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
Market Overview

- Stable signals
  - Low NG & electric prices
  - Abundant NG production & storage
  - Moderate weather in Midwest, Northwest & Northeast
  - Robust fuel stockpiles—heating & generation

- Challenges
  - Low NG and oil rig counts
  - Cold weather in South
  - Potential demand increases from NG industrial & LNG exports
  - New England price volatility
## Futures Prices Decline

<table>
<thead>
<tr>
<th>Location</th>
<th>2015^</th>
<th>2016*</th>
<th>Δ</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

Source: NOAA National Weather Service
Natural Gas Storage Poised To Set a Record Entering Winter

![Graph showing storage inventories from April to March, with a peak in November.]

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 (Bcf/d)

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

Natural Gas pipeline capacity additions in 2014 & 2015 (Bcf/d)

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

*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

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

THREE-MONTH OUTLOOK
TEMPERATURE PROBABILITY
0.5 MONTH LEAD
VALID NDJ 2015
MADE 15 OCT 2015

EC MEANS EQUAL CHANCES FOR A, N, B
A MEANS ABOVE
N MEANS NORMAL
B MEANS BELOW
Cumulative HDDs by City
July– September

City Location
This Year
Last Year
5 Year Average

Source: Bloomberg Weather (daily data summed quarterly)

Updated Oct-2015
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%
- SPP North Hub: $23, 18%
- ERCOT North: $28, 26%
- NEMA Boston: $45, 7%
- NYISO ZJ: $42, 8%
- Palo Verde: $30, 28%
- 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

Updated Oct-2015
Spot Average Natural Gas Trading Volumes (MMBtus) July–September

Source: ICE Updated Oct-2015

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

- **Spot Average Natural Gas Trading Volumes (MMBtus)**
  - PG&E Citygate: 580,029 (14%)
  - SoCal Border: 317,611 (-31%)
  - El Paso Permian: 240,476 (-7%)
  - NGPL Tex-Oklahoma: 338,386 (9%)
  - Chicago Citygate: 419,667 (103%)
  - Columbia TCO: 27,843 (138%)
  - Transco Z6-NY: 81,007 (-4%)
  - Algonquin Citygate: 89,234 (49%)
  - Henry Hub: 208,877 (33%)
  - FGT-Z3: 120,924 (11%)
  - HSC: 19,497 (-77%)

- **Source:** ICE
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%

- LNG Imports: 8.2%
- Net Pipeline Imports: 5.6%
- Net Dry Gas Production: 6.0%

US Natural Gas Demand
Total Change in Demand  4.8%

- Power Generation: 3.4%
- Industrial: 17.0%
- Residential/Commercial: -1.9%

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

Updated: Oct 2015
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.

Updated: Oct 2015
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**

Notes:
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**

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**WEST**

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**PRODUCING**

Source: Derived from Bloomberg Data

Update: Oct-2015
National Natural Gas Market Overview: Monthly U.S. Dry Gas Production

Monthly U.S. Dry Gas Production – Lower 48 States

- Dry Production

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
National Natural Gas Market Overview: Rig Count

Gas vs Coal

![Graph showing gas and oil prices over time](image)

**Notes:**
- Derived from Bloomberg data

**Source:** Derived from Bloomberg data

**Updated:** Oct-2015
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
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.
Historical and Future World Gas Prices

Source: Derived from Bloomberg data

Notes:
Updated Oct-2015
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>
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<tbody>
<tr>
<td><strong>Pipeline</strong></td>
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<td></td>
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<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>
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<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>
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<tr>
<td><strong>Storage</strong></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Placed in Service</td>
<td>2</td>
<td>8.0</td>
<td>0.0</td>
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<td>4,800</td>
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<td>Certificated</td>
<td>0</td>
<td>0.0</td>
<td>0.0</td>
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<td></td>
<td>0</td>
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<tr>
<td>Proposed</td>
<td>1</td>
<td>0.0</td>
<td>15.0</td>
<td></td>
<td></td>
<td>0</td>
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<tr>
<td><strong>LNG (Import &amp; Export)</strong></td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Placed in Service</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
<td>0</td>
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<tr>
<td>Certificated (Import/Export)</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<td></td>
<td>0</td>
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<tr>
<td>Proposed (Export)</td>
<td>2</td>
<td>11.6</td>
<td>2,825</td>
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<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>
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<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>
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<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>
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<tr>
<td>Geothermal Steam</td>
<td>0</td>
<td>0</td>
<td>1</td>
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<tr>
<td>Solar</td>
<td>6</td>
<td>20</td>
<td>142</td>
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<tr>
<td>Waste Heat</td>
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<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>
</tr>
</tbody>
</table>
# Electric Transmission Highlights

## Transmission Projects Completed

<table>
<thead>
<tr>
<th></th>
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<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>
</tr>
<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>

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

## Proposed Transmission Projects In-Service by September 2017

<table>
<thead>
<tr>
<th>Line Length (miles)</th>
<th>2,947.3</th>
<th>5,636.0</th>
</tr>
</thead>
</table>

## New Transmission Projects by Voltage

- **115 kV**
- **138 kV**
- **161 kV**
- **230 kV**
- **345 kV**
- **500 kV**

![Graph showing new transmission projects by voltage](image-url)
Infrastructure Report

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

(see “Energy Infrastructure” tab)