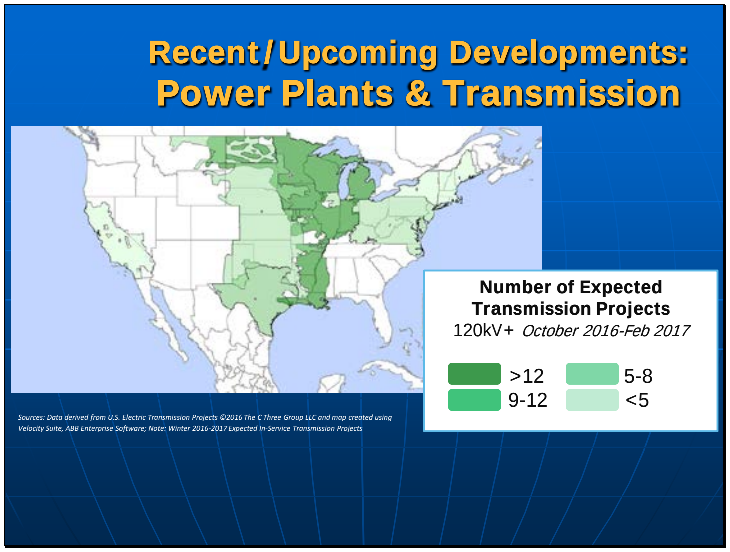

Looking ahead, on the power generation side we continue to see a shift away from large centralized power plants. The majority of new entrants expected to come on-line between now and February 2017 are primarily small to mid-size generators, which are less than 400 MW, and renewable projects. These generators will make-up nearly 90 percent of the new generating capacity expected to become available and renewables will account for nearly 80 percent of new generating capacity over that time frame. Ensuring that the electricity generated by these new plants can be delivered to where it is needed requires a comprehensive transmission planning process. This map shows various regions by number of proposed new transmission projects. In the darkest shaded region you will see that there are more than 20 high voltage transmission line projects expected to be completed in MISO between now and February 2017. Many of these projects will serve areas that have been identified by staff as having persistent price divergences, and may help to alleviate those divergences.

In terms of upcoming generator retirements, the Fort Calhoun nuclear power plant in Nebraska is the only major announced nuclear plant retirement this winter. However, significant price impacts are not anticipated from its closure as two previously retired units are being brought back into service and one that was scheduled for retirement is no longer being retired.

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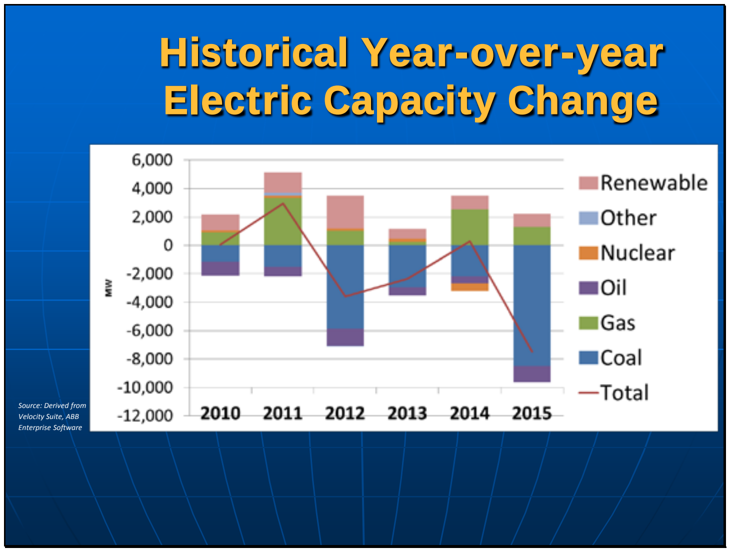

This chart shows the annual change in electric generation capacity since 2010 for ISO-NE, NYISO, and PJM. It illustrates a decrease in overall generation capacity of nearly 7,500 MW from 2014 to 2015. The chart also highlights the decrease in coal-fired generating capacity and the increasing importance of natural gas for electricity generation.

This change in the resource mix can pose challenges for winter operations, especially in ISO-NE, where approximately 44% of generation capacity is now gas-fired and disruptions in gas supply and pipeline capability can occur due to the configuration of the system. Historically, ISO-NE has been able to rely on coal and oil-fired power plants in the winter when residential and commercial demand peaks. However, coal accounts for a relatively small amount, approximately 6 percent, of ISO-NE's system capacity. To help maintain reliability with its changing resource mix, ISO-NE has implemented a Winter Reliability Program that is designed to prevent overreliance on natural gas-fired generators, as well as to implement other proactive measures during the winter months. The Winter Reliability Program provides incentives for three types of resources: oil and dual-fuel generators to increase oil inventories, LNG to augment natural-gas-fired generators' pipeline gas, and demand response.

More broadly, residential gas customers served by local utilities have priority on the pipeline system to meet heating needs during the winter. The high demand for natural gas during periods of extreme cold weather over a large portion of the country can reduce the availability of natural gas for generation plants. NYISO and PJM experience winter problems similar to ISO-NE. In NYISO, nearly 50 percent of capacity is natural gas-fired and NYISO's demand response programs, which reduce energy use at peak times, can be activated to help support regional reliability and manage demand during the winter months.

In PJM, natural gas accounts for more than 30 percent of generating capacity. PJM continues to build on the gas-electric coordination efforts established after the 2014 Polar Vortex. Also, this winter will be the first year that PJM's new capacity performance market design will be in effect. For the delivery year that began June 1, 60 percent of all resources that cleared are capacity performance resources that must be available when called on during times of system stress or else they must pay significant penalties that may equal or exceed capacity revenues.

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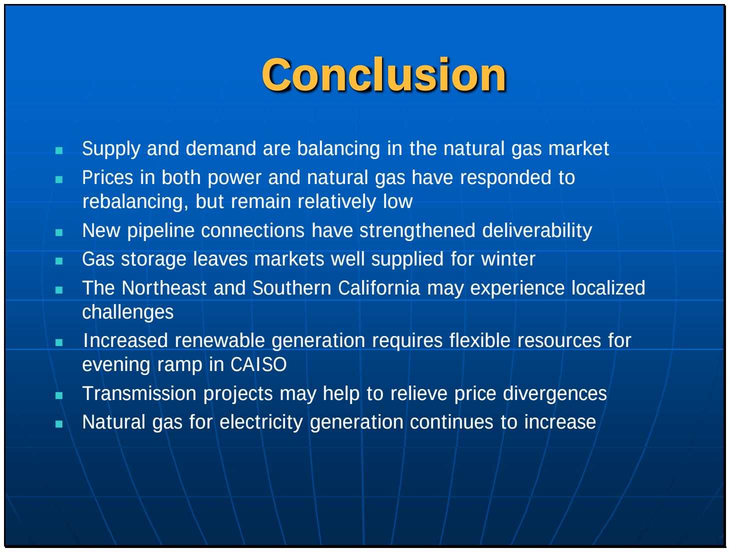

In summation, the outlook for winter is cautiously optimistic, with markets well supplied for the coming season. Normal to above average temperatures are expected and should lessen possible gas delivery constraints. New infrastructure, in terms of pipelines and transmission lines, will transport gas and electricity to alleviate price differences and mitigate spikes. Staff will continue to monitor developments within the electric and natural gas markets, with particular attention paid to the issues at Aliso Canyon and in the Northeast.

This concludes the 2016-2017 Winter Energy Market Assessment.
We are happy to answer any questions you may have.

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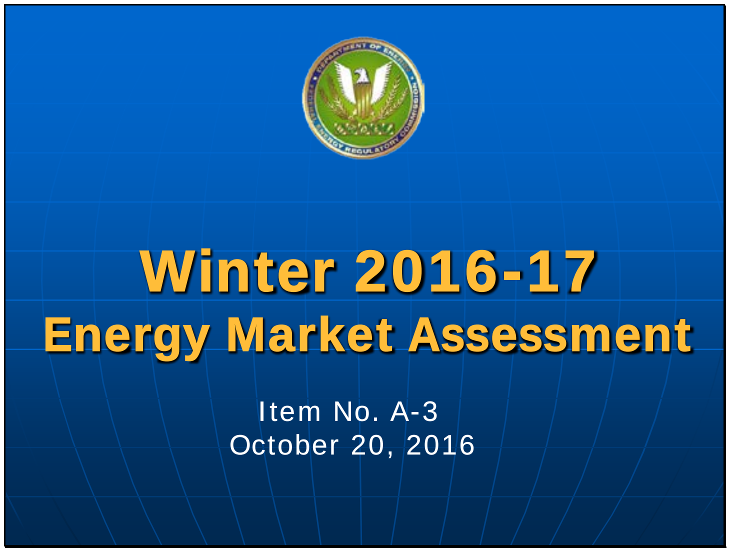
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