TESTIMONY OF ERICA BOWMAN,
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AMERICA'S NATURAL GAS ALLIANCE

SENATE ENERGY & NATURAL RESOURCES COMMITTEE

MAY 14, 2015

Introduction

Good morning, Chairman Murkowski, Ranking Member Cantwell and Members of the Committee. Thank you for the opportunity to testify today. My name is Erica Bowman. I am Vice President for Research and Policy Analysis and Chief Economist at America's Natural Gas Alliance (ANGA).[1]

We appreciate the opportunity to testify in support of legislative efforts to strengthen our nation's energy infrastructure. I will limit my remarks today to specific legislation, addressing energy infrastructure and LNG exports, in the series of bills on the agenda for this legislative hearing.

ANGA supports S. 1210 introduced by Senator Capito and co-sponsored by Senator Heitkamp. This legislation will help improve coordination between FERC and other permitting agencies involved in federal authorizations for siting interstate natural gas pipelines and we believe this bill is a step in the right direction toward streamlining permitting while protecting reasonable and sufficient public input in the process.

ANGA supports S. 1196, introduced by Senator Cassidy and co-sponsored by Senators Inhofe and Capito. This legislation would amend the Mineral Leasing Act to clarify the authority of the Secretary of the Interior in siting natural gas pipeline rights-of-way across federal lands. As pipeline developers continue to experience project delays and added costs as a result of permitting challenges, we support legislative efforts to provide greater certainty to the siting and permitting of energy infrastructure projects in a timely and cost-effective manner while maintaining appropriate public input.

ANGA opposes legislation that seeks to limit liquefied natural gas (LNG) exports by prohibiting the Department of Energy (DOE) from approving applications that will result in

[1] ANGA represents North America's leading independent natural gas exploration and production companies. We work with industry, government and customer stakeholders to increase demand for, and ensure availability of, our nation's natural gas resources for a cleaner and more secure energy future. The collective natural gas production of ANGA member companies is approximately eight trillion cubic feet annually, which represents one third of total U.S. production.

surpassing arbitrary export thresholds. Concerns that LNG exports will harm domestic consumers of natural gas are unfounded. In their 2015 Report to the President, the White House Council of Economic Advisors found that LNG exports would result in economic and national security benefits for the United States.[2] A cap on LNG exports volume is unnecessary and will have negative effects on the ability of U.S. natural gas to compete in the global marketplace staunching our opportunity to capture value from the international LNG market and forsaking the domestic and foreign policy benefits associated with LNG exports.

ANGA opposes legislation requiring the Federal Energy Regulatory Commission (FERC) to consider regional constraints in the natural gas supply and to consider whether a proposed LNG terminal would benefit regional consumers of natural gas before approving or disproving an application for the LNG terminal. Natural gas supply, demand and the connections that link them evolve over time. Such a policy does not take into account the movement of natural gas throughout the country or the past actions of states or localities that may constrain their own supplies of natural gas. Further, an economic analysis is already considered by the FERC during the application review process.[3]

The broader subject of today's legislative hearing - strengthening our nation's energy infrastructure - is an important one for our nation's future. As a result of the shale energy revolution, America has moved from a posture of energy scarcity to one of energy abundance. This paradigm shift is helping to drive economic growth, environmental stewardship and energy security. However, to fully realize the enormous potential presented by our natural gas abundance, it is imperative that we support the acceleration of natural gas infrastructure development in all regions of the United States. A modernized infrastructure system alongside a rational and predictable regulatory regime will lead to a more secure connection between rising natural gas production and growing regional natural gas demand. Achieving this balance will help us take full advantage of our vast domestic energy resource and strengthen our energy security.

Substantial reserves of natural gas in the United States have led to significant, positive change in our domestic energy outlook. The Potential Gas Committee's (PGC)[4] recently issued biennial report found a record natural gas resource assessment for the sixth consecutive report. U.S. natural gas consumption in 2014 totaled 27 trillion cubic feet (Tcf), while the total volume of U.S. natural gas recoverable *with existing technology* is more

[2] White House Council of Economic Advisors, "Economic Report of the President", February 2015, 261 accessed May 11, 2015, http://www.whitehouse.gov/sites/default/files/docs/cea_2015_erp.pdf.

[3] FERC, "Prea Filing Environmental Review Process," accessed May 12, 2015 , https://www.ferc.gov/help/processes/flow/lnga 1a text.asp.

[4] A group of highly knowledgeable and experienced geologists, engineers and others who, since 1964, have assessed the technically recoverable natural gas resource base in the United States on a biennial basis. The Colorado School of Mines leads the work with the PGC.

than 100 times greater - over 2,850 Tcf. In addition, the U.S. Energy Information Administration's (EIA) 2015 Annual Energy Outlook projects increased domestic natural gas production and stable prices for decades to come—even with rising natural gas consumption across power generation, industrial usage, space heating and exports.

Not only have reserves, production and consumption grown, but so too has the number of regions in the United States that produce natural gas. This geographic diversity has led to increased regional opportunities to use this domestic resource to meet rising demand for affordable, clean power generation, manufacturing fuel and feedstock as well as exports.

These conclusions have been confirmed by the Department of Energy's (DOE) newly released *Quadrennial Energy Review: Energy Transmission, Storage, and Distribution Infrastructure*. The DOE notes that:

- Without shale gas, U.S. natural gas prices would be 70 percent higher than projected prices by 2040.
- The availability of lower-cost natural gas and natural gas liquids provides an advantage to U.S. manufacturers.
- Natural gas has enabled an economic option to reduce emissions in power generation and that the U.S. has enormous capacity and reserves and will likely become a major natural gas exporter.[5, 6]

For the regional opportunities presented by our natural gas abundance to fully materialize, the new facilities currently under construction, from power plants to manufacturing facilities to liquefied natural gas (LNG) export terminals, will need additional infrastructure to connect them to their respective natural gas supply basins.

The DOE found that most infrastructure siting and permitting decisions are made at state and local levels and that close stakeholder interaction and knowledge of local resources and sensitivities is required. However, the DOE also found that state agencies lack the incentives to act on multi-state projects when the projects' perceived "beneficiaries" are located in other states.[7] ANGA recognizes the complexities associated with pipeline projects and encourages a robust stakeholder process to address these potential issues.[8] ANGA urges all stakeholders with proposed natural gas infrastructure projects in their regions to fully recognize and evaluate the energy security and economic opportunities these projects present and to effectively educate the broader public about the benefits of these important infrastructure initiatives.

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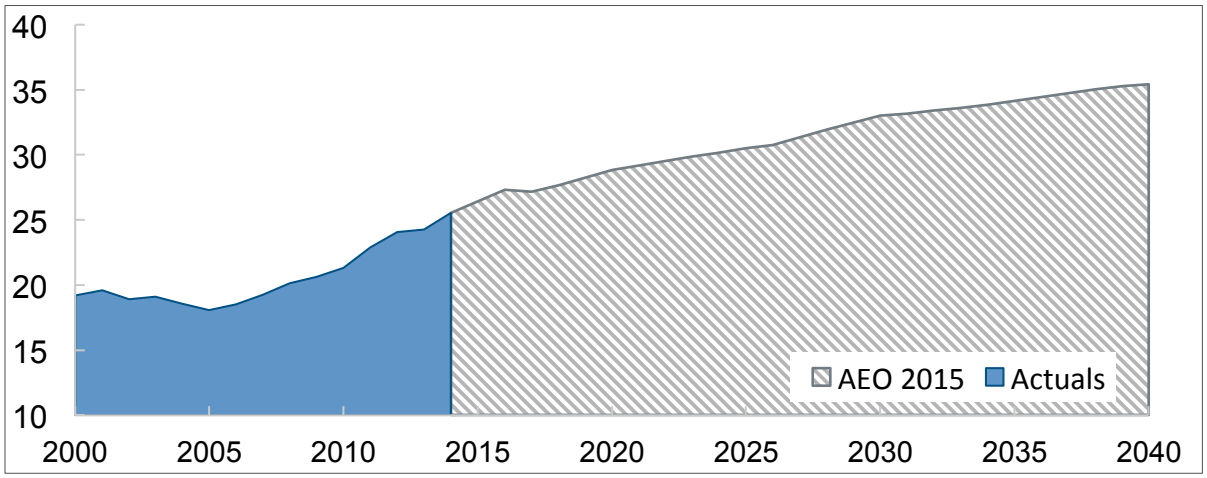
[5] DOE, "Quadrennial Energy Review: Energy Transmission, Storage, and Distribution Infrastructure," April 2015, 1-6 – 1-7.
[6] Ibid, 4-2.
[7] Ibid, 9-7.
[8] DOE, "Quadrennial Energy Review: Energy Transmission, Storage, and Distribution Infrastructure," April 2015, 9-2.

The following testimony details the regional benefits that natural gas infrastructure projects provide. In addition, the testimony highlights the unique circumstances surrounding the infrastructure-constrained Northeast and ways for additional U.S. regions to avoid this fate.

Supply, Demand and the Importance of Infrastructure

America's abundant natural gas supplies will be consistently available to power our nation's economy for generations to come. The United States is the world's leading producer of natural gas—ahead of Russia and Iran. Future projections show this trend continuing. Since 2005, U.S. natural gas production has increased 41 percent. EIA's 2015 Annual Energy Outlook (AEO) projects a further 22 percent increase in production from 2015 to 2040.[9]

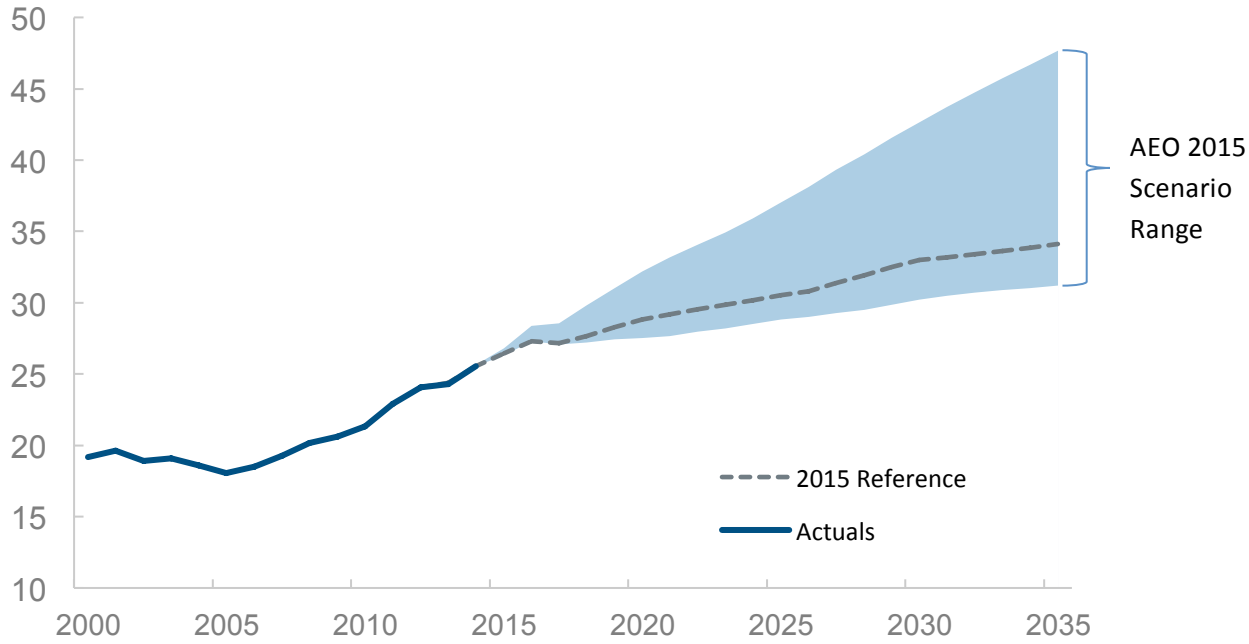
Figure 1: U.S. Natural Gas Production (TCF): Actuals and Reference Case



Additionally, natural gas demand has increased 23 percent since 2005 and the EIA 2015 AEO projects a further 29 percent increase in demand from 2015 to 2040 in the reference case (this demand growth includes exports).[10]

[9] EIA, "Annual Energy Outlook: Total Energy Supply, Disposition, and Price Summary, Reference Case Table," April 2015, accessed May 5, 2015. Reference case.
[10] Ibid.

Figure 2: U.S. Natural Gas Demand (Bcf/d): Domestic Consumption and Exports



Demand for U.S. natural gas is expected to grow across all scenarios evaluated in the EIA 2015 AEO with the potential upside in demand growth significantly higher than the reference case.[11] These projections of increased production and consumption for natural gas are further evidence of the urgency to modernize our energy infrastructure system in order to keep pace.

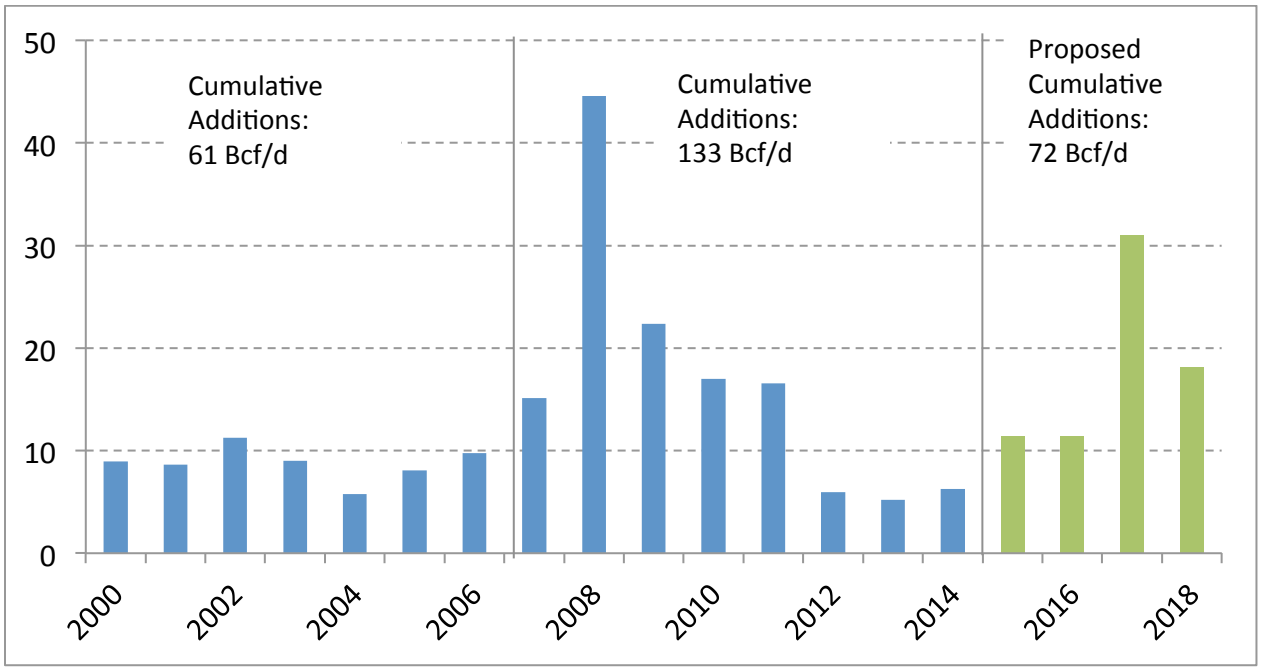
The U.S. has the most extensive natural gas pipeline system in the world –more than 300,000 miles of major intra- and interstate gas pipelines.[12] It is essential that our nation's natural gas infrastructure be optimized to connect natural gas supplies to demand centers. This infrastructure is the system through which our entire country can benefit from our prolific and affordable natural gas resources. Without such infrastructure, U.S. regions lacking indigenous supplies of natural gas will need to use more expensive, alternative fuels for power generation, space heating and industrial processes or could see growth constrained.

[11] EIA, "Annual Energy Outlook: Total Energy Supply, Disposition, and Price Summary Tables: Reference Case, Low Oil Price Case, High Oil Price Case, Low Economic Growth Case, High Economic Growth Case, High Oil and Gas Resource Case," April 2015, accessed May 5, 2015.

[12] Pipeline and Hazardous Materials Safety Administration, "2014 Gas Transmission & Gathering Annual Data", accessed May 5, 2015, http://www.phmsa.dot.gov/portal/site/PHMSA/menuitem.6f23687cf7b00b0f22e4c6962d9c8789/?vgnextoid=a872dfa122a1d110VgnVCM1000009ed07898RCRD&vgnextchannel=3430fb649a2dc110VgnVCM1000009ed07898RCRD&vgnextfmt=print.

Since 2007, the beginning of the shale gas revolution, more than 130 Bcf/d of pipeline capacity has been added to the natural gas interstate and intrastate pipeline systems. This is more than double what was added between 2000 and 2006, and an additional 72 Bcf/d of pipeline capacity has been proposed through 2018. To put this in perspective, one billion cubic feet of natural gas is able to meet the total natural gas needs (including power generation) of the state of Arizona for one day. We need to continue this progress through the support of proposed pipeline projects at the federal, state and local level to ensure our nation's abundant natural gas supplies are able to connect to the growing demand of U.S. consumers and businesses.

Figure 3: U.S. Pipeline Capacity Additions[13]



The pipeline additions provide significant and broad economic benefits. Among these are well-paying jobs, which Sean McGarvey, President of North America's Building Trades Unions, remarked on in late 2014. "Simply put, the development of our nation's domestic energy resources is the single biggest contributing factor for job growth in the U.S. construction industry today, as well as other sectors of our economy." For every incremental billion cubic feet per day of natural gas produced in the United States, approximately 15,000 to 21,000 direct and indirect jobs are created, which include equipment manufacturers, oil and gas service jobs, material suppliers and others.[14] In 2012, unconventional oil and gas activity contributed approximately $63 billion in federal,

[13] EIA, "U.S. Natural Gas Pipeline Projects," April 2015, accessed May 5, 2015
[14] ICF, "Tech Effect: How Innovation in Oil and Gas Exploration Is Spurring the U.S. Economy," October 2012, 4.

state and local tax receipts. By 2020, this revenue is expected to grow to more than $110 billion.[15] Achieving the full potential of this employment and revenue growth depends on robust, reliable infrastructure that can move natural gas from areas of development to regions eager to put it to use.

Infrastructure Challenges: Lessons from New England

The energy infrastructure challenges in New England are well documented, as are the resulting strains placed on consumers. DOE has found that despite large volumes of new unconventional gas resources available from the Marcellus Shale in nearby Pennsylvania, pipeline constraints have not allowed sufficient supplies of natural gas to reach New England, resulting in upward pressure on prices during peak demand times. The New York City area, by contrast, has alleviated winter congestion by adding new pipeline capacity.[16]

New England has several unique characteristics that differentiate it from other regions of the country. While choices over the past decade have contributed to the problem, there is emerging consensus among the region's current political leaders that the time has come to address these shortcomings so New England can reap the same benefits from natural gas that the rest of the country enjoys.

New England's geology is not conducive to the production or underground storage of natural gas. This forces the region to rely solely on pipeline capacity and more expensive LNG storage to meet peak natural gas demand days. This typically occurs only in the coldest parts of winter when existing pipelines strain to meet peaks in natural gas demand for both heating and electricity. In non-winter months, without the winter residential and commercial heating demand, there is ample pipeline capacity to serve the region's natural gas needs.[17]

To achieve environmental goals, two trends have occurred concurrently in New England. Residential and commercial natural gas demand has grown over time along with natural gas demand in the electric generation sector.

The Natural Gas Act requires an interstate natural gas pipeline to seek a "certificate of public convenience and necessity" from the Federal Energy Regulatory Commission (FERC).[18] Basically, any new or expanded pipeline capacity must be subscribed – while no

[15] IHS, "America's New Energy Future: The Unconventional Oil and Gas Revolution and the US Economy – Volume 2: State Economic Contributions," December 2012, 14.
[16] DOE, "Quadrennial Energy Review: Energy Transmission, Storage, and Distribution Infrastructure," April 2015, 2-27.
[17] EIA, "Northeast natural gas spot prices particularly sensitive to temperature swings," August 2014, accessed May 5, 2015, http://www.eia.gov/todayinenergy/detail.cfm?id=17491#tabs_SpotPriceSlider-3.
[18] 15 USC Section 717f.

set subscription percentage is required, often 80 percent is used as a guiding threshold as to whether or not a project moves forward.

Local distribution companies are required to purchase natural gas via firm contracts that ensure sufficient pipeline capacity and storage to meet customer demand on peak demand days. They also are allowed to sell off excess, unused capacity on the spot market. Merchant electric generators typically purchase this surplus, which comes at a lower cost but without any guarantee of delivery on peak days when demand exceeds deliverable supply.

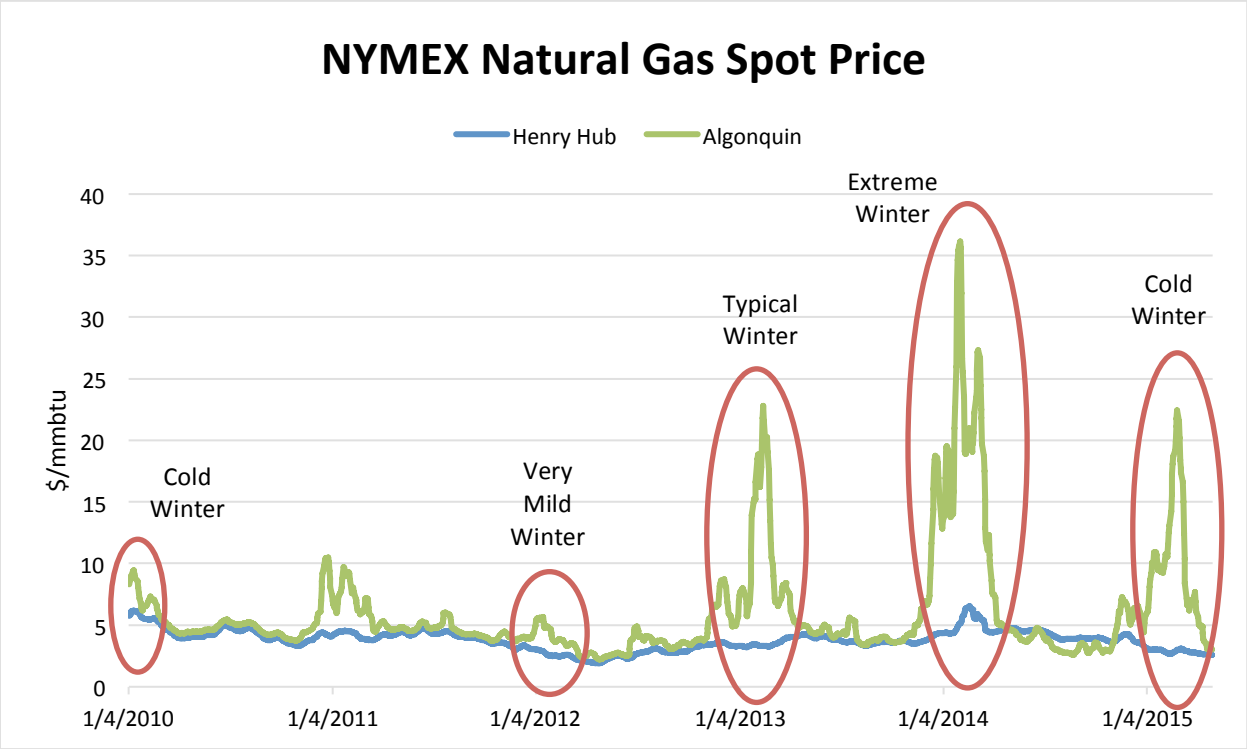
Unlike regions where cost-recovery for new power generation capacity and associated fuel supply is recovered through state public utility commission action, New England relies on New England's independent system operator (ISO-NE) - the regional market operator - to appropriately procure resources to meet future load.

While ISO-NE market rules have changed to improve resource adequacy and resource performance for incoming capacity post June-2018, the region has had limited options for merchant electric generators to recover cost for firm natural gas pipeline capacity.[19] Given this, natural gas generators have not entered into firm contracts with pipeline companies; hence, natural gas electric generators depend on LDC pipeline capacity release for their fuel supply leading to electric generator capacity uncertainty during high residential and commercial heating demand days. Even with ISO-NE market changes, ISO-NE expects additional infrastructure will be needed to meet growing demand for natural gas.[20]

In addition to the electric market structure, from a political perspective over the past decade it has been difficult to develop any energy infrastructure to serve New England including electric transmission lines delivering hydropower from Canada, offshore wind in Nantucket Sound and natural gas pipelines into the region due to a host of issues, including local concerns over property values, environmental issues and quality of life. These decisions have occurred simultaneously with increased reliance on natural-gas fired electric generation due to generation retirements in the region and increased use of natural gas in the residential and commercial sector.

[19] ISO-NE, "Challenges Facing the New England Power System," March 2015, 13.
[20] Ibid.

Figure 4: New England Prices vs. Henry Hub ($/MMBtu)[21]



The above graph depicts the difference adequate infrastructure makes. The blue line reflects low, stable natural gas prices at the Henry Hub, which is considered a proxy for increasingly homogenous U.S. natural gas prices on the spot market. As natural gas production and overall supply estimates have grown, the majority of regions across the United States have benefited from affordable natural gas prices.

By contrast, the green line represents prices at the Algonquin Citygate, which reflects the New England market. Due to the region's seasonal infrastructure constraints, prices in the Northeast spike even during "typical" winters, as experienced in 2013. The record cold of the polar vortex of 2013-2014 put additional strain on Northeast pipelines, which further exacerbated spot prices there. Once demand exceeded deliverable supply, prices spiked and remained high for most of that winter. This past winter, prices remained high. While not as high as the winter of 2013-2014, the price differentials continued to signal a strong need for additional natural gas pipeline capacity into the region. The New England region needs not only the changes made by NE-ISO, but also political will and efficient permitting processes to usher additional pipeline capacity into the region.

[21] NYMEX Spot Prices, 14-day moving average.

The bottom line: Natural gas price spikes are increasingly an anomaly in the new era of shale abundance. They exist in New England due to a disconnection between supply and demand—namely inadequate pipeline infrastructure. Sufficient pipeline capacity mitigates regional price spikes. Regions should support additional pipeline capacity, including permitting timetables that provide for appropriate public input without unreasonable delay, to enable deliverability capability and flexibility.

Infrastructure Opportunity: Marcellus and Utica

The Marcellus and Utica Shales, two of the most promising North American shale plays, hold potential not just for power generation, but for revitalizing our manufacturing base and natural gas exports. Fortunately, the expansion, adaptation and modification of pipelines to allow more gas movement both into and out of the Northeast producing region is growing, and expanding existing systems and building new systems to transport natural gas produced in the Northeast to consuming markets outside the region brings more supply to demand centers around the country. Pipeline companies are planning to modify their pipeline systems enough that 8.3 Bcf/d of Marcellus gas can be moved out of the Northeast to other consuming markets.[22] As an example, the Rockies Express Pipeline (REX) was one of the first pipelines to allow movement of Appalachian gas[23] from east to west. Recent enhancements to REX will provide approximately 1.8 Bcf/d of additional capacity by mid-2015 to western markets. There are also multiple interconnects on REX able to receive Appalachian gas from the mainline and transfer the gas to major industrial markets, such as Chicago and the Gulf Coast.[24]

Additionally, Columbia Gulf Transmission completed two bidirectional projects in 2013 and 2014 that enabled their system to transport natural gas from Pennsylvania to Louisiana. Likewise, the ANR Pipeline, Tennessee Gas Pipeline, Texas Eastern Transmission and Transcontinental Gas Pipeline, which all currently flow into the Northeast, are planning to become bidirectional. These projects will ultimately be capable of moving a total of 5.5 Bcf/d of Marcellus gas to the Gulf Coast, taking advantage of the potential industrial demand and LNG exports in that region.[25]

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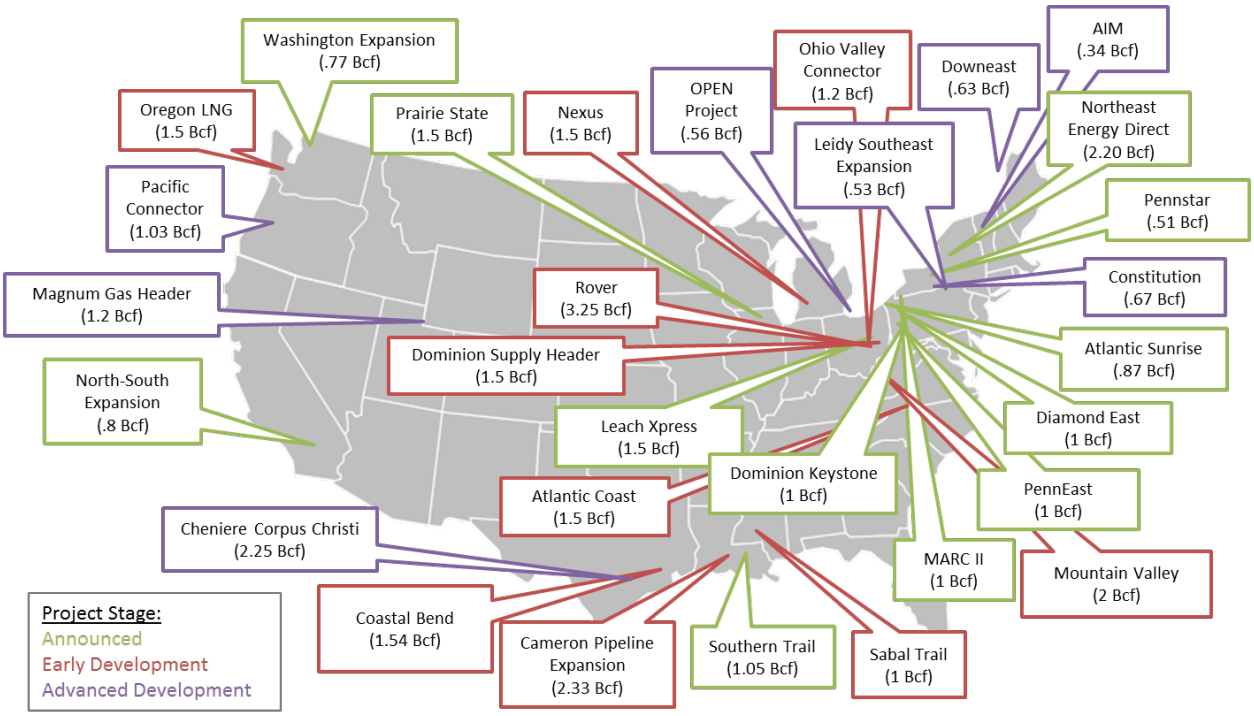
[22] EIA, "Today in Energy", last modified December 2, 2014, accessed May, 7, 2015, http://www.eia.gov/todayinenergy/detail.cfm?id=19011.
[23] Appalachian gas refers to natural gas from the Marcellus, Utica, and Devonian shale plays.
[24] EIA, "First westbound natural gas flows begin on Rockies Express Pipeline", last modified June 18, 2014, accessed May 7, 2015, http://www.eia.gov/todayinenergy/detail.cfm?id=16751.
[25] EIA, "Today in Energy", last modified December 2, 2014, accessed May 7, 2015, http://www.eia.gov/todayinenergy/detail.cfm?id=19011.

By better connecting Marcellus and Utica natural gas supplies to demand centers across the U.S., all regions will be able to benefit from this prolific regional supply, this includes more connection capacity to other producing regions. For example, Bentek Energy found that Southeast natural gas demand is expected to grow 8.5 Bcf/d by 2024.[26] Supplies from the Marcellus and Utica will be able to meet this growing demand through the new bidirectional capacity and incremental pipeline additions. This supply enables the revitalization of manufacturing, cleaner power generation and increased LNG exports.

Figure 5: Major Pipeline Projects in the U.S.



Source: SNL, ANGA

The economic benefits from linking producing regions to demand centers are profound. IHS found in 2012 that GDP contributions were $238 billion from upstream production activity, $39 billion from midstream and downstream activity and $7 billion from energy-related chemical activity. By 2025, IHS estimates that these GDP contributions will grow to $475 billion for upstream, $7 billion from midstream and downstream and over $51 billion from energy-related chemicals.[27] Robust infrastructure capacity provides the connection between supply basins and demand centers that will help unleash our nation's economic potential.

[26] Bentek Energy, "The Southeast: Major Natural Gas Demand, Supply and Infrastructure Coming Together 2014-2024," May 2014, 12.
[27] IHS, "America's New Energy Future, Volume 3: A Manufacturing Renaissance – Main Report," September 2013, 1.

Conclusion

As a result of innovative breakthroughs, the natural gas industry is able to access vast domestic natural gas resources. The accompanying significant growth in natural gas over the past decade has transformed us from a posture of energy scarcity to one of energy abundance. This shift has provided our nation with enormous economic, environmental and energy security benefits. However, to fully realize the potential presented by our natural gas abundance, it is imperative that we support natural gas infrastructure development in all regions of the United States.

This Congress has an unprecedented opportunity to advance our nation's economy, environment and energy security by strengthening our nation's natural gas infrastructure. We appreciate the opportunity to testify today and ANGA looks forward to working with you on important solutions as this legislative process moves forward. Thank you.