



conEdison

Natural Gas Infrastructure

The Capacity to Fuel the Future

Introduction

Natural gas is a critical fuel in New York State's energy portfolio, providing 27% of all the primary energy consumed by New Yorkers, fueling 35% of existing electric generation plants within the state, and heating more than half of all residences in the state. There are over 4.5 million natural gas customers in New York, consuming 1,100 billion cubic feet (BCF) of natural gas annually. Natural gas's role in the New York State energy markets is expected to grow significantly in the future, due in part to its combination of affordable pricing, desirable emissions characteristics, and the secure and abundant domestic nature of natural gas. Indeed, 50% of all the future electric capacity currently in the New York Independent System Operator's (NYISO) interconnection queue is expected to be natural gas fired, and conversions from oil to natural gas heat reached record levels this year due in part to the clean, affordable characteristics of natural gas as compared to oil.

New York also is served by a safe, robust natural gas infrastructure, including 10 natural gas pipelines with 4,726 miles of interstate pipe installed, 226 BCF of underground natural gas storage, and 10 local distribution companies (LDCs) providing the final link between the sources of natural gas and the customers. New York is also a producer of natural gas, supplying 55 BCF annually, 5% of the state's total consumption of natural gas. Local natural gas production is expected to grow, due to recent technological advances in the extraction of natural gas from shale deposits, which are abundant in New York.

Finally, concerns about global climate change have highlighted natural gas's ability to serve as a bridge to a future where the energy production process is less carbon intensive than it is today. As the hydrocarbon with the lowest proportion of carbon, which is additionally available in abundance from domestic sources, most observers anticipate that addressing climate change – at least in the short term – will likely mean an increase in reliance on natural gas as a primary fuel.

The forecasted growth in reliance on natural gas raises issues to be managed regarding the status of the natural gas infrastructure in New York State, and what needs to change in the future to ensure the sufficiency and reliability of our robust natural gas infrastructure system. This white paper will address these questions, as well as recommending policy modifications that will allow the creation of the needed infrastructure.

Discussion

Natural Gas Infrastructure Reliability Planning

Due in part to the central role of natural gas in New York State's energy portfolio, today and in the future, State Energy Plan participants have noted that there is no central

planning authority to ensure the reliability or sufficiency of New York's natural gas pipeline infrastructure. In New York's electric industry, the job of ensuring bulk power system reliability is performed primarily by the NYISO, implementing reliability rules that are set by the North American Electric Reliability Corporation (NERC) and the Northeast Power Coordinating Council (NPCC). In the natural gas pipeline industry, this function of ensuring reliability and sufficiency is performed by a combination of market forces and LDCs working with the Public Service Commission, and implemented by the LDCs and natural gas pipeline companies.

This "light-handed regulation" scheme has been working well. Substantial new gas pipeline infrastructure has been constructed in New York State. Examples of this new infrastructure include the Iroquois and Millennium pipelines, as well as numerous expansions of the incumbent pipelines like the Transcontinental, Texas Eastern, Algonquin and Tennessee pipelines. The construction and expansion of storage fields in western New York, that interconnects pipelines transporting Canadian and domestic U.S. sources, has also added to the reliability of the New York gas system.

LDC peak day planning mandates have made it possible for LDCs to sign up for new pipeline capacity needed to maintain reliable service to firm customers on the coldest days of the winter. Because this new capacity is paid for by those who benefit from the capacity, pipelines have been willing to build capacity when a sufficient proportion of the capacity is subscribed to by customers.

This capacity is also used to support the fuel needs of electric generators, which are greatest on the hottest days in the summer. However, there are no requirements that electric generators subscribe to firm pipeline capacity and many generating units are permitted to burn alternate fuels for only a few hours annually due to emissions requirements. As a result, some electric generators risk shut down on the coldest days absent firm natural gas capacity. The issue of natural gas capacity sufficiency is a critical one for both natural gas and electric customers, and currently there is no single entity testing the natural gas infrastructure system on a state-wide basis for capacity sufficiency.

LDCs engaged in supply and pipeline capacity planning for the needs of their customers have naturally focused on those customers with reliability needs that can only be supplied by firm pipeline capacity, which for the most part are firm heating customers. Those same LDCs, when designing and constructing their own gas infrastructure, also design for their firm service customers. Many LDCs, however, also serve electric generation units "behind the city gate" that cannot be supplied directly by the gas pipelines; these generators do not typically sign up for firm service from the LDC, since the winter capability paid for by firm heating customers is often – but not always – sufficient to supply gas to generators during their summer peak season, when winter heating customers are not using the LDC system as intensively. During peak winter months, this means these LDC-served generators often must switch to backup fuels.

Commodity Impacts of Natural Gas Infrastructure

Because LDCs sign up only for the capacity needed to supply their firm customers (typically winter heating customers), the volumes of capacity added to the New York gas infrastructure have primarily been incremental in nature, which gives an advantage to incumbent pipelines since those incumbents can expand their existing assets. But natural gas commodity price spikes in certain areas signal that there may be a benefit for new infrastructure beyond that required to maintain reliability of the natural gas systems of LDCs. The price spikes have been occurring in certain New York City markets, and FERC among others has taken note. Most notably were price spikes that occurred in February 2007 and January 2008 when the NYC daily spot price was more than \$25 per dekatherm higher than other areas of the country.

Smoothing these spikes in natural gas commodity prices can have significant benefit for utility customers – many of whom are both gas and electric retail customers – since these customers are impacted on both their gas bill and also their electric supply bill since natural gas is usually the marginal electric production fuel.

Fuel Diversity

The issue of fuel diversity as it relates to electric generation has gotten some attention as a result of perceived reliability issues that occurred in New England in 2001, and the related cost impact of high natural gas prices on electric prices. In this increasingly carbon-centric environment, the emissions reductions resulting from the use of natural gas cannot be ignored. Here again, additional gas transmission capacity to serve electric generators would increase the ability to meet targets set under cap and trade programs such as the Regional Greenhouse Gas Initiative (RGGI), and result in the ability to meet initial and future carbon emission caps.

Increased reliance on natural gas is addressed in several ways to mitigate impacts on customers. New York receives gas from many different sources (Gulf of Mexico, Canada, Midwest, imported LNG, as well as a growing quantity of local production) transported on several different pipelines. Generators connected to the Con Edison transmission system are protected from an outage due to the loss of one of the pipelines because the Con Edison system is fed by a number of different pipelines. Additionally, many older generation units located in the Con Edison electric service territory have sufficient backup fuel (normally fuel oil or kerosene) that can be used either when reliability of the gas system is a concern (for example, when cold winter temperatures raise the needs of firm heating customers thus reducing the availability of non-firm pipeline capacity for electric generators) or when price makes those liquid fuels more economic than natural gas. Here again, newer generating units without backup fuels may not have the luxury of fuel switching other than for emergencies because of environmental constraints.

If a concern regarding generator fuel diversity is cost, then policy makers should examine the fundamental factors causing high gas prices. If price spikes due to gas transmission constraints are driving high natural gas costs, then policy makers should encourage construction of additional gas infrastructure – pipelines and storage – as a way of solving

their pricing concerns. Another way to address cost issues in the natural gas market is to attract new supplies, for example by approving LNG import terminals which have been faced with challenging regulatory requirements in New York.

Environmental Benefits

The environmental benefits of natural gas in comparison to other fuels are well known. By modifying the gas transmission infrastructure to allow generators that can currently burn both natural gas and liquid fuels to burn more natural gas and fewer liquid fuels, local air pollution can be reduced.

Natural gas also may be able to support a smooth transition to a low- or no-carbon future. Renewable resources such as wind and solar have become substantially more attractive due to advances in technology and reductions in cost, but both wind and solar are intermittent resources that depend entirely on a factor outside anyone's control – the weather. Dispatchable resources (i.e. resources which can be ordered to come on line whenever there is a need for them) such as traditional and particularly quick start generation technologies, can offset the reliability challenge posed by renewable resources. The reliability and proven technology of dispatchable gas fired turbines may make an ideal pairing with the growing intermittent renewable resources currently planned for the New York State. By instituting rules and markets that allow additional gas fired generators to be paired with new intermittent renewable resources, a safe, reliable and significantly less carbon-intensive electric generation portfolio will start to emerge in New York.

A renewed emphasis on greening our transportation infrastructure should also examine expansions of natural gas vehicles and the compressed natural gas fueling infrastructure needed to support those vehicles. As these increases in NGVs occur, additional demands will be placed on the state's natural gas infrastructure. For more information on this issue, see our companion white paper on this topic, "Alternative Fuel Vehicles."

Proposal

1. The State Energy Plan should consider endorsing changes to LDC peak day planning mandates to allow LDCs to plan their own system or subscribe to new pipeline capacity to reduce gas commodity price spikes. While planning for gas system reliability is likely to reduce commodity price spikes, there may be instances where new gas transmission capacity can be justified on the basis of the economic benefits provided to gas customers, and LDCs should be able to explore these options.
2. The State Energy Plan, when examining the attractiveness of renewable resources, should be mindful of the intermittent nature of many of these resources, and make it economically feasible for the pairing of renewable resources with reliable, dispatchable gas generation resources. This can be accomplished through additional "quick start" generation such as gas fired

combustion and combined cycle turbines to be built in order to ensure overall electric system reliability is maintained.

3. The State Energy Plan can support electric reliability by establishing a cross-functional team, made up of representatives from the NYISO, the major gas pipelines and the LDCs, to monitor the peak summer gas use of electric generators so that it does not overwhelm the available gas transmission capacity. An even more critical metric to monitor is the ability of the electric generators to forecast hourly gas consumptions in order to ensure that daily pipeline capacity can meet short term load durations. Also, this team should evaluate how much firm gas transmission capacity should be available to meet firm winter generation loads, similar to that capacity contracted for higher priority firm customers, who are often residential and commercial retail customers of LDCs. This cross-functional team should also examine other aspects of electric/gas reliability relationships to ensure that new generation resources are sited in areas where they do not worsen the risk of a gas transmission outage causing electric reliability problems.
4. The State Energy Plan should consider how new gas transmission capacity (either on an LDC's gas transmission network or on the interstate gas pipeline system) can be funded in cases when that new gas transmission capacity also benefits electric customers in a region. The benefits examined would include the elimination or reduction of electric market costs, including uplift charges, made possible by reducing the cost of natural gas supplies.

01/19/09