OE ENERGY
MARKET SNAPSHOT
National – Data Through March 2016

Office of Enforcement
Federal Energy Regulatory Commission
April 2016
2015 State of the Markets
Market Overview

Stable signals

- Increased gas supply led to lower gas prices, and in turn, lower electricity prices.
- Natural gas power generation exceeded that of coal in seven months during 2015.
- Hydropower recovered in the West by April 2016.

Challenges

- Declining oil and natural gas prices have put significant stress on producers.
- Capacity markets in PJM and New England became larger revenue sources while the generation mix continues to change.
NG Prices Fall Across U.S.

Spot Natural Gas Prices 2015 Average ($/MMBtu)

Source: Derived from Platts data

- Sumas $2.31 -41%
- CIG $2.39 -39%
- El Paso Permian $2.45 -37%
- SoCal Border $2.61 -37%
- NGPL Midcon $2.46 -37%
- Chicago Citygate $2.73 -40%
- Transco Z6-NY $3.77 -38%
- Columbia TCO $2.52 -37%
- Transco Z5 $3.62 -46%
- Algonquin Citygate $4.75 -30%
- Henry Hub $2.61 -35%
- FGT-Z3 $2.62 -35%

Pricing Point Location
2015 Average Price
Red – % decrease from 2014

Source: Derived from Platts data
2015 Prices of Crude and Oil-Indexed Products Decline

Source: Derived from EIA data
U.S. NG Production Plateaus in 2015

Source: Derived from Bentek Energy data
Total U.S. Natural Gas Demand - All Sectors

Source: Derived from Bentek Energy data
On-Peak Day-Ahead 2015 Electric Spot Prices Fall

Sources: NYMEX and CME Clearport market data

- **NP 15**: $36, -31%
- **Mid-Columbia**: $26, -32%
- **Palo Verde**: $27, -35%
- **Indiana Hub**: $33, -30%
- **SPP**: $29, -35%
- **PJM West**: $43, -32%
- **ERCOT North**: $30, -32%
- **NYISO ZJ**: $48, -35%
- **Mass Hub**: $49, -35%
- **Into Southern**: $31, -27%

$ = Average 2015 Spot Price
% Decrease from 2014

Sources: NYMEX and CME Clearport market data
Capacity and Energy Prices Diverge in New England & PJM

- **New England ISO (Mass Hub)**
  - Forward Capacity Auction Clearing Price for 2018-19 period relative to 2016-17 period: **+203%**
  - Forward Capacity Auction Clearing Price for 2019-2020 period relative to 2018-2019 period: **-26%**

- **PJ M (Western Hub)**
  - Average Day-Ahead LMP (2013-15): **-6.02%**
  - Base Residual Auction Clearing Price for *Base Capacity* 2018-19 period relative to 2016-17 period (Rest of RTO): **+152.6%**
  - Base Residual Auction Clearing Price for *Capacity Performance* in the 2018-2019 period relative to the 2016-2017 period (Rest of RTO): **+23.1%**

*Sources: Derived from PJM and ISO-NE data*
Electricity Demand Slightly Down in 2015

Source: Derived from EIA data

- Residential
- Commercial
- Industrial
Net Metering and Distributed Energy Resources Growing

Source: Derived from EIA Form 826 data

TOTAL ELECTRIC ENERGY SOLD BACK TO THE UTILITY FOR ALL STATES SERVED (MWh)

2011 2012 2013 2014 2015
DR Revenues Have Grown Through Capacity Markets

Source: Derived from PJM and ISO-NE
Renewables Output Continues to Grow in CAISO and MISO

Source: Derived from MISO and CAISO data
2015 Hydropower was Below Average in West

Source: Derived from EIA data
National Slides
Cumulative HDDs by City
Nov 2015– March 2016

Source: Bloomberg Weather (daily data summed quarterly)
## Cumulative CDDs by City
### Apr 2015–Oct 2015

<table>
<thead>
<tr>
<th>City</th>
<th>This Year</th>
<th>Last Year</th>
<th>5 Year Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vancouver</td>
<td>76</td>
<td>63</td>
<td>47</td>
</tr>
<tr>
<td>Calgary</td>
<td>82</td>
<td>72</td>
<td>44</td>
</tr>
<tr>
<td>Pittsburgh</td>
<td>1,120</td>
<td>1,023</td>
<td>1,179</td>
</tr>
<tr>
<td>Chicago</td>
<td>1,984</td>
<td>2,072</td>
<td>2,282</td>
</tr>
<tr>
<td>Oklahoma City</td>
<td>1,179</td>
<td>1,279</td>
<td>1,893</td>
</tr>
<tr>
<td>Denver</td>
<td>1,523</td>
<td>1,494</td>
<td>1,566</td>
</tr>
<tr>
<td>Pittsburgh</td>
<td>942</td>
<td>885</td>
<td>1,044</td>
</tr>
<tr>
<td>NYC</td>
<td>1,532</td>
<td>1,485</td>
<td>1,632</td>
</tr>
<tr>
<td>Sacramento</td>
<td>1,566</td>
<td>1,523</td>
<td>1,607</td>
</tr>
<tr>
<td>Los Angeles</td>
<td>1,632</td>
<td>1,579</td>
<td>1,893</td>
</tr>
<tr>
<td>Dallas</td>
<td>3,147</td>
<td>2,906</td>
<td>3,238</td>
</tr>
<tr>
<td>Houston</td>
<td>3,210</td>
<td>2,954</td>
<td>3,166</td>
</tr>
<tr>
<td>New Orleans</td>
<td>3,469</td>
<td>2,944</td>
<td>3,211</td>
</tr>
<tr>
<td>Miami</td>
<td>3,761</td>
<td>3,541</td>
<td>3,591</td>
</tr>
</tbody>
</table>

Source: Bloomberg Weather (daily data summed quarterly)

Updated: Apr-2016
2015 Spot Power Prices ($/MWh)

$ = Average 2015 Spot Price
% Decrease from 2014
Spot Natural Gas Prices Average ($/MMBtu) Nov 2015– March 2016

- **AECO**: $1.52 (-41%)
- **CIG**: $1.86 (-38%)
- **El Paso Permian**: $1.88 (-37%)
- **NGPL Tex-Okla**: $1.90 (-38%)
- **SoCal Border**: $2.04 (-35%)
- **Chicago Citygate**: $2.04 (-66%)
- **Columbia TCO**: $2.63 (-43%)
- **FGT-Z3**: $2.37 (-32%)
- **Henry Hub**: $1.99 (-38%)
- **HSC**: $1.95 (-37%)
- **PG&E Citygate**: $2.37 (-32%)
- **Transco Z6-NY**: $3.18 (-65%)
- **Algonquin Citygate**: $3.18 (-65%)

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

Source: ICE

Updated: Apr-2016
Spot Average Natural Gas Trading Volumes (MMBtus)
Nov 2015 – March 2016

Source: ICE

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

Updated Apr-2016
National Natural Gas Market Overview: U.S. Supply and Consumption

U.S. NG Supply and Demand


**US Natural Gas Supply**

<table>
<thead>
<tr>
<th>Category</th>
<th>2014/2015</th>
<th>2015/2016</th>
<th>Total Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net Pipeline Imports</td>
<td>70</td>
<td>60</td>
<td>-10%</td>
</tr>
<tr>
<td>LNG Imports</td>
<td>70</td>
<td>60</td>
<td>-11.7%</td>
</tr>
<tr>
<td>Net Dry Gas</td>
<td>60</td>
<td>60</td>
<td>0%</td>
</tr>
<tr>
<td>Production</td>
<td>60</td>
<td>60</td>
<td>0%</td>
</tr>
</tbody>
</table>

**Total Change in Supply** -0.1%

**US Natural Gas Demand**

<table>
<thead>
<tr>
<th>Category</th>
<th>2014/2015</th>
<th>2015/2016</th>
<th>Total Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generation</td>
<td>75</td>
<td>60</td>
<td>-12.9%</td>
</tr>
<tr>
<td>Industrial</td>
<td>50</td>
<td>45</td>
<td>-10%</td>
</tr>
<tr>
<td>Residential/Commercial</td>
<td>30</td>
<td>22</td>
<td>-18.8%</td>
</tr>
</tbody>
</table>
| Total Change in Demand** -7.1%**

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

Updated Apr-2016
Total U.S. Natural Gas Demand All Sectors

Source: Derived from Bentek Energy data, derived from interstate pipeline flow and modeled data.

Updated Apr-2016
U.S. Natural Gas Consumption for Power Generation

Source: Derived from Bentek Energy data

Updated Apr-2016
EIA National Storage Inventories

Source: Derived from Bloomberg Data

Updated Apr-2016
EIA Regional Storage Inventories

Source: Derived from Bloomberg Data

Updated Apr-2016
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 Apr-2016
National Natural Gas Market Overview: Rig Count by Type

Rigs by Type

Source: Derived from Bloomberg data

Updated Apr-2016
Gas vs Coal

Source: Derived from Bloomberg data

Updated Apr-2016
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

Updated Apr-2016
National Natural Gas Market Overview: World LNG Landed Prices

World LNG Estimated March 2016 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 Apr-2016
Historical and Future World Gas Prices

Source: Derived from Bloomberg data

Notes:

Updated Apr-2016
National Natural Gas Market Overview: WTI vs Brent Oil Price

WTI vs Brent Crude Oil Price

Source: Derived from Bloomberg data

Updated Apr-2016
Infrastructure Report
## Natural Gas Highlights

### Natural Gas Activities through March 31, 2016

#### January through March 31, 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 through March 31, 2015</td>
<td>6</td>
<td></td>
<td></td>
<td>1,134.0</td>
<td>51.7</td>
<td>46,800</td>
</tr>
<tr>
<td>Placed in Service through March 31, 2015</td>
<td>4</td>
<td></td>
<td></td>
<td>629.0</td>
<td>21.7</td>
<td>30,970</td>
</tr>
<tr>
<td>Certificated through March 31, 2015</td>
<td>16</td>
<td></td>
<td></td>
<td>4,965.9</td>
<td>789.4</td>
<td>523,622</td>
</tr>
<tr>
<td>Certificated through March 31, 2015</td>
<td>12</td>
<td></td>
<td></td>
<td>2,537.0</td>
<td>140.3</td>
<td>123,673</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 through March 31, 2015</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td></td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>Placed in Service through March 31, 2015</td>
<td>2</td>
<td>2.4</td>
<td>53</td>
<td></td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>Certificated through March 31, 2015</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td></td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>Certificated through March 31, 2015</td>
<td>1</td>
<td>1.7</td>
<td>0</td>
<td></td>
<td></td>
<td>0</td>
</tr>
<tr>
<td><strong>LNG (Import &amp; Export)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Placed in Service through March 31, 2015</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>Certificated (Import/Export) through March 31, 2015</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>Certificated through March 31, 2015</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
<td>0</td>
</tr>
</tbody>
</table>

Source: Staff Database
## Electric Generation Highlights

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

<table>
<thead>
<tr>
<th>Primary Fuel Type</th>
<th>March 2016</th>
<th>January – March 2016 Cumulative</th>
<th>January – March 2015 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>0</td>
</tr>
<tr>
<td>Natural Gas</td>
<td>0</td>
<td>0</td>
<td>2</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>0</td>
</tr>
<tr>
<td>Water</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Wind</td>
<td>2</td>
<td>72</td>
<td>9</td>
</tr>
<tr>
<td>Biomass</td>
<td>9</td>
<td>33</td>
<td>9</td>
</tr>
<tr>
<td>Geothermal Steam</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Solar</td>
<td>9</td>
<td>75</td>
<td>44</td>
</tr>
<tr>
<td>Waste Heat</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Other *</td>
<td>1</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>21</strong></td>
<td><strong>180</strong></td>
<td><strong>67</strong></td>
</tr>
</tbody>
</table>

Sources: Data derived from Velocity Suite, ABB Inc. and The C Three Group LLC which include plants with nameplate capacity of 1 MW or greater. The data may be subject to update.
Electric Transmission Highlights

### Transmission Projects Completed

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>≤230</td>
<td>0.0</td>
<td>27.0</td>
<td>38.0</td>
<td>260.3</td>
<td>2,668.8</td>
</tr>
<tr>
<td>345</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>1,048.3</td>
<td>2,202.5</td>
</tr>
<tr>
<td>500</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>294.0</td>
<td>642.9</td>
</tr>
<tr>
<td>Total U.S.</td>
<td>0.0</td>
<td>27.0</td>
<td>38.0</td>
<td>1,602.6</td>
<td>5,514.2</td>
</tr>
</tbody>
</table>

### Proposed Transmission Projects with a High Probability of Completion by March 2018

- FRCC
- MRO
- NPCC
- RP
- SERC
- SPP
- RE
- TRE
- WECC

### New Transmission Projects by Voltage

- 114 kV
- 138 kV
- 161 kV
- 230 kV
- 346 kV
- 600 kV

Sources: Data derived from Staff Database and U.S. Electric Transmission Projects ©2016 The C Three Group, LLC.

Disclaimer: This Report contains analyses, presentations, and conclusions that may be based on or derived from the data sources cited, but do not necessarily reflect the positions or recommendations of the data providers.
Infrastructure Report

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

(see “Energy Infrastructure” tab)