OE ENERGY
MARKET SNAPSHOT
National – Data Through September 2015

Office of Enforcement
Federal Energy Regulatory Commission
October 2015
Agenda

- 2015-16 Energy Market Winter Assessment
- National Slides
- Infrastructure Report
2015-2016 Energy Market Winter Assessment
<table>
<thead>
<tr>
<th>Stable signals</th>
<th>Challenges</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Low NG &amp; electric prices</td>
<td>• Low NG and oil rig counts</td>
</tr>
<tr>
<td>• Abundant NG production &amp; storage</td>
<td>• Cold weather in South</td>
</tr>
<tr>
<td>• Moderate weather in Midwest, Northwest &amp; Northeast</td>
<td>• Potential demand increases from NG industrial &amp; LNG exports</td>
</tr>
<tr>
<td>• Robust fuel stockpiles—heating &amp; generation</td>
<td>• New England price volatility</td>
</tr>
</tbody>
</table>
### Futures Prices Decline

<table>
<thead>
<tr>
<th>Location</th>
<th>2015^</th>
<th>2016*</th>
<th>∆</th>
</tr>
</thead>
<tbody>
<tr>
<td>Algonquin (New England)</td>
<td>$21.45</td>
<td>$9.69</td>
<td>-55%</td>
</tr>
<tr>
<td>Transco Zone 6 non-NY (Mid-Atlantic)</td>
<td>$9.09</td>
<td>$6.21</td>
<td>-32%</td>
</tr>
<tr>
<td>Transco Zone 6 NY (New York City)</td>
<td>12.82</td>
<td>$9.29</td>
<td>-28%</td>
</tr>
<tr>
<td>Dominion South (Marcellus)</td>
<td>$2.51</td>
<td>$1.97</td>
<td>-21%</td>
</tr>
<tr>
<td>Southern California Border</td>
<td>$4.30</td>
<td>$2.85</td>
<td>-34%</td>
</tr>
<tr>
<td>Henry Hub</td>
<td>$4.08</td>
<td>$2.77</td>
<td>-32%</td>
</tr>
<tr>
<td>Massachussets Hub</td>
<td>$183.88</td>
<td>$89.28</td>
<td>-51%</td>
</tr>
<tr>
<td>PJM Western Hub</td>
<td>$72.60</td>
<td>$50.56</td>
<td>-30%</td>
</tr>
<tr>
<td>Northwest (Mid-C)</td>
<td>$37.73</td>
<td>$24.88</td>
<td>-34%</td>
</tr>
<tr>
<td>Southern California (SP-15)</td>
<td>$46.13</td>
<td>$33.76</td>
<td>-27%</td>
</tr>
</tbody>
</table>

*Source: Derived from ICE and Nymex data.*

^January and February 2016

^January and February 2015

*SP-15 2016

*Power Note: Prices in $/MWh. Peak financial swap prices.

*Gas Note: Prices in $/MMBtu. Regional futures natural gas prices are the sum of the Henry Hub futures contract price plus the regional basis futures.
Winter Temps Warmer in North & Cooler in South
Natural Gas Storage Poised To Set a Record Entering Winter

Source: EIA data & Staff analysis.
Winter NG Demand Projections Lower than Previous Winters

U.S. Natural Gas Demand by Sector (Bcf/d)

Projected

- Residential
- Commercial
- Electric Power
- Industrial
- Vehicle

Source: EIA data & Staff analysis.
Natural Gas Production Sets Record

U.S. Natural Gas Production (Bcfd)

Marcellus
Utica
Eagle Ford
Williston
Permian
Niobrara

Source: Bentek Energy.
Pipeline Projects
Connect New Production to Markets

Natural Gas pipeline capacity additions in 2014 & 2015 (Bcfd)

Source: Staff analysis.
Winter Natural Gas Prices Converge in Northeast

Composite Price ($/MMBtu)*

*Regional composites are averages of January and February prices.

Source: Staff analysis.
RTO/ISO Winter Preparations

- Gas electric coordination
- Seasonal modeling assessments
- Adequate reserve margins with load pockets
- Winterization testing
- Situational awareness
CAISO Winter Ramp

CAISO Winter Average Net Load

Net Load (MW)

32000
30000
28000
26000
24000
22000
20000
18000

December
18 21 24 3 6 9 12 15 18 21 24

January
18 21 24

Hour Ending

Source: Derived from CAISO data via Ventyx
ISO-NE Relies on Winter Fuel Diversity

Source: Derived from Ventyx data
Power Market Developments

- SPP Expanded Membership with Integrated Systems
- NV Energy may join EIM
- NYISO increased reserve requirements and scarcity prices
- SPP-MISO improve interregional coordination
National Slides
NOAA Nov 2015 Through Jan 2016 Outlook
Cumulative HDDs by City
July– September

Source: Bloomberg Weather (daily data summed quarterly)
Cumulative CDDs by City
July–September

Source: Bloomberg Weather (daily data summed quarterly)

Updated Oct-2015
Spot Power Prices
Average Monthly ($/MWh)

- **Mid-Columbia**
  - $27
  - 32%

- **Indiana Hub**
  - $34
  - 10%

- **Palo Verde**
  - $30
  - 28%

- **SPP North Hub**
  - $23
  - 18%

- **ERCOT North**
  - $28
  - 26%

- **NEMA Boston**
  - $45
  - 7%

- **NYISO ZJ**
  - $42
  - 8%

- **PJM West**
  - $38
  - 9%

- **Into Southern**
  - $30
  - 21%

\$ = Average Sept. 2015 On-peak DA Price

% Decrease from 2014 (increase)

Source: Derived from ISO/RTO and SNL Data
Spot Natural Gas Prices
Average ($/MMBtu)
July– September

Source: ICE
Spot Average Natural Gas Trading Volumes (MMBtus) July–September

- Pricing Point
  - **BOLD** – This year
  - **Green** – % increase from previous year
  - **Red** – % decrease from previous year

Source: ICE

Updated: Oct-2015
National Natural Gas Market Overview: U.S. Supply and Consumption

U.S. NG Supply and Demand Year to Date – Sep 2015 vs. Sep 2015

US Natural Gas Supply
Total Change in Supply 5.6%

US Natural Gas Demand
Total Change in Demand 4.8%

Note: Balance includes all amounts not attributable to other categories.
Source: Derived from Bentek Energy data

Updated: Oct 2015
National Natural Gas Market Overview: Canadian Imports

Regional Imports from Canada

Source: Derived from Bentek Energy data

Updated: Oct 2015
Total U.S. Natural Gas Demand All Sectors

Source: Derived from Bentek Energy data, derived from interstate pipeline flow and modeled data.
U.S. Natural Gas Consumption for Power Generation

Source: Derived from Bentek Energy data

Updated: Oct 2015
EIA National Storage Inventories by Region

- East Storage Level
- West Storage Level
- Production Area Storage Level
- 5 Year Average

U.S. Storage Levels (Bcf)


Source: Derived from Bloomberg Data

Updated Oct-2015
EIA National Storage Inventories

Source: Derived from Bloomberg Data

Notes:
Updated Oct-2015
EIA Regional Storage Inventories

**EAST**

**WEST**

**PRODUCING**

Source: Derived from Bloomberg Data

Update Oct-2015
Monthly U.S. Dry Gas Production – Lower 48 States

Note: Prior to July 2010, chart was derived from a combination of EIA and Bentek Energy data
Source: Derived from Bentek Energy data

Updated: Oct 2015
National Natural Gas Market Overview: Rig Count by Type

Rigs by Type

Source: Derived from Bloomberg data

Updated Oct-2015
Gas vs Coal

Notes:
Source: Derived from Bloomberg data
Updated Oct-2015

Notes:
Source: Derived from Bloomberg data
Updated Oct-2015
Daily Gas Sendout from Existing U.S. LNG Facilities

Notes: Everett data includes flows onto the AGT and TGP interstate lines, plus estimates of flows to the Mystic 7 power plant, Keyspan Boston Gas, and LNG trucked out of the terminal. Excludes flows to the Freeport LNG which flows via intrastate pipelines and flows to the Mystic 8 and 9 power plants.

Source: Derived from Bentek Energy data
National Natural Gas Market Overview: World LNG Landed Prices

World LNG Estimated October 2015 Landed Prices

Note: Includes information and Data supplied by IHS Global Inc. and its affiliates ("IHS"); Copyright (publication year) all rights reserved.
Landed prices are the monthly average of weekly trades from the prior month.

Updated Oct 2015
National Natural Gas Market Overview: LNG Competitive Price Hubs

Historical and Future World Gas Prices

Source: Derived from Bloomberg data

Notes:
Updated Oct-2015
WTI vs Brent Crude Oil Price

Source: Derived from Bloomberg data
National Natural Gas Market Overview: Nymex Futures Curve

Source: Derived from Bloomberg data

Updated Oct-2015
Infrastructure Report
## Natural Gas Highlights

### Natural Gas Activities in September 2015

<table>
<thead>
<tr>
<th>Status</th>
<th>No. of Projects</th>
<th>Storage Capacity (Bcf)</th>
<th>Deliverability (MMcf/d)</th>
<th>Capacity (MMcf/d)</th>
<th>Miles of Pipeline</th>
<th>Compression (HP)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pipeline</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Placed in Service</td>
<td>0</td>
<td></td>
<td></td>
<td>0.0</td>
<td>0.0</td>
<td>0</td>
</tr>
<tr>
<td>Certificated</td>
<td>2</td>
<td></td>
<td></td>
<td>830.0</td>
<td>34.1</td>
<td>12,260</td>
</tr>
<tr>
<td>Proposed</td>
<td>10</td>
<td></td>
<td></td>
<td>10,230.3</td>
<td>1,244.3</td>
<td>304,651</td>
</tr>
<tr>
<td><strong>Storage</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Placed in Service</td>
<td>2</td>
<td></td>
<td></td>
<td>8.0</td>
<td>0.0</td>
<td>4,800</td>
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<tr>
<td>Certificated</td>
<td>0</td>
<td></td>
<td></td>
<td>0.0</td>
<td>0.0</td>
<td>0</td>
</tr>
<tr>
<td>Proposed</td>
<td>1</td>
<td></td>
<td></td>
<td>15.0</td>
<td>0.0</td>
<td>0</td>
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<tr>
<td><strong>LNG (Import &amp; Export)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Placed in Service</td>
<td>0</td>
<td></td>
<td></td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Certificated (Import/Export)</td>
<td></td>
<td></td>
<td></td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td>Proposed (Export)</td>
<td>2</td>
<td></td>
<td></td>
<td>11.6</td>
<td>2,825</td>
<td>0</td>
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## Electric Generation Highlights

### New Generation In-Service (New Build and Expansion)

<table>
<thead>
<tr>
<th>Primary Fuel Type</th>
<th>September 2015</th>
<th>January – September 2015 Cumulative</th>
<th>January – September 2014 Cumulative</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. of Units</td>
<td>Installed Capacity (MW)</td>
<td>No. of Units</td>
</tr>
<tr>
<td>Coal</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Natural Gas</td>
<td>2</td>
<td>346</td>
<td>34</td>
</tr>
<tr>
<td>Nuclear</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Oil</td>
<td>0</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>Water</td>
<td>0</td>
<td>0</td>
<td>18</td>
</tr>
<tr>
<td>Wind</td>
<td>3</td>
<td>448</td>
<td>26</td>
</tr>
<tr>
<td>Biomass</td>
<td>2</td>
<td>4</td>
<td>16</td>
</tr>
<tr>
<td>Geothermal Steam</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Solar</td>
<td>6</td>
<td>20</td>
<td>142</td>
</tr>
<tr>
<td>Waste Heat</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Other</td>
<td>0</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>Total</td>
<td>13</td>
<td>817</td>
<td>250</td>
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</tbody>
</table>
# Electric Transmission Highlights

## Transmission Projects Completed

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>≤230</td>
<td>0.0</td>
<td>0.0</td>
<td>153.4</td>
<td>1,218.5</td>
<td>2,947.3</td>
<td>5,636.0</td>
</tr>
<tr>
<td>345</td>
<td>82.0</td>
<td>202.0</td>
<td>808.7</td>
<td>1,659.8</td>
<td>2,416.8</td>
<td>4,806.6</td>
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<tr>
<td>500</td>
<td>0.0</td>
<td>0.0</td>
<td>256.0</td>
<td>70.0</td>
<td>950.9</td>
<td>3,292.9</td>
</tr>
<tr>
<td>Total U.S.</td>
<td>82.0</td>
<td>202.0</td>
<td>1,218.1</td>
<td>2,948.3</td>
<td>6,315.0</td>
<td>13,735.5</td>
</tr>
</tbody>
</table>

## Proposed Transmission Projects In-Service by September 2017

<table>
<thead>
<tr>
<th>Voltage (kV)</th>
<th>Line Length (miles)</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤230</td>
<td>5,636.0</td>
</tr>
<tr>
<td>345</td>
<td>4,806.6</td>
</tr>
<tr>
<td>500</td>
<td>3,292.9</td>
</tr>
<tr>
<td>Total U.S.</td>
<td>13,735.5</td>
</tr>
</tbody>
</table>

## Transmission Projects with a High Probability of being completed by September 2017

<table>
<thead>
<tr>
<th>Voltage (kV)</th>
<th>Line Length (miles)</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤230</td>
<td>5,636.0</td>
</tr>
<tr>
<td>345</td>
<td>4,806.6</td>
</tr>
<tr>
<td>500</td>
<td>3,292.9</td>
</tr>
<tr>
<td>Total U.S.</td>
<td>13,735.5</td>
</tr>
</tbody>
</table>

## New Transmission Projects by Voltage

- **115 kV**
- **138 kV**
- **230 kV**
- **345 kV**
- **500 kV**
Infrastructure Report

Office of Energy Projects Energy Infrastructure Update
http://www.ferc.gov/legal/staff-reports.asp

(see “Energy Infrastructure” tab)