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Proposed NESE Gas Pipeline in New York: A Bad Bargain for Ratepayers and Taxpayers

Modern Energy Planning Would Be a Better Approach

Executive Summary

National Grid proposes construction of a new gas pipeline that is estimated to cost at least $1 billion to build. National Grid claims that the proposed pipeline is needed to meet a growing demand for gas heating in cold weather, but its claim has no factual support, as detailed in this report.

This Northeast Supply Enhancement (NESE) pipeline would ship fracked gas from Pennsylvania to downstate New York for burning. The contract for its use would require ratepayers in Long Island, Brooklyn, Staten Island and most of Queens to pay $193 million a year for 15 years.

The pipeline would provide profits for its developer, the Williams Companies, Inc., based in Tulsa, Oklahoma, and related construction would provide profits for National Grid. But the ratepayers face a substantial risk. National Grid does not disclose what will happen if construction costs are higher than predicted—a common phenomenon in large construction projects. Also, this expensive ratepayer-funded structure could soon become obsolete, and ratepayers will be left with paying for an asset that provides no service.

Asking New Yorkers to pay for a $1-billion pipeline that is not needed is not responsible.

The project required a Clean Water Act water quality certification for construction. During the first two rounds of environmental hearings in New York, National Grid's proposal was rejected by the State Department of Environmental Conservation. The company responded by unilaterally declaring a moratorium on all new development. Inexplicably, it even refused to restore existing but suspended service. The New York State Public Service Commission (PSC) ordered National Grid to remove its unauthorized moratorium and to produce a report to evaluate long-term energy needs in its service area and alternatives to the pipeline. The PSC order is an attempt to find a constructive way to settle this matter. National Grid's proposed

report was issued for public comment in February 2020, and it must be finalized by June 2020.

The Institute for Energy Economics and Financial Analysis (IEEFA) has examined this proposed report and concludes that the pipeline is not needed for the following reasons:

- National Grid is not facing an urgent, pending, unmet demand. Ratepayers are being asked to foot the whole bill for a pipeline that will be used principally during very cold winter days.
- Conditions of extreme cold weather "peak demand" occur on only a few days out of the year, and experts report that the average number of days per year of below-freezing weather, locally, has been declining. A Con Edison study finds that overall warmer winters could lead to a 33% decrease in gas sales by 2050 and a 49% decrease by 2080.
- More flexible, targeted non-pipeline methods exist to manage and reduce peak demand.
- National Grid's projections of increasing demand are higher than Con Edison's, out of step with local and national trends, and unlikely to occur.
- The COVID-19 pandemic's adverse impact on economic activity is substantial. The extent of this impact over the next several years is likely to have a dampening effect on demand, and as new demand arises, it is likely to encounter a market in which consumers have additional choices beyond natural gas.
- Future economic growth in New York does not depend on soaring use of natural gas. New York leads the country in industrial energy efficiency and its comparatively strong record in commercial and residential efficiency is about to become more robust due to new laws.

Strategic planning for energy efficiency and peak demand reduction to ensure coverage is reasonable, but, given these considerations, capital construction is not. The public dialogue is not about whether sufficient supply exists to meet current need. It does. The dialogue is about how to meet the needs of future economic growth in the region. The data confirms that there is no need for this pipeline. Weather trends, population patterns, existing efficiency measures, proven innovations to reduce consumer usage and rate-setting tools make clear that a no-pipeline alternative is sound policy that will have an affordable outcome for consumers.

Asking New Yorkers to pay for a $1-billion pipeline that is not needed is not responsible. Twenty years ago, National Grid and the Williams Companies' case for a pipeline would have faced little public or institutional opposition, but time and innovation have rendered this proposal a monument to the past. Future economic growth in New York can and should be achieved using the best practices we have

now, not outdated remedies. National Grid should move forward with a sustainable program designed with projections more in line with current real-world conditions.

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Introduction

National Grid is proposing to spur construction of a pipeline—the proposed Northeast Supply Enhancement Project, or "NESE" pipeline—to send up to 400,000 dekatherms (400 MDth[1]) of fracked gas from Pennsylvania to New York City and Long Island.[2] The pipeline system would start in Pennsylvania, travel through New Jersey, cross New York Harbor and terminate in the waters near the Rockaway Peninsula.

When the New York State Department of Environmental Conservation denied a Clean Water Act Water Quality Certification for the project in 2019,[3] National Grid unilaterally declared a moratorium on new gas service connections, asserting this was needed to ensure that it could meet future peak demand.[4]

The New York State Public Service Commission (PSC) brought an enforcement action against National Grid challenging its unauthorized conduct in declaring the moratorium.[5] This resulted in a settlement agreement and PSC Order in November 2019 that lifted the regulated utility's self-imposed moratorium on new gas service connections for at least two years.

Enough information is available to conclude that the NESE pipeline is neither needed nor financially advisable.

Under the settlement agreement, the company must assess long-term capacity need for its downstate New York territory—the KeySpan Gas East (KEDLI) and Brooklyn Union Gas (KEDNY) service areas—and investigate options to address it. National Grid's proposed report, issued February 24, 2020 for public comment,[6] continues to present the NESE pipeline as a key element of its capacity strategy. A final report is due by June 2020.

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[1] One MDth is 1,000 Dekatherms. National Grid uses this unit uniformly throughout its 2020 Report.

[2] Estimates vary, but 400,000 dekatherms could serve roughly 2.1 million homes, based on estimates by the Williams Companies, Inc., of other projects it has sponsored in the region. See, *e.g.*, Williams Companies, Inc., FERC approves Transco project to serve growing demand for natural gas in northeastern U.S., August 14, 2018 (stating that 190 MDth/day would serve the heating and other needs for about 1 million homes).

[3] NYS Department of Environmental Conservation, Notice of Denial of Water Quality Certification, Northeast Supply Enhancement Project, DEC ID 2-9902-00109/00004, May 15, 2019.

[4] National Grid, Implementation and Contingency Plan, Oct 21, 2019, NYS PSC Case 19-G-0678, p. 2.

[5] The Public Service Law ("PSL"), § 65-a establishes that if a utility cannot provide increased service due to a gas shortage, the PSC can authorize it to cease providing new or incremental service, but that it should be done in a manner that avoids undue hardship. If adequate supply exists, however, utilities must provide residential customers with service upon a proper application. PSL §31(1) and Transportation Corporations Law §12.

[6] National Grid, Natural Gas Long-Term Capacity Report for Brooklyn, Queens, Staten Island and Long Island, February 2020 (hereafter, National Grid 2020 Report).

Currently, while the demand for gas can peak on extremely cold winter days and exceed the capacity of the existing Lower New York Bay Lateral pipeline serving the area, National Grid manages to meet that peak demand. The company reported to the PSC in 2018 that "National Grid already has a system in place of supplemental gas sources and demand reduction strategies to address peak demand," and that such a peak "only lasts for a few hours."[7]

Today, it still does *not* claim that its existing peak demand management and supply systems have *ever* failed. Rather, it asserts that higher levels of gas burning should occur in New York and that this higher level of gas burning should be achieved by building a massive, costly pipeline, even though it would mostly not be needed except during short periods of peak demand.

The PSC has launched a new initiative to improve natural gas planning in New York. It declares:

> *The current approach to gas system planning poses risks of incomplete alignment with CLCPA, sub-optimal consideration of alternatives and timeframe, increased risk and cost to consumers, and unsatisfactory provision of services and solutions for those same consumers. To align with these policies and to recognize the emergence of potentially viable alternatives to gas infrastructure, gas planning must explicitly take into account of the likely useful life of all alternatives, and of the resulting cost and risk implications.*[8]

The PSC Order requires gas utilities in New York to "file a supply and demand analysis with regard to the locations in their respective service territories known to be vulnerable to supply constraints" by June 17.[9] This information would have been helpful for analysis of National Grid's 2020 Report, but the company did not include it in the proposed report that it issued in February. The Order requires, in subsequent months, a more comprehensive supply-and-demand analysis regarding the utility's service area, a proposal for peaking services and moratorium management issues,

The PSC Order requires a more comprehensive supply-and-demand analysis.

[7] National Grid, Gas Demand Response REV Demonstration Project in New York City and Long Island: Q4 2017 Report, January 31, 2018 (hereafter, National Grid Gas Demand Pilot Report Q4 2017), p. 1.
[8] PSC, Order Instituting Proceeding on Motion of the Commission in Regard to Gas Planning Procedures, Case No. 20-G-0131, March 19, 2020, pp. 6-7. PSC documents are organized by case docket, and the link to the docket is provided. Individual documents within that docket generally can be found most easily by scrolling to the date of submission and searching for the author.
[9] Ibid., p. 12.

and proposals for energy efficiency, demand response, non-pipeline alternative procurements and other measures.[10]

In the absence of this disclosure, nevertheless, enough information is available to conclude that the NESE pipeline is neither needed nor financially advisable, and that more prudent alternatives exist.

Background: National Grid's Corporate Structure and U.S. Activities

KEDNY, also known as the Brooklyn Union Gas Company, is a local distribution company that sells natural gas to roughly 1.3 million customers in Brooklyn, Staten Island, and part of Queens. KEDLI, known as KeySpan Gas East Corporation, similarly serves Long Island and the Rockaway Peninsula in Queens. Although KEDLI and KEDNY operate under separate tariffs, they are both wholly-owned subsidiaries of National Grid USA (NGUSA). NGUSA is a wholly-owned subsidiary of National Grid North America Inc. (NGNA), which is a wholly-owned subsidiary of National Grid plc, a company incorporated under the laws of England and Wales. Moody's reports that utility operations in New York State accounted for roughly 28% of National Grid plc's annual revenues as of March 31, 2019.[11]

While National Grid provides both natural gas and electricity in parts of New York, Massachusetts and Rhode Island,[12] it no longer provides direct electricity services in downstate New York.[13] It sells only natural gas as a fuel for housing, businesses and power plants.

Getting to the Truth About Future Need

The major driver of National Grid's push for the pipeline is its projection that gas demand will rise by an average of 1.8 percent per year "under current policies and customer usage patterns."[14] Its 2020 Report asserts that efficiency measures

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[10] Ibid., pp. 13-14.
[11] Moody's Investor Services, Credit Opinion: KeySpan Gas East Corporation, December 30, 2019, p. 3; Moody's Investor Services, Credit Opinion: Brooklyn Union Gas Company, December 30, 2019, p. 3; and PSC, Request for Proposals, p. 6, attached to PSC, Order Instituting Proceeding and Authorizing Issuance of a RFP, Case No. 18-M-0195, May 17, 2018.
[12] National Grid's operations in Massachusetts were subject to scrutiny when it issued a lockout order in mid-2018 against its workers during a protracted labor contract dispute, suspending their health insurance. The dispute was resolved in early 2019. The state legislature and governor had acted to pass a law extending unemployment benefits for the workers. Boston Globe, National Grid workers ok contract, ending lockout, Katie Johnston, January 7, 2019.
[13]National Grid's management service contract for transmission and distribution of electricity for the Long Island Power Authority (LIPA) ended in 2013; LIPA transitioned the service to the Public Service Enterprise Group Long Island LLC (PSEG-LI). NorthStar Consulting Group, A Comprehensive Management and Operations Audit of National Grid USA's New York Gas Companies, Final Report, Case 13-G-0009, July 25, 2014 (hereafter, NorthStar 2014 Audit of National Grid), p. II-3.
[14] National Grid 2020 Report, p. 7.

required by State policy would reduce this rate to 1.1 percent (a "High Demand, Energy Efficiency" scenario), and the rate could drop to 0.8 percent (a "Low Demand, Energy Efficiency" scenario) with more aggressive energy efficiency.[15] But the projection raises more questions than it answers because of the large gap between National Grid's planning target and actual record highs in gas demand, and the unexplained steep upward incline in National Grid's demand projection that is inconsistent with recent trends.

National Grid's projections raise more questions than they answer.

The Gap Between National Grid's Planning Target and Actual Record Highs of Peak Demand Is Substantial

To develop its projections, National Grid uses a "Design Day," which is a hypothetical day of extreme cold that would generate a high demand for gas. The utility selects that level of demand as the target capacity for its gas supply system.

The Design Day load forecast should be protective, while staying within a reasonable range. The reasonableness of this Design Day load forecast is important. National Grid uses it to develop its Five-Year Distribution System Reinforcement and Reliability Plan and to justify the amount of natural gas capacity that it deems necessary to establish for each year.[16]

National Grid defines a Design Day as a 24-hour period in which the temperature averages 0°F.[17] Although this is intended to be a one-in-40-year probability, downstate New York has not actually experienced a real "Design Day" condition since 1934, over 85 years ago.[18] Such conditions were not even reached during the notorious "polar vortex" event of the 2013/14 winter. By way of example, National Grid reports that on the two very cold January days in 2019 that generated record-setting demand, the actual average temperature was 8°F and 13°F, respectively.[19]

Currently, the gap between the load called for by National Grid's Design Day and the actual peak load is substantial. National Grid testified to the PSC regarding the size of "new records for sendouts"—the amount of gas that is released from the system to meet the day's needs—that occurred during the last two winter heating

[15] National Grid 2020 Report, p. 8.
[16] NorthStar 2014 Audit of National Grid, p. V-26.
[17] National Grid 2020 Report, p. 19. It reports that the Consolidated Edison Company of New York (Con Edison) uses the same Design Day.
[18] National Grid 2020 Report, pp. 18-19.
[19] The dates were January 6 and 21, 2019. National Grid Gas Infrastructure and Operations Panel ("GIOP"), Direct Testimony, KEDNY Rate Case No. 19-G-0309, April 2019, pp. 57 and 66.

seasons.[20] It reported that:

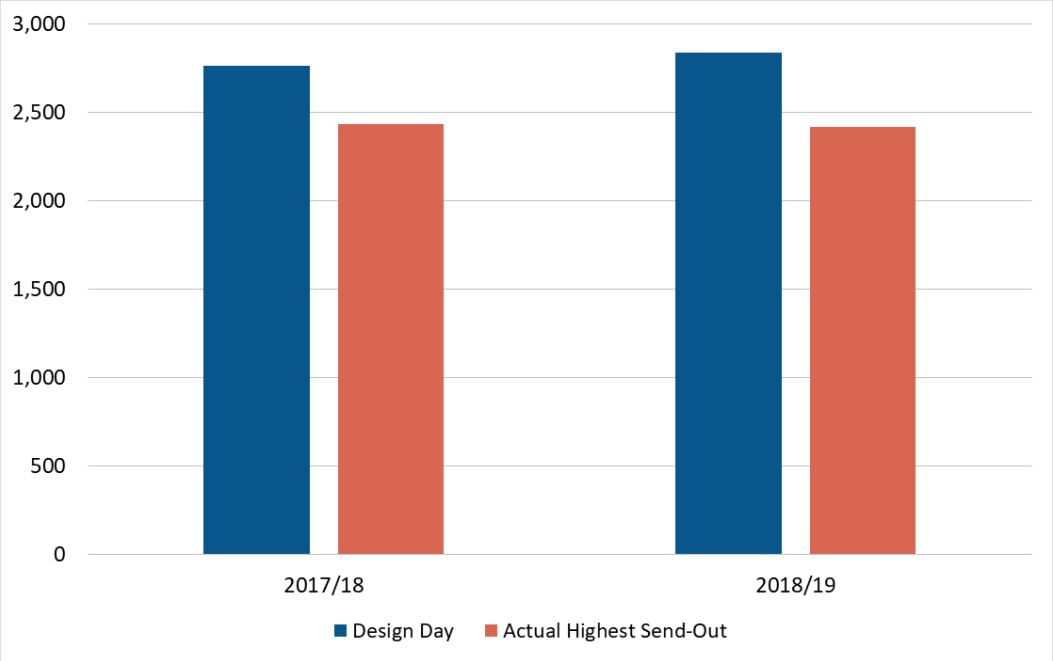
- During the winter of 2017/18, KEDNY and KEDLI both recorded four of their top ten sendout records. On January 6, 2018. KEDNY had a firm load record sendout of 1,417 MDth, and KEDLI's was 1,015 MDth.

- During the winter of 2018/19, KEDNY and KEDLI both recorded two of their top ten sendout records. On January 21, 2019. KEDNY had a second highest firm load sendout of 1,388 MDth, and KEDLI's was 1,030 MDth.[21]

But the combined total of 2,432 MDth for 2017/18 and 2,418 MDth for 2018/19 were still well below National Grid's existing Design Day system capacity, which was 2,762 MDth for 2017/18 and 2,837 MDth for 2018/19.[22] Out of the total 2018/19 Design Day capacity, 330 MDth in 2017/18 and 410 MDth in 2018/19 remained unused on the date of National Grid's highest "sendout" of gas for the downstate New York service area, even though National Grid states that these were record high sendouts.

[20] Ibid., p. 66.
[21] Ibid. and National Grid GIOP, Direct Testimony, KEDLI Rate Case No. 19-G-0310, April 2019, p. 57.
[22] National Grid, 2018-19 National Grid Winter Supply Review, Case 18-M-0272, July 16, 2018 (hereafter, National Grid Winter Supply Review 2018-19), p. 56, Table 1a [2018/19] and p. 84, Exh. 1 [2017/18]. The Design Day capacity is 2,868 MDth for 2019/20. See National Grid Director of Gas Supply Planning, Second Supplemental Testimony to the PSC, Elizabeth Arangio, Rate Case Nos. 19-5-0309 and 19-G-0310, December 13, 2019, Exh. EDA-6SS.

Figure 1: Design Day Load vs. Actual Record Send-outs



Source: National Grid GIOP, Direct Testimony, KEDNY Rate Case, p. 66, and Direct Testimony, KEDLI Rate Case, p. 57; National Grid, 2018-19 National Grid Winter Supply Review, p. 56, Table 1a and p. 84, Exh. 1; and National Grid Director of Gas Supply Planning, Second Supplemental Testimony, Exh. EDA-6SS.

The Independent Monitor appointed by the PSC to ensure compliance with the enforcement case settlement order, Adam H. Schuman, has recommended that National Grid should revisit the appropriateness of this Design Day given that, "the need to supply capacity for such an event may be highly infrequent, but National Grid plans for such an event and, absent possessing sufficient capacity to meet demand in a Design Day scenario, contemplates a moratorium."[23]

A new report by Synapse Energy Economics suggests, based on 70 years of temperature data, that a Design Day average temperature of 3°F would be reasonable, and calculates that this change would reduce the design load by about 107 MDth/day for the 2019/20 winter heating season.[24] If the PSC were to determine that this is a reasonable adjustment to the Design Day target, it would reduce the estimate of unmet Design Day peak load needed for the winter of 2034/35 by more than a quarter (26 percent) under National Grid's middle range projection (high demand plus energy efficiency) and by roughly 40 percent or more under National Grid's low range projection (Low Demand plus Energy Efficiency).[25]

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[23] Adam H. Schumann, Independent Monitor, National Grid Monitorship, 1st Quarterly Report, Cases Nos. 20-G-0086 and 20-G-0087, March 13, 2020, p. 11.
[24] Synapse Energy Economics, Inc., Assessment of National Grid's Long-Term Capacity Report: Natural gas capacity needs and alternatives, prepared for the Eastern Environmental Law Center, April 6, 2020, p. 15.
[25] See National Grid 2020 Report, p. 43, Figure 20.

The Actual Frequency of Peak Demand Periods in Downstate New York

The PSC's natural gas planning order places a high priority on transparency. For example, it instructs the PSC staff to consider the competing interests of utility business confidentiality and the "high importance to the public" of disclosure of relevant information in making determinations about confidentiality.[26] This will be helpful in future proceedings, but the current proceeding has not benefited from this mandate. Important information relevant to assessing peak demand is missing.

National Grid's 2020 report does not disclose how often conditions of peak demand occur.

National Grid's 2020 Report does not disclose how often conditions of peak demand occur.[27] Nor has it responded to questions submitted by the public in the enforcement proceeding about how often peak demand measures are implemented.[28] Other documents, however, indicate that hours of peak demand causing utilities to ask "firm" customers (who have no alternate heating system or are never required to use one) to reduce load, typically may occur roughly four to seven times per year. Documents imply that customers with fuel-switching capability and lower, incentivized rates, may be required to temporarily use alternate fuel up to ten or more times a year.

National Grid operates a peak shaving pilot project—an incentive-based program targeting large commercial firm gas customers in areas prioritized by gas distribution constraints. That program requires participating customers to commit to respond to demand reduction action requests ("curtailment events") "no more than six (6) times per winter."[29] These customers voluntarily shift their timing or amounts of gas use, rather than switching fuels. Curtailment events last from 6:00

[26] PSC, Order Instituting Proceeding on Motion of the Commission in Regard to Gas Planning Procedures, p. 6.
[27] In National Grid's 2020 Report, the term "peak demand" is not defined, but appears to be used to describe conditions during which the utility takes action to tap additional gas supplies and to curb demand. Con Edison defines "peak demand" as "the highest rate at which gas is delivered to or by a system, expressed in cubic feet or therms, or multiples thereof, for a designated period of time." Con Edison, Gas Long Range Plan 2019-2038, January 2019, p. 59.
[28] See Sara Gronim, Letter of comment to the PSC, Case No. 19-6-0678, March 3, 2020; and Oral comments of Alexi Assmus, Eastern Environmental Law Center, urging response to requests for information on how various assumptions to estimate future demand were developed. A National Grid spokesperson replied that responses would be provided after the public comment period closed, "probably by the end of April." Transcript from National Grid Natural Gas Long-Term Capacity Report Public Meeting, March 30, 2020, pp. 25-26.
[29] National Grid, Gas Demand Response Report Q4 2017, p. 2.

a.m. to 9:00 a.m.[30] National Grid reported to the PSC that:

- From January through February 2018, it activated the demand management request, as planned, five times in its KEDLI territory and three times in its KEDNY territory.
- In 2019, it again "called" five events in its KEDLI territory three events in its KEDNY territory.[31]
- Apparently, no peak hour conditions occurred during the winter of 2019/2020 to trigger the calling of an event. National Grid stated in its January 31, 2020 report, "During the third DR season (2020), no events have been called due to relatively warm weather conditions."[32]

In discussing the need to continue to collect data, National Grid acknowledged that it had not been able to verify performance "under true peak day conditions, which have not been experienced during the course of the Project."[33]

By way of comparison, with regard to a gas peak demand pilot project for Westchester County, Manhattan, the Bronx, and parts of Queens, Con Edison projected that, based on the "previous 10 years of weather data," it would likely have to call "an average of 3-4 events per season for the 2018/19 event trigger of 18°F."[34] Its projection was correct. Con Edison called three events for the 2018/19 winter, all of which occurred in the month of January, with average temperatures ranging from 13°F to 14°F.[35] Some variation in frequency can occur. Con Edison reports that if its project had been in effect for the 2017/18 winter, it might have called gas demand response events seven times during the

Con Ed called three events for the 2018/19 winter, with temperatures from 13°F to 14°F.

[30] Ibid.
[31] It notes that a period of higher demand did occur in November 2018, but its program—unlike a similar program by Con Edison, did not include that month. The project runs from December 1 through March 1. National Grid, Gas Demand Response REV Demonstration Project – Q4 2018 Report, Case No. 16-G-0058, January 31, 2019, p. 7.
[32] National Grid, Gas Demand Response REV Demonstration Project – Q4 2019 Report, Case No. 16-G-0058, January 31, 2020 (hereafter, National Grid Gas Demand Pilot Report Q4 2019), p. 7.
[33] Ibid., p. 4.
[34] Con Edison, Gas Demand Pilot Project Implementation Plan, 2018-2021, Case No. 17-G-0606, April 26, 2018, p. 6. According to the PSC, Con Edison predicted that an average of 3-5 events would occur per season. PSC, Order Approving With Modification Gas Demand Response Pilot, Case 17-G-0606, August 9, 2018, p. 6.
[35] Con Edison, Gas Demand Response Report on Pilot Performance, 2018-2019, Case No. 17-G-0606, July 1, 2019, p. 6.

season, which could have included two or three days in a row.[36] Nevertheless, Con Edison advises customers who are considering enrolling in the program that they can expect "approximately four events" per winter season.[37]

Under a more conservative National Grid program, activated when temperatures fall below 16°F, certain large customers pay lower rates in exchange for temporarily switching entirely from natural gas to an alternate fuel. To be eligible for this program, a customer must have access either physically or contractually to a 10-day supply of alternate fuel.[38]

Peak demand conditions also tend to occur during certain hours of the day. National Grid reports that "customers tend to use more gas in the early morning hours, typically 6-10 a.m., and again in the evening from 4-8 p.m."[39]

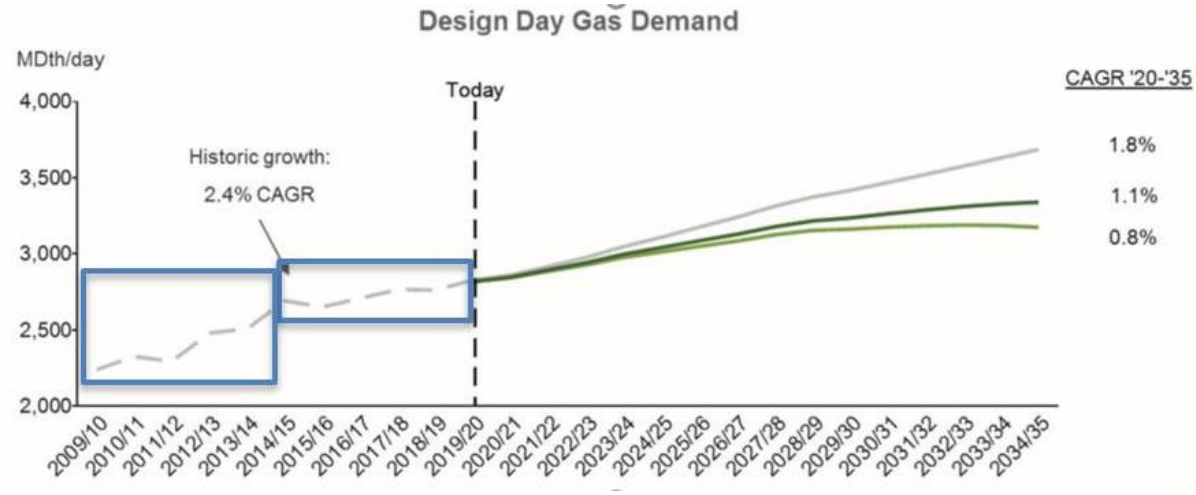
While National Grid should supply a more robust analysis of actual peak day occurrences, it is reasonable to conclude that peak demand conditions occur on only a few days of the year. Moreover, as explained below, the number of peak days that occur per year likely is declining. Information on the frequency of occurrence of peak days would help inform the discussion of what types of measures are reasonable for managing peak demands.

National Grid's Inexplicable Steepened Incline: Inconsistent With Trends

The rationale for National Grid's baseline compound annual growth projection of 1.8 percent is not clear. National Grid's graph of the historical rise in Design Day Gas Demand shows that the rate of increase has slowed substantially over the past six years compared with the preceding four years. This has occurred even without the additional energy efficiency initiatives to be included under National Grid's alternate scenarios. The Energy Futures Group, in a recent report, provided a modified version of National Grid's graph, simply highlighting the noticeable shift in rate of growth.

[36] Con Edison, Response to Comments on Petition for Approval of the Smart Solutions Natural Gas Demand Response Pilot, Case 17-G-0606, July 26, 2018, p.4.
[37] Con Edison webpage, Smart Usage Rewards for Reducing Gas Demand: Frequently Asked Questions, accessed April 9, 2020.
[38] Typically, the alternate fuel used is ultra-low sulfur No. 2 distillate fuel oil. National Grid is launching an additional TC program that activates fuel-switching at 20°F. See PSC, Order Approving Tariff Revisions and Requiring Further Tariff Filings, Cases Nos 16-G-0058 and 16-G-0059, February 7, 2019, pp. 3 and 13.
[39] National Grid 2020 Report, p. 19. While Con Edison's pilot required reductions over a 24-hour period, National Grid's pilot only required reductions from 6:00 am to 9:00 am. See Con Edison, Gas Demand Pilot Project Implementation Plan.

Figure 2: National Grid's Historical/Projected Design Day Gas Demand Highlighted by Energy Futures Group[40]



By way of comparison, Con Edison, which provides gas for Manhattan, the Bronx, part of Queens, and most of Westchester County, stated in its January 2019 Gas Long Range Plan that while its "near-term" compounded annual growth rate for firm peak demand is forecasted to be 1.1 percent over the next five years, its forecast drops to "0.5 percent over the next 20 years."[41] National Grid's report does not explain the difference between its demand projection and that of Con Edison's.

The EIA predicts a slower rate of demand growth nationally in the coming decade. It expects natural gas use in the residential and commercial sectors to remain "largely flat" due to "efficiency gains" and "population shifts."[42] It predicts that the total demand for residential, commercial, industrial and electric power production after 2030 will rise "almost 1% per year on average" due to increased use in the electric power and industrial sectors.[43] This post-2030 forecast is still lower than National Grid's mid-range prediction (high demand plus energy efficiency).

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[40] National Grid 2020 Report, Figure 1, p. 8, with the Energy Futures Group highlighting the shift in pace of annual average gas demand growth. Energy Futures Group, Critical Elements in Short Supply: Assessing the Shortcomings of National Grid's Long-Term Capacity Report, March 9, 2020, p. 10.

[41] Con Edison, Gas Long Range Plan 2019-2038, January 2019, p. 17.

[42] EIA, Annual Energy Outlook 2020., p. 56. The EIA's prediction of 1% growth per year includes the national industrial sector, so it is a conservative prediction relative to New York, meaning that it may overestimate growth. While EIA predicts that national industrial sector gas consumption rises through 2050, New York's industrial sector has a much lower rate of energy use than other states, as noted in this report. The EIA predicts that natural gas used for electricity generation peaks in 2021, then dips and remains "relatively flat through 2030," and does not rise again to its 2021 level until the late 2040s.

[43] Ibid., p. 46.

The impact of newly mandated energy efficiency and demand response programs and that of additional energy efficiency and demand response measures—as indicated by National Grid's middle-range "high demand plus energy efficiency" 1.1% compounded annual growth curve and its "low demand plus energy efficiency" 0.8% compounded annual growth curve, respectively—likely should be subtracted from a more reasonable baseline.

Neither the National Grid nor the Con Ed projection considers climate change impacts.

Neither the National Grid projection nor the Con Edison projection, moreover, consider climate change impacts. A subsequent Con Edison study released in December 2019, however, found:

> *In a generally warmer climate, the gas sector could experience significant decreases in winter energy sales for heating. There could be up to a 33% decrease by 2050 and a 49% decrease by 2080. Similarly, under the RCP 8.5 [a higher prediction of climate-driven temperature increases] scenario, winter gas peak load is projected to decrease by 144 MMdt [144,000 MDth] in 2050, compared to the base case.*[44]

Its report notes that, "To account for changing temperatures, Con Edison could integrate climate change data on changes in the winter gas TV into gas volume and peak load forecasting so that the company is continuously planning for future changes in climate."[45]

Considering climate change impacts would be consistent with the approach of the Energy Information Administration ("EIA"). This federal entity[46] considers climate change in its predictions based on historical and near-term forecast data from the National Oceanic and Atmospheric Administration and on population projections. Its Annual Energy Outlook 2020 report projects that:

> *Demand for space heating from fuels such as natural gas, distillate fuel oil, propane, and electricity decreases through 2050 as a result of fewer heating degree days (HDDs)—a measure of how cold a location is over a time period*

[44] Con Edison, Climate Change Vulnerability Study, December 2019, p. 51. RCP refers to a "Representative Concentration Pathway." Ibid., p. 4. Con Edison explains, "To acknowledge uncertainty in future greenhouse gas concentrations, the Study team selected the commonly used RCPs 4.5 and 8.5 to drive each GCM, following precedent set by IPCC and NPCC. RCP 4.5 represents a moderately warmer future based on a peak in global greenhouse gas emissions around 2040. In contrast, RCP 8.5 represents a hotter future." Ibid., p. 17.
[45] Ibid., p. 51.
[46] See Department of Energy (DOE) Organization Act of 1977 (P.L. 95-91, 42 USC 7135).

relative to a base temperature.[47]

Although the Con Edison climate study did not find a significant decrease in number of heating degree days,[48] the 2019 report of the New York City Panel on Climate Change found that the number of days per year below freezing temperatures declined at a rate of roughly 1.9 days each decade from 1900 to 2017, according to Central Park temperatures. That resulted in about 22 fewer days per year below freezing in 2017.[49] Also, Con Edison predicts an overall winter warming, stating that by 2050, "winter minimum temperatures are expected to fall below 50°F as many as 40 fewer times per year than in the past by mid-century, representing a 20% decrease."[50]

Design Day growth projections should also take into account energy efficiency and alternative sources.

While a Design Day growth projection should be conservative enough to account for variations that can occur in weather conditions, it should recognize the growing impact of energy efficiency and alternative energy sources, and it should take cognizance of climate realities.

Getting to the Truth About Future Demand: Questionable Components of National Grid's Projection of Growth

National Grid states that its projections of growth rest on several usage sectors, including oil-to-gas boiler conversions, losses of temperature-controlled customers, new connections and higher gas usage per customer. National Grid's 2020 Report acknowledges that:

> *Design Day demand has grown faster than annual demand largely due to two factors: 1) the shift of residential customers from non-heat [using gas for cooking or other purposes but not space-heating] to heat, which drives load expansion, particularly during colder days, and 2) a reduction in the temperature-controlled customer base, as customers have a preference to use*

[47] EIA, Annual Energy Outlook 2020, p. 116. Heating Degree Days (HDDs) are a measure of the coldness of the weather, based on the extent to which the daily mean temperature falls below a reference temperature (typically 65°F).
[48] Con Edison, Climate Change Vulnerability Study, p. 43.
[49] New York City Panel on Climate Change 2019 Report, Annals of the New York Academy of Science 1439:11-12 (2019), p. 15.
[50] Con Edison, Climate Change Vulnerability Study, p. 19.

natural gas vs. switching to burn fuel oil when the temperature drops.[51]

Both of these factors are conditions that National Grid has failed to manage well. National Grid asserts that the growth in demand that has occurred over the past ten years has also been driven by "new connections" and "higher gas usage per customer."[52] The number of new connections, however, will be influenced by population changes and may also be affected by the economic impact of the COVID-19 pandemic. Furthermore, the premise of higher gas usage per customer—other than that due to oil-to-gas or temperature-controlled to firm customers—conflicts with existing trends.

The Economic Argument for Oil-to-Gas Conversions Is Becoming Less Compelling, and a New Study Controverts the Environmental Argument

The impact on overall demand of converting customers from heating oil to gas is substantial:

- National Grid predicts that roughly 7,600 residential non-heat customers per year will convert to gas heat, for a total of 76,000 customers converting from residential non-heat to gas heat by the winter of 2029/30.[53]
- The rise in Design Day demand created by fuel conversion of residential non-heat customers to residential heat customers is .0014 MDth/day per customer, according to National Grid.[54]
- If all those 76,000 customers, over the next 10 years, did not switch from oil to gas heat but rather to a heat pump system, the impact on Design Day gas demand would be a reduction of 106.4 MDth/day. Even if only a third to a half of these residences were diverted from gas, the impact would be substantial.

Oil-to-gas conversions in New York City initially were driven by passage of Local Law 43 of 2010 and regulations requiring conversion of heavy residual No. 6 and No. 4 fuel oil boilers to other heating alternatives, such as ultra-low sulfur No. 1 distillate oil, natural gas or electrification.[55] No. 6 boilers were required to convert by December 31, 2015. Subsequent legislation required that the No. 4 boilers must

[51] National Grid 2020 Report, p. 28.
[52] National Grid 2020 Report, p. 7.
[53] National Grid, Natural Gas Long-Term Capacity Report Technical Appendix, March 20, 2020, p. 2, Table 1. National Grid states that the greatest increases are from residential heat and multi-family, "offset by reductions in residential non-heat and temperature-controlled customers as these customers switched to firm gas heat." National Grid 2020 Report, p. 29.
[54] Ibid. Based on the data presented, the Design Day gas demand is .0001 MDth/day per residential non-heat customer, but .0015 MDth/day per residential heat customer.
[55] City of New York, Local Law 43 of 2010 and Rules of the City of New York, Chapter 2 (Engineering Criteria for Fossil Fuel Burning Boilers & Water Heaters), Title 15, §§ 2-15(b)(2), (c)(1) and (d)..

be converted upon replacement, but no later than by 2030.[56] National Grid admits that nearly all such boilers have already been converted.[57]

Nevertheless, National Grid continues to conduct fuel conversions, targeting not only the remaining older boilers, but also the far more plentiful boilers burning ultralow sulfur fuel oil No. 2 (blended with some biodiesel). The No. 2 boiler conversions are not required by law because No. 2 oil is much less polluting than the heavier residual No. 4 and No. 6 oils that were banned. Conversions of No. 2 oil to gas have occurred, however, because of a market price differential between oil and gas, and National Grid has encouraged these conversions. An audit of National Grid by The NorthStar Consulting Group in 2014 disclosed that:

National Grid must re-examine oil-to-gas conversion costs, market/industry conditions and environmental concerns.

> *In late 2012, NGUSA established a working team to assess the gas distribution expansion opportunities. The team addressed the following question: "How can National Grid cost-effectively connect the most customers with the goal of achieving allowed regulated returns?"*[58]

The auditors reported that the NGUSA working team determined that while franchise expansion offered only limited opportunities, "unserved customers offer high potential for growth." These included customers who used gas for cooking but not heating, and non-gas potential customers who were located reasonably close to a gas main. The audit team observed that the plan to convert unserved customers was approached by location rather than individual customer request, reporting:

> *The team evaluated four strategic options: 1) Controlled Growth (focus on single customers), 2) Focused growth (combine groups of customers), 3) Strategic Build Out (coordinate growth construction with main replacement and other work under a load density constraint and other constraints, and 4) Access to Gas for all (similar to Strategic Build Out, but no density constraints)… NGUSA chose to pursue the Strategic Build Out option.*[59]

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[56] New York City adopted legislation in 2015, Local Law 38, that prevented the burning of No. 6 fuel oil for any purpose by January 1, 2020, and the burning of No. 4 fuel oil by January 1, 2030 – except that any boiler replaced before the deadline must use a cleaner fuel. City of New York. Local Laws of The City of New York For the Year 2015, No. 38, April 16, 2015.
[57] National Grid Winter Supply Review 2018-19, p. 32.
[58] NorthStar 2014 Audit of National Grid, p. V-22.
[59] Ibid., p. V-22. National Grid concluded that over 220,000 potential customers were located within 200 feet of a gas main.

National Grid admits that it plans to increase its annual oil-to-gas conversions of previously non-heat customers from an average of 7,023/year (2010-2019) to an average of 7,614 per year from 2020-2035.[60] While National Grid predicts that a high rate of such conversions will continue,[61] the Synapse Energy Economics report reviewed the decreasing requests for oil-to-gas conversions from 2010 to 2019 and estimated that National Grid's Design Day demand growth may be overestimated by roughly 240 MDth/day based on this factor.[62]

National Grid must re-examine further the potential of the comparative costs of oil and gas to drive future oil-to-gas conversions, based on even more recent shifts in market and industry conditions as well as environmental concerns.

Volatility Is Affecting Market Prices for Both Oil and Gas

National Grid's current predictions about oil-to-gas conversions, as well as use of gas in new construction, are based on an expectation that, "Gas price advantage is expected to increase between CY 2020 and 2023 and is expected to drive continued demand for gas, particularly in the new construction market."[63] Certainly, the economics of switching from oil to gas have appeared attractive to building and home owners for many years, but those economics may be changing.

The EIA's Annual Energy Outlook 2020 predicts, based on its overall market analysis, that natural gas prices in both the residential and commercial sectors will increase steadily in the long run, by an average of 0.5% per year, through 2050. That price increase is enough to "decrease consumption in the residential sector and moderate consumption growth in the commercial sector."[64]

Other forces are at work in the natural gas industry that are more directly relevant to a Pennsylvania-to-New York pipeline—and may have less predictable outcomes. A recent analysis by IEEFA found that, at current prices, fracking companies in Pennsylvania and other parts of Appalachia have failed to produce positive free cash flow each year for the past decade. The costs of exploration and production have outpaced and overburdened the market. In a briefing note (*In Extremis: Crisis Mounts for Appalachian Shale Producers*), IEEFA reports that eight of Appalachia's largest producers collectively spent $73.4 billion more on drilling and other capital

[60] National Grid 2020 Report, p. 33, Table 9.
[61] Ibid., p. 30.
[62] Synapse Energy Economics, p. 13.
[63] National Grid GIOP, Direct Testimony, KEDLI Rate Case No. 19-G-0310, p. 54. It expects a "steady demand" for residential conversions in KEDLI's territory, with a slight decrease in commercial conversions "due to market saturation." Ibid. In KEDNY's territory, it expects "a dip in residential conversions" due to market saturation but a "steady demand" for multifamily and commercial conversions. National Grid GIOP, Direct Testimony, KEDNY Rate Case No. 19-G-0309, p. 64.
[64] EIA, Annual Energy Outlook 2020, p. 126. This prediction is based on the EIA report's "Reference Case," which represents EIA's best assessment of how U.S. and world energy markets will operate through 2050. Ibid., p. 4.

expenses than they realized by selling natural gas during the decade.[65] Wall Street is expressing concern about continuing to provide huge amounts of capital to the industry.[66] It is unclear what the impact would be on the volatility of natural gas prices if the industry's access to capital is reduced.

Conversely, recent disruptions in the oil market have made oil prices drop precipitously. IEEFA reports that the oil and gas market has been experiencing financial distress for some time. It notes that:

> *In the late 1980s, oil and gas stocks represented 28% of the Standard & Poor's 500. Today they make up only 3.9% of the index… In the 1980s, seven of the top ten companies in the S&P 500 were oil and gas stocks. Today, after ExxonMobil dropped out of the top ten in 2019, there are none.*[67]

The EIA warned on March 26th of this year that both the COVID-19 virus and international events are affecting oil markets:

> *Crude oil prices have fallen significantly since the beginning of 2020, largely driven by the economic contraction caused by the 2019 novel coronavirus disease (COVID19) and a sudden increase in crude oil supply following the suspension of agreed production cuts among the Organization of the Petroleum Exporting Countries (OPEC) and partner countries. With falling demand and increasing supply, the front-month price of the U.S. benchmark crude oil West Texas Intermediate (WTI) fell [to] the lowest nominal crude oil price since February 2002…As of March 23, 2020, residential heating oil prices averaged $2.45 per gallon, almost 15 cents per gallon below last week's price and nearly 77 cents per gallon lower than last year's price at this time.*[68]

Its April 1 report states, "As of March 30, 2020, residential heating oil prices averaged more than $2.42 per gallon, almost 3 cents per gallon below last week's price."[69] While the international disruption may be abated, the other price-dampening factors noted above are likely to persist.

Recent EIA communications reveal that oil prices have been falling rapidly, while natural gas prices have either increased or decreased by a much smaller percentage. In its April 7, 2020 Short-Term Energy Outlook, the EIA predicted that from 2019 through 2021, residential natural gas prices would increase by 0.9 percent, and

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[65] IEEFA, In Extremis: Crisis Mounts for Appalachian Shale Producers, Kathy Hipple, Clark Williams Derry, and Tom Sanzillo, March 2020.
[66] See, *e.g.,* Jed Graham, Is the U.S. shale boom over? Four major threats to the fracking revolution, Investor's Business Daily, March 6, 2020.
[67] IEEFA, Proposed PTTGC Petrochemical Complex in Ohio Faces Significant Risks, Tom Sanzillo, Kathy Hipple, and Suzanne Mattei, March 2020, p. 2.
[68] EIA, This Week in Petroleum: Oil Market Volatility Is at an All Time High, March 26, 2020.
[69] EIA, This Week in Petroleum: U.S. Gross Refinery Inputs Declined in 2019, and Weekly Gross Inputs Have Fallen Significantly So Far in 2020, April 1, 2020.

heating oil prices would drop by 17.7%.[70]

While the EIA monthly predictions vary somewhat (a March 11 report found roughly a one percent reduction in natural gas prices), the general prediction of significantly lower oil prices contrasted with much smaller changes in natural gas prices is relatively consistent with what the New York State Energy Research and Development Authority (NYSERDA) has found. In its most recent assessment of New York energy trends, it found that from 2015 to 2016, residential natural gas prices had dropped by approximately 3 percent, while home heating oil prices had dropped by 14.1 percent.[71]

This price volatility may influence the pace of residential home heating oil clients moving to natural gas.

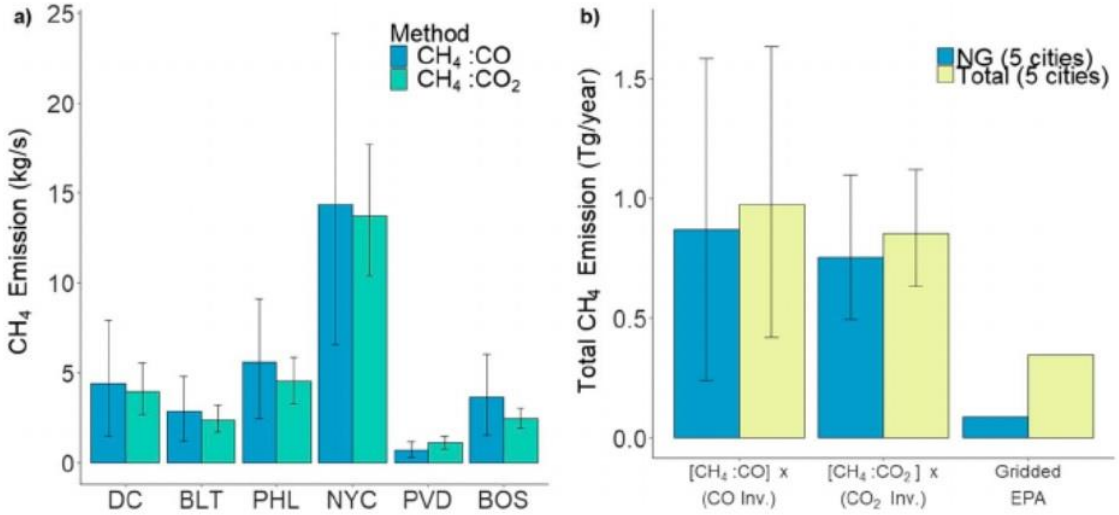
National Grid's Market Strategy of Converting No. 2 Oil Boilers to Gas Is Not an Environmental Imperative and Not the Most Sustainable Long-Term Option

National Grid has encouraged fuel conversions based not only on price, but also on an argument about the comparative greenhouse gas emissions benefits of gas versus oil. This argument, however, is based on inaccurate assumptions about methane emissions from natural gas pipelines and end uses. While natural gas, for many years, enjoyed a reputation of being a better option for reducing greenhouse gas emissions than oil, that belief is based on outdated information. The methodology established by the federal Environmental Protection Agency (EPA) for estimating fugitive methane emissions from pipeline leaks can no longer be deemed accurate.

A new academic study based on direct observations, rather than estimates, of methane emissions from four major urban centers on the east coast—including New York City—found that observed methane emissions are roughly twice that reported in the EPA inventory.[72] New York City, not surprisingly, had by far the highest emissions of methane.

[70] EIA, Short Term Energy Outlook, April 7, 2020. Nationally, the average residential price for heating oil is projected to drop from $3.00 to $2.71 per gallon while the natural gas price increases from $10.56 to $10.66 per thousand cubic feet.
[71] NYSERDA, Patterns & Trends: New York Energy Profiles, 2002-2016, January 2019, p. ii.
[72] Genevieve Plant, et al., Large fugitive methane emissions from urban centers along the U.S. east coast, Geophysical Research Letters 46 (14): 8500-8507, July 28, 2019.

Figure 3: (a) Methane Emissions (kg/s) for the Six Urban Regions as Observed and Analyzed and (b) Summed Total Emissions (Tg/year)[73] for the Five Largest Cities Compared to Gridded EPA Inventory[74]



This study, moreover, focuses only on the impacts at the local distribution end. Methane leaks occur at many points throughout the natural gas extraction and pipeline transport process, and have been found to exceed federal estimates.[75]

National Grid contracted with a consultant who produced a report on greenhouse gas emissions from natural gas in 2019, which its 2020 Report cites in support of converting boilers from oil to gas.[76] That consultant report, however, was produced before the new data on urban centers described above was published.

The consultant also focused the body of the report on the 100-year impact comparison of methane and carbon dioxide.[77] This approach downplays the far more powerful impact that an emission of methane has during roughly the first 20 years of its presence in the atmosphere, until it breaks down into CO_2 and water vapor. As the Environmental Defense Fund (EDF)—which consulted on but did not co-sponsor the National Grid-funded study—pointed out in testimony to the PSC in the pending rate proceeding for KEDNY and KEDLI, the Intergovernmental Panel on

[73] One Tg equals one million tons.
[74] Reproduced from op cit. Plant, p. 8505, Figure 4.
[75] Ramon A. Alvarez et al., Assessment of methane emissions from the U.S. oil and gas supply chain, Science 361:186-88, 2018. This study investigated production, processing and transmission but not distribution or end use. Using ground-based, facility-scale measurements with validation by aircraft observations, it found emissions roughly 60% higher than those estimated by the EPA method. The consultant report considered this in its upstream analysis.
[76] National Grid 2020 Report, p. 30. See M. J. Bradley & Associates, LLC, Life Cycle Analysis of the Northeast Supply Enhancement Project, produced for National Grid, June 11, 2019.
[77] M. J. Bradley & Associates, LLC, p. 7. The report included some discussion of the 20-year impact, but in an appendix.

Climate Change (IPCC) concludes that methane "causes 84 times as much global warming as the same amount of carbon dioxide over a twenty-year horizon."[78] Methane's impact on climate change under a 100-year scenario is 25 times—rather than 84 times—greater than CO_2. The IPCC states, "The choice of time horizon markedly affects the weighting especially of short-lived climate forcing agents, such as methane."[79] EDF scientists produced a paper in 2017 urging that both the short-term and long-term impacts must be considered.[80]

As the issue of life-cycle greenhouse gas pollution from natural gas gains more visibility, homeowners concerned about climate change may be more likely to look beyond gas for alternatives to heating oil.

National Grid itself, moreover, should overhaul its oil-to-gas market plan to curb peak demand growth instead of worsening it—by working with NYSERDA to promote heat pump technology and other conversion alternatives that support the State's goal of greenhouse gas emission reduction.

National Grid Should Retain Temperature-Controlled Customers or Help Them Transition to Energy Efficient Heat Pump Electrification or Other Alternatives

Temperature-controlled (TC) customers contract at a lower rate for "interruptible" service rather than firm service.[81] They are required to switch to an alternate fuel during cold weather episodes, typically when the temperature reaches 15°F or lower.[82] National Grid's High Demand scenario presumes that more and more TC customers will convert to firm service. Indeed, it predicts that 140 customers per year, under its baseline scenario of high demand, would make this switch.[83] Its Low Demand scenario assumes that a newly proposed tariff will reduce the rate of TC conversion—but only by 25 percent.[84]

This projection conflicts with State energy policy. The PSC Staff Rates Panel has objected to National Grid's prediction of a decline in the number of TC customers. It testified in the pending rate proceeding that because KEDNY and KEDLY are required to increase their energy efficiency and demand response programs, "we would expect the number of non-firm customers, which are demand response

[78] James Fine, Environmental Defense Fund, Direct Testimony to the PSC, Cases 19-G-0309 and 19-G-0310, February 6, 2020, pp. 5-6, citing IPCC, Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, 2014), p. 87, Box 3.2, Table 1.
[79] IPCC, p. 87.
[80] Ilissa Ocko, *et al.*, Unmask temporal trade-offs in climate policy debates, Science 356 (6337): 492-493, May 5, 2017.
[81] Roughly 85% of TC buildings are multi-family residential and 15% are commercial. See National Grid Capacity Report, Table 4.
[82] See PSC, Order Approving Tariff Revisions and Requiring Further Tariff Filings, Cases Nos 16-G-0058 and 16-G-0059, February 7, 2019, p. 3.
[83] National Grid 2020 Report, p. 33, Table 9.
[84] Ibid., pp. 35-36.

customers, to increase rather than decrease."[85]

While the price volatility of oil and gas, as well as NYSERDA's encouragement of energy efficient electrification, may dampen the interest of TC customers in switching to firm gas service, National Grid should itself take strong action. It should not only to develop a more effective program to maintain existing TC customers, but also facilitate their conversion to energy efficient electrification or other alternatives. As the PSC order on natural gas planning observes, "Interruptible rates will continue to be effective in places," but since it substitutes another fossil fuel for gas, "[o]ther methods of demand response and peak reduction must be developed."[86] These include the range of demand response and energy efficiency measures described in the recent reports by the Energy Futures Group and Synapse Energy Economics.

Energy Demand Post-Pandemic, Population Trends Pre-Pandemic, and Projected Demand per Customer

Uncertainties about longer-term impacts of the COVID-19 pandemic, as well as pre-pandemic trends in development and energy demand, make investment in infrastructure that is premised on substantially increased demand quite risky. National Grid reported to the PSC in April 2019 regarding the KEDNY territory that it predicts "steady growth in the multi-family new construction market, and an increase in the commercial new construction market. In the residential sector, the forecast shows an expected increase in demand in residential new construction."[87] For the KEDLI territory, it states that, "The residential new construction market is expected to increase sharply, and multi-family new construction is expected to begin rising in CY 2020."[88] Before the COVID-19 pandemic, these robust goals faced headwinds; now, they will be pushed back to much later dates, if they materialize at all as part of any recovery.

Post-Pandemic Impacts on Energy Demand Trends That May Occur

Job loss and other economic impacts from a COVID-19-induced recession will reduce energy demand in the short term and are likely to dampen demand for several years while the economy recovers. The PSC has recognized that the COVID-19 issue is of concern. The Public Utility Law Project (PULP), joined in its motion by AARP, requested that the PSC reopen the factual record in the pending rate proceeding to require new data and information regarding the current and potential future impacts of the COVID-19 crisis on rates and ratepayers' abilities to pay them.

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[85] PSC Staff Rates Panel, Prepared Supplemental Testimony, Cases Nos. 19-G-0309 and 19-G-0310, January 2020, p. 8.
[86] PSC, Order Instituting Proceeding on Motion of the Commission in Regard to Gas Planning Procedures, p. 10.
[87] National Grid GIOP, Direct Testimony, KEDNY Rate Case No. 19-G-0309, p. 64.
[88] National Grid GIOP, Direct Testimony, KEDLI Rate Case No. 19-G-0310, p. 54.

While the PSC hearing officers declined to reopen the factual record of the rate proceeding as requested, they stated:

> *Although we deny PULP's motion, we recognize that it raises points well-taken with respect to both economic and policy considerations the Commission may decide to address in this proceeding or in a separate generic proceeding.*[89]

The PSC, however, needs to consider the COVID-19 issue not only in light of rates and affordability, but also in light of the size and quality of National Grid's demand projections. The PSC should take cognizance of the issue in its review of National Grid's Long-Term Natural Gas Capacity report pursuant to the pending enforcement proceeding.

Most economists agree that the coronavirus pandemic is triggering a recession. In late-March, the International Monetary Fund predicted negative global growth for 2020 and warned of "a recession at least as bad as during the global financial crisis or worse."[90] Goldman Sachs projected a 24 percent decline in U.S. output from April through June compared with a year earlier, and an unemployment rate of nine percent in the months ahead.[91] Capital Economics predicts second-quarter U.S. economic growth plunging 40 percent from a year earlier and unemployment spiking to 12 percent.[92]

A recession dampens energy demand. By way of example, during the "Great Recession," the Energy Department reported that from May 2008 to May 2009, consumption of natural gas dropped by about 5 percent.[93]

Many economists are optimistic that the virus-related recession will be sharp, but short. A survey by the National Association for Business Economists of 45 professional forecasters indicated an overall prediction of a projected precipitous rise in the national unemployment rate—from the actual 3.8% rate of employment at the beginning of the year to 12% in the second quarter of 2020. They predict that it will then drop to 9.5% at the year's end and to 6.0% by April 2021. Nevertheless, predictions about gross domestic product, while trending optimistic, revealed a wide range between high and low forecasts and thus a "lack of consensus about the

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[89] PSC, Ruling Denying Public Utility Law Project's Motion to Reopen the Record, Cases Nos. 19-G-0309 and 19-G-0310, April 7, 2020, p. 8; S&P Global, Market Intelligence, Coronavirus, climate policy hang over National Grid's NY gas rate case, Tom DiChristopher, April 13, 2020.
[90] International Monetary Fund, IMF Managing Director Kristalina Georgieva's Statement Following a G20 Ministerial Call on the Corona Virus Emergency, March 23, 2020.
[91] Business Insider, Goldman Sachs now says US GDP will shrink 24% next quarter amid the coronavirus pandemic – which would be 2.5 times bigger than any decline in history, Carmen Reinicke, March 20, 2020.
[92] Bloomberg, Goldman see virus causing greater economic pan, Simon Kennedy, Morgan Stanley, March 22, 2020.
[93] The New York Times, Natural gas prices plummet to a seven-year low, Clifford Krauss, August. 20, 2009. See also Power Magazine, Recession reduces demand for electricity, Mark Axford, June 1, 2009.

shape of the recovery."[94]

The speed of such recovery, of course, will depend on a number of factors, including the duration of the COVID-19 pandemic, potential resurgences of the virus in the population after pandemic measures have abated, the resilience and response of the business community, the rising level of debt burden on both businesses and individual consumers, and the extent and effectiveness of government efforts to spur recovery. The number of uncertainties make it more likely that the recovery will be slower than the most optimistic projections.

To the extent that recession impacts hit downstate New York, it could be many years before the local economy fully recovers. After the Great Recession, the modest pace of job growth relative to the size of job losses in the first few years of the recovery kept the unemployment rate high long after the official end of the recession. According to the New York State Department of Labor:

- The unemployment rate for Nassau and Suffolk counties was 4.7 percent in January 2008, but by January 2009, the rate had hit 6.89 percent. Then, in January 2010, it reached 8.2 percent. High unemployment persisted for the next three years; the rate did not drop below 6 percent until October 2013.[95]

- New York City's unemployment rate began climbing in January 2009. By October 2009, it had reached 10 percent. High unemployment persisted for four more years and did not drop below 6 percent until April 2015.[96]

According to U.S, Bureau of Labor statistics, it took the borough of Queens more than six years for its economy to register significant improvement after the onset of the Great Recession. The Queens unemployment rate began climbing from 5.5 percent in October 2008 to hit a peak of 9.4 in February 2010. It was not until February 2015, five years later, that the rate finally dipped below six percent.[97]

If similar circumstances apply to the COVID-19-caused recession, energy demand would decline and the rebound may reflect slower growth and different choices by state regulators and utilities.

Pre-Pandemic Trends in Population and Development

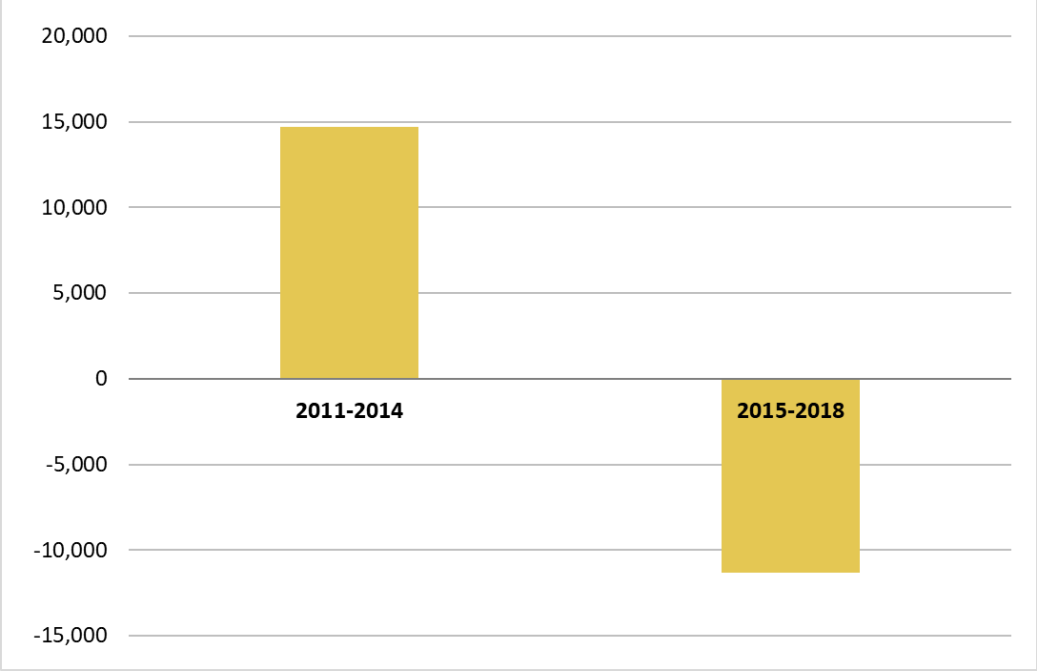
National Grid's 2020 Report asserts that its demand growth projections are based in part on "continued growth in population."[98] It refers to a "growth in the number of households of 0.7% per year" from 2009-2019, and predicts slower but continued

[94] National Association for Business Economics, survey release: COVID-19 Drags U.S. Economy into Recession; NABE Panel Expects GDP Declines in Q1 and Q2 2020, but Upticks in Q3 and Q4, April 10, 2020.
[95] New York State Department of Labor statistics.
[96] New York State Department of Labor statistics for New York City. The Department does not break out its posted figures for New York City by borough.
[97] The U.S. Bureau of Labor statistics for Queens.
[98] National Grid 2020 Report, p. 7.

growth from 2020-2029, averaging 0.3% per year.[99] Recent statistics suggest that such an assumption about population growth in downstate New York during the utility's planning period may not be reliable, at least in the near-term.

The population of Long Island rose by 14,714 residents from 2011-2014 but fell by 11,348 residents from 2015-2018.[100]

Figure 4: Long Island Net Population Change



Source: U.S. Census Bureau, 2010 Census and American Community Survey Estimates, 1-Year Estimates and Public Use Microdata Sample, reported in Newsday, U.S. Census estimate: Suffolk losing residents, but Nassau Gaining, David Olson, April 18, 2019.

The population statistics indicate that the reductions were due to a declining birthrate, a rising death rate, and a 47 percent rise in domestic "out-migration" (people moving from Long Island).[101]

A similar shift occurred in recent years in New York City. While the population of New York City increased since the 2010 census by 0.4 percent, recent figures evidence a decline. The population reached about 8.5 million in 2016 but dropped by an estimated 76,000 over the next two years.

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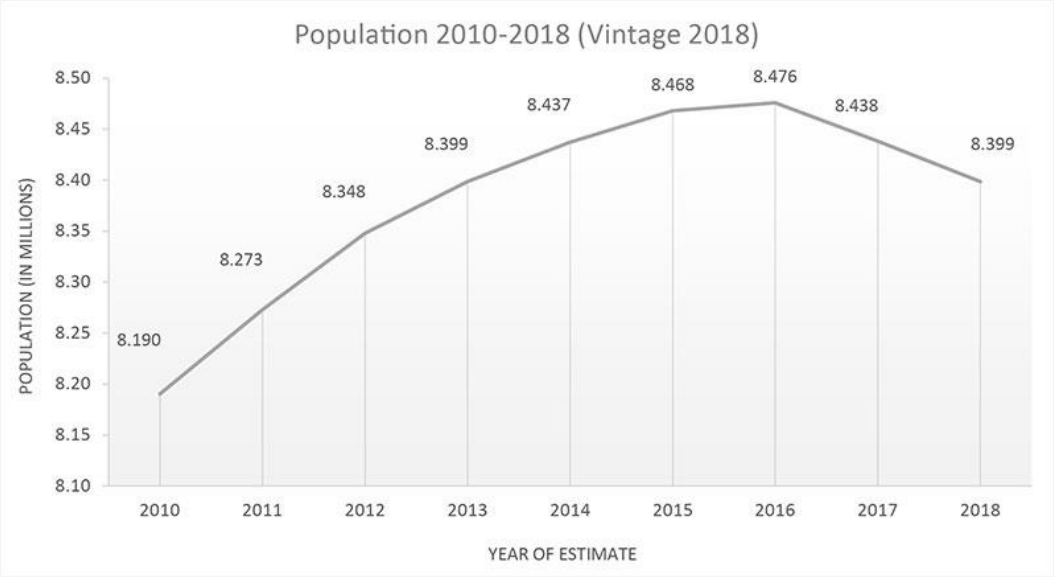
[99] Ibid., p. 30.
[100] U.S. Census Bureau, 2010 Census and American Community Survey Estimates, 1-Year Estimates and Public Use Microdata Sample, reported in Newsday, U.S. Census estimate: Suffolk losing residents, but Nassau Gaining, David Olson, April 18, 2019. The New York State Comptroller's Office notes that from 2010 to 2018, population growth on Long Island was only 0.1%, with Suffolk County losing population. Office of the State Comptroller, Long Island Region Economic Snapshot, May 2019, p. 3.
[101] Ibid.

Figure 5: New York City Population Curve (2020-2018)



Source: NYC Planning, Population Division, 2019.

U.S. Census Bureau figures indicate that New York City's net domestic out-migration (people moving from the City) declines have, in recent years, outweighed the gains achieved by the surplus of births over deaths.

Table 1: New York State and New York City Change in Population (April 2010, July 2017 and July 2018)

Change in Population, Census Bureau Estimates April 2010, July 2017, and July 2018

	Census 2010	Estimates 2017	Estimates 2018	Annual Change 2010-2017		Change 2017 to 2018	
				Number	Percent	Number	Percent
New York State	19,378,102	19,590,719	19,542,209	29,326	0.2	-48,510	-0.2
New York City	**8,175,133**	**8,438,271**	**8,398,748**	**36,295**	**0.4**	**-39,523**	**-0.5**
Bronx	1,385,108	1,439,725	1,432,132	7,533	0.5	-7,593	-0.5
Brooklyn	2,504,700	2,596,385	2,582,830	12,646	0.5	-13,555	-0.5
Manhattan	1,585,873	1,629,780	1,628,701	6,056	0.4	-1,079	-0.1
Queens	2,230,722	2,296,865	2,278,906	9,123	0.4	-17,959	-0.8
Staten Island	468,730	475,516	476,179	936	0.2	663	0.1

Source: 2010 Census; Census Bureau Current Estimates Program.

The biggest drop was recorded for Queens, which is estimated to have lost a total of 17,979 residents in the one-year period between July 2017 and July 2018. The second largest decline was registered for Brooklyn, with a net total loss of 13,555 residents during the same period.

Table 2: Estimates of the Components of Population Change for New York City and Counties, July 1, 2017 to July 1, 2018

Geographic Area	Total Population Change*	Natural Increase (Births-Deaths)	Net Migration		
			Total	Net Domestic Migration	Net International Migration
New York City	**-39,523**	**48,083**	**-87,812**	**-137,191**	**49,379**
Bronx	-7,593	9,064	-16,764	-29,477	12,713
Brooklyn	-13,555	20,709	-34,282	-46,706	12,424
Manhattan	-1,079	4,626	-5,635	-15,453	9,818
Queens	-17,959	12,475	-30,596	-44,434	13,838
Staten Island	663	1,209	-535	-1121	586

*Note: The estimated components of population change will not equal the numerical population change because of a small residual after controlling to the national totals.

Source: Population Division, U.S. Census Bureau.

These statistics bear watching, and a more robust analysis will be possible after the findings of the current 2020 Census. In the meantime, caution should be exercised when making predictions about population-related energy needs—and when making substantial investment decisions based on such predictions.

Energy Use per Customer or per Job: Economic Growth Is More Independent of Energy Demand in New York Than Nationally and Is About to Become Even More So

National Grid's prediction of "higher gas usage per customer"[102] does not comport with the trends in New York absent the fuel conversion issues discussed above.

- In an analysis produced in January 2019, NYSERDA concluded that New York State's Gross State Product (adjusted for inflation) *increased* 2.3% from 2015 to 2016 while overall energy consumption in New York (including for both heating and light) *decreased* 1.7% over the same period.

Economic growth is more independent of energy demand growth in New York.

- Indeed, while the national trend in economic development is toward greater energy efficiency, New York is getting there faster. Overall energy consumption per dollar of gross state product from 2002 to 2016 dropped by 28.5 percent in New York, compared to the national decrease of 22.3

[102] National Grid 2020 Report, p. 7.

percent per dollar of gross domestic product.[103]

- LIPA has adopted PSEG Long Island's projection that peak electricity demand on Long Island will decline by approximately 400 megawatts by 2030, "primarily as a result of greater adoption of energy efficiency and distributed energy resources such as rooftop solar and is consistent with state and national trends."[104] This is true despite plans to increase the conversion of oil-heated homes to energy-efficient heat pump electrification.

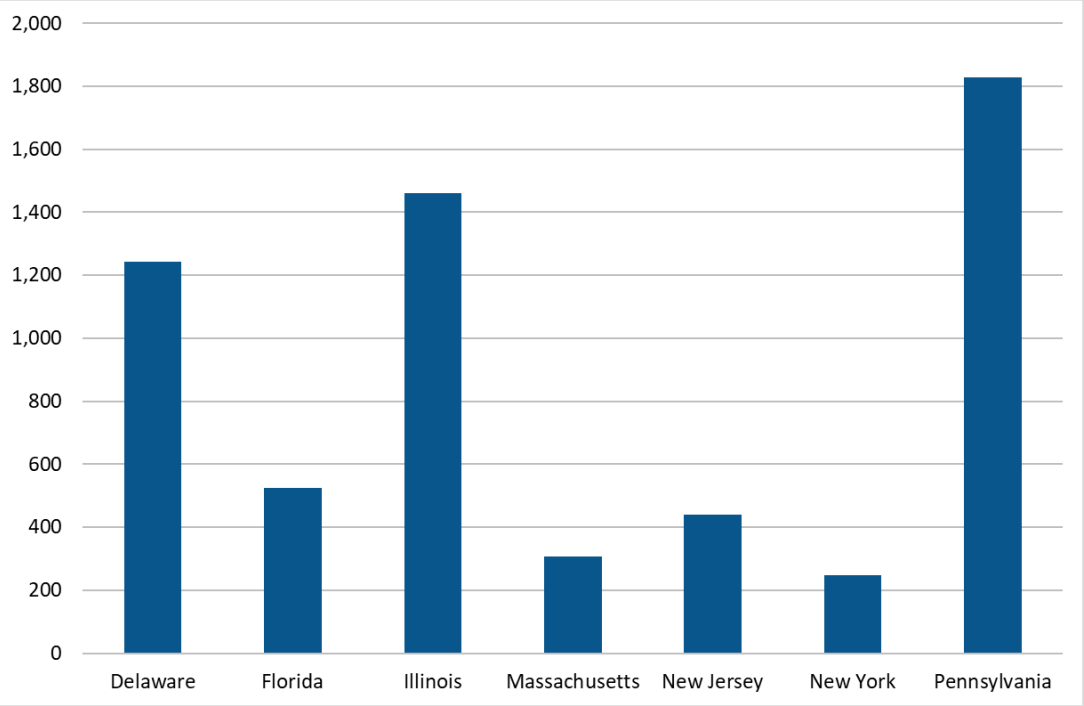
Economic growth is more independent of overall energy demand growth in New York than nationally, sector by sector, and new state and local laws are about to make it even more so.

Average Use per Industrial Customers

Industrial energy demand, per unit of economic productivity, varies by region, likely based on types of industrial enterprises and investments in energy efficiency. Interestingly, the mix of types of industrial growth that occur in New York does not translate into high energy demand, compared with other states. New York industries actually rank at the very bottom, 50th in the nation, in the amount of energy used per unit of Gross State Product. New York industries use 247 Btu per unit of Gross State Product, as compared with, for example, California at 695 Btu, Delaware at 1,243 Btu, Illinois at 1,461 Btu, Massachusetts at 307 Btu, New Jersey at 441 Btu and Pennsylvania at 1,827 Btu.[105]

[103] NYSERDA, Patterns & Trends: New York Energy Profiles, 2002-2016, pp. ii, 14 (Table 2-8), and 19 (Table 2-13.a).
[104] LIPA, Annual Disclosure Report of the Long Island Power Authority, Fiscal Year 2018, p. 9.
[105] NYSERDA, Patterns & Trends: New York Energy Profiles, 2002-2016, p. 14, Table 2-8.

Figure 6: Industrial Sector Energy Use in Btus per Unit of Gross State Product - Comparison of Seven States



Source: NYSERDA, Patterns & Trends: New York Energy Profiles, 2002-2016 , p. 14, Table 2-8.

The Long Island Power Authority ("LIPA") revised its electrical power production forecasts downward in 2017, stating that local power plan production had dropped and would continue to decline, "driven by increases in energy efficiency, net-metering, feed-in-tariffs, the decoupling of economic growth and energy use, and lower econometric growth projections."[106] Thus, industrial economic development can and does occur in New York State without heavily drawing upon energy capacity.

Average Use per Commercial Customer

New York provides more commercial sector jobs per unit of energy than many other states. It ranks 39th in the nation in overall energy use per non-industrial employee, at 124 Btu, compared with Delaware at 132 Btu, Florida at 126 Btu, Illinois at 147 Btu, Massachusetts at 119 Btu, New Jersey at 148 Btu, and Pennsylvania at 120 Btu.[107]

[106] PSEG Long Island, 2017 Integrated Resource Plan: PSEG Long Island Analysis Summary (Draft, April 1, 2017). This plan has since continued to guide LIPA's decisions regarding power generation. See LIPA, Annual Disclosure Report of the Long Island Power Authority, FY 2018, p. 8.
[107] NYSERDA, Patterns & Trends: New York Energy Profiles, 2002-2016, p. 13, Table 2-7.

Figure 7: Commercial Sector Energy Use Per Non-Industrial Employee by State in Btus - Comparison of Seven States

Source: NYSERDA, Patterns & Trends: New York Energy Profiles, 2002-2016, p. 13, Table 2-7.

And New York is about to become even more efficient.

While National Grid states that it is including the new efficiency targets of the State and New York City in its adjusted projections for both low and high demand,[108] the assertion of increased gas use per customer is inconsistent with New York State and New York City statutes and energy plans. These initiatives, even if only partly successful, will place downward pressure on most growth projections for natural gas demand.

- The State's New Efficiency: New York plan calls for new construction to be Net Zero Energy or Net Zero Carbon energy by 2030, with interim progress milestones in 2020 and 2025.[109] Utilities must develop and implement programs to comply with the plan. Increased use of gas per customer in this sector is a very short-lived option at best.

- Also, the New Efficiency: New York plan calls for any facility with an annual

[108] National Grid 2020 Report, pp. 8 and 33.
[109] NYSERDA, New Efficiency: New York (April 2018), p. 65. The PSC has ordered National Grid and other utilities to develop and implement plans to carry out the New Efficiency: New York initiative. See PSC, Order Adopting Accelerated Energy Efficiency Targets, Case No. 18-M-0084, December 13, 2018.

utility bill higher than $300,000 to upgrade its building shell before replacing its HVAC system, and to evaluate the cost-effectiveness of an electric heat pump HVAC system. If the cost difference between a replace-in-kind (but more efficient than code) system versus an electric heat-pump system is a simple payback of 10-years or less (or has an internal rate of return greater than 7%), then the building will switch to a heat pump system.[110]

- The first phase of New York City's Local Law 97 takes effect in 2024 and targets for efficiency improvements the worst 25% of buildings with the highest emissions. The second phase takes effect in 2030 and targets the remaining 75% of buildings. Buildings face fines if they do not upgrade efficiency. Both commercial and residential buildings are covered by this law. Given that it targets the high energy consumption outliers first, it is likely to make significant differences in the average use per customer.

- Governor Cuomo's current budget includes substantial investments in energy efficiency financing. New York State provides incentives through NYSERDA, which can provide funding for efficiency upgrades. The Real Time Energy Management (RTEM) program can cover up to 30% of costs for qualifying projects from approved vendors.[111]

Average Use per Residential Customer

National Grid's assumption of increased gas usage per customer is based largely on two factors over which National Grid can exercise significant control—temperature-controlled customers switching from interruptible to firm supply and customers switching from oil to gas for home heating.[112] For reasons discussed above, National Grid can and should change its strategies with regard to these two customer sectors.

Use of natural gas by residential customers in New York should not be increasing.

Use of natural gas by residential customers in New York, absent National Grid's inappropriate and weak market strategies, should not be increasing. Residential buildings are covered by the New Efficiency: New York plan and will benefit from the NYSERDA programs discussed above. The Synapse Energy Economics report found that National Grid's calculations of impacts of energy efficiency efforts did not account for the efficiencies to be achieved by NYSERDA's programs.[113] It also found

[110] NYSERDA, New Efficiency: New York, p. 67.
[111] See NYSERDA webpage, Real Time Energy Management program.
[112] See National Grid 2020 Report, p. 30, which states, "Existing gas customers have been increasing their load, most notably temperature-controlled customers switching to firm supply (year-round) and existing non-heating customers choosing to heat their houses with gas."
[113] Synapse Energy Economics, pp. 19-20.

that National Grid significantly underestimated the impact of Local Law 97 on acceleration of electrification of heat in residential buildings.[114]

How National Grid Would Actually Use Such a NESE Pipeline

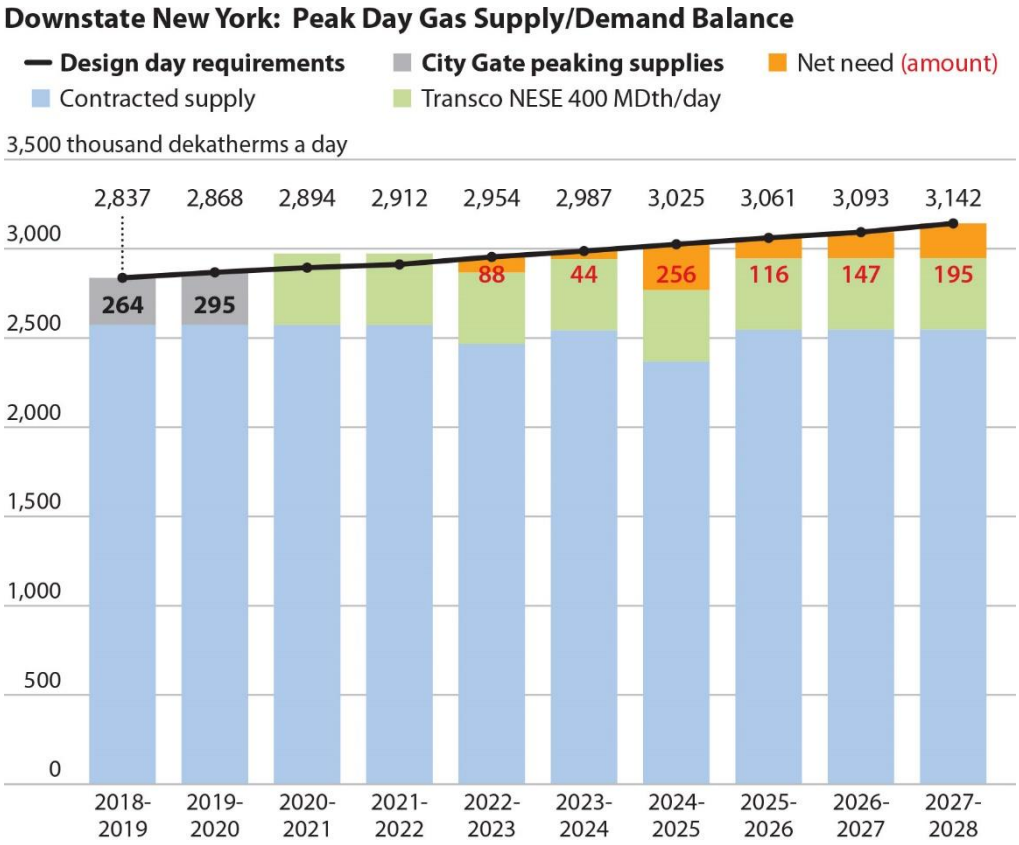
National Grid has claimed that construction of the NESE pipeline is needed to address immediate peak demand and to meet future growth demand. These arguments do not hold up under scrutiny. National Grid would not use the pipeline to address currently unmet need. Rather, initially it plans to employ the pipeline solely to replace certain supplies reserved for "peak demand" conditions that occur only a few days per year. Otherwise, the pipeline would not be needed at all at that point. And given the existing trends of increasing energy efficiency, the potential to reduce peak demand further, and the impacts of other demand-reducing factors discussed above, this initial lack of usage would likely persist for a long time. With continued energy transition trends, the pipeline could ultimately become obsolete.

The Pipeline Is Not Needed to Meet an Urgent Existing or Pending Demand

The notion that the pipeline would meet an urgent existing or pending demand is premised on National Grid abandoning the flexible contractual supply system that currently provides gas to meet peak demand on an as-needed basis. National Grid's April 2019 rate proceeding testimony to the PSC on gas supply planning includes a graph showing that the NESE pipeline initially would be used to replace existing contractual "City Gate Peaking Supplies" that National Grid has procured year after year.[115] (A "city gate" is a point at which the transmission pipeline system feeds into the lower pressure pipeline distribution system that brings gas directly to homes and buildings.[116] In the 2019 testimony, National Grid projected that if the NESE pipeline were built, its use of City Gate Peaking Supplies would drop to zero in 2020/21. The pipeline would completely replace the City Gate Peaking Supplies contracts.

[114] Ibid., pp. 24-26.
[115] See National Grid Director of Gas Supply Planning, Testimony, Elizabeth Arangio, KEDNY and KEDLI Rate Cases Nos. 19-G-0309 and 19-G-0310 April 2019, p. 15 (graph) and National Grid Director of Gas Supply Planning, Supplemental Testimony to the PSC, Rate Cases Nos. 19-G-0309 and 19-G-0310, June 11, 2019, attached exhibit EDA-5S, p. 2.
[116] The City Gate peaking supply of 700 MDth/day is split between Con Edison (400 MDth) and National Grid (300 MDth). National Grid 2020 Report, p. 41.

Figure 8: National Grid's Original Projection of Demand Presuming NESE Pipeline Is Built (High Demand Scenario, Not Accounting for Impact of Mandated Energy Efficiency)



Source: National Grid Director of Gas Planning, Testimony, Elizabeth Arangio, April 2019, p. 15.

Note that the amount presented for City Gate Peaking Supplies is only a contract amount, not a statement of actual use. The 2018/19 contract amount exceeds the "Design Day" level.

National Grid contracted from City Gate Peaking Supplies for 304 MDth/day in 2018/19, and 295 MDth/day in 2019/20. Replacing this contractual peaking supply with the NESE pipeline would leave only about 100 MDth/day of this new pipeline's capacity for meeting National Grid's unrealistic projections for new development or increased demand.

National Grid acknowledges that demand will grow faster under the pipeline scenario.

National Grid acknowledges that demand will grow faster under the NESE pipeline scenario than under the "No Infrastructure" scenario, as programs such as

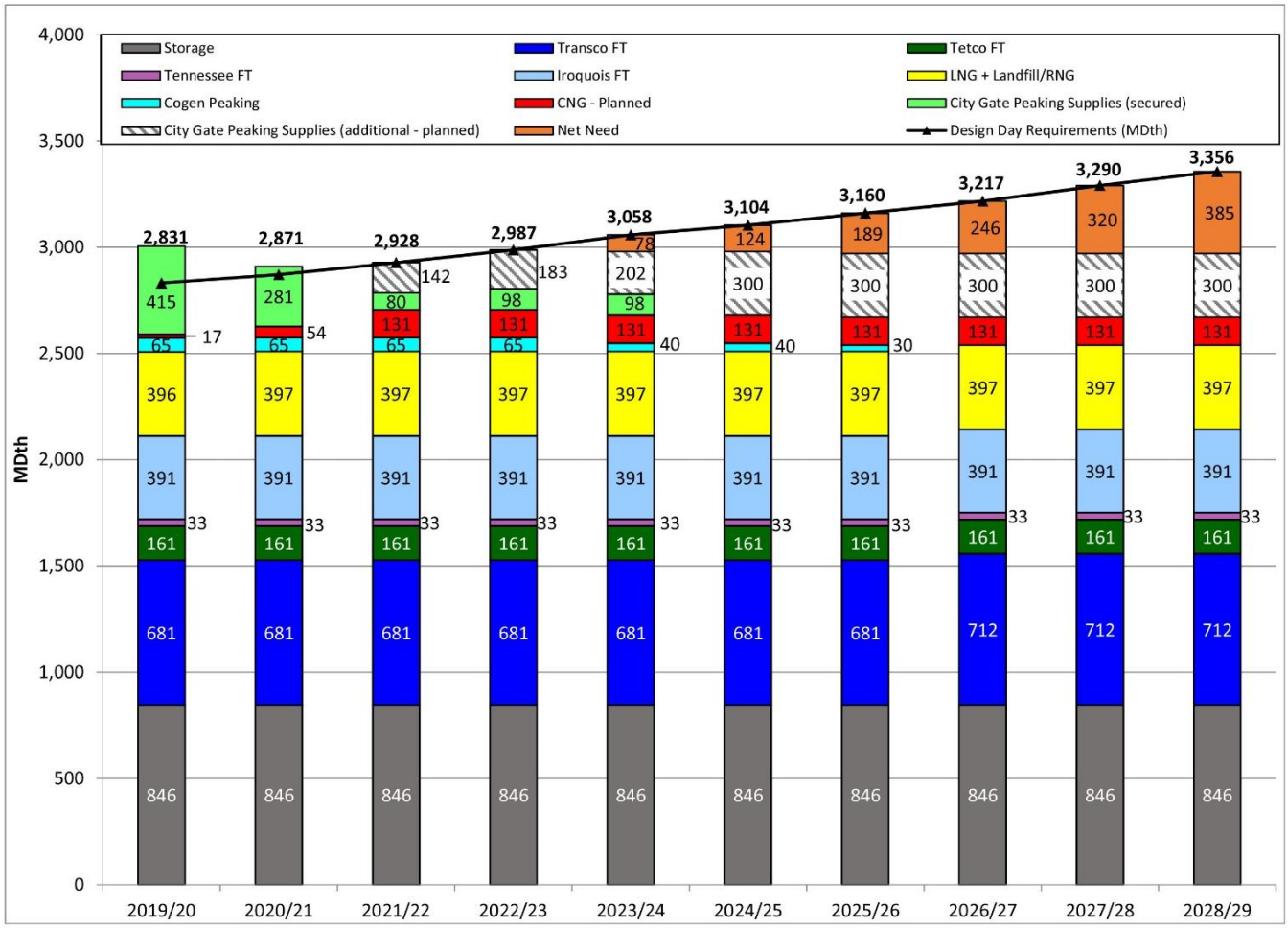
Electrification of heat move customers off the gas system.[117] Under the faster growing demand of the NESE scenario, this 100 MDth/day of the pipeline's capacity would quickly be used up, requiring either a return to the City Gate Peaking Supplies or other alternatives. As seen in Figure 8, National Grid's testimony to the PSC regarding the NESE scenario shows this beginning to happen by the winter of 2021/22,[118] with demand continuing to rise. It is not a sustainable scenario.

Nor is it necessary.

Given that the NESE project currently is in limbo and National Grid was ordered to take action to lift its unilateral moratorium, the company has contracted again for City Gate Peaking Supplies for the upcoming winter, 2020/21, at 261 MDth/day.[119] According to National Grid's December 2019 testimony to the PSC regarding its No-NESE scenario, it has secured enough City Gate Peaking Supplies for this winter and next to exceed its Design Day capacity, and it expects to be able to procure enough for 2021/22 and 2022/23 to meet Design Day capacity.[120]

[117] National Grid, Supplement to the Downstate new York Natural Gas Long-Term Capacity Report, March 23, 2020, p. 3.
[118] National Grid Director of Gas Supply Planning, Testimony, p. 15.
[119] National Grid Director of Gas Supply Planning, Supplemental Testimony, p. 6.
[120] See National Grid Director of Gas Supply Planning, Second Supplemental Testimony, Elizabeth Arangio, p. 3 and Exh. EDA-6SS. The testimony states, "The companies will continue to procure City Gate and CNG supplies to serve peak day and peak hour requirements for as long as they are needed." Ibid. National Grid added strategies to accommodate new connections, including expanded use of portable compressed natural gas (CNG) injections to maintain system pressure during peak conditions, various demand-side measures and reliance on city gate peaking supplies. National Grid GIOP, Second Supplemental Testimony, Case 19-G-0309 and 19-G-0310, December 13, 2019, p. 4.

Figure 9: National Grid's Revised Projection of Demand Presuming No Pipeline Scenario



Source: National Grid Director of Gas Supply Planning, Second Supplemental Testimony, Exh. EDA-6SS.

This December 2019 graph—which uses a Design Day that is still based on National Grid's "high demand scenario" without accounting for energy efficiency—does not start to project the existence of unmet Design Day need until 2023/24.

The steep-climbing projection of Design Day need is not reasonable.

Under the No-Infrastructure scenario, moreover, increased investment in energy efficiency and demand response ultimately not only slows but lowers demand, which will allow reliance on City Gate Peaking Supplies to decrease. This is important because reliance on peaking services such as the City Gate Peaking

Supplies is not a long-term strategy. The gas under these contracts costs more to purchase and the service typically is contracted only on a one-year basis. The PSC order on natural gas planning observes that no standards for acceptable levels of reliance on such services exists and clear criteria should be developed.[121] But the PSC also observes that non-pipe solutions, which include energy efficiency, electrification, and clean demand response as well as temporary supply, "can reduce or eliminate the need for gas infrastructure and investments." It further notes that:

> *Non-pipe solutions have been considered on an as-needed basis in previous cases; these solutions should be integrated into gas utilities' planning processes, both in the context of specific avoidable projects in a particular area of the distribution system, and system-wide to reduce overall demand and the need for infrastructure investment.*[122]

Moreover, as explained in this report, as well as the reports of the Energy Futures Group and Synapse Energy Economics, the graph's steep-climbing projection of Design Day need is not reasonable.

National Grid's documents fail to make a convincing case for an urgent need to build the pipeline.

Building to National Grid's Design Day Load Forecast Leaves the Pipeline System with Costly Excess Capacity

Whether the Design Day formula is revisited or not, it should not drive over-building of pipeline structure. Methods to meet the Design Day goal should aim at the real target—moderating the sporadic spikes in demand. This can be done through rigorous peak demand management and other efficiency measures, such as those outlined in the recent Energy Futures Group report.

The NESE pipeline would add costly excess capacity to the gas system for most days of the year.

National Grid's 2020 Report does not acknowledge that this pipeline would not be needed most of the time. As noted above, peak demand usually occurs only a few days of the year. In a demand response program report to the PSC, National Grid admits with regard to its existing system that because "the gas system experiences a peak that only lasts for a few hours," building a gas system to serve the peak level "means there is a great deal of excess capacity during the non-peak hours."[123]

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[121] PSC, Order Instituting Proceeding on Motion of the Commission in Regard to Gas Planning Procedures, p. 8.
[122] Ibid., p. 7.
[123] National Grid Gas Demand Pilot Report Q4 2017, p. 1.

The NESE pipeline would add a large and costly new layer of infrastructure capacity to the gas supply system that would not be needed most of the year. As Figure 8 illustrates, the primary role of the NESE pipeline would be to replace the existing contractually available peaking supply that National Grid accesses during the few days of the year in which peak demand occurs.

Thus, building to the Design Day load forecast would leave the pipeline system with substantial excess capacity, including during the winter season, other than on the few days with peak demand.

Moreover, the increasing adoption of energy efficient electrification and alternative energy sources—as required by New York State energy policy as well as local laws—not only will slow demand growth, but also can reasonably be expected to cause demand to decline in the long-term. The Synapse Energy Group report estimates, for example, that energy efficiency and peak demand measures will not only eliminate the unmet need under the National Grid growth scenarios, but also reduce demand by 334 MDth to 440 MDth.[124] Under such circumstances, ultimately, the NESE pipeline will likely become a vestigial piece of infrastructure.

Strategic Planning for Peak Demand Is Reasonable, But Capital Construction Is Not

National Grid had asserted in April 2019, after declaring its self-imposed moratorium, that without the NESE, "the Companies cannot continue to add new gas load without creating an unacceptable risk of significant supply shortfalls and corresponding drops in system pressure to below minimum thresholds."[125] But after reaching the settlement agreement in PSC's enforcement action against its unilateral moratorium action, National Grid suddenly acknowledged that it could in fact manage its pending new gas load without the construction of the NESE.[126]

Building to peak demand is not in the public's best interest. The *State Energy Plan* explains that building infrastructure to meet peak need is why energy is more expensive in New York than it needs to be:

> *In order to maintain reliability, we have been making expensive energy infrastructure improvements to satisfy peak demand, but we are using the whole system less over the remaining course of the year. As a result, the overall system is both energy and capital inefficient.*[127]

[124] Synapse Energy Economics, pp. 1-2.
[125] National Grid Director of Gas Supply Planning, Testimony, p. 16.
[126] National Grid GIOP, Second Supplemental Testimony, p. 4.
[127] 2015 State Energy Plan, Vol. 1, pp. 10-11. This passage is focused on electrical generation but applies to the building fuel supply system as well.

The NorthStar 2014 auditors of National Grid similarly observed that planning for gas capacity must be a careful balancing act. While understatement of weather and economic variables "may result in suboptimal sizing of system infrastructure requirements or in extreme situations, supply shortages," nevertheless "[o]verstatement of assumptions can result in unnecessary capital expenditures, resulting in higher rates."[128]

New York State and New York City have a long history of good results from energy initiatives. Indeed, utilities throughout the United States have demonstrated results in keeping consumer usage down and their monthly payments with it. Markets and technology are all pointing away from large-scale, costly pipeline projects in favor of sensible scale, least cost methods of home heating.

Overstatement of assumptions can result in unnecessary capital expenditures.

Strategic peak demand management and energy efficiency are far more flexible and adaptive measures than construction of a massive pipeline that locks downstate New York into a pattern of burning more natural gas, while diverting attention and resources away from peak demand management and energy efficiency programs.

While the Pipeline Developer and National Grid Would Profit from Over-Building, the Ratepayers Would Be Placed at Financial Risk

The pipeline would provide excessive profits for its developer, and related construction would provide profits for National Grid, both of which would translate into higher costs for the ratepayers. But the ratepayers could face a greater risk if construction costs are higher than predicted, or if the pipeline itself proves to be unneeded or becomes obsolete.

The PSC order on natural gas planning urges that "gas planning must explicitly take account of the likely useful life of all alternatives, and of the resulting cost and risk implications."[129] In the case of the NESE pipeline, the useful life of the pipeline is very much in question, and the risk to the ratepayers would be substantial.

FERC has used the same rate of return in case after case, for more than 15 years.

[128] NorthStar 2014 Audit of National Grid, p. VIII-1.
[129] PSC, Order Instituting Proceeding on Motion of the Commission in Regard to Gas Planning Procedures, p. 7.

The ratepayers would be forced to foot excessive profits for the pipeline developer. The NESE pipeline would provide an extraordinarily high return-on-investment for the pipeline developer and any investors. The Federal Energy Regulatory Commission (FERC) authorized a high pre-tax return on equity of 15.34 percent of the rate base embedded in the proposed recourse rate.[130] FERC has not updated this rate of return, which it has allowed in case after case, for more than 15 years. IEEFA's 2016 report on another pipeline project explained that setting this rate was supposed to help protect ratepayers against monopoly pipeline companies—but FERC's failure to update it has caused it to have the opposite effect.[131] The PSC, while challenging this outdated rate of return in another pipeline case in 2018, produced an analysis concluding that FERC should set the rate of return at 10.95 percent instead. That case was dismissed for lack of standing.[132] The developer's profit from the NESE pipeline therefore is still based on that inflated, outdated rate of return. Downstate New York ratepayers would pay gas rates that reflect these inflated profits.

Ratepayers would also be on the hook for National Grid's profits.

The ratepayers would also be on the hook for National Grid's profits. The pipeline would fuel National Grid's continued home heating fuel market expansion plans. Those plans in some cases would entail construction of new distribution

[130] Transcontinental Gas Pipe Line Company, LLC, NESE Project, Application for Certificate of Public Convenience and Necessity, Federal Energy Regulatory Commission (FERC) Docket No. CP17-101, March 27, 2017 (hereafter, NESE Application to FERC), Exhibit P: Tariffs, Preface and "Derivation of Incremental Daily Reservation charge and Commodity (Usage) Charge," p. 1. FERC sets the "cost-of-service fallback rate," also known as the "recourse rate," to regulate negotiations between a monopoly pipeline and a shipping customer such as a utility. The recourse rate can protect a utility's ratepayers if it properly reflects market conditions because "an appropriate recourse rate equalizes an otherwise imbalanced negotiation." PSC, Proof Brief as Intervenor in Support of Petitioner, in *North Carolina Utilities Commission v. Federal Energy Regulatory Commission,* CADC Docket No. 18-1018, May 22, 2018 (appeal regarding rate of return for incremental recourse rates – Transco Atlantic Sunrise, Virginia Southside Expansion, and Dalton Expansion Projects), p. 11.

[131] Cathy Kunkel and Tom Sanzillo, IEEFA, Risks Associated with Natural Gas Expansion in Appalachia, April 2016, pp. 6-7.

[132] See op cit., PSC, Proof Brief as Intervenor in Support of Petitioner, in *North Carolina Utilities Commission v. Federal Energy Regulatory Commission*, p. 11.

pipelines.[133] National Grid discloses that, in addition to the existing non-heat customers who expand their service to add gas heat, roughly "5,400 new customers per year join National Grid by converting from non-gas fuels to gas."[134] Providing service to many of these new customers would require some infrastructure construction—capital costs for which National Grid would be entitled to a return on investments. Indeed, in the pending rate proceeding, National Grid seeks a higher rate of return on its investments.[135] John Bruckner, Jurisdictional President for National Grid's New York businesses, stated in the current rate proceeding that National Grid has requested a return on equity of 9.65 percent for the Rate Year. The current return on equity is set at 9 percent.[136]

The financial risk of this NESE pipeline project has a material impact on National Grid's revenue requirements. The pipeline developer stated in March 2017 that the pipeline would cost $926.6 million to construct.[137] National Grid reports that it will pay $193 million per year over a 15-year contract,[138] for a total of nearly three billion dollars, to use the NESE pipeline. Added to this is the cost of the gas itself, which will vary with the market. National Grid states that the gas is expected to average three dollars per dekatherm from this 400,000-dekatherm pipeline.[139] But a full analysis would have to consider a range of risks. For example:

- National Grid does not disclose what will happen if the construction costs are higher than predicted—a phenomenon all too common in large construction projects, including pipeline projects.[140] Indeed, the assumed costs for labor, materials and other services have likely changed such that an updated estimate would be higher even before commencement of

[133] Local distribution companies such as National Grid "pass on" natural gas to customers at cost, "without any markup or profit." See New York State Energy Plan 2015, Vol. 2, Sources, p. 68. Profits are generated by infrastructure investments.
[134] National Grid 2020 Report, p. 30.
[135] John Bruckner, Jurisdictional President for National Grid's New York businesses, Direct Testimony, Case 19-G-0309 and 19-G-0310, April 2019, p. 5.
[136] National Grid seeks a return on equity rising from 9% to 9.5%, on an assumed equity to regulatory capitalization rising from 48% for 2021 to 50% for FY 2022 and FY 2023. Bruckner Testimony, pp. 50-51. National Grid argues that a higher rate of return is needed to protect its credit rating. Ibid., p. 6. Moody's, however, indicates that the rate proceeding's overall outcome is more significant for credit purposes. The PSC staff counter-proposed a rate of 8.2%, and Moody's anticipates a settlement below the 9% level. See Moody's Investor Services, Credit Opinion: Brooklyn Union Gas Company, December 30, 2019, p. 3.
[137] NESE Application to FERC, p. 6 and Exh. K. National Grid cites an estimated cost of $1 billion. National Grid 2020 Report, p. 62.
[138] National Grid Revenue Requirements Panel, Supplemental Testimony, Case 19-G-0309 and 19-G-0310, June 11, 2019, p. 5, line 9 reaffirms the revenue requirements for the Rate Year of $1.2 billion. The debt service alone would be approximately 16% of the annual revenue requirement compared to a utility sector average of 6.8% of revenues for debt service (see Edison Electric Institute, 2018 Financial Review, p. 14).
[139] National Grid 2020 Report, p. 61.
[140] S&P Global Market Intelligence reported that the projected price tag for Dominion's proposed Atlantic Coast Pipeline rose from $5.1 billion in 2015 to $7.8 billion as of November 2019. IEEFA, Cost Overruns Post New Concerns for Dominion's Long-Delayed Atlantic Coast Pipeline, November 15, 2019; see also BTU Analytics, Gas Pipeline Costs Run Higher, Andrew Bradford, September 7th, 2018.

construction. National Grid is listed as the NESE pipeline's sole end use customer,[141] so it is reasonable to expect that the pipeline developer would look to National Grid to cover such costs, if not in the current 15-year contract, then in the subsequent contract.

- If the NESE pipeline proves to be obsolete and unneeded, which is likely to happen under current energy trends and policies, the ratepayers will be left paying for an asset that provides no service.

National Grid's presentation of options in its 2020 Report lacks a clear, transparent analysis of the size and internal composition of rate increases that would flow from the investments required over the next several years under each option. National Grid has proposed rate increases for the pipeline of between 5.15% of the total bill for KEDLI customers and 11.99% for KEDNY customers.[142] It is impossible to determine whether these increases are reasonable without comparison to the other scenarios assessed in the report. Such an analysis should assess each scenario according to baseline assumptions and consider a range of risks, such as those described above.

It should also examine the findings of the Synapse Energy Economics report with regard to cost estimates. That report concludes, based on consideration of a number of factors, that National Grid overestimates the costs of energy efficiency measures, and that the no-infrastructure solution is "substantially cheaper than all of the large infrastructure options."[143] Moreover, much of these expenditures would be necessary whether the NESE pipeline were built or not, in order to comply with the Climate Leadership and Community Protection Act (CLCPA)[144] and State energy policy.

National Grid overestimates the costs of energy efficiency measures.

National Grid's 2020 Report, in addition, should discuss how costs can be managed through rate tools. National Grid's 2020 Report reveals that while the "no

[141] The NESE Application to FERC, p. 3, states, "The Project capacity is fully subscribed by two entities of National Grid: The Brooklyn Union Gas Company, d/b/a National Grid NY and KeySpan Gas East Corporation, d/b/a National Grid (collectively, "National Grid" or "Project Shippers")," and that the Williams Companies, Inc., had "executed binding precedent agreements with the Project Shippers for 100% of the 400,000 dt/day firm transportation service to be provided under the project. The precedent agreements require Transco and the Project Shippers to Execute firm transportation service agreements, each with a fifteen-year primary term."
[142] John Bruckner, Jurisdictional President for National Grid's New York businesses, Direct Testimony, p. 4.
[143] Synapse Energy Economics, p. 47.
[144] The CLCPA sets a commitment to reduce greenhouse gases by 85% by 2050 with offsets for the remaining 15%, to achieve a net zero increase, and a commitment to establish a 70% renewable electrical grid by 2030 and 100% carbon free electricity by 2040.

infrastructure" option of energy efficiency and peak demand management incurs higher costs during five of the years of early implementation, under the more reasonable Low Demand Scenario, the costs quickly plummet and this option begins to produce annual savings by 2028.[145] In a subsequently released appendix to the 2020 Report, National Grid produced a calculation of total cost impact (percent change from baseline) to customers of the various options, concluding that the "no infrastructure" option would have higher impacts for the first 10 years but would cause savings—reduce the baseline costs—in the final five years, for a lower 15-year average.[146]

The failure of a comprehensive treatment of rate impacts in the National Grid analysis does not allow for a review of how costs under each scenario could be treated in a final rate order. The current rate proceeding, and most rate proceedings, can establish costs based on several regulatory models, including recovery formulas that support the utility, yet balance factors to mitigate rate impacts.[147]

Key Analysis Lacking: The Missing Audit of 2019

A comprehensive audit of National Grid's operations would be helpful at this important decision-making juncture—and a new audit should have been available in September 2019.[148] A current audit, unfortunately, is not available because the consultant company hired to carry out the audit failed to meet professional standards in conducting the work, according to the PSC. The PSC terminated the contract for cause in October 2019.[149] The PSC notified National Grid in December 2019 that PSC staff will complete the audit, based on the information and materials unearthed by the consultant company.[150] Some of the areas of inquiry required in this audit are highly relevant to the considerations of the PSC in this enforcement proceeding, including:

- Assess the models and inputs used to develop short-and long-term gas forecasts, and determine the extent to which "backcasts"—which define a desired future condition and then identify what steps are needed to achieve

[145] National Grid 2020 Report, Figures A5, p. 109 and A-19, p. 116.
[146] National Grid, Customer Cost Supplement to the Downstate New York Natural Gas Long-Term Capacity Report, March 23, 2020, p. 3, Table 2.
[147] See, for example, the New York State Consumer Protection Division's discussion of cost allocation related to residential and commercial classifications as well as the policy considerations for the definition of pipeline demand-related costs. NYS Department of State, Division of Consumer Protection, Utility Intervention Unit, Direct Testimony, Danielle Panko, Case Nos. 19-G-0309 and 19-G-0310, August 30, 2019.
[148] PSL § 66(19) requires the PSC to order an audit of a large utility (such as National Grid) at least once every five years. The PSC may conduct the audit itself or require the utility to pay for an independent auditor.
[149] PSC Management and Operations Audit, Utility Supervisor Jeremy Routhier-James, Letter to Saleeby Consulting Group re Case 18-M-0195, October 2, 2019.
[150] PSC Management and Operations Audit, Utility Supervisor Jeremy Routhier-James, Letter to Philip DeCicco, Vice-President and General Counsel, National Grid, re Case 18-M-0195, October 2, 2019.

it—are employed to determine the accuracy of the forecasting function.

- Assess the readiness, capability and possible impediments to meeting increasing natural gas load, and possible alternatives to new long-term projects like pipeline capacity, including the ability of conservation, temporary compressed natural gas facilities, demand response or other programs to meet peak load requirements in the future.[151]

- Determine the extent to which National Grid incorporates the consideration of Non-Pipe Solutions as well as both traditional and non-traditional demand response techniques into its gas planning processes for its downstate New York territory.

- Assess the replacement programs for leak prone pipes, including flood zone management, risk models, and other factors used to determine mains to be replaced, verification that high-risk pipes are replaced, and the program's impact on total system leaks.

- Evaluate how National Grid identifies and selects capital projects for its downstate New York territory, considers alternatives, and memorializes which projects move forward and which do not.[152]

- Assess the management of National Grid's Energy Efficiency programs, including a review of procedures for collecting, reporting, remediation of data errors, the impact of data errors on the planning process, and QA/QC procedures for ensuring data quality.

- Evaluate how energy efficiency and demand response programs are coordinated with, and incorporated into, forecasting and planning processes.[153]

The evaluations of these issue areas, which are so pertinent to the inquiry at hand, are not yet available—and will not be so until the PSC can complete its audit. When questioned in the pending rate proceeding for KEDNY about the status of the audit, PSC attorney Brandon Goodrich testified:

> *A report has not yet been issued and I do not anticipate one will be issued at least in [the] near future, at least in the next I would say couple months at the very least. I don't honestly have [a] known date for an expected release of that report.*[154]

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[151] PSC, Request for Proposals, p. 15 (Issue 5), attached to PSC, Order Instituting Proceeding and Authorizing Issuance of a Request for Proposals, Case No. 18-M-0195, May 17, 2018.
[152] PSC, Request for Proposals, p. 16 (Issues 5, 6 and 8).
[153] PSC, Request for Proposals, p. 17 (Issue 9).
[154] PSC Attorney Brandon Goodrich, Statement in response to question on status of audit from Administrative Law Judge Leary, Transcript of Evidentiary Hearing, Brooklyn Union Gas Rate Case 19-G-0309, February 25, 2020, p. 4220.

Without this evaluation, both the PSC and the public lack key information that would normally be an integral part of the pending rate proceeding and also would certainly be relevant to the analysis and decision-making regarding the current enforcement proceeding for which National Grid's 2020 Report was prepared.

The last required audit of National Grid's operations in downstate New York was completed in 2014. NorthStar reported that the company's gas operations provided gas service "in a reliable manner,"[155] but expressed concern that strategic planning was occurring primarily at the National Grid plc level.[156] The auditors found a "lack of structured review of short-term gas supply decisions and metrics to measure procurement performance, and inconsistent documentation of long-term decisions" which limited opportunities to improve performance.[157] They noted with regard to oil-to-gas conversions that NGUSA had "no overall assessment of the opportunities from technological innovation or market trends," or its "possible impacts on the National Grid's New York gas systems or ratepayers."[158] The auditors recommended that National Grid should prepare "a true strategic plan" for its New York operations that would "build on the state energy policy and Connect21 white papers and incorporate other PSC, state and federal energy and regulatory initiatives."[159]

Auditors found a "lack of structured review of short-term gas supply decisions…"

It is worth noting, in this context, that the Massachusetts Department of Public Utilities (DPU) recently required a management review audit of National Grid. The DPU order calls for review of National Grid's management and staffing approach to its electronic vehicle programs and its management of the distributed generation interconnection process related to solar power development. In particular, the DPU expressed concern about what it deemed a lack of timely disclosure of interconnection issues that resulted in the need for a "Cluster" study. It stated:

> *We are troubled that the Company did not inform the Department of the potential for a Cluster Study in a timely manner given the likeliness of the cluster Study to delay the interconnection of affected projects, which total over*

[155] NorthStar 2014 Audit of National Grid, pp. I-3 to I-4.
[156] Ibid., p. III-27.
[157] Ibid., p. I-7.
[158] Ibid., p. III-30.
[159] Ibid., p. I-8.

> *900 MW…, or more than half of the Commonwealth's target for solar development under the solar Massachusetts renewable target (SMART) program. Based on the record evidence, the delay could be years depending on the length of the study and the time needed to implement any necessary system upgrades. The company's failure to meaningfully engage with the Department and stakeholders prior to the commencement of the Cluster Study raises serious concerns about management decisions made at the Company, whether these decisions serve the public interest, and about the efficiency and timeliness of communications between personnel performing the work and management.*[160]

The Massachusetts DPU declared that its investigation would address, among other issues, "potential management problems through to the highest levels of the organization."[161]

While National Grid did subsequently submit a strategic plan in response to NorthStar's 2014 recommendations,[162] the need for completion of the missing 2019 audit for its New York operations is clear. The results of that audit, upon completion, should be made available to inform this enforcement proceeding.

The need for a 2019 audit of National Grid's New York operations is clear.

Conclusion

Asking new Yorkers to foot the bill for a $1 billion pipeline that is not needed is not responsible. Ten years ago, this may have made sense, but time and innovation have made this proposal a monument to the past. Future economic growth in New York can be achieved using the best practices we have now, not outdated remedies.

The rationales provided for constructing the proposed NESE pipeline are rooted in presumptions of demand trends that have shifted. In addition, recent events have created uncertainties in the oil and gas market and economic forecasts that make investments in a costly pipeline unwise. Strategic planning to ensure coverage of peak demand is reasonable, but, given these considerations, capital construction is

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[160] State of Massachusetts DPU, Decision and Order, Petition of Massachusetts Electric Company and Nantucket Electric Company, each doing business as National Grid, for Approval of General Increases in Base Distribution Rates for Electric Service, Case 18-150, September 30, 2019, pp. 501-502.
[161] Ibid, p. 502.
[162] National Grid, Implementation Plan Update re Comprehensive Management and Operations Audit of National Grid USA's New York Gas Companies, Case No. 13-G-0009, November 17, 2018, p. 12.

not. Carefully targeted peak demand management programs and energy efficiency are far more flexible measures than construction of a massive pipeline. National Grid should move forward with a sustainable program designed with projections properly suited to real-world conditions.

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