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1977-2017
CELEBRATING 40 YEARS

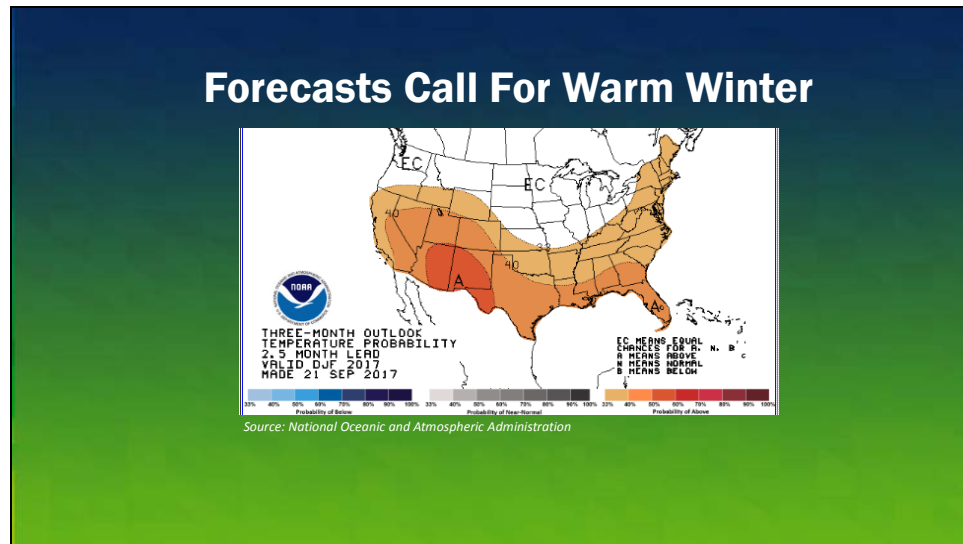
**Winter 2017-18
Energy Market Assessment**

Docket No. AD06-3 | Item No. A-3 | October 19, 2017
Commission meeting presentation shortened due to time constraints

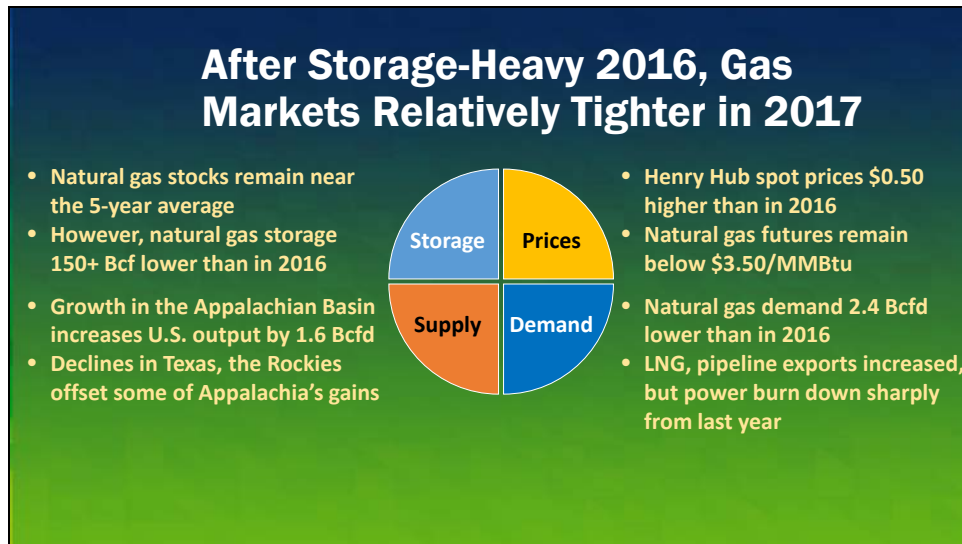
Few Major Risks for Winter Outlook

- Less storage, higher prices than in 2016 will return natural gas market to more moderate conditions.
- Growth in LNG, piped exports are propelling natural gas demand.
- Natural gas production growth over the winter will exceed incremental demand.
- Market for natural gas is well supplied overall, except for unexpected weather-driven events or operational issues.
- Electric capacity is adequate in all regions.
- Electricity markets are adjusting to plentiful gas supply.
- Energy Imbalance Market is expanding, creating opportunities for market efficiencies.

Good morning Mr. Chairman and Commissioners. The Office of Enforcement presents its 2017-18 Winter Energy Market Assessment. The Winter Energy Market 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 markets are entering this winter with a strong storage base and an expanding pipeline network that is delivering more supply to local markets and beyond. A lag in natural gas production over the past year-and-a-half is expected to give way to renewed production growth as a result of increased drilling activity, while LNG projects in the Gulf and East coasts are expected to increase demand. Weather forecasts call for warmer than normal winter temperatures that look to moderate demand in the most sensitive markets, for example the Northeast, during the upcoming season. In the electric markets, electric capacity is sufficient in all regions based on current load forecasts. Since the extreme winter events of 2014, grid operators in the East have paid closer attention to winter readiness and reliability. For example, PJM and ISO New England continue to phase in performance requirements for capacity resources and the RTOS and ISOs have initiated other programs and procedures that focus on winter readiness. In the West, the Energy Imbalance Market (EIM) continues to expand this winter with the addition of Portland General Electric. These developments are expected to improve electric market operations in the winter months. Both the natural gas and electricity markets are unlikely to be impacted by long-lasting outages from hurricanes Harvey and Nate, which collectively forced the closure or reduced operations of more than 10 refineries in Texas and Louisiana in late August and early October, respectively.

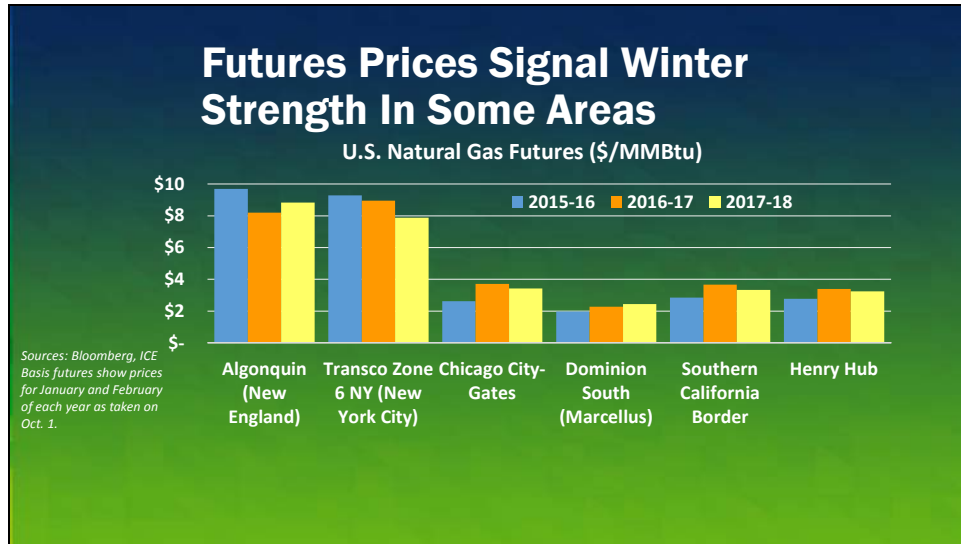


Current long-term temperature forecasts for the winter months indicate the greatest probability is for a warmer than normal winter throughout most of the continental United States. The National Oceanic and Atmospheric Administration, at this time, predicts that the El Niño-La Niña effect will be neutral this winter. A neutral effect generally means that average Pacific Ocean temperatures will have little influence on continental United States temperatures or precipitation. These forecasts suggest that fuel and electric demand will likely be moderate this winter. However, there is always the possibility of extreme weather events, which can dramatically alter short-term demand.

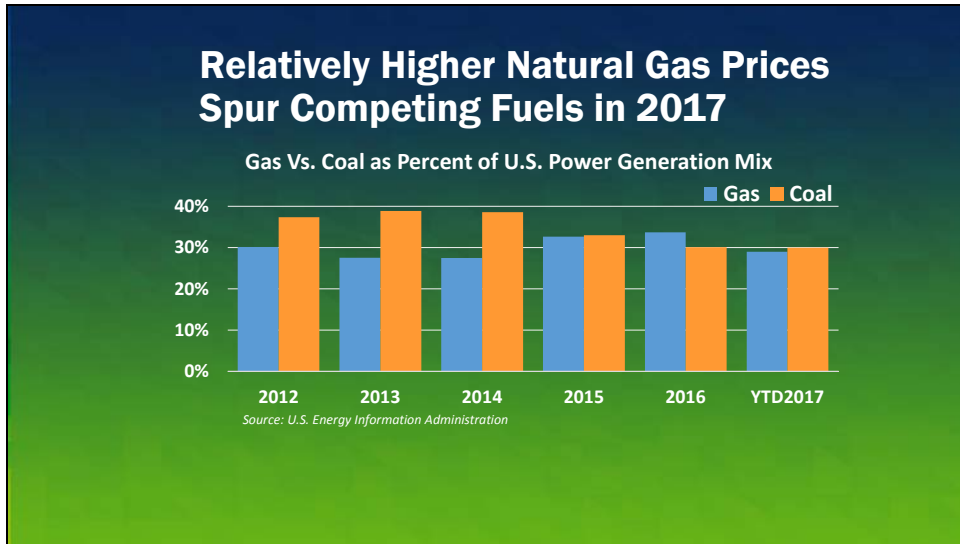


Thus far in 2017, the natural gas market has charted a very different course than in 2016. Where 2016 was dominated by an abundance of storage volumes that demand was slow to pare back, 2017 has seen slower production growth that has resulted in lower storage levels. However, these stocks are hovering near the five-year average, outweighing early October storage levels in five of the past 10 years. From this robust base, the natural gas market should be positioned to meet anticipated needs for natural gas throughout the winter. Of course, this outlook could be affected by unexpected major weather events or significant operational issues.

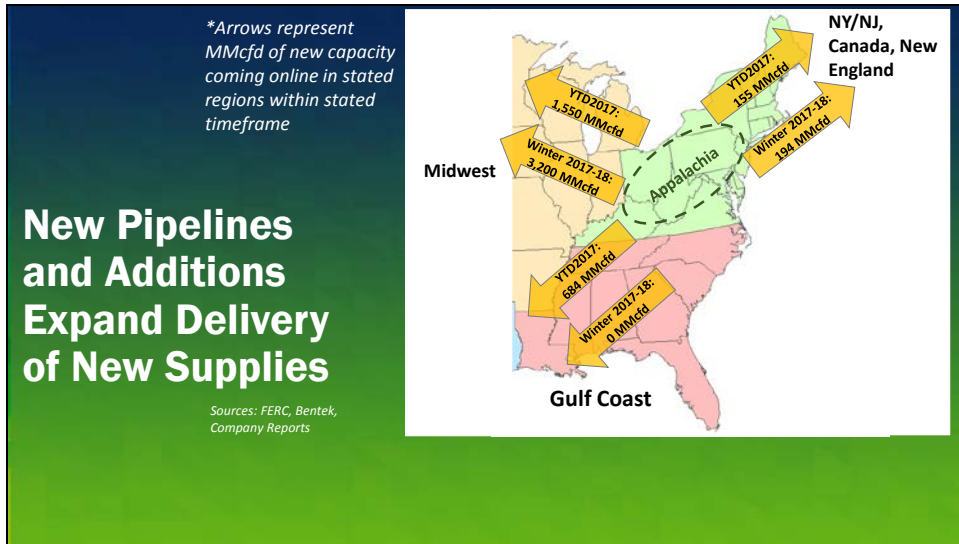
Compared to a year ago, spot natural gas prices today are averaging 50 cents higher at Henry Hub, making natural gas less competitive as a fuel source for power generation in some regions. However, gains in exports, such as pipeline deliveries to Mexico and LNG deliveries to international markets, have partially offset the domestic decline in demand. On the supply side, production gains have not been as strong as in 2014 and 2015, as decreasing output in Texas and the Rockies mitigated some of the production gains in Appalachia. Looking toward this winter, prices are likely to average at or near the low levels seen in 2016, outside of weather-driven peak days during which prices may surge higher.



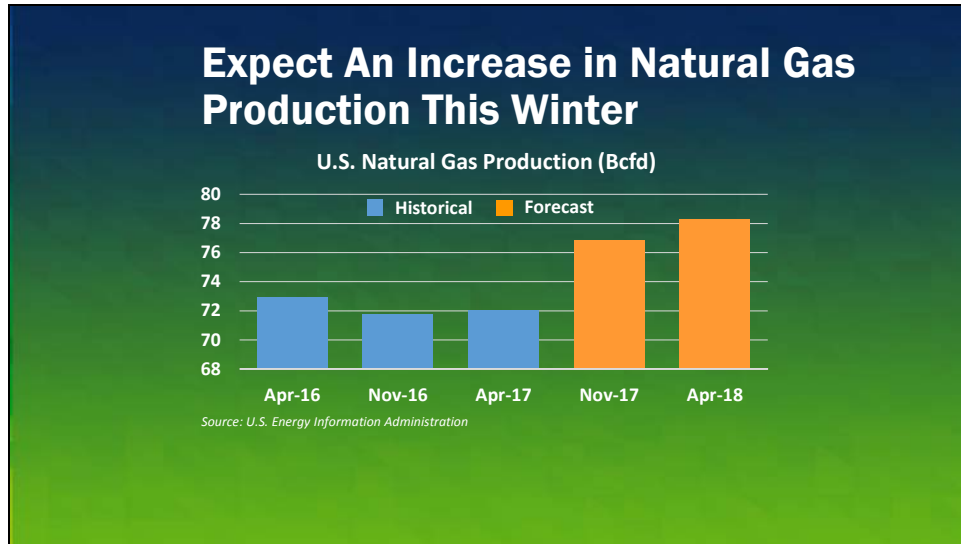
Basis futures prices are signaling market expectations for slightly higher prices in New England during the winter, while many other regions see some relief from 2016 levels. Henry Hub futures prices averaged in the low \$3/MMBtu range for January and February, a few cents below last year's market expectations going into winter. Futures prices in Southern California and in the Midwest are similarly showing a slight drop from 2016 prices, while New York City futures are more than one dollar lower, though still near \$8/MMBtu. New pipeline connections from Appalachia into the Northeast and Midwest helped to tame winter prices in those markets, while New England is still facing capacity constraints during peak conditions.



Throughout 2017, slightly higher gas prices in some regions, such as the Midwest and Southeast, have made competing fuels—namely coal—more competitive for power generation. This led to some relative shifts in fuel usage patterns, with coal overtaking natural gas on average thus far in 2017 after being supplanted by natural gas in 2016. This dynamic is likely to continue through the winter, when coal typically takes a more prominent position in the generation mix.

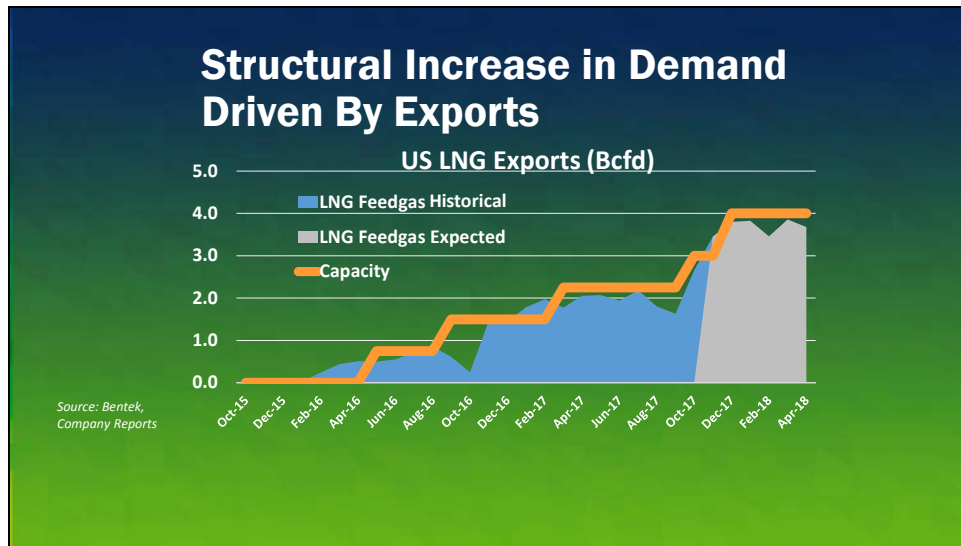


The tempering of winter prices in some markets is due in part to the added capacity linking relatively cheap Appalachian supply to markets on the East Coast, in the Midwest, and further south. Since 2016, nearly 2.5 Bcfd of new field-to-market capacity has been added and another 3.4 Bcfd is expected to come online between now and April. Collectively, these additions provide consumers in markets from New York City to Chicago with cheaper supply from which to feed winter needs. Among the expansions and greenfield projects expected to come online this winter are TransCanada's TCO Leach Xpress, which would add 1.5 Bcfd to the Northeast, and the Rover Pipeline, which would carry 3.25 Bcfd toward the Midwest.



After a temporary idling of production growth, United States operators are poised to see strong production gains from shale fields across the country. The pace of growth reached an inflection point in July, when United States natural gas output increased for the first time in 15 months. Expectations are that the trend will continue through the winter, as new pipeline projects come online and producers are able to reach higher priced markets.

The Appalachian basin, with the Marcellus and Utica shale plays, outperformed every other major producing region in terms of incremental supply over the past several years. In fact, overall United States production may have fallen further and faster had it not been for gains in the region in early 2017. Marcellus and Utica are expected to grow at a strong pace into the spring of 2018. Additionally, production is increasing in the Haynesville Basin in Louisiana and the Permian Basin in Texas as production costs have fallen. In total, United States production is expected to grow by more than 5 Bcf/d year-over-year by April. These production gains could further strengthen the natural gas system's reliability for winter, particularly in and around the Northeast.

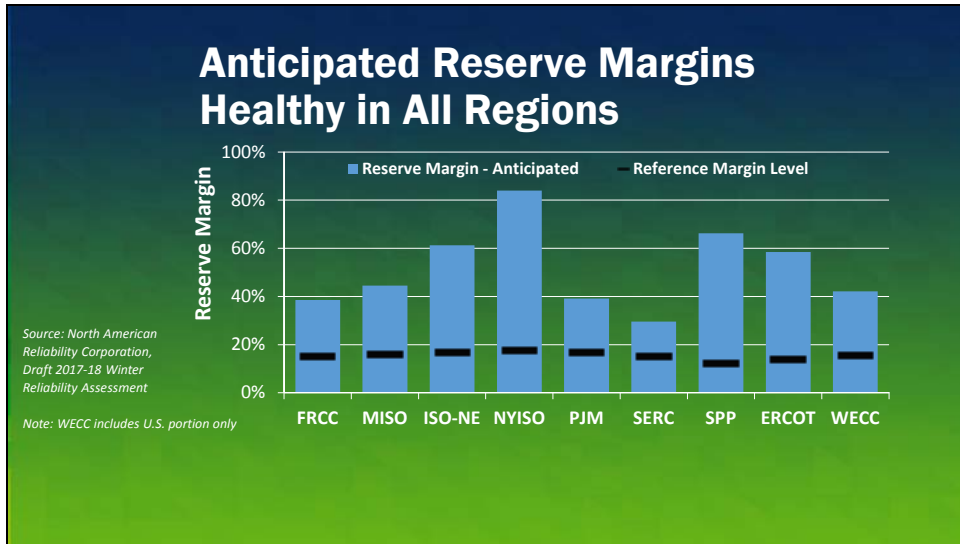


Recent growth in natural gas demand has come primarily from exports. The commercial start-up of the first three trains at Cheniere’s Sabine Pass liquefaction plant in Louisiana, paired with increased cross-border flows on pipelines to Mexico, have collectively increased exports by more than 3 Bcf/d since the start of 2016. This surge in export volume has also been heavily concentrated in the Gulf Coast, with Texas and Louisiana accounting for more than 80 percent of the incremental demand. The chart above shows the steady increase in flows for LNG exports, which recently peaked at 2.9 Bcf/d. At times, flows into liquefaction plants have actually surpassed nameplate capacity, though the overages came during commissioning and testing of new trains in advance of service.

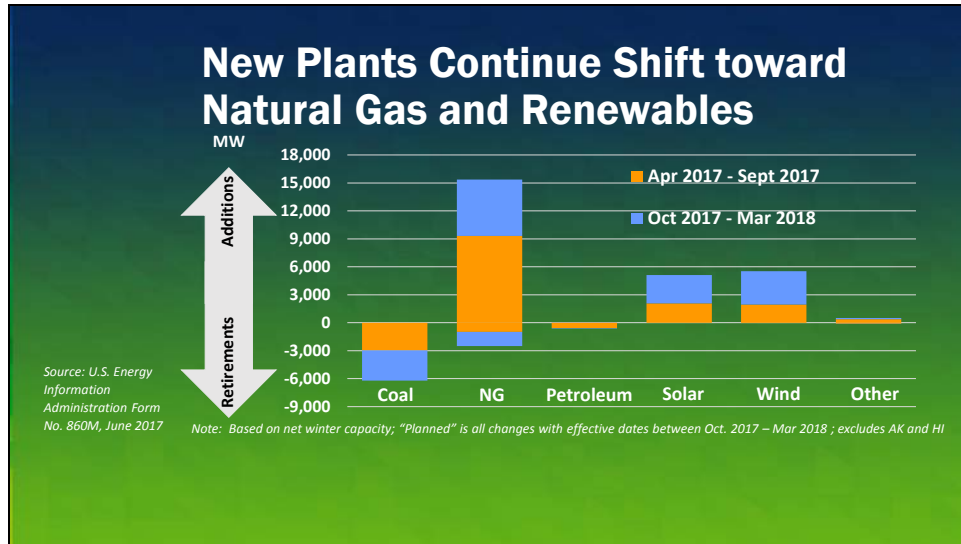
Flows into LNG terminals are expected to increase even more this winter, as the first East Coast LNG project—Cove Point—comes online before year’s end. The Cove Point facility has already received pipeline deliveries during commissioning and is nearing start-up. It is highly likely, with the opening of Cove Point and the commercial start-up of an additional train at Sabine Pass, flows into those terminals will collectively surpass 3 Bcf/d and stay at that level into spring.



Operational constraints at the Aliso Canyon gas storage facility may continue to pose risks to the functioning of natural gas and electric markets in Southern California during peak winter conditions. Though the facility has returned to service after an extended outage following the 2015 leak, 62 of the facility's 114 wells were taken out of permanent operation, limiting injection and withdrawal capabilities. Currently, the Southern California Gas system holds 65 Bcf in storage, the lowest on record for this time of year since at least 2001 and far below the 118 Bcf the system has averaged over the past 5 years. This low inventory did not disrupt the gas system during the summer with an electric peak near record levels and some periods of stressed conditions. It is conceivable, however, that limitations at Aliso Canyon during periods of the highest winter demand could challenge regional stability and increase natural gas and electricity prices. The recent outages of SoCal Gas Line 235-2 and Line 3000 may also limit flexibility in the region. This risk could also be magnified by upstream pipeline issues, like further outages or wellhead freeze-offs.

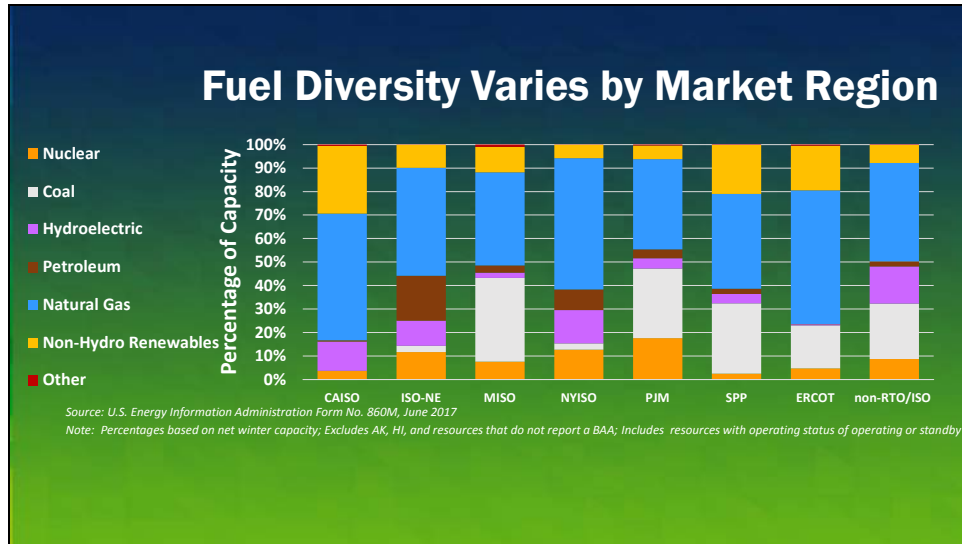


Preliminary data from NERC’s Winter Reliability Assessment indicates that reserve margins for all assessment areas are anticipated to be healthy this winter. The columns shown on this chart display the anticipated reserve margins for various regions, while the black bars indicate the Reference Margins, which are the minimum reserves required by the state, the RTO, or other authority. Electric demand is forecast to be slightly higher in some regions, such as SPP and SERC, and slightly lower in others, such as ERCOT and ISO New England. All regions are expected to maintain healthy reserve margins for the winter.



The past few years have seen natural gas-fired plant additions in several parts of the United States, replacing retirements of coal capacity and nuclear capacity. This figure shows actual and planned capacity additions and retirements between April 2017 and March 2018, as reported to the U.S. Energy Information Administration. While nuclear capacity has also retired recently, no retirements have occurred or are planned for the period shown.

As shown in the chart, a large share of recent capacity additions has been natural gas-fired or renewable. From the end of last winter through the upcoming winter, about 15 GW of natural gas capacity have been or will be added across the contiguous United States. The installed capacity of renewable resources continues to increase, including significant additions of wind in SPP and MISO and solar photovoltaic in CAISO.



Any assessment of a market’s preparation for the winter season must take into account capacity mix and its resulting fuel diversity. Some regions take extra steps to ensure that there are adequate fuel supplies during periods of extreme cold when power generation competes with other uses of natural gas for limited supplies. ISO New England is one of the markets most affected by winter fuel supply considerations and its Winter Reliability Program will be used to manage fuel conditions this winter. The New York ISO has similar challenges in the downstate portion of the region because state rules place restrictions on the reliance of natural gas as a generation fuel at critical times. Regions with greater reliance on coal-fired generation must pay attention to coal delivery issues, especially in areas where coal delivery has been an issue in past winters, specifically the Midwest.

Conclusion

- Staff analysis identifies few major concerns.
- The forecast is for warmer than average weather and lower demand.
- The markets appear to be prepared to manage disruptive events.

In summation, at this time we do not see major risk factors that would likely lead to significant market disruptions during this winter. There is always the possibility of unforeseen events and staff will continue to monitor developments within the electric and natural gas markets. We will pay particular attention to the issues at Aliso Canyon and in the Northeast. This concludes the 2017-2018 Winter Energy Market Assessment. We are happy to answer any questions you may have.