A solution in search of a problem:
Analysis shows no need for PennEast pipeline

By Barbara Blumenthal, Ph.D.

for

New Jersey Conservation Foundation

September 2018

New Jersey Conservation
FOUNDATION

New Jersey Conservation FOUNDATION

Table of Contents

Introduction

There is no clearer way to say what thorough analysis proves: the proposed PennEast pipeline is a solution in search of a problem.

Expert analyses and data refute all claims of market demand for the proposed PennEast pipeline. Furthermore, New Jersey's transition to clean energy does not require new pipelines.

This report answers key questions about the future of gas consumption and pipeline capacity in New Jersey and, specifically, the proposed PennEast project.

The findings, based upon expert studies and data, conclusively show that the PennEast pipeline is not needed to meet either current or future energy demand in New Jersey and the region the proposed pipeline would service. Moreover, building the pipeline would increase costs to New Jersey energy consumers and become increasingly wasteful and irrelevant as the state transitions to deep decarbonization based on clean, renewable energy sources.

Key Takeaways

- New Jersey currently has substantial excess pipeline capacity to meet its needs — even during extreme cold periods — and by 2030 will continue to have more than 1.3 billion cubic feet per day of excess capacity. PennEast would add another 1 billion cubic feet of unnecessary capacity.

- Experts reconfirmed this finding of excess capacity using new data from the extreme cold period (referred to as the "Bomb Cyclone") from December 2017 through January 2018, stating: This analysis shows that PennEast is not needed to meet peak winter demand, not even for a single day, even during extreme weather events.

- New analysis shows that this existing excess pipeline capacity would meet any contingency that would temporarily increase gas consumption in New Jersey, including the retirement of all remaining coal plants and nuclear plants.

- New Jersey Division of the Rate Counsel and its energy experts concluded that PennEast's self-dealing contracts do not reflect genuine market demand, and the need for the project appears to be driven by the opportunity to earn a 14% rate of return "tantamount to winning the lottery."

- By creating a further glut of capacity, PennEast would immediately increase costs to New Jersey consumers by an estimated $180 million to $280 million per year.

- There is no evidence or analysis in the record to support PennEast's claims that its proposed pipeline would increase reliability of the interstate pipeline grid.

- Independent research found that PennEast inflated the estimated job numbers by at least 66% and the project would result in only 10 ongoing jobs in New Jersey. According to the research PennEast would have an "infinitesimally small" contribution to the economy. Clean energy jobs already employ about 52,000 New Jerseyans, and this number will grow substantially.[1]

- As New Jersey takes necessary steps to address climate change, the gap between already high levels of excess pipeline capacity and what the state actually needs will continue to grow.

- Meeting the state's goals under the Global Warming Response Act will require a dramatic reduction in the usage of natural gas, which is the primary source of emissions in the electricity generation, commercial, and residential sectors.

- New studies that model electric grids each year until 2050 suggest how states can achieve deep decarbonization goals. Studies show that little-to-no-gas will be needed by 2050 if states support low-cost pathways based on optimized portfolios of clean energy resources.

- Such portfolios would achieve reductions in carbon dioxide emissions of 90% or more and create substantial costs savings over the current gas-heavy portfolio of generation. Modeling also shows that clean energy pathways — with 90% or more variable generation — can provide reliable electric service throughout the year.

- As regulators and energy markets adapt to the new reality that low-cost electricity will come from a portfolio of clean energy resources, demand for natural gas generation will decline dramatically.

- Portfolios of clean energy resources can also produce substantially greater employment than portfolios based on natural gas, with significant job growth in demand-response, energy efficiency, electrification of transportation and building systems, and storage — all businesses for which jobs are inherently local.

[1] *New Jersey Energy Efficiency Jobs in America.* September 6, 2018. Environmental Entrepreneurs (E2). https://www.e2.org/wp-content/uploads/2018/09/NEW-JERSEY-Dist.pdf.

Overview of New Jersey Pipeline Capacity and Need

New Jersey already has excess pipeline capacity and can meet future gas demands, even on the coldest winter days.

New Jersey already has more than enough gas pipeline capacity to meet current and projected needs. With about 8 billion cubic feet per day of pipeline capacity now serving the state, there are only a few days each year when pipeline capacity may be fully utilized. New pipelines should only be considered to address unmet needs during peak periods, which occur on cold winter days. Studies conclusively show no such needs in New Jersey.

As explained in this section, analysis by international gas experts at Skipping Stone — an energy markets consulting and technology services firm founded by former energy CEOs [2] — found that a rapid buildout between 2011 and 2018 added **3.1 bcf/d** of pipeline delivery capacity to New Jersey — a 52% increase.[3]

This analysis shows that by 2018, more pipeline capacity was added and excess capacity is now conservatively estimated at more than **2 billion cubic feet per day** (bcf/d).[4] This estimate of excess capacity means that there is currently about 35% more pipeline capacity than needed to meet peak demand. Figure 1 shows the results of the analysis that is described more fully in the following sections.

The current glut of capacity will persist to 2030 and beyond. Analysis by Skipping Stone shows that pipeline capacity serving New Jersey will exceed demand by at least **1.3 billion cubic feet per day** (bcf/d) by 2030, even in the unlikely scenario in which peak demand continues to grow by 25% through 2030.

PennEast would increase this unneeded, excess capacity to **2.3 bcf/d** in 2030. In the near term, PennEast would increase excess capacity from about 2 bcf/d to 3 bcf/d Of course, any progress on reducing emissions and achieving climate goals would significantly reduce peak demand and further increase this substantial excess pipeline capacity.

[2] Skipping Stone Inc. President Greg Lander is responsible for strategic consulting in the mergers and acquisition arena with numerous clients within the energy industry. As an expert in the energy industry he has advised and given testimony at numerous FERC, state-level, arbitration, and legal proceedings. Lander has served for 22 years as a Member of Board of Directors for the North American Energy Standards Board, and its predecessor, the Gas Industry Standards Board. As Chairman of the Business Practices Subcommittee he drafted approximately 450 initial industry standards that are now codified FERC regulations.

[3] Lander, Greg. PennEast Analysis of Alternatives. September 12, 2016, p. 11. Skipping Stone. https://rethinkenergynj.org/wp-content/uploads/2016/09/PennEast-Analysis-of-Alternatives_Skipping-Stone_Sept-12-2016.pdf.

[4] Peak demand occurs during winter months when the Residential and Commercial sectors use natural gas to heat buildings. While in 2011 these sectors used a total of 405 billion cubic feet of gas, by 2017 this usage had dropped to 375, a decline of 7%, due in part to efficiency measures. It follows that peak usage would have declined as well. Because data on precise peak usage is not available for 2017, we allowed for an increase of peak usage of 20% from the 2011 baseline of 5 bcf/d of peak demand, as explained below in Skipping Stone, September 2016 analysis of need. Even allowing for a 20% increase in peak demand, excess capacity in 2018 would be 2.1 bdf/d, or 35% more than needed.

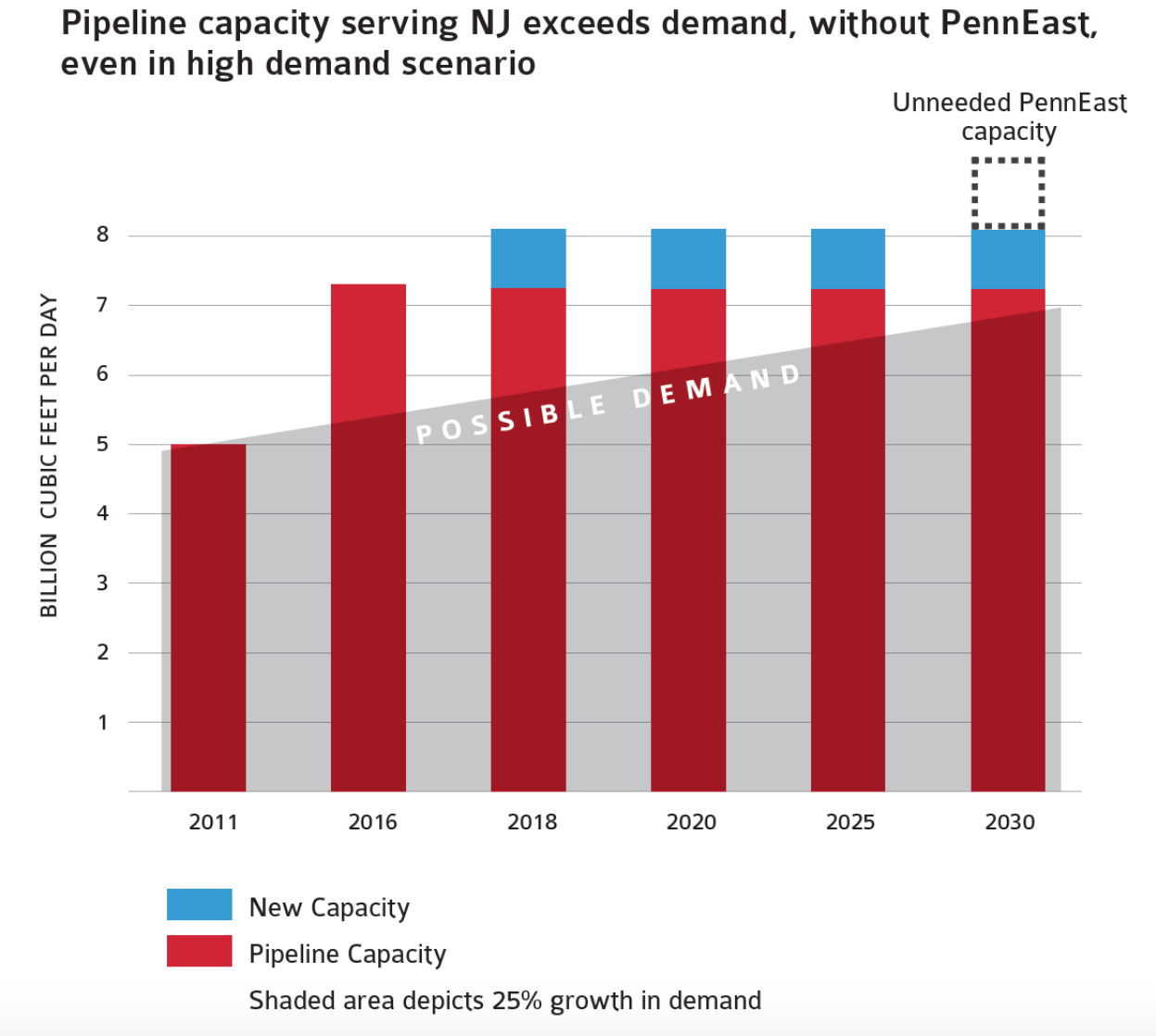

Figure 1. Excess pipeline capacity by 2030

This finding is not surprising, given that New Jersey is well supplied by a network of five major interstate pipeline networks.

Figure 2. Major natural gas pipelines in eastern Pennsylvania and New Jersey

In February 2018, Skipping Stone reconfirmed its finding of excess capacity using new data from the extreme cold period (referred to as the "Bomb Cyclone") from December 2017 through January 2018, stating:

> **This analysis shows that PennEast is not needed to meet peak winter demand, not even for a single day, even during extreme weather events.** Given the addition of Atlantic Sunrise capacity by June 2018, which increases capacity in the region by another 14%, and the existence of substantial, in-region, interstate-pipeline connected, peaking supplies, it is difficult to imagine any scenario for at least a decade where additional pipeline capacity will be required.[5]

Skipping Stone also revealed that on January 4, when 2018 prices reached their peak, excess gas supplies were flowing to the south, away from New Jersey's colder weather and into Virginia. This flow pattern confirms that pipeline capacity was more than adequate and that price increases on the spot market were not caused by any constraints in New Jersey. Thus, adding more pipeline capacity into New Jersey, as PennEast would do, would do nothing to address the higher spot-market prices that occurred.

Future demand is the second part of the equation when evaluating whether further pipeline capacity is required. There is no expectation that PennEast customers, predominantly local gas companies, will see an increase in demand.

[5] Lander, Greg. *Analysis of Regional Pipeline System's Ability to Deliver Sufficient Quantities of Natural Gas During Prolonged and Extreme Cold Weather (Winter 2017-2018).* February 11, 2018, p. 3. Skipping Stone. https://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=14820449.

New Jersey Rate Counsel agrees that PennEast is not needed, stating:

> While the faith demonstrated in "if you build it, they will come" makes for a wonderful movie plot, it cannot be the basis for building an enormously expensive greenfield pipeline. Rather, as PennEast's affiliate-LDCs' own filings with state regulators demonstrate, these LDCs: (1) currently have adequate capacity; (2) have experienced minimal load growth during the past years of very low gas prices; and (3) project very limited new load growth.[6]

In a previous comment, the Rate Counsel said:

> **Thus, two-thirds of the demand for the pipeline exists because the Project's stakeholders have said it is needed**.…these LDCs' own projections suggest peak day requirements will remain relatively stable through 2020 — and indicate that there is no imminent need for significant amounts of additional capacity. [7]

Similarly, in its request to the Federal Energy Regulatory Commission (FERC) for that body to rehear the PennEast application, Rate Counsel commented:

> Record evidence demonstrates that PennEast's precedent agreements do not reflect genuine market demand.
>
> The Final EIS [Environmental Impact Statement] and, in turn, the January 19 Order that relies upon it, accept at face value PennEast's assertion of need for the Project. The Commission fails to examine with any rigor whether PennEast has in fact demonstrated that need.
>
> The Final EIS did not question whether these shippers' respective contract demands were new, and which would require a new pipeline, or simply transferred demands. If, as NJ Rate Counsel contends, and which contention is supported by PennEast's affiliates' own state regulatory filings, the contract demands will be transferred from existing pipelines to PennEast, in the absence of load growth — and the record lacks evidence of regional load growth — the construction of PennEast will create excess capacity on the region's natural gas transportation network.
>
> Indeed, the demand projections of New Jersey and Pennsylvania LDCs indicate that there is no imminent need for significant amounts of additional capacity, particularly in light of the glut of underutilized capacity on existing long-haul gas transmission systems serving the Mid-Atlantic. [8]

---

[6] *Motion for Leave to Answer and Answer of New Jersey Division of Rate Counsel to Comments of PennEast Pipeline Company, LLC.* November 14, 2016. New Jersey Division of Rate Counsel. https://rethinkenergynj.org/wp-content/uploads/2016/11/Rate-Counsel-Answer-to-PennEast-1.pdf

[7] *Comments of the New Jersey Division of Rate.* September 12, 2016, p. 8. New Jersey Division of Rate Counsel. https://elibrary.ferc.gov/idmws/file_list.asp?accession_num=20160912-6003.

[8] *Request for Rehearing of the New Jersey Division of Rate Counsel.* February 20, 2018. New Jersey Division of Rate Counsel. https://www.nj.gov/rpa/docs/Request_for_Rehearing.pdf.

PennEast is driven by profits, not need

The primary owners of PennEast are for-profit entities affiliated with three New Jersey regulated natural gas utilities. These parent firms created a new company — PennEast — to build an interstate pipeline that would supply new capacity to their own regulated utilities. Shareholders of these publicly-traded firms would earn a regulated 14% return on their investment, while New Jersey customers bear the risk of a 15-year contract for pipeline capacity. Rate Counsel speculated about the motivation to propose an unneeded pipeline, saying:

> NJ Rate Counsel is concerned that the DEIS [Draft Environmental Impact Statement] does not address that the "need" for the Project appears to be driven more by the **search for higher returns on investment** than any actual deficiency in gas supply or pipeline capacity to transport it.[9]
>
> In this financial environment, **the opportunity to receive a Commission-regulated return of 14% is tantamount to winning the lottery.** NJ Rate Counsel is concerned that this opportunity may be a key motivating factor behind the Project.

PennEast makes exaggerated claims about creating jobs

Independent research by the Goodman Group, a consulting firm whose specialties include pipeline economics and regulation, concluded that:

- PennEast's job claims are inflated by 66% or more
- Most jobs associated with constructing a pipeline last no more than 5 months, and at least half of those involving PennEast would be outside New Jersey. The pipeline would result in only 10 ongoing jobs in New Jersey
- The PennEast analysis has not provided adequate documentation of the methodology used in its economic modeling, making it impossible to understand how the company developed its employment estimates
- PennEast would make an "infinitesimally small" contribution to the economy[10]

[9] "PennEast's requested rate of return is excessive." *Comments of the New Jersey Division of Rate Counsel.* September 12, 2016, p. 8. New Jersey Division of Rate Counsel. https://elibrary.ferc.gov/idmws/file_list.asp?accession_num=20160912-6003.

[10] Goodman, Ian and Rowan, Brigid. *Expert Report on the PennEast Pipeline Project Economic Impact Analysis for New Jersey and Pennsylvania*. November 4, 2015. The Goodman Group. http://njconservation.org/docs/PennEastEconomicReport.pdf

Summary of Experts' Analysis of Need

Several experts' studies consistently confirmed that by 2016 the pipeline network serving New Jersey could deliver far more than would be required, even on the coldest day. In addition, new analysis from February 2018 examined pipeline utilization during the winter of 2018 and shows substantial excess capacity, even during the peak period of prolonged cold weather.

Skipping Stone, February 2018 analysis of pipeline utilization:

This analysis examined the contracted capacity and actual delivery on the Transco pipeline in Zone 6, which includes New Jersey and runs from Maryland to New York City. During an extended cold spell, this analysis found, 1.7 bcf of unused capacity was available for New Jersey customers on the coldest day on just one of five major interstate pipelines serving New Jersey. The proposed PennEast pipeline would increase the amount of existing excess delivery capacity during peak demand by 1 bcf/d, creating a total of 2.7 bcf/d excess capacity on the Transco pipeline alone.

Within Zone 6 of Transco, 5 bcf/d of capacity is under contract, representing the entire physical capacity of the pipeline. During the recent period of extreme cold weather, for a total of 13 days, **the amount of gas actually delivered was higher than the total capacity contracted**, which represents the physical capacity of the pipeline, reaching 5.3 bcf/d.

Because the Transco pipeline now operates bidirectionally, there is substantial additional capacity available to customers that purchase capacity on the secondary market. A total of 7 bcf/d of delivery capacity was available during this period, of which 1.7 bcf/d went unused.

Figure 3 shows the results of this analysis.

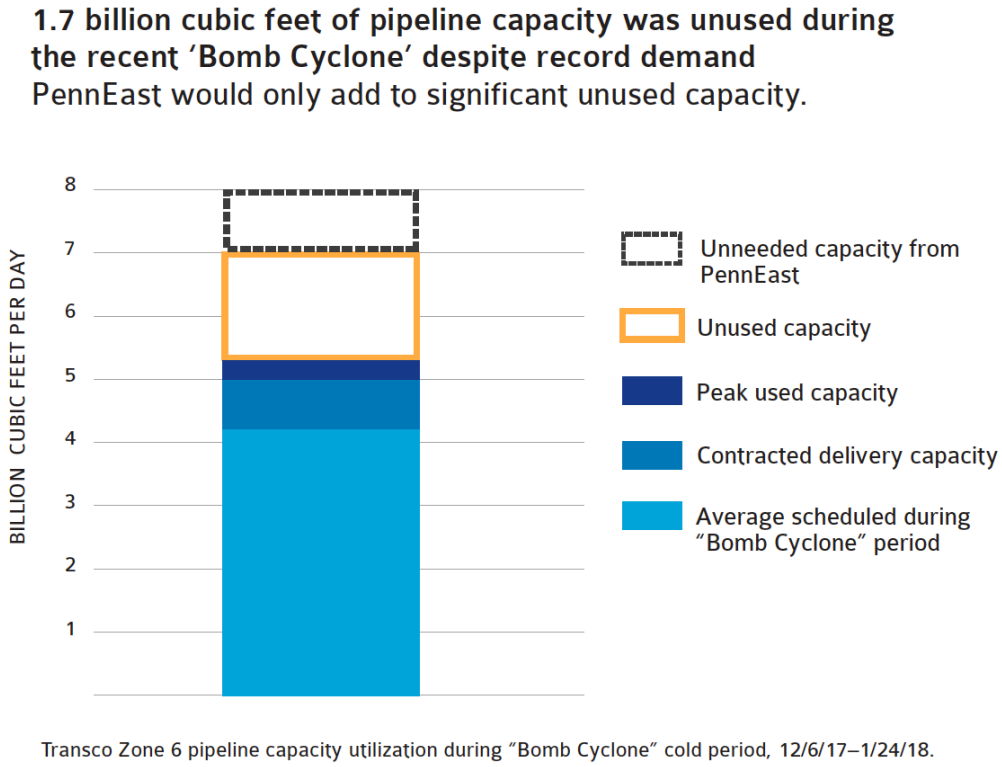

Figure 3. Transco pipeline utilization during Bomb Cyclone

Skipping Stone stated:

> **This analysis shows that PennEast is not needed to meet peak winter demand, not even for a single day, even during extreme weather events.** Given the addition of Atlantic Sunrise capacity by June 2018, which increases capacity in the region by another 14%, and the existence of substantial, in-region, interstate-pipeline connected, peaking supplies [11], it is difficult to imagine any scenario for at least a decade where additional pipeline capacity will be required.
>
> Further, on January 4th, when 2018 prices reached their peak for customers in Transco Zone 6 (NY, NJ, PA, MD), excess gas supplies (.242 bcf) were flowing to the south, away from New Jersey's colder weather and into Virginia. This flow pattern confirms that pipeline capacity was more than adequate and that prices increases were not caused by any constraints in New Jersey.

[11] There are LNG vaporization facilities connected to Transco: 1) in the Zone 6 NY pricing region of Transco; 2) from the Cove Point MD LNG Terminal which feeds Transco near the Zone 5/6 border; 3) in Zone 6 Philadelphia; and 4) by contract on Algonquin where a Transco shipper receives LNG in Providence RI into Algonquin which delivers the receipt quantity by "backhaul" to Transco outside NY for delivery Transco to the Transco Shipper in NYC.

Such analysis of actual contracts and delivery during cold weather is essential to understanding unmet need. Skipping Stone explains:

> When assessing the need for additional interstate pipeline capacity, the central question should be whether the current pipeline system is able to deliver sufficient quantities of natural gas under stress; more specifically, during prolonged and extreme cold weather. The recent period of historic and prolonged cold weather in December 2017 and January 2018 provides an excellent opportunity to address this central question.[12]

Dismukes, September 2016 analysis of need:

In its request for rehearing, New Jersey Rate Counsel quotes its expert affiant David Dismukes who explained that demand for natural gas in the Mid-Atlantic region has been declining, not increasing:

> Indeed, the demand projections of New Jersey and Pennsylvania LDCs indicate that there is no imminent need for significant amounts of additional capacity, particularly in light of the glut of underutilized capacity on existing long-haul gas transmission systems serving the Mid-Atlantic.
>
> New Jersey LDCs report sufficient access to production from the Marcellus Shale… without the Project.
>
> In the absence of substantial load growth, LDCs will turn back capacity on other pipelines, and do not need to have another pipeline constructed to provide more firm capacity.
>
> NJ Rate Counsel presented data showing that completion of the Project and subscription to it by LDCs will actually decrease diversity of supply and flexibility of delivery pipelines.[13]

Skipping Stone, March 2016 analysis of need:

In its March 2016 analysis, Skipping Stone found that additional capacity is not needed. This report was the first analysis to clearly show that PennEast would add to existing excess capacity and that it would raise, rather than lower, costs.

The analysis examined all pipeline capacity serving PennEast customers in 2016, and compared it to the peak day forecasts provided by PennEast, and concluded:

> Local gas distribution companies in the Eastern Pennsylvania and New Jersey market have more than enough firm delivery capacity to meet the needs of customers during peak winter periods. The analysis shows there is currently 49.9%

[12] Lander, Greg. *Analysis of Regional Pipeline System's Ability to Deliver Sufficient Quantities of Natural Gas During Prolonged and Extreme Cold Weather (Winter 2017-2018).* February 11, 2018, p. 3. Skipping Stone. https://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=14820449.

[13] *Request for Rehearing of the New Jersey Division of Rate Counsel.* February 20, 2018. New Jersey Division of Rate Counsel. https://www.nj.gov/rpa/docs/Request_for_Rehearing.pdf.

> more delivery capacity than needed to meet even the harsh winter experienced in 2013 (the Polar Vortex Winter).

Skipping Stone, September 2016 analysis of need:

Skipping Stone's September 2016 report evaluated both pipeline capacity and market demand data to determine whether existing pipeline capacity would be sufficient to meet future needs:

> Skipping Stone's analysis of existing pipeline capacity and future market demand shows that **there is no demand for natural gas, even as far out as 2030, that would be unmet by either current pipeline capacity or existing supplemental resources.**

Analysis of pipeline deliveries in 2015 showed an enormous buildout of new pipeline capacity available in New Jersey, totaling an additional 2.3 bcf/d — a 52% increase over the capacity available in 2011.

The study determined that peak demand in 2011 reached 5 bcf on the coldest day. To estimate future demand for natural gas, Skipping Stone used data from a key government study.[14] The study assumed that, by 2030, peak usage in New Jersey would increase by 25%, to 6.8 bcf on the coldest day.[15]

Comparing this projected peak demand to existing pipeline capacity in 2016 found there would be sufficient capacity to meet this projection of need in 2030, without adding new capacity. Total delivery capacity reached 7.3 bcf by 2016, which would provide excess capacity of 0.5 bcf on the coldest day by 2030.

The 6.8 bcf peak demand in 2030 used in this analysis can be viewed as a maximum potential peak demand. A number of existing and new policies could result in a significant decline in overall natural gas consumption, including higher energy-efficiency gains, decreased reliance on baseload natural gas-fired generation, improved building efficiency and weatherization, and a shift of heating and cooling systems from natural gas to high efficiency electric heat pumps.

2018 Update to Skipping Stone September 2016 analysis:

The excess capacity available to New Jersey grew since 2016 by 0.8 bcf/day. Excess pipeline capacity now stands at 1.3 bcf/d more than could be needed by 2030, under very conservative assumptions of projected future peak demand.

---

[14] Skipping Stone first determined the demand requirements in 2011 and those projected for 2030 based on the 2014 report commissioned by the National Association of Regulatory Utility Commissioners (NARUC) and the Eastern Interconnection States' Planning Council (EISPC). The NARUC/EISPC report provides a detailed picture of demand for pipeline capacity that existed in 2011 and projected demand in 2030.

[15] The growth rate for peak period natural gas demand in New Jersey is estimated as 25% in the NARUC/EISPC Report between 2011 and 2030, a period where the population of New Jersey is expected to grow by only 10%. This increase in potential demand is based on industry participant projections from 2014 and are higher than more current projections of future demand for natural gas by U.S. Energy Information Administration. In addition, there are many factors that would reduce future consumption. For example, new standards for furnace efficiency for both new construction and replacement furnaces as well as other energy efficiency measures may reduce the growth of natural gas consumption over this period.

Figure 1 depicts the pipeline capacity available to meet New Jersey peak demand by 2016, updated to include two additions available by 2018. The Atlantic Sunrise expansion of the Transco pipeline added 0.3 bcf/d of capacity to New Jersey in 2017. Finally, substantial pipeline delivery capacity was added in the past two years that did not require the construction of physical pipelines. Recent analysis of Tetco and Transco pipelines shows that both are now bidirectional, meaning gas can flow in both directions depending on where the demand is on a given day.

With bidirectional flow, pipelines are able to deliver gas beyond 100% of their physical capacity by scheduling multiple deliveries in both directions within a zone. Estimates are that the deliverability of both pipelines has recently increased by more than 10%.

Figure 1 also compares expected peak demand versus available pipeline capacity. The shaded area shows projected peak demand in 2030 from the National Association of Regulatory Utility Commissioners (NARUC) study, and actual peak demand in 2011.

PennEast would immediately increase consumer costs in New Jersey

New Jersey Rate Counsel has filed comments opposing PennEast based on expert analysis showing that all New Jersey residents who use natural gas would be forced to pay for the unnecessary capacity that would result from building the pipeline.

The glut of capacity PennEast would create would lead to increased costs to utility customers as the use of major pipelines would decline. The financial burden for consumers is estimated at $180 million to $280 million per year on just two legacy pipelines.

Analysis by Skipping Stone examined the cost implications of creating a glut of capacity:

> The impact of PennEast may well be to increase, rather than decrease, costs to gas customers. Analysis shows that rate-paying consumers of local gas distribution companies (LDCs) bear the greatest risk of increased costs regardless of whether they are on PennEast or competing pipelines…
>
> Our analysis of transactions on two competitor pipelines shows that the loss of benefit to ratepayers, just on those two pipelines, could be between $130 million to $230 million each year... Second, as customers shift contracts from existing pipelines to PennEast, FERC rules permit those pipelines to file for rate increases on remaining customers to recover lost revenues. Resulting rate increases could expose ratepayers to additional costs of over $50 million per year — just on these two pipelines.[16]

[16] Lander, Greg. *Analysis of Public Benefit Regarding PennEast Pipeline.* March 9, 2016, p. 11. Skipping Stone. https://rethinkenergynj.org/wp-content/uploads/2016/03/PennEastNotNeeded.pdf.

Rate Counsel makes the same argument and encouraged FERC to protect "...captive customers of existing pipelines to ensure that they are not forced to choose between giving up natural gas service and paying prohibitively expensive rates."[17]

A Rate Counsel expert also debunked earlier assertions that PennEast would have saved customers money during the Polar Vortex: "had the Project been in full operation at that time, the regions would have still seen substantial price spikes."[18]

Contrary to unfounded claims by PennEast, adding to pipeline capacity in New Jersey would have absolutely no impact on winter price spikes. Because New Jersey is in the same pricing zone for gas supplies as New York City, New Jersey businesses pay spot-market prices that reflect an imbalance of supply and demand for gas in New York City, and building additional capacity into New Jersey would do nothing to address the issues that originate in New York City.

PennEast is unlikely to result in lower costs from access to Marcellus Shale supplies

Two independent experts dispute the unsubstantiated claim that PennEast will provide access to lower-cost Marcellus gas. Their analysis shows that new gas supply from PennEast is unlikely to reduce costs in New Jersey because local gas companies are already well supplied with natural gas from the Marcellus region; in fact, some recently turned back excess capacity from the region.

Rate Counsel explains:

> In addition to the glut of underutilized capacity on existing gas transmission systems into the Mid-Atlantic, New Jersey LDC Public Service Electric & Gas Company (PSE&G) reports that it has turned back 145,000 Dth/d of firm transportation capacity in the past year.[6] Several New Jersey LDCs also report sufficient access to production from the Marcellus Shale.[7] For example, in its most recent annual review and revision of its basic gas supply service, New Jersey Natural Gas Company reported that "[t]he majority of the market area assets of the Company are positioned to take advantage of the natural gas produced in the Marcellus Shale."[8]
>
> As Dr. Dismukes makes clear, the data suggest that the market does not demand additional transportation capacity or, more specifically, additional access to the Marcellus Shale.[19]

Skipping Stone explains why somewhat higher prices in New Jersey compared with the producing region in Pennsylvania are unlikely to persist if new pipeline capacity is built.

---

[17] *Comments of the New Jersey Division of Rate Counsel.* July 25, 2018, p. 6. New Jersey Division of Rate Counsel. https://www.nj.gov/rpa/docs/PL18-1_Comments_of_NJDRC.pdf.
[18] Dismukes, David E., Ph.D. *Affidavit of David E. Dismukes, Ph.D.* November 14, 2016, p.10. https://www.nj.gov/rpa/docs/Dismukes%20Affidavit.pdf.

[19] Strauss, Scott H. "PennEast's requested rate of return is excessive." *Comments of the New Jersey Division of Rate Counsel.* September 12, 2016, p. 6. New Jersey Division of Rate Counsel. https://elibrary.ferc.gov/idmws/file_list.asp?accession_num=20160912-6003.

Evidence shows that new pipelines tend to increase prices at the source, rather than reducing prices at the destination.

> One of the lessons to be drawn from the history of price effects from new pipelines is: don't bank on the current basis persisting once the constraint (that led to the basis in the first place) is relieved. That lesson appears to be evidenced in the case of PennEast as well, given that:
>
> 1) not only is less than 10% subscribed by producers seeking east coast outlets for their gas, but also
>
> 2) there remains another 100,000 Dth per day as yet unsubscribed. If NE PA Marcellus producers saw valuable market accessible by PennEast, that unsubscribed capacity would not be left available.
>
> Another lesson to be drawn from the price effects data is that statements that there will be "cost savings" not otherwise accessible to the ratepayers of the regulated LDC shippers must be deeply analyzed, and their likelihood and veracity tested. While there may be some level of peak period cost savings, owing to additional pipeline capacity available during such periods, that short-lived savings must be balanced against year-round fixed costs, and fixed costs that will persist for 15 years following in-service.[20]

Rate Counsel's expert reaches the same conclusion that potential savings are unlikely to be realized:

> The basis differential benefits asserted in the Concentric Report assumes that those differentials will persist over the long-term when they are, in fact, simply shorter-term cyclical variations in regional natural gas markets. Other publicly available analyses, including those conducted by the Energy Information Administration, clearly show declining basis differentials that contradict Concentric's assertions.[21]

These experts make clear that there is no basis for PennEast assertions that the proposed pipeline would reduce the cost of gas for New Jersey consumers.

Winter 2018 price spike claims

Contrary to unfounded claims by PennEast, the addition of pipeline capacity in New Jersey would have absolutely no impact on winter price spikes. In fact, during the coldest periods in December 2017 and January 2018, New Jersey customers had access to substantial unused capacity. There was no shortage of pipeline capacity available to New Jersey customers.

Data on actual pipeline deliveries show that 5.3 bcf of natural gas was delivered in Transco Zone 6, and 1.7 bcf of delivery capacity out of 7 was unused.

---

[20] Lander, Greg. *Analysis of reliability in the Electric and Gas Markets, Cost Savings and Project Need.* November 28, 2016, page 15. https://rethinkenergynj.org/wp-content/uploads/2017/01/Nov-2016-Skipping-Stone.pdf

[21] Dismukes, David E., Ph.D. *Affidavit of David E. Dismukes, Ph.D.* November 14, 2016, p.10. https://www.nj.gov/rpa/docs/Dismukes%20Affidavit.pdf.

Submissions to FERC in March 2018 explain:

> In short, PennEast rests its entire criticism of the Skipping Stone Winter reliability report on the fact that there were high prices. In doing so, PennEast ignores the fact that gas left Zone 6 to lower priced Zone 5 markets because the gas in Zone 6 could not get into New York City — the reason for the price spikes. In turn, PennEast ignores the related fact that its proposed project would do nothing to solve the New York City constraint problem that led to those price spikes in the first place.
>
> "… The infrastructure limitations in New York City caused buyers to bid up the price of delivered gas on the spot market (Citygate Spot Priced Gas). Having the additional capacity from PennEast would not have had any effect on this outcome, because PennEast does not provide physical pipeline capacity into any New York City citygate station.
>
> Second, there is no evidence that industrial customers were harmed by buying the Citygate Spot Priced Gas.[22] Generally, industrial customers in New Jersey choose to buy Citygate Spot Priced Gas, which is always priced higher when prices spike. Prices spike a few days a year. Those choosing to buy Citygate Spot Priced Gas often do so because they make the calculation that is it is in their overall interest to do so rather than paying for year-round pipeline capacity; capacity the industrial customer would pay for whether or not the capacity were needed year-round. Indeed, data on all trades and prices during the recent thirteen day cold spell shows that during the recent winter, industrial customers buying Citygate Spot Priced Gas would have saved almost $80,000 over a single year compared to the cost of contracted firm capacity plus supply area prices.[23] Even more important to the business decision is the fact that contracting for new firm capacity typically requires a 20-year commitment. Many gas customers would be reluctant to make such a commitment, even if the annual costs were somewhat lower than purchasing Citygate Spot Priced Gas on the spot market.[24]

PennEast is not needed to increase reliability of the pipeline network

According to national gas experts, PennEast simply asserted that it would improve reliability, without presenting any evidence of a reliability problem, or offering facts that show how PennEast would address the unidentified problem. As Skipping Stone responded:

> There is no evidence or analysis in the record that would allow a determination that the proposed PennEast pipeline will "increase reliability" of the interstate pipeline grid.

[22] Industrial consumers including electric generators are typically the ones who pay these spot prices.
[23] *Natural Gas Intelligence, NGI's Daily Gas Price Index.* http://www.naturalgasintel.com/newsletters/1-
[24] *Motion For Leave To Answer and Answer on Behalf of New Jersey Conservation Foundation and Stony Brook Millstone Watershed Association.* March 15, 2018, pg. 4. Columbia University School of Law Environmental Law Clinic and Eastern Environmental Law Center.

> The current high reliability and strong resiliency of the interstate gas grid that receives and delivers almost 70 billion cubic feet of gas per day is the result of more than 10,000 firm bilateral transportation and/or storage contracts. [25, 26]

PennEast's proposed pipeline does not contribute in any way to supply-security. New Jersey is served by five major interstate pipelines, with multiple connections.

New Jersey Rate Counsel agreed, stating, "PennEast also attempts to justify the Project as a means to increase 'supply diversity' and 'supply flexibility.' But PennEast does not even allege, much less show, that there is an existing lack of supply diversity or flexibility."

Rate Counsel also offered advice to FERC about evaluating such claims:

> Of course, in most circumstances, an additional pipeline will provide some added increment of resilience and reliability. But the Commission must carefully examine any such claims, and should require a specific demonstration and quantification of benefits from claimed increases in reliability and resilience.[27]

Analysis of Demand for Gas

Demand for natural gas in New Jersey reached a high in 2016 and is likely to decline across all uses. Even if demand were to increase, additional pipeline capacity will not be required.

Estimating future demand for natural gas is necessary to evaluate whether current levels of excess pipeline capacity will continue to meet New Jersey's needs. Estimates of future demand are incorporated into several studies described above and show that even assuming peak demand were to grow 25% by 2030, there will be significant unused pipeline capacity.

In this section, we evaluate additional factors that will shape demand for natural gas and that show that all factors point to future reductions in demand.

- Recent modeling of gas generation located in New Jersey used to estimate in-state emissions for Reginal Greenhouse Gas Initiative (RGGI) show that gas consumption will decline by 2020, and further decline by 2030.
- Even if a substantial increase of in-state gas generation occurred in New Jersey (which is not expected to occur) there is more than enough current excess pipeline capacity.
- Meeting the Global Warming Response Act goals will require less natural gas.
- New modeling shows pathways in other states that achieve 80% or higher emissions reductions by 2050. These pathways show more clearly that natural gas can be

[25] The January 2016 Index of Customers filed by each interstate natural gas company with the FERC shows a total of 10,457 individual contracts between 140 large and small pipelines and storage companies and 2,560 distinct shippers.
[26] Lander, Greg. *Analysis of reliability in the Electric and Gas Markets, Cost Savings and Project Need.* November 28, 2016. https://rethinkenergynj.org/wp-content/uploads/2017/01/Nov-2016-Skipping-Stone.pdf
[27] *Comments of the New Jersey Division of Rate Counsel.* July 25, 2018, p. 6. New Jersey Division of Rate Counsel. https://www.nj.gov/rpa/docs/PL18-1_Comments_of_NJDRC.pdf.

replaced by portfolios of clean energy resources, while maintaining reliable electric service and lowering costs.

Three large sectors of the New Jersey economy are now almost exclusively fueled by natural gas: residential, commercial, and electric generation. Together, these sectors accounted for 40% of statewide emissions in 2012, almost entirely attributed to natural gas, as shown in Figure 4.

In New Jersey, the transition from coal generation to gas occurred from 2007 to 2016 and resulted in lower overall emissions from electric generation. Coal generation provided less than 2% of New Jersey's electric needs in 2017. New Jersey built a natural gas "bridge" a decade ago and now needs to take steps to remove it.

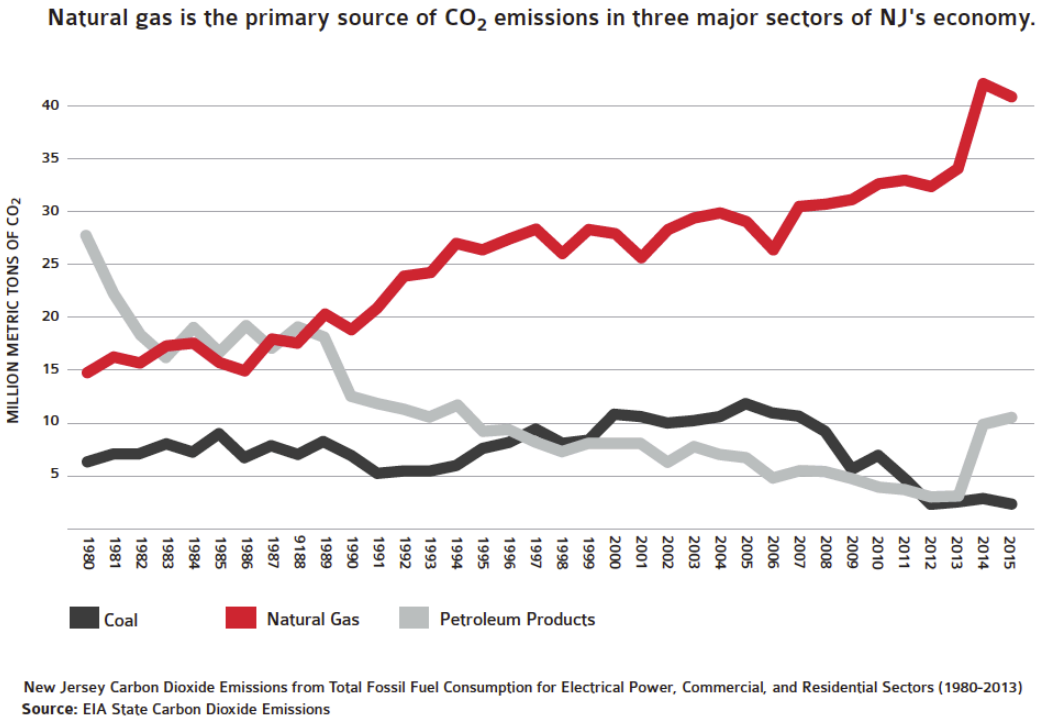

Figure 4. Natural gas emissions in New Jersey

Even if additional gas-fired generation plants were built in New Jersey and resulted in increased total generation, sufficient excess pipeline capacity already exists to meet this potential increase in demand.

In addition, the following new analysis shows that the maximum amount of gas that would be needed to replace generation from retiring coal plants and eventually the three remaining nuclear plants could be met by existing pipelines.

Further growth of gas-fired generation plants in New Jersey would result in higher utilization of existing gas pipelines in New Jersey, rather than new pipelines, since it is not cost-effective for gas plant owners to contract for new pipeline capacity.

Most natural gas use in New Jersey is for heating space and water in building systems (53% of gas consumed), followed by gas-fired electric generation (39% of gas consumed). In 2016, gas consumption in all sectors reached a high of 760 bcf.

Further, recent EPA data show that demand for natural gas-fired generation located in New Jersey also declined in 2017.

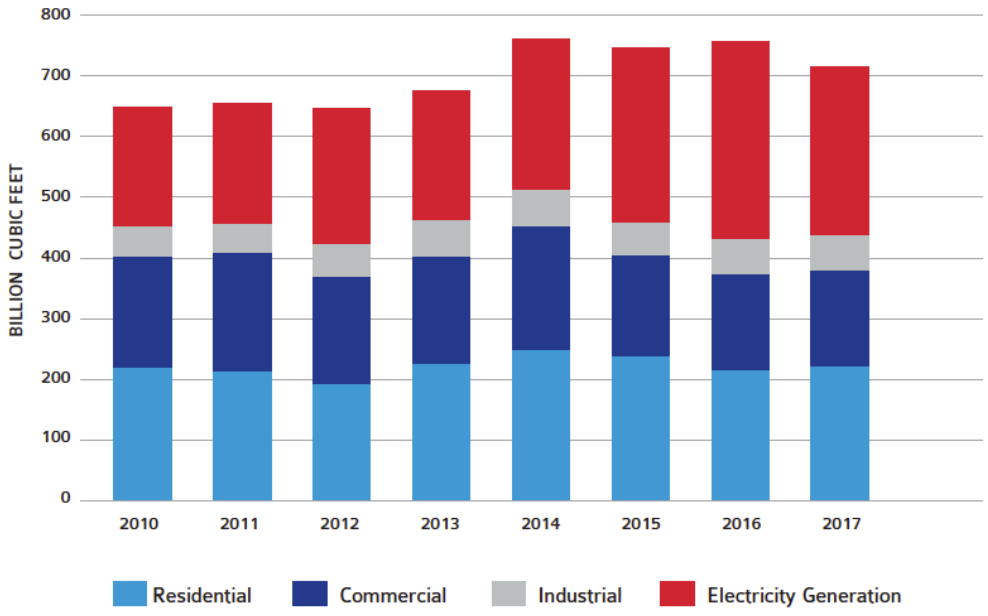

Figure 5. Natural gas consumption in New Jersey by sector, 2010 to 2017

Climate policies and market forces are also expected to contribute to reduced gas-fired generation in New Jersey.

In the spring of 2018, Natural Resources Defense Council (NRDC) commissioned consulting firm ICF International, Inc. to conduct modeling of an appropriate Regional Greenhouse Gas Initiative (RGGI) emissions cap and trajectory for New Jersey upon re-entry to RGGI. NRDC shared the findings with New Jersey and RGGI states. The analysis was completed with ICF's Integrated Planning Model (IPM), a detailed model of the electric power system routinely used by the electricity industry and regulators, to assess the effects of environmental regulations or policies. The analysis reflects all federal and state policies as of May 2018, including New Jersey's Clean Energy Act of 2018.[28]

[28] NRDC assumed a cap of 12.6 million short tons of CO2 in 2020 for New Jersey that then declines by 3% a year from 2021 to 2030, in line with the established Phase 2 trajectory for all RGGI states. The initial 2020 cap was based on unit-level financial modeling of New Jersey's existing and planned power plants using S&P Global Market Intelligence Power Forecast Model. S&P utilizes the AuroraXMP tool to project revenue potential, simulate and

The ICF analysis shows that an initial target for 2020 of no more than 13 million short tons of CO_2 is reasonable and achievable for the state's power sector. Further, it shows that a 3% per year decline in the state's cap through 2030 is reasonable and achievable for New Jersey.

This decline in emissions comes largely from reduced natural gas consumption by the state's power fleet, with annual consumption falling from 255 trillion Btu in 2017 to 177 trillion Btu in 2030, a decline of 30%.

Thus, this analysis projects a 30% decline by 2030 in consumption of natural gas for gas-fired generation from 2017 levels. With additional renewable and storage capacity coming online under the new legislation, the modeling also finds no need to build additional, new natural gas facilities to meet demand or balance the grid.

In addition, several New Jersey policies will create downward pressure on energy prices in the state, making in-state gas generation less competitive, which could result in reduced generation, depending on such other market factors as:

- Energy efficiency in New Jersey will reduce local demand and put downward pressure on energy prices for all generation serving New Jersey.
- In-state solar and offshore wind have low operating costs and will put downward pressure on energy prices for all generation serving New Jersey.
- Policies that encourage flexible load and storage can reduce demand for in-state gas-fired peaking plants and reduce emissions. These reductions are particularly important for local health as these plants produce high levels of harmful emissions.

These trends tell us that gas consumption in New Jersey likely reached its peak in 2016. Current and future climate policies — higher energy-efficiency gains, decreased reliance on gas-fired electricity generation, improved building efficiency and weatherization, and a shift of heating and cooling systems from natural gas to high-efficiency electric heat pumps — would lead to a significant decline in natural gas consumption.

Analysis of Contingencies That Could Increase Demand for Gas

Existing pipeline capacity is sufficient to meet potential short-term increases in gas-fired generation.

analyze generation dispatch decisions at a unit- and wholesale market level, among other things. The Power Forecast model and its outputs is a subscription service of S&P Global Market Intelligence. It is updated quarterly based on the latest market data and futures/forward curves for fuel costs and emission allowances (including RGGI). NRDC relied on S&P's December 2017 modeling. See www.spglobal.com/marketintelligence/en/campaigns/energy.

While the above analysis of demand describes several factors that will reduce the consumption of natural gas over the medium and longer term, we nevertheless consider several reasons why a temporary increase in gas consumption could occur.

In total, if all three nuclear power plants and remaining coal plants were to retire by 2030 and were replaced solely with in-state gas-fired generation, New Jersey would **require at most 0.6 bcf/d per day of additional peak pipeline capacity.** The above analysis of capacity shows the state's current excess pipeline capacity of at least 1.3 bcf/d is more than sufficient to meet demand even if the aforementioned coal and nuclear plants close. With further climate policies, the excess capacity available in New Jersey will only grow from 1.3 bcf/d by 2030, without adding new pipeline capacity.

Further growth of gas-fired generation plants in New Jersey would result in greater use of existing gas pipelines in New Jersey, rather than creating the need for new pipelines. The maximum amount of gas that would be needed to replace generation from retiring coal plants, and eventually the three remaining nuclear plants, could be met by existing pipelines.

This analysis examines several possible scenarios that could temporarily increase in-state gas consumption. These short-run events would not alter the impact of climate policies expected to drive a reduction in natural gas usage to very low levels by 2050.

Market forces could lead to the closure of New Jersey's three remaining coal plants in the near term. This generation (1,300 GWh per year) would be replaced by the lowest-cost mix of generation within the regional PJM network. In the unlikely event that all of the generation were replaced with in-state, gas-fired electric generation, the additional gas required would total just 8 bcf per year — less than 2% of New Jersey's gas consumption.

The Salem and Hope Creek nuclear power plants (3,360 MW capacity) now provide about 28,000 GWh of generation each year to PJM, representing 37% of New Jersey's retail electric sales. If these nuclear power plants close prior to 2030, the loss of generation would be replaced by a mixture of gas-fired generation, possibly coal, and renewables from within the PJM network of states, and by reducing peak demand and increasing energy efficiency. The most likely scenario is that a significant portion of this electricity would come from outside New Jersey.

The maximum increase in gas consumption in New Jersey would occur if nuclear power were replaced **solely by** in-state gas-fired generation. In this unlikely event, gas consumption would increase by 18%, or 0.5 bcf, on peak days. Significant excess gas-fired generation already exists in PJM that could replace all of this generation. If, however, even half of this electricity would come from within New Jersey, it would represent a 9% increase of gas consumption, with a peak daily requirement of 0.25 bcf.

Electric-generation plant owners rarely invest in new pipeline capacity

Further growth of gas-fired generation plants in New Jersey would result in more use of existing gas pipelines, rather than new ones. The maximum amount of gas that would be

needed to replace generation from retiring coal plants and eventually the three remaining nuclear plants could be met by increased utilization of existing pipelines.

If a net expansion did occur in response to market conditions, additional pipeline capacity would not be required for several reasons.

First, gas-fired generation plants produce the most electricity during the summer months to provide air-conditioning, at a time when gas usage for heating buildings is low and pipelines typically have more than 50% unused capacity. Electricity usage peaks during summer months, while peak demand for gas occurs in the winter.

Second, the current amount of excess pipeline capacity would be more than sufficient to meet winter demand for new gas-fired electric plants.

And, third, gas-fired electric generation plants rarely contract for new pipeline capacity. They often require a short connection between a new gas plant and the closest transmission line, but do not drive the creation of new transmission pipelines such as PennEast.

For electric plants, the cost of new pipeline capacity (in the form of contracts for firm capacity) is significantly higher than other options for obtaining fuel. Under current conditions, gas-plant owners save money each year by avoiding entering into long-term contracts for pipeline capacity and, instead, simply buying "leftover" gas available in the marketplace year-round and paying higher "spot" prices on some days in the winter when demand is highest. By doing this, they avoid paying for "firm" pipeline capacity every day for at least 15 years whether or not the capacity is utilized.

Privately owned gas generation plants and local gas utilities decide whether to invest in new pipeline capacity based on economic analysis of available options. Options for purchasing natural gas are to:

Option 1. Purchase new pipeline capacity, locked in for 15-20 years
Option 2. Purchase natural gas in the spot market year-round, including during peak periods
Option 3. Invest in additional on-site or nearby storage such as natural gas liquefaction to liquified natural gas (LNG) and storage in LNG tanks
Option 4. In the case of private generators, switch to alternative fuel a few days a year when gas prices are highest
Option 5. Plan on an annual winter delivery of stored LNG available at existing LNG storage sites and delivered through the existing pipeline network, when needed

Electric generators rarely subscribe for more than token amounts of pipeline capacity as they find the other options both less costly and lower-risk, as shown in the analysis in Chart 1. The analysis of options 1 and 2 below uses cost data from a 13-day cold period in 2017-2018, during which firms would have realized substantial savings ($80,000) by purchasing gas on the spot market compared to purchasing new pipeline capacity.[29]

[29] Lander, Greg. *Analysis of Regional Pipeline System's Ability to Deliver Sufficient Quantities of Natural Gas During Prolonged and Extreme Cold Weather (Winter 2017-2018).* February 11, 2018, p. 3. Skipping Stone. https://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=14820449.

Even more important to the business decision, purchasing via the spot market requires no long-term commitment, while a contract for new pipeline capacity generally requires a firm commitment for 20 years. A gas generator would be locked into a higher cost option valued at about $10 million over 20 years, making it difficult to compete in the wholesale electric market.

Gas priced on new pipeline capacity	Gas available in spot market	Savings for spot market gas, each year	20-year savings (discounted)
$575,780	$495,810	$79,970	~ $10 million
20-year commitment required	No long-term commitment required	n/a	n/a

Chart 1. Economic analysis for privately owned gas generation plant.[30]

Further analysis of options may lead private generation plants to choose a dual fuel option if it is less costly than the spot market option. Each option would result in savings over the purchase of firm pipeline capacity, if the expected number of cold days and spot prices resemble the most recent winter analyzed here.

Reducing greenhouse gas emissions will require reductions in natural gas usage

The New Jersey Global Warming Response Act, enacted in 2007, calls for reducing statewide greenhouse gas emissions to 80% below 2006 levels by 2050, setting a target of 25.4 million metric tons of carbon dioxide equivalent (MMT CO2e) across all sectors. Given the level of emissions from electric generation in 2006, an 80% target for 2050 would be about 7 MMT CO2e; at 90%, emissions would be limited to about 3.5 MMT CO2e.

In 2016, emissions from natural gas usage in three sectors — electric generation, residential, and commercial — was 41 MMT CO2e. To reach 7 or 3.5 MMT CO2e will require a dramatic reduction in usage of natural gas.

If in-state, gas-fired electricity generation increases in the medium or longer term, New Jersey would have a very low chance of meeting its goals under the Global Warming Response Act.

[30] *Motion For Leave To Answer and Answer on Behalf of New Jersey Conservation Foundation and Stony Brook Millstone Watershed Association*. March 15, 2018, pg. 4. Columbia University School of Law Environmental Law Clinic and Eastern Environmental Law Center.

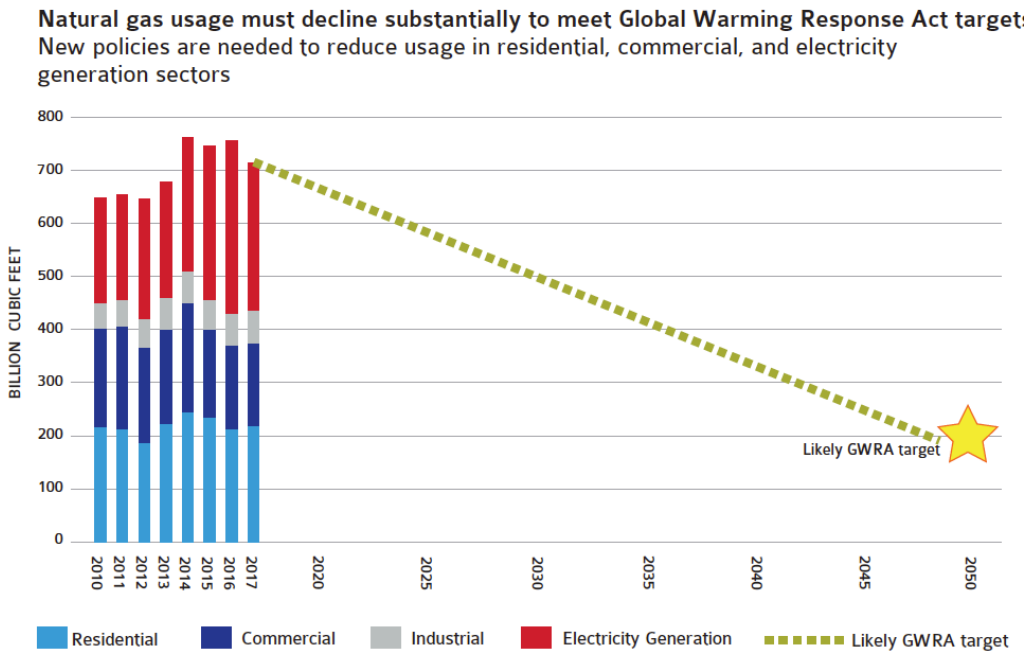

Figure 6. Estimated reduction of natural gas emissions required to achieve GWRA goals

New Jersey's Clean Energy Future

Very little, if any, gas generation will be needed in a low-cost clean energy future.

A portfolio of clean energy resources could now offer the lowest-cost pathway for New Jersey consumers. New research suggests that states like New Jersey may achieve significant savings over business-as-usual by growing an optimized portfolio of renewable energy, flexible load, and electrification of key sectors. A clean portfolio would both reduce CO_2 emissions in the electricity generation sector by at least 90% by 2050, and electrify the transportation, residential, and commercial sectors — which could lead to an economy-wide reduction of emissions of 80% by 2050.

The elements of low-cost pathways to 2050 became clearer in the past year as policymakers and advisors have used modeling tools to identify pathways to 2050. These models simulate the energy production needed to balance load and provide reliable service over long timeframes, based on different combinations of primarily renewable resources. Such models have recently been used in Hawaii, California, and Minnesota to evaluate pathways to achieve 80% to 100% clean energy goals by 2050.

Insights from the Minnesota study[31] are particularly relevant to New Jersey's situation. The study considers scenarios to reduce the **entire state economy's CO_2 emissions by 80%** from 2005 levels by 2050. This level of deep decarbonization would require significant electrification of transportation and building heating and cooling systems, along with a 91% reduction in emissions from the electric sector.

The model considers all types of generation as it creates a low-cost pathway, including nuclear, gas, coal, hydro, solar, and wind. The model optimizes combinations of generation, flexible load, storage, and transmission that would provide reliable service, achieve at least 91% reduction of electric sector emissions, and produce the lowest cost way to implement various pathways to 2050. The different pathways explore alternative policy approaches, such as making all the renewable investment in Minnesota versus making some in other states with higher quality or more diverse renewable energy supplies, building more interstate transmission, or building only intrastate transmission.

The study found that for Minnesota:

- By 2050, with high levels of variable generation and little to no natural gas use, the electric system can provide reliable electric service, without fail (and with reserve capacity), with enough generation to meet load every 5 minutes throughout the year.
- Each pathway included high levels of renewables, increased flexible load and storage, and significant electrification, which added additional flexible and inflexible load.
- Scenarios that electrify and decarbonize are estimated to produce yearly savings of between $600 to $1,200 per Minnesota household by 2050.
- A high level of electrification of transportation and building systems helped achieve these cost savings, both by providing efficient new load and significant flexible load.
- Selecting an optimal, diverse mix of renewable resources also contributed significantly to cost savings, both by replacing more costly renewable resources with less costly renewable sources and, perhaps more important, by selecting a renewable portfolio whose energy production profile over time best matched the profile of load, including flexible load.
- Pathways with diverse in-state and out-of-state renewables and additional interstate transmission were considerably less costly than pathways depending entirely on in-state renewables and transmission, which is of special relevance to New Jersey given its location in the PJM regional grid.
- The cost savings to consumers, relative to a natural gas-dominated business as usual scenario, were significant even with continued low gas prices, and became even more remarkable in scenarios with higher future natural gas prices.

New Jersey should undertake similar research and modeling, to provide greater clarity on the most cost-effective pathways to reduce natural gas, along with its emissions.

[31] *Minnesota's Smarter Grid.* July 31, 2018. McKnight Foundation. https://www.mcknight.org/wp-content/uploads/MNSmarterGrid-VCE-FinalVersion-LR-1.pdf

Conclusion

The bottom line is this: New Jersey now relies on a fossil fuel that creates a significant amount of dangerous emissions for much of its electric generation, heating and cooling. We must now move aggressively toward 80% lower emissions by 2050, and this next phase requires a major decline in natural gas consumption. Instead, a smart combination of wind, solar, flexible load, storage, and stepped-up energy efficiency will not only heat, cool, and power New Jersey reliably, it will save money and support a vibrant economy. At this point, building unnecessary pipelines will only increase costs and increase emissions, taking the state in the wrong direction.

"Simply put, the evidence shows that this pipeline is not necessary to reduce gas prices, ensure reliability, allow for flexibility, or for any other reason." [32]

[32] *Motion For Leave To Answer and Answer on Behalf of New Jersey Conservation Foundation and Stony Brook Millstone Watershed Association*. March 15, 2018, pg. 8. Columbia University School of Law Environmental Law Clinic and Eastern Environmental Law Center.