2019 Summer Outlook for Natural Gas

Markets Matter

The Natural Gas Supply Association's (NGSA) *2019 Summer Outlook for Natural Gas* summarizes the association's view of this summer's natural gas market conditions and fundamentals. The analysis covers the key points that can affect supply and demand dynamics, which ultimately impact all consumers of natural gas.

NGSA forecasts whether wholesale natural gas prices will be subject to ***upward, downward or neutral ("flat") pressure*** for the upcoming summer compared to the summer of 2018, but the association does not forecast actual prices.

Executive Summary

Based on an analysis of the weather, economy, consumer demand, production and storage, NGSA expects neutral price pressure on the natural gas market in summer 2019 compared to the summer of 2018's average natural gas price of $2.92 per million Btu (MMBtu).

Our expectation for flat price pressure is based on a forecast for impressive growth in exported liquefied natural gas (LNG) and very large weekly storage injections, which will place upward pressure on natural gas wholesale prices—but are counterbalanced by cooler summer weather and very high production placing downward pressure on price.

A glance at the natural gas market's major pressure points for summer 2019 reveals:

- **WEATHER:** The National Oceanic and Atmospheric Administration (NOAA) predicts that the continental United States will on average experience a summer that will be 14 percent cooler than last summer, but 3 percent warmer than the 30-year average. Compared summer-over-summer, the total number of cooling degree days (CDDs) is signifcantly less than summer 2018, leading to a projection that weather will place **downward pressure** on demand and prices.
- **ECONOMY:** Public data anticipates the economy will show continued steady growth in GDP, although at a slightly lower rate of growth than summer 2018. The GDP and economic numbers are so similar that they translate to **neutral pressure** on natural gas prices compared to last summer.
- **DEMAND:** NGSA expects record demand in summer 2019, led by a near-doubling of net U.S. exports of LNG from 3.3 Bcf/day last summer to an expected 6 Bcf/day in summer 2019. Increased exports to Mexico by pipeline and some growth in the industrial market also contribute to the expectation for overall record summer demand of 82.1 Bcf/day. While exports and the industrial sector heat up, power sector demand and demand from the residential/commercial sector are forecasted to decrease slightly because of NOAA's prediction for a cooler, wetter summer than summer 2018. When all sectors are combined, overall demand is projected to be 2.5 Bcf/day (3.1 percent) greater than 2018's record summer demand, thus placing **neutral pressure** on natural gas prices compared to last summer.
- **STORAGE:** The natural gas industry entered the summer cooling season with storage inventories that were below the five-year average and below last summer. Filling storage to adequate levels will require average weekly injections of 85 Bcf — more than 40 percent larger than last summer's average weekly injections. Storage is forecasted to place additional **upward pressure** on prices.
- **PRODUCTION:** Production is projected to smash through previous robust levels, due to increased production of both dry gas and "wet" gas often associated with oil and valuable natural gas liquids (NGLs) production. The increased production also reflects continued advances in drilling efficiency, a number of wells coming online and production from eight deepwater projects. Dramatic increases in summer-over-summer levels of production are likely to result in **downward pressure** on natural gas prices.

All of these projected pressure points are interrelated and a deviation in one affects the other assumptions in this equation. Increased demand for exports and pressure to re-build storage inventories together place upward pressure on prices that is counterbalanced by tremendous growth in production — ultimately resulting in a forecast for neutral pressure on prices compared to the summer of 2018.

The following pages will provide more detailed information about each of the five factors analyzed in NGSA's *2019 Summer Outlook*, as well as a look at possible "wild card" factors and a discussion of natural gas industry trends that transcend this summer's time frame.

NGSA
Natural Gas Supply Association

Representing America's Major Producers and Suppliers of Natural Gas Since 1965
1620 Eye Street, NW » Suite 700 » Washington, D.C. 20006 » www.ngsa.org
202.326.9314 » Orlando Alvarez, Chairman » Dena Wiggins, President and CEO

Weather/Demand

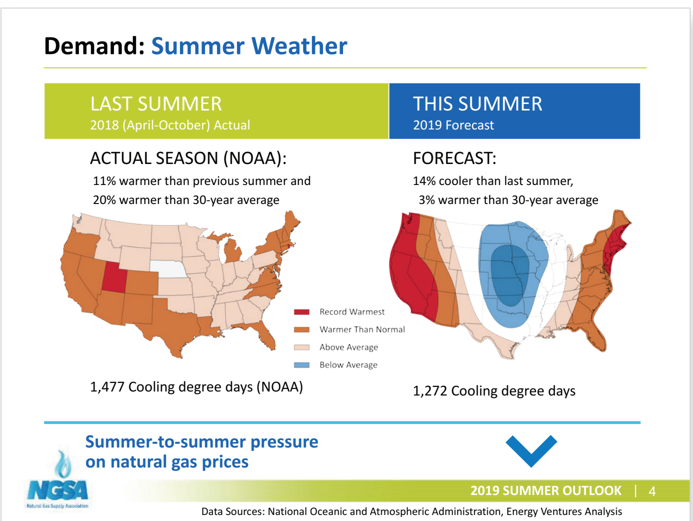
Based on NOAA's current projections for April-October 2019 temperatures, Energy Ventures Analysis, Inc. (EVA) forecasts that the summer months will be 14 percent cooler than the very hot summer of 2018, yet still 3 percent warmer than the 30-year average.

On a regional basis, for the months of June through August, NOAA forecast shows a summer of contrasts, projecting hotter-than-normal summer weather for Pacific Coast states and the coastal Northeast, and cooler-than-normal weather in the Plains states. NOAA also projects a very wet summer in most of the United States.

Based on NOAA's forecast for the full seven-month summer cooling season (April 2019-October 2019), EVA is forecasting 1,272 cooling degree days (CDDs) this summer, compared to 1,477 CDDs last summer. The number of cooling degree days is defined as the difference between 65 degrees Fahrenheit and the average outside temperature for that day.

In the maps shown below, the map on the right captures only June-August and not the full 7-month cooling season from April -October.

Based on the summer-over-summer cooling degree days, the forecast is for **weather to put downward pressure** on natural gas prices.



Economy/Demand

This summer, public forecasts anticipate an economy that will grow at rate that will be similar last summer's solid growth.

A key component of economic health is the Gross Domestic Product (GDP). According to IHS Economics, a nationally recognized economic forecasting firm, the GDP is expected to increase by a steady 2.5 percent compared to the summer of 2018, when GDP expanded by 2.9 percent.

IHS also predicts that manufacturing, an important influence on the GDP, will show less growth than last summer, projecting growth of just over 1 percent this summer compared to the summer of 2018's growth of 2.5 percent, perhaps as a result of uncertainty around tariffs. Because energy is becoming a global commodity, NGSA also included the figures for World GDP in this forecast, with World GDP expected to show a very slight decrease in growth from 3 percent last summer to 2.8 percent in the summer of 2019. Finally, the latest Consumer Sentiment Index (CSI) shows that consumers have strong positive feelings about the economy, with the CSI tracking at a robust 98 percent, indicating general consumer optimism, a reflection of the prosperous economy and job growth. The Consumer Sentiment Index is a gauge of consumer confidence in the economy conducted for more than 40 years by the University of Michigan.

These economic indicators all reflect good news for consumers, but are similar enough to last summer's economic figures that NGSA anticipates the **economy will place neutral summer-over- summer pressure** on natural gas prices.

Overall Natural Gas Demand

An independent demand analysis performed by EVA notes that summer-to-summer natural gas demand will reach an all-time summer record this year. EVA forecasts overall summer 2019 demand for natural gas at 82.1 billion cubic feet per day (Bcf/d) compared to 79.6 Bcf/d last summer – about a 3 percent increase.

Demand: Customer Demand

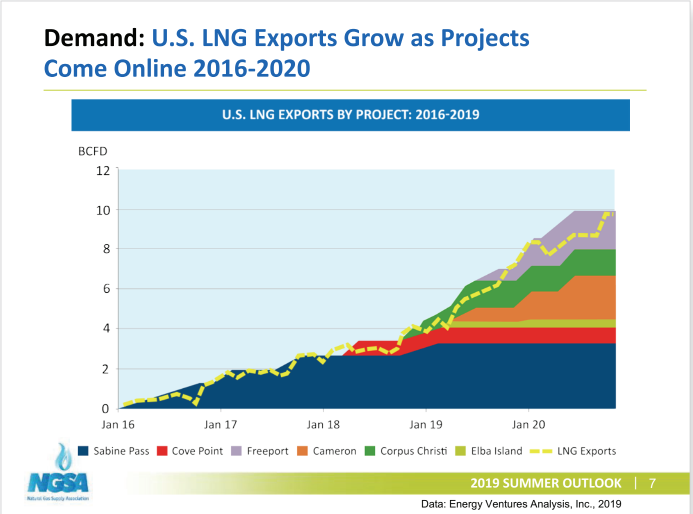
SUMMER SEASON Period-to-period Change	LAST SUMMER 2018 Actual	THIS SUMMER 2019 Forecast
Customer Gas Demand	**79.6 Bcf/d**	**82.1 Bcf/d**
▪ Electric	32.1 Bcf/d	31.3 Bcf/d
▪ Industrial	21.5 Bcf/d	22.1 Bcf/d
▪ Residential/Commercial	11.9 Bcf/d	11.0 Bcf/d
▪ Pipeline exports - Mexico	4.7 Bcf/d	5.5 Bcf/d
▪ LNG exports (net)	3.3 Bcf/d	6.0 Bcf/d
Change from previous year	+13.4 %	+ 3.1 %
Growth sector	Electric + 16.3%	Exports + 44%
Summer-to-summer pressure on natural gas prices		

2019 SUMMER OUTLOOK | 6

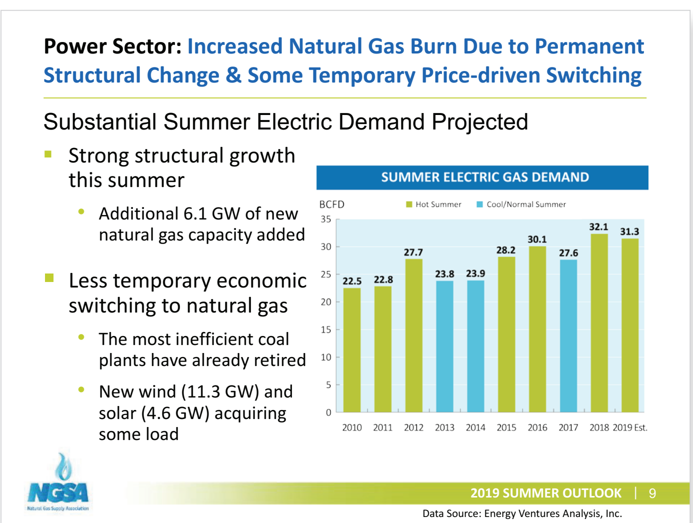
Data Source: Energy Ventures Analysis, Inc.

A sector-by-sector breakdown of customer demand follows.

- **Exports** — The largest expected increase in demand is projected to come from exports of liquefied natural gas (LNG) this summer, which EVA forecasts to **almost double from 3.3 Bcf/day in summer 2018 to 6.0 Bcf/day in summer 2019**, with multiple projects expected to become fully operational in 2019. In addition to the increase in LNG exports, **U.S. pipeline exports to Mexico are expected to increase by just under 1 Bcf/ day to reach 5.5 Bcf/day in the summer of 2019**. The construction of new pipeline capacity on both sides of the border, particularly the Mexican side, is easing gas's path from the U.S. to Mexico.



- **Industrial Sector** — EVA attributes growth in industrial demand to new projects coming online this year to boost demand, such as fertilizer, methanol, ethylene, propylene and polyethylene facilities. An extended forward view of industrial demand shows 40 major new or expanded natural gas-intensive industrial projects on the 2019-2023 horizon, with total added demand of 2 Bcf/day. This growth is in addition to 40 previously-completed major gas-intensive projects over 2015-2018, which already have added approximately 1.7 Bcf/day.
- **Electric Sector** — EVA projects stagnant growth in gas demand from the electric sector this summer, with the forecast for cooler, damper summer weather masking the underlying structural growth in demand for natural gas due to new natural gas-fired power generation added to the fleet since last summer. EVA projects a 2 percent decrease in natural gas power burn in summer 2018 compared to last summer.



The phenomenon of short-term coal-to-gas switching, also known as fuel switching, occurs when electric utilities choose to run natural gas- fired power plants rather than coal plants to generate electricity. Switching is a short-term decision that is purely an economic choice based on the current price of the competing fuels.

EVA expects some coal-to-natural gas switching in the power sector that is driven by price sensitivity. The amount of temporary price-driven switching to natural gas is expected to be less than the summer of 2018, which EVA attributes partially to (1) changes in the coal industry, as many coal-fired plants still operating are more efficient and economical than those that have already retired; and (2) the growth of renewable generation, particularly wind energy.

- **Residential/Commercial Sector** — The residential/ commercial sector is expected to experience a small decrease in demand for natural gas for the April-October summer 'cooling' season, due to the forecast for a cooler summer than summer 2018.

Storage/Demand

Underground natural gas storage enables companies to purchase and physically stockpile natural gas supplies in the spring and summer for use during the winter when demand for natural gas space heating is at its peak.

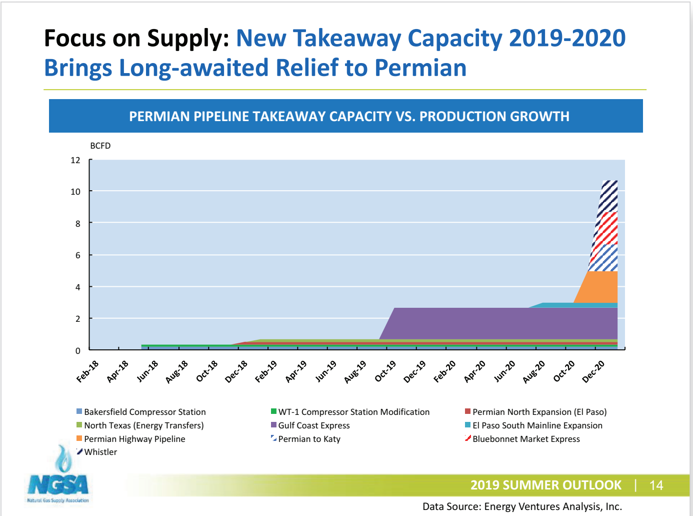
Going into the winter heating season, EVA projects that 3,745 Bcf of natural gas will be in storage by the end of the 2019 injection season, which would require an average weekly injection of 85 Bcf. This level of injection is robust and significantly larger than last summer's average weekly injections of 60 Bcf, but slightly less than the summer of 2014's average weekly injections of 89 Bcf. **The difference in the size of the weekly injections between the summers of 2018 and 2019** is expected to place **upward pressure** on natural gas prices this summer.

Production/Supply

Turning to natural gas production, EIA expects summer domestic production to exceed last summer's record-breaking production figures. Domestic natural gas production this summer is forecasted to be a remarkable 89.4 Bcf/day, a sizeable increase over last summer's 82.6 Bcf/day.

Among the reasons that summer production is expected to increase so dramatically are: strong production from the Marcellus and Permian basins and associated gas plays, strong production from shale gas plays as previously drilled but uncompleted (DUC) wells come online; increased efficiencies in natural gas extraction techniques; and improved takeaway capacity in the form of pipelines and processing plants in areas such as the Marcellus. New deepwater projects in the Gulf of Mexico also make an important contribution.

The forecast anticipates long-awaited relief in the Permian where new pipeline takeaway capacity is scheduled to come online in late summer. Other new takeaway capacity is expected to come online throughout 2019 and through late 2020, easing the existing infrastructure constraints.



In summary, natural gas production will increase to an all-time record, placing **downward pressure** on natural gas prices compared to the summer of 2018.

The *2019 Summer Outlook* also predicts a moderately-sized, but important, contribution to supply from low-cost Canadian imports.

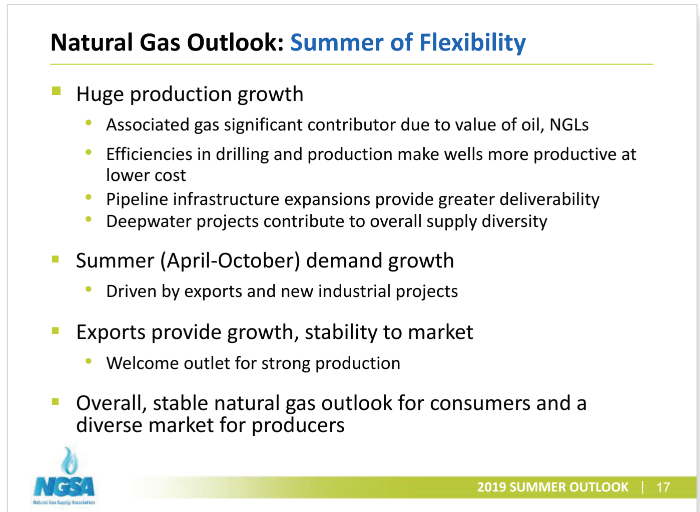
"Wild Card" Market Factors

There are always a few "wild card" factors that can influence the market, in addition to the fundamentals addressed in this Outlook. This summer's wild card:

- Should an unpredicted and lively hurricane/storm season materialize, it would mainly affect demand and not production, since most onshore producing gas fields are not vulnerable to hurricanes.

In conclusion, ***NGSA's analysis of various data indicates overall neutral (flat) pressure on natural gas prices this summer compared with last summer***, primarily due to upward pressure from exports and the need to rebuild storage, mitigated by dramatic downward pressure from booming production. A recap of the five major pressure points reveals:

- Production exceeding previous summer record levels, aided by new pipeline capacity and fueled by drilling efficiencies, increased production of natural gas found in association with oil and NGLs and newly-completed onshore and offshore wells. — **DOWNWARD PRESSURE**
- Overall record demand — Export sector leads demand growth with net LNG exports expected to increase from 3.3 to 6 Bcf/day and Mexican exports to grow as well. When both are combined, exports account for 11.5 Bcf/day and 14 percent of customer demand this summer. But weather-related decreases in the electric, residential, and commercial sectors will moderate demand. — **FLAT PRESSURE**
- Cooler summer weather — **DOWNWARD PRESSURE**
- Similar summer-over-summer economic conditions. — **FLAT PRESSURE**
- Significantly large weekly injections of 85 Bcf/day required to bring storage to estimated 3,745 Bcf. — **UPWARD PRESSURE**



OVERVIEW: *Record Production Enables Industry to Easily Match Record Demand*

- Strong production supporting remarkable growth in U.S. LNG exports and steady growth in industrial markets.
- Structural, long-term demand growth from power sector temporarily masked by cooler summer, but underlying fundamentals reflect more than 6 GW of new gas-fired generation in operation compared to last summer.
- Industrial demand spurred mainly by new builds and expansions in petrochemical, fertilizer and steel and new methanol facility.

For more information, please visit www.ngsa.org or contact us directly.