2019 Summer Outlook

Markets Matter

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Understanding the Symbols

-Upward market pressure

- Flat market pressure

- Downward market pressure
2019 Summer Outlook: Outline

- Looking ahead to Summer 2019
  - Market pressure points:
    - Weather
    - Economy
    - Demand
    - Storage
    - Production
  - Wild card factors
  - Summer expectations

- Summary

Demand: Summer Weather

<table>
<thead>
<tr>
<th>LAST SUMMER</th>
<th>THIS SUMMER</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018 (April-October) Actual</td>
<td>2019 Forecast</td>
</tr>
</tbody>
</table>

**ACTUAL SEASON (NOAA):**
- 11% warmer than previous summer and
- 20% warmer than 30-year average

**FORECAST:**
- 14% cooler than last summer,
- 3% warmer than 30-year average

1,477 Cooling degree days (NOAA)

1,272 Cooling degree days

Summer-to-summer pressure on natural gas prices

Data Sources: National Oceanic and Atmospheric Administration, Energy Ventures Analysis
**Demand: Economy**

<table>
<thead>
<tr>
<th>SUMMER SEASON</th>
<th>LAST SUMMER 2018 Actual</th>
<th>THIS SUMMER 2019 Forecast</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economy</td>
<td>Solid growth</td>
<td>Steady growth</td>
</tr>
<tr>
<td>GDP Growth</td>
<td>2.9%</td>
<td>2.5%</td>
</tr>
<tr>
<td>World GDP Growth</td>
<td>3.0%</td>
<td>2.8%</td>
</tr>
<tr>
<td>Unemployment Rate</td>
<td>3.9%</td>
<td>3.6%</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>2.5%</td>
<td>1.1%</td>
</tr>
<tr>
<td>CPI</td>
<td>2.7%</td>
<td>2.3%</td>
</tr>
<tr>
<td>Consumer Sentiment Index</td>
<td>98.2</td>
<td>97.7</td>
</tr>
</tbody>
</table>

**Summer-to-summer pressure on natural gas prices**

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**Demand: Customer Demand**

<table>
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<tr>
<th>SUMMER SEASON</th>
<th>LAST SUMMER 2018 Actual</th>
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</thead>
<tbody>
<tr>
<td>Customer Gas Demand</td>
<td>79.6 Bcf/d</td>
<td>82.1 Bcf/d</td>
</tr>
<tr>
<td>• Electric</td>
<td>32.1 Bcf/d</td>
<td>31.3 Bcf/d</td>
</tr>
<tr>
<td>• Industrial</td>
<td>21.5 Bcf/d</td>
<td>22.1 Bcf/d</td>
</tr>
<tr>
<td>• Residential/Commercial</td>
<td>11.9 Bcf/d</td>
<td>11.0 Bcf/d</td>
</tr>
<tr>
<td>• Pipeline exports - Mexico</td>
<td>4.7 Bcf/d</td>
<td>5.5 Bcf/d</td>
</tr>
<tr>
<td>• LNG exports (net)</td>
<td>3.3 Bcf/d</td>
<td>6.0 Bcf/d</td>
</tr>
<tr>
<td>Change from previous year</td>
<td>+13.4 %</td>
<td>+ 3.1 %</td>
</tr>
<tr>
<td>Growth sector</td>
<td>Electric + 16.3%</td>
<td>Exports + 44%</td>
</tr>
</tbody>
</table>

**Summer-to-summer pressure on natural gas prices**

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Data Source: IHS Markit Macroeconomic Advisers, May 2019

Data Source: Energy Ventures Analysis, Inc.
Demand: U.S. LNG Exports Grow as Projects Come Online 2016-2020

U.S. LNG EXPORTS BY PROJECT: 2016-2019

Projects 2019-2023
2.0 Bcf/d
Total Natural Gas Demand

Focus: Industrial Demand Peak Growth Phase
Natural Gas Spurring 80 Major Industrial Projects 2015–2023

>$135 Billion Investment to Build
Increase of 3.7 Bcf/d by 2023

Projects
2015-2018
1.7 Bcf/d Total Natural Gas Demand Added

Projects
2019-2023
2.0 Bcf/d Total Natural Gas Demand

Data Source: Energy Ventures Analysis, May 2019

Photo courtesy: Chevron U.S.A. Inc., 2017 (Pascagoula)
Power Sector: Increased Natural Gas Burn Due to Permanent Structural Change & Some Temporary Price-driven Switching

Substantial Summer Electric Demand Projected

- Strong structural growth this summer
  - Additional 6.1 GW of new natural gas capacity added
- Less temporary economic switching to natural gas
  - The most inefficient coal plants have already retired
  - New wind (11.3 GW) and solar (4.6 GW) acquiring some load

Data Source: Energy Ventures Analysis, Inc.

Electric Demand for Natural Gas in Focus: 2019 Permanent Structural Growth Outpaces Temporary Economic Switching

Data Source: Energy Ventures Analysis, Inc.
### Demand: Summer Storage

<table>
<thead>
<tr>
<th>SUMMER SEASON</th>
<th>LAST SUMMER 2018 Actual</th>
<th>THIS SUMMER 2019 Forecast</th>
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<tbody>
<tr>
<td>Season starting point</td>
<td>1,391 Bcf</td>
<td>1,130 Bcf</td>
</tr>
<tr>
<td>Average weekly injections</td>
<td>60 Bcf</td>
<td>85 Bcf</td>
</tr>
<tr>
<td>End of injection season</td>
<td>3,247 Bcf</td>
<td>3,745 Bcf</td>
</tr>
</tbody>
</table>

**Summer-to-summer pressure on natural gas prices**

*Data Sources: Energy Information Administration and Energy Ventures Analysis*

### Supply: Summer Production – RECORD PRODUCTION

<table>
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<th>SUMMER SEASON</th>
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<tbody>
<tr>
<td>Summer average production (Lower 48)</td>
<td>82.6 Bcf/d</td>
<td>89.4 Bcf/d</td>
</tr>
<tr>
<td>Canadian imports (net)</td>
<td>5.4 Bcf/d</td>
<td>4.7 Bcf/d</td>
</tr>
</tbody>
</table>

**Summer-to-summer pressure on natural gas prices**

*Data Source: Energy Ventures Analysis*
Focus on Supply: Diverse Production April 2018-April 2019
Dry & Associated Gas Increase Including 8 Major Deepwater Projects

PRODUCTION YOY TRENDS BY PLAY - APRIL 2019 VS APRIL 2018

Data Source: Energy Ventures Analysis, Inc.

Focus on Supply: New Takeaway Capacity 2019-2020
Brings Long-awaited Relief to Permian

PERMIAN PIPELINE TAKEAWAY CAPACITY VS. PRODUCTION GROWTH

Data Source: Energy Ventures Analysis, Inc.
Summer Outlook: Wild Cards

- Hurricane activity
- Tariff impact on industrial sector
- Stable market provides buffer from most wild cards

This Season’s Summer Outlook

<table>
<thead>
<tr>
<th>SUMMER SEASON Period-to-period Change</th>
<th>THIS SUMMER 2019 Forecast</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weather</td>
<td>✓</td>
</tr>
<tr>
<td>Economy</td>
<td></td>
</tr>
<tr>
<td>Overall demand</td>
<td></td>
</tr>
<tr>
<td>Storage</td>
<td>✓</td>
</tr>
<tr>
<td>Summer production</td>
<td>✓</td>
</tr>
</tbody>
</table>

Summer-to summer pressure on natural gas prices
Natural Gas Outlook: Summer of Flexibility

- Huge production growth
  - Associated gas significant contributor due to value of oil, NGLs
  - Efficiencies in drilling and production make wells more productive at lower cost
  - Pipeline infrastructure expansions provide greater deliverability
  - Deepwater projects contribute to overall supply diversity

- Summer (April-October) demand growth
  - Driven by exports and new industrial projects
  - Moderated by more normal summer temperatures impact on electric and residential/commercial sectors

- Exports provide growth, stability to market
  - Welcome outlet for strong production

- Overall, stable natural gas outlook for consumers and a diverse market for producers

About NGSA

- Represents major producers and suppliers of domestic natural gas
  - Integrated and independent companies: 14 members

- Promotes benefits of competitive natural gas markets, reliable and efficient transportation and delivery, benefiting customers and suppliers of natural gas

- Only Washington, D.C. natural gas association with a dedicated focus on downstream gas industry issues

- Includes the Center for LNG
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