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New York State Department of Environmental Conservation
625 Broadway
Albany, New York 12233

RE: Effects of the Loss of Indian Point Nuclear Generating Units 2 and 3 Capacity and Generation on New York State Environmental, Economic and Energy Needs

Dear Sir or Madam:

This letter responds to a request by counsel to Entergy Nuclear Indian Point 2, LLC and Entergy Nuclear Indian Point 3, LLC (collectively "Entergy") that we provide information to the New York State Department of Environmental Conservation ("NYSDEC") on the effects of a potential loss of the two Indian Point generation units ("IP2" and "IP3" and collectively "IP") on electricity system reliability, electricity prices and consumer impacts, and climate change and air quality objectives in New York State. NERA Economic Consulting ("NERA") currently is engaged in an empirical study of these effects. At this time, it is possible to identify the general nature of these impacts and to summarize conclusions from prior studies. The following is a brief summary.

- *Electricity system reliability impacts*. Loss of IP generation and capacity (through an extended outage or other cause) would have a major adverse effect on the reliability of the New York power system. The New York Independent System Operator ("NYISO") noted in its May 2009 Comprehensive Reliability Plan[1] ("CRP") that, "[d]ue to their location in a constrained area of the system . . . [r]etirement of both [IP] units would cause a severe shortage in resources needed to maintain bulk power system reliability, resulting in the probability of an involuntary interruption of load that is approximately 40 times higher than the reliability standard in 2018." (p. 18). Taking into account other risk factors that the NYISO identified (e.g., effectiveness of energy efficiency programs, reductions in capacity due to environmental restrictions, higher-than-projected demand growth) would exacerbate the adverse reliability effects of a loss of IP capacity.

[1] New York ISO. *2009 Comprehensive Reliability Plan: Final Report.* May 2009 (2009a).

- *Electricity price and consumer impacts.* Loss of IP would substantially increase already-high electricity prices and consumer electricity expenditures in New York State. As the NYISO notes in its October 2009 comments[2] on the New York State Energy Planning Board's August 2009 Draft State Energy Plan, "[r]eplacing a low marginal-cost resource such as Indian Point with a gas-fired facility, which has some of the highest marginal operating costs on the electric system, would almost certainly increase wholesale electricity market clearing prices." (pp. 10-11). These price increases would be passed through to New York State retail electricity customers. Electricity price increases in turn would both reduce the standard of living for New York State residents and make New York State businesses less competitive.

- *Environmental impacts.* Loss of the IP units—which do not emit criteria air pollutants and other regulated emissions in conjunction with their substantial baseload electricity generation—would adversely affect the State's ability to meet important carbon dioxide ("CO_2") targets that are called for in the Regional Greenhouse Gas Initiative ("RGGI"), as well as air-quality targets related to emissions of nitrogen oxides, sulfur dioxide, mercury and other toxic emissions. Both climate change and air quality goals are likely to be expanded through future federal air quality policies (e.g., new ambient ozone standards and related nitrogen oxides emission standards), making it even more difficult to achieve New York targets if IP were not available. These various air quality policies also may impact NYISO's ability to satisfy reliability goals, if some existing facilities are unable to generate as much as they currently do as a result of increasingly stringent air-quality requirements.

Note that the adverse effects would be even greater if the regulatory requirements that could lead to loss of IP generation and capacity were extended to other facilities, as indicated in the DEC's recent proposed policy regarding Best Technology Available ("BTA") for cooling water intake structures.[3] These other facilities also would face the prospect of prolonged outages, leading to even greater impacts.

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[2] Comments prepared by Stephen G. Whitley, President and Chief Executive Officer, New York Independent System Operator, on the August 2009 Draft State Energy Plan. October 19, 2009 (2009b).

[3] New York Department of Environmental Protection, *Best Technology Available (BTA) for Cooling Water Intake Structures*, Draft. March 4, 2010.

A. Introduction

In a letter[4] dated April 2, 2010, NYSDEC proposed to deny Entergy's request for a federal Clean Water Act section 401 Water Quality Certificate. NYSDEC based its decision, in part, on a conclusion that "conversion from a once-through cooling system to a closed-cycle cooling system, while expensive and involving a potentially lengthy construction process, is nevertheless an available and technically feasible technology for Units 2 and 3 to meet the BTA requirement of 6 NYCRR § 704.5 and comply with this State water quality standard." (p. 17).

As the NYSDEC letter indicates, engineering analyses have determined that installation of closed-cycle cooling at IP would require lengthy temporary facility outages for construction, with the potential for more substantial outages a distinct possibility. In a February 2010 study[5] prepared for Entergy, Enercon Services, Inc. estimated that closed-cycle cooling would require both IP units to be simultaneously out of service a minimum of 42 weeks. Enercon noted that its "scheduling of many tasks represents a best-case scenario" (p. 47), and that the actual outage length could be significantly longer. This extended removal of IP would have important implications for New York residents and businesses.

The objective of this letter is to provide a general assessment of the implications of the loss of IP generation and capacity (through an extended outage or other cause) on electricity reliability, wholesale electricity prices and air-quality and climate change goals. As noted above, we are developing quantitative estimates that will be provided at a later date. We begin with an overview of IP and its key characteristics.

B. Background on Indian Point

IP is located in the Village of Buchanan in upper Westchester County, New York. The generating plant consists of two pressurized light water reactors, Units 2 and 3,[6] owned by Entergy. The combined capacity of the two units is approximately 2,158 megawatts ("MW").[7]

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[4] Letter from William R. Adriance, Chief Permit Administrator, New York State Department of Environmental Conservation, to Dara F. Gray, Entergy Nuclear Operations, Inc. April 2, 2010.

[5] Enercon Services, Inc. *Engineering Feasibility and Costs of Conversion of Indian Point Units 2 and 3 to a Closed-Loop Condenser Cooling Water Configuration*. February 12, 2010.

[6] IP's Unit 1 ceased operation in 1974.

[7] Enercon Services, Inc. *Engineering Feasibility and Costs of Conversion of Indian Point Units 2 and 3 to a Closed-Loop Condenser Cooling Water Configuration*. February 12, 2010, p. vi.

As a nuclear generating station, IP has low marginal costs relative to fossil-fired generating units. Thus, it provides base-load generation service to the NYISO, the entity responsible for operating the electric transmission system and New York's competitive wholesale electricity markets. IP generally operates at full capacity other than during scheduled outages for refueling and maintenance (typically, fewer than 30 days).

Indian Point is situated in NYISO's Zone H (Millwood), in the capacity-constrained southeastern New York region. In 2009, IP generated approximately 16.5 million MWh of energy, more than twice as much power as any other single facility in southeastern New York.[8] IP 2 and IP 3 each individually is expected to provide more summer 2010 generating capability (MW) than any non-IP unit in southeastern New York.[9] Indian Point also provides voltage services necessary to maintain transmission capabilities. Moreover, IP contributes to the ability of New York to meet key air-quality and climate change targets, including CO_2 targets related to RGGI, as well as nitrogen oxides ("NO_x"), sulfur dioxide ("SO_2") and mercury targets related to conventional and toxic air quality goals.

In summary, there are five major attributes of IP that make it critical to meeting New York energy, air-quality and climate change needs.

- *Location*. IP is located in the Southeastern New York area that represents the majority of the state's electricity demand and that is traditionally supply-constrained due, in part, to the difficulty and cost of siting new generation and transmission infrastructure.

- *Capacity*. IP represents more than 10 percent of the total generating capability in southeastern New York (defined as NYISO zones G, H, I, J, and K).

- *Baseload operation and generation*. Aside from specific outages, IP contributes power across all months of the year and hours of the day. As a result, IP generated more energy in 2009 than any other facility in southeastern New York. Indeed, IP's power amounts to about 30 percent of the energy generated within this region (New York City, Westchester County and Long Island).[10]

[8] New York Independent System Operator. *Load & Capacity Data "Gold Book."* April 2010.

[9] Ibid.

[10] *See* NYISO (2009b), p. 9.

- *Voltage service*. In addition to the energy and capacity it provides, IP is a critical source of voltage support in the Lower Hudson Valley and is thus essential to the local transmission system. This contribution to transmission capacity is particularly important because of the difficulty of siting additional generation in the New York City area.

- *Non-emitting*. IP generation does not emit CO_2, NO_x, SO_2, mercury, or any other air pollutant. Thus, IP contributes substantially to the ability of New York State to meet key climate change and air quality goals.

These characteristics mean that loss of IP—through an extended outage or some other cause—would have substantial negative effects on energy, air-quality and climate change objectives in New York. The following sections provide summaries of these effects.

C. Effects of Loss of Indian Point Capacity and Generation on New York Electric System Reliability

1. Background on Electric System Reliability

Electric system reliability refers to the ability of the wholesale power system to satisfy electricity needs in different regions and at different times of the day and year. Thus, reliability is based on the relationship between the supply of electricity—including generating facilities, external capacity, transmission capacity, and other resources— in a given region and the demand for electricity from residential, commercial, industrial, and other sources.

The New York State Reliability Council ("NYSRC") is charged with determining the minimum level of installed reserves that must be available in order to provide adequate supply in New York. In advance of each summer peak period, the NYSRC—in coordination with the NYISO—establishes statewide and localized reserve margin[11] requirements for that summer.

The standard that the NYSRC uses to establish the reserve requirement is known as loss-of-load expectation ("LOLE"), a metric that represents the expected number of days per year during which lack of sufficient available capacity would require involuntary disconnection of some customers' loads from the grid. The North American Electric Reliability Corporation ("NERC"), Northeast Power Coordinating Council ("NPCC"), and NYSRC mandate a maximum LOLE level of 0.1 in New

[11] The reserve margin is the ratio of available capacity to expected peak demand.

York—that is, they require an expected frequency of involuntary load disconnection of no more than one day per ten years.[12] As described below, NYISO and other agencies regularly publish forecasts of LOLE under alternative assumptions about market conditions.

To mitigate the risk of involuntarily disconnecting customer load, the NYISO maintains emergency operating procedures to help preserve reliability in the event of a capacity shortage. These measures include special case resources, emergency demand response programs, and public appeals.[13] All of these measures are costly, and they are generally used only when conventional resources are insufficient. Consequences of using these resources can include risks to equipment, reduced productivity/efficiency for affected electricity consumers, and general economic impacts due to the high costs to the power system.

2. Impacts of Loss of IP Capacity and Generation on New York Electric Reliability

IP is the largest generating station located near the major load centers in the New York metropolitan area, and thus provides many benefits to the New York electricity system.

- *Overall load.* IP represents about 30 percent of the total energy generated to serve the New York City area (New York City, Westchester County and Long Island).

- *Peak demand.* IP is south of one of the largest congestion points in the New York Control Area ("NYCA") transmission system (the Upstate New York-Southeast New York interface) and thus is a critical resource that is available to provide generation during peak demand periods (when reliability concerns are most relevant and the transmission system is constrained).

- *Voltage support.* In addition to serving capacity and energy needs of the New York metropolitan area, the IP units provide voltage support at a critical location on the grid. This voltage support allows energy to flow on the transmission system from the northern and western parts of the state to the New York metropolitan area load centers. Without IP, the power that could be transferred to the New York metropolitan area would be reduced, perhaps substantially.

[12] New York Independent System Operator. *2009 Reliability Needs Assessment*. January 2009 (2009c).

[13] New York State Reliability Council. *New York Control Area Installed Capacity Requirements for the Period May 2009 through April 2010*. December 2008.

These benefits would be lost if IP were lost to the system, with major adverse effects on the reliability of the New York electricity system.

The NYISO has repeatedly emphasized the importance of IP to electric reliability and the difficulty of developing reliable replacements if IP were not in operation. The southeastern New York area has a peak load of more than 19,500 MW, and a generating capacity of 17,300 MW (NYISO 2009b, p. 10). Retiring more than 2,000 MW of generation located within this area of the transmission system would increase further the need to import power. Moreover, the loss of IP's reactive power/voltage support (which supports voltage levels in the Lower Hudson Valley region) would reduce the capacity of the transmission system.

Replacing IP's generation and other benefits would be difficult for many reasons. Siting increased generation and transmission capacity in the area would be a lengthy and contentious process. Using energy efficiency to compensate for some of the loss would not necessarily provide a replacement since the reactive needs of the system still would have to be met. As the NYISO notes, a strategy of replacing IP with a combination of combined-cycle generating plants and energy efficiency would provide less reactive power/voltage support to the transmission system and thus would not fully replace the IP services. The NYISO concludes in commenting on the draft New York State Energy Plan as follows.

> Any plan proposed as a reliable replacement to the Indian Point nuclear units would have to be studied in much greater detail to quantify its impact on: 1) the ability to transfer power to the downstate load centers; 2) the transfer capability of the transmission system into the area; 3) reactive power resources in the lower Hudson Valley; and 4) overall system reliability. (NYISO 2009b, p. 10)

Existing quantitative assessments provide some indications of how New York electric system reliability would be affected by a loss of IP. Below, we review recent NYISO studies and a 2006 study by the National Academy of Sciences regarding the impacts of a loss of IP. All studies conclude that electric reliability would be substantially adversely affected by a loss of IP capacity and generation.

a. NYISO Empirical Analyses of Reliability Impacts

NYISO regularly publishes analyses of New York electric reliability, including forecasts of LOLE under alternative electricity market and other scenarios. These reliability evaluations consistently have emphasized the importance of IP to meeting

State electric system reliability standards. In an assessment[14] of reliability needs published in 2005, for example, the NYISO stated that "[t]he NYCA LOLE increases significantly with the retirement of the Indian Point units to well in excess of 3.5 days per year," (p. 9). This 2005 estimate of loss-of-load expectation is more than 30 times greater than the minimum allowed under the state requirement. In its 2007 report,[15] NYISO noted that IP "is essential to New York City and the Lower Hudson Valley to meet electricity needs …" (p. 57).

In its most recent Reliability Needs Assessment ("RNA") published in January 2009 and its Comprehensive Reliability Plan published in May 2009, NYISO evaluated risk scenarios that could adversely affect the reliability of the New York electricity system. In the 2009 RNA the NYISO concluded:

> Indian Point 2 and 3 are each 1,000 MW generating facilities. In addition to providing energy and capacity to consumers in the lower Hudson Valley and New York City, these facilities also are a critical source of voltage support for this area. Due to their location in this constrained area of the State, the LOLE levels are exceeded in Southeastern New York and correspondingly, for the NYCA, without just the first unit in service, in 2014. Without the second unit in service two years later in 2016, the impacts are far more severe. Under NERC and NPCC requirements, the LOLE cannot exceed one day in 10 years which is stated as a 0.10 LOLE. Without both units in service, the LOLE jumps to over 2.0 throughout zones in Southeastern New York below the Leeds Pleasant Valley transmission line and correspondingly, for the NYCA. The LOLE then skyrockets in later years without these two units reaching an LOLE of 4.11 in 2018. These LOLE levels were reached as applied against a Base Case that assumes significant load reductions due to the State's focused energy efficiency efforts. If load reductions are ultimately not achieved or are achieved at lower levels in this area of the State, the LOLE impacts without these two units will become even more pronounced (NYISO 2009c, p. 5-6).

Thus, even with assumptions regarding energy-efficiency achievements that the NYISO characterizes as potentially aggressive and other assumptions that tend to reduce the

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[14] New York Independent System Operator. *Comprehensive Reliability Planning Process (CRPP) Reliability Needs Assessment*. December 2005.

[15] New York Independent System Operator. *Comprehensive Reliability Planning Process Supporting Document and Appendices for the 2007 Reliability Needs Assessment*. March 2007.

effects of a loss of IP, the ISO in early 2009 concluded that loss of IP would result in a loss of load more than 40 times the NYISO standard.

b. National Research Council Estimates of Reliability Impacts

In 2003, Congress asked the National Research Council ("Council") of the National Academies to form a committee to evaluate the feasibility and desirability of various alternative means of replacing the output and capacity that IP currently provides to New York. The Council's report,[16] published in 2006, provided (among other analyses) an evaluation of the reliability implications of a loss of IP under alternative scenarios. Its modeling "included additional, aggressive programs to improve efficiency of electricity use and stronger demand-side measures to reduce peak demand" (p. 62), but nonetheless found that loss of IP could result in major reliability problems.

The first modeling case assumed substantial capacity growth before and after the loss of the two IP units, but no incremental new capacity added specifically to address the loss of IP. In this case, the committee determined that the loss of IP would increase reliability risks "to unacceptable levels" (p. 62), including a LOLE more than 13 times greater than the maximum allowable standard.

The Council also developed a scenario in which a combination of aggressive demand-side measures and new capacity would be added to maintain an acceptable LOLE despite loss of IP. The resulting scenario relied on addition of the 1,100-MW TransGas Energy facility proposed for Brooklyn, New York, which has since been cancelled following a permit denial[17] by the New York State Department of Public Service. This scenario also included accelerated addition of additional natural gas and wind generating capacity in New York City and surrounding areas, as well as the aggressive demand-reduction assumptions described above. The inclusion of all of these optimistic assumptions demonstrates the extreme difficulty of developing a realistic scenario in which IP units could cease to operate without severely affecting reliability in New York State. As the NRC notes,

> "[i]dentifying the generation and transmission system capability that must be provided to replace Indian Point is much easier than determining whether it actually would get built when needed. All these measures will

[16] National Research Council of the National Academies. *Alternatives to the Indian Point Energy Center for Meeting New York Electric Power Needs*. 2006.

[17] New York Department of Public Service. State Siting Board Rules on TransGas Petition for Rehearing. Press Release 08077/01-F-1276. July 2008.

> take time to implement, and several factors may converge to make it even more difficult," (NRC 2006, p. 73).

In sum, qualitative as well as quantitative assessments show that loss of IP generation and capacity would seriously compromise the reliability of the New York electricity system. These effects would be substantially greater if other New York units facing requirements related to New York's recently proposed BTA policy also were unavailable.

D. Effects of Loss of IP Capacity and Generation on New York State Electricity Prices and Consumer Expenditures

1. Background on New York Electricity Prices and Price Determination

The NYISO was formed in 1999 to oversee the functioning of the wholesale electricity market in New York State. NYISO takes bids to supply electricity from wholesale suppliers. Based on the bids from wholesale suppliers (which generally reflect the marginal cost of generating electricity—i.e., the cost to a wholesale supplier of producing one additional unit of electricity), the NYISO dispatches generating units and other resources to meet electricity demand in the most cost-effective way, subject to transmission and other constraints.

Because of their relatively low marginal cost of generation, nuclear facilities such as IP typically bid low into the wholesale market. Thus, nuclear facilities are routinely deployed as base-load facilities that provide power that is consumed by customers at all times of the day and year. This implies that a reduction in nuclear availability in the market would generally require that plants that currently are too costly for use during off-peak hours be utilized during such hours, with higher prices needed to induce them to generate. The effect would be similar during peak periods, when plants that currently are so costly that they are used rarely would be needed more frequently. To induce the infrequently-used facilities to generate more often, higher market electricity prices would be required.

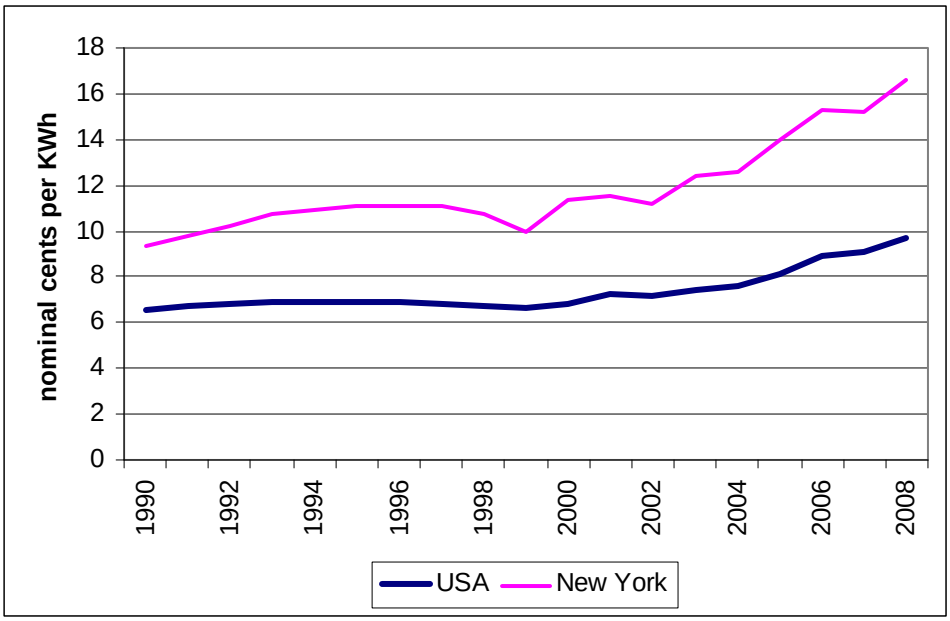
Thus, loss of baseload generators, such as nuclear facilities, typically would increase regional wholesale electricity prices throughout the hours of the day and seasons of the year, and lead to broad increases in the amount that consumers pay for electricity. NYISO noted in October 2009 that

> "[r]etiring Indian Point would impact wholesale electricity prices and total system production costs. Replacing a low marginal-cost resource

> such as Indian Point with a gas-fired facility, which has some of the highest marginal operating costs on the electric system, would almost certainly increase wholesale electricity market clearing prices," (NYISO 2009b, pp. 10-11).

These effects would occur in the context of current New York electricity prices, which are among the highest in the country. Figure 1 shows overall average electricity prices in New York and the United States between 1990 and 2008. In 2008, average electricity prices in New York were more than 70 percent higher than average electricity prices in the country as a whole. On average, New York prices were about 60 percent higher than U.S. prices over the 19-year period.

Figure 1. Average electricity price in the USA and New York State.



Source: U.S. Energy Information Administration, *1990-2008 Average Price by State by Provider*, EIA-861.

2. Impacts of Loss of IP Capacity and Generation on New York Electricity Prices

Prior studies have developed quantitative information on the price and consumer expenditure increases that would result from loss of IP capacity and generation. These studies show that the loss of IP would result in substantial increases in New York's already-high electricity prices.

In its 2006 IP study, the Council performed electricity market modeling using the GE MAPS model. The Council developed modeling runs based on alternative fuel prices and assumptions regarding the availability of generating units. For its "most likely" case, with IP still in service, the Council forecasted 2015 statewide average wholesale prices of $59/MWh and average prices in New York City (Zone J) of $67/MWh (NRC 2006, p. 70). With IP removed, statewide average prices were forecasted to increase by about 12 percent, to $66/MWh. In New York City, the increase was even greater, with prices expected to rise about 18 percent to $79/MWh (NRC 2006, p. 70).

In 2002, General Electric Power Systems Energy Consulting ("GE") and NERA completed a study[18] of the impacts of potential shutdowns of northeastern nuclear units that was submitted to the NYSDEC. This study also used the GE MAPS model to estimate the effects of removal of IP from the New York electricity system. The study found that, over the 3.5-year period modeled (June 2002-December 2005), removal of IP would increase consumer expenditures on electricity by about $3.4 billion (p. 3). The underlying price increases measured about 11 to 16 percent in the state as a whole (depending on year) and 10 to 25 percent for the four downstate distribution companies (p. 17-29).

Effects on electricity prices and consumer expenditures would be even greater if the BTA requirements that might lead to loss of IP units were extended to other units in New York, as called for in NYSDEC's recently proposed BTA policy. Moreover, these increases in electricity rates would tend to make New York State businesses less competitive, resulting in adverse effects on employment and other measures of economic activity.

3. Additional Concerns Related to Fuel Diversity

The effects of loss of IP on New York State electricity prices could be even more pronounced if, as expected, it led to increased reliance on natural gas. Regulators in New York have expressed concern over New York State's reliance on natural gas for electricity generation, particularly in its downstate service territories. An October 2008 NYISO white paper[19] on fuel diversity stated that "comparatively limited downstate fuel diversity poses certain risks for the New York City and Long Island areas," (p. 3-6). It noted that, statewide, the price-setting (or "marginal") fuel source was natural gas-fired (including dual-fuel) during 83 percent of the hours of 2007. In New York

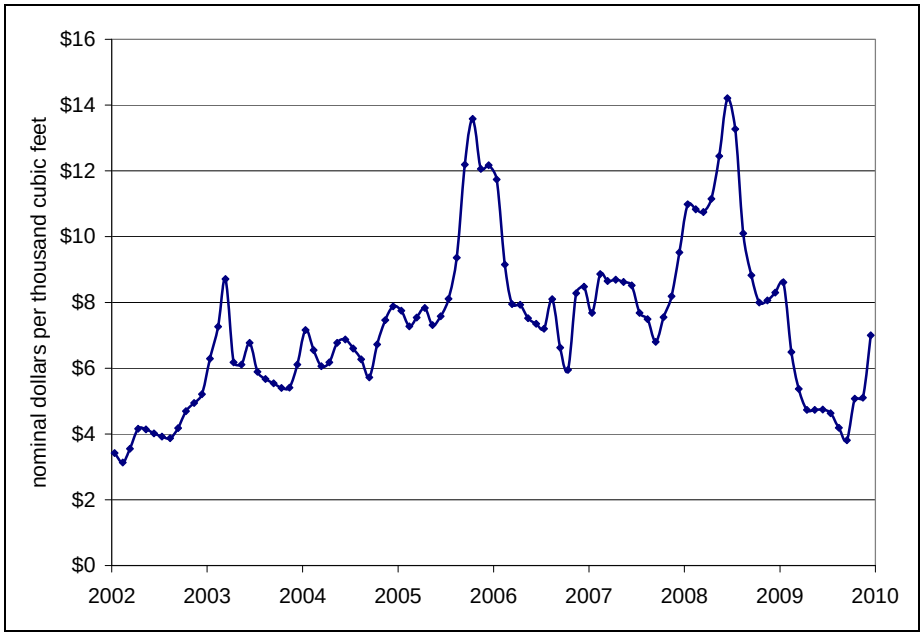
[18] General Electric Power Systems Energy Consulting and National Economic Research Associates. *Electricity System Impacts of Nuclear Shutdown Alternatives*. March 2002.

[19] New York Independent System Operator. *Fuel Diversity in the New York Electricity Market.* October 2008.

City, such facilities set the price in "virtually all hours of the year," (p. 3-4). The NYISO white paper identified loss of IP as a prominent potential factor that could increase these risks, stating that "a closure [of Indian Point] could exacerbate New York City's existing dependence on natural gas for power production," (page 3-6).

Further, because natural gas is already the predominant price-setting fuel in New York State, the state's electricity prices are already significantly exposed to changes in natural gas prices, which are highly volatile. Figure 2 shows prices for natural gas delivered to the New York State electricity sector from January 2002 to December 2009. This history shows the significant volatility in natural gas prices, which translates into volatile electricity prices since natural gas-fired generating units set prices in most demand periods in New York State. The increased reliance on natural gas due to loss of IP would lead to even greater exposure to natural gas price volatility.

Figure 2. Historical prices for natural gas delivered to New York State electricity sector



Source: U.S. Energy Information Administration. New York Natural Gas Prices Sold to Electric Power Consumers. http://tonto.eia.doe.gov/dnav/ng/hist/n3045ny3m.htm.

E. Effects of Loss of IP Capacity and Generation on New York State Environmental Objectives

1. Background on New York State Climate Change and Air Quality Objectives

New York State has adopted an ambitious set of climate change and air quality objectives, motivated in part by increasingly ambitious federal requirements. Numerous state, regional, and federal policies to reduce CO_2, SO_2, NO_x, and other air emissions apply in New York.

a. Climate Change Policies

Policies to reduce CO_2 emissions in New York State include the Regional Greenhouse Gas Initiative and Executive Order 24. RGGI is an agreement among ten Northeast and Mid-Atlantic States, including New York State, to reduce CO_2 emissions from the power sector by 10 percent below their 2009 level by 2018. These CO_2 reductions are to be achieved through a cap-and-trade program that began in 2009. Executive Order 24, signed by Governor David Paterson in August 2009, sets a goal of reducing greenhouse gas emissions in New York State by 80 percent below their 1990 level by 2050. The Executive Order also creates the New York Climate Action Council, and requires it to prepare a draft Climate Action Plan for the state by September 2010.

Pressures to reduce CO_2 emissions in New York would increase if the federal government adopted a national climate policy. Several bills creating national CO_2 cap-and-trade programs have been passed or proposed in Congress. In June 2009, the House of Representatives passed the Waxman-Markey bill, which would reduce U.S. greenhouse gas emissions by 17 percent below their 2005 level by 2020 and 83 percent by 2050. Senate proposals with comparable emission reduction goals include the Kerry-Boxer bill, which was passed by the Senate Environment and Public Works Committee in November 2009.

Adoption of federal climate change legislation would substantially increase pressures to reduce CO_2 emissions, leading to potential retirements of fossil-fueled facilities. These changes would mean even greater need for non-emitting units such as IP to provide for New York State electricity needs.

b. Air Quality Policies

Policies in New York State to reduce SO_2 and NO_x emissions include the federal Acid Rain Trading Program, the Northeast NOx Budget Trading Program, and the Clean Air

Interstate Rule ("CAIR"). The Acid Rain Trading Program was adopted under the U.S. Clean Air Act Amendments of 1990 and began in 1995. It limits SO_2 emissions from power plants across the country through a cap-and-trade program. The Northeast NO_x Budget Trading program covers 12 states in the Northeast, including New York State, and the District of Columbia. It aims to reduce the formation of ground-level ozone (smog) by reducing NO_x emissions from power plants. The U.S. Environmental Protection Agency ("EPA") promulgated CAIR in 2005 to improve air quality in 28 eastern states, including New York State, and the District of Columbia. When fully implemented, CAIR will require reductions in SO_2 emissions in covered states by over 70 percent and reductions in NOx emissions by over 60 percent below their 2003 levels. In February 2008, the DC Circuit Court of Appeals overturned CAIR, but it later reinstated CAIR temporarily to give EPA time to prepare a replacement policy. EPA has announced that it plans to propose a new version of CAIR in May 2010.

In January 2010, the EPA proposed to reduce the National Ambient Air Quality Standard ("NAAQS") for ozone beyond the level that was revised in 2008. In 2008, the EPA changed the ozone standard from 84 parts per billion ("ppb") to 75 ppb. The January 2010 proposal would reduce the ozone standard further to a level within the range of 60 ppb to 70 ppb.[20] This revised ozone standard would lead to requirements to make further reductions in NOx emissions around New York City and other areas of New York State.

Mercury emissions from generating units in New York State were scheduled to be covered by a national cap-and-trade program beginning in 2010. However, in February 2008, the U.S. Court of Appeals for the D.C. Circuit overturned U.S. EPA's proposed regulation and found that a cap-and-trade program for mercury is not permissible under the Clean Air Act. U.S. EPA has until November 2011 to promulgate new federal mercury regulations.[21]

In summary, New York State will be under pressure to make major reductions in emissions of CO_2, NO_x, SO_2, mercury and other air pollutants in response to state and federal environmental goals. Major reductions in the use of non-emitting nuclear power will make these goals much more difficult to achieve.

[20] Eilperin, Juliet. *EPA proposes stricter limits on smog pollutants*. Washington Post. January 8, 2010.

[21] Bravender, Robin. *EPA Crafting Multipollutant Strategy*. E&E News Greenwire. October 27, 2009.

2. Impacts of Loss of IP Capacity and Generation on New York State Air Quality and Climate Change Objectives

Since IP is a nuclear facility, IP generation does not produce CO_2, NO_X, SO_2, or any other air emissions. The loss of IP generation would require that fossil-fueled sources of generation be used more intensively, particularly gas-fired plants—since natural gas is usually the marginal fuel source in New York (i.e., it is the fuel that typically would replace generation lost from other facilities)—but also coal-fired plants. This shift would mean that power formerly generated from facilities with no combustion-related air emissions would be replaced by power from fossil-fired units that emit various pollutants. For natural gas units, these emissions include NO_X emissions associated with regional ambient air problems (ground-level ozone, fine particles, and acid deposition) and CO_2 emissions associated with global climate change. In addition to producing greater emissions of NO_x and CO_2 emissions than gas-fired units, coal-fired units also emit other air pollutants—including SO_2, primary particles, and mercury—that EPA has identified as having adverse health and other environmental impacts. The NYISO noted in its October 2009 memorandum that removal of IP would significantly adversely affect the state's ability to meet its environmental goals.

There are some preliminary assessments of the potential implications of removing IP for air quality and climate change goals. In March 2009, NERA[22] developed preliminary estimates of the effects of loss of IP on various emissions. The NERA preliminary analysis indicated that loss of IP would lead to an increase in CO_2 emissions of about 9.6 million tons of CO_2 per year. As noted above, under RGGI, New York electric generators are required to reduce their annual emissions of CO_2 by about 6.4 million tons by 2018.[23] Thus, the potential increase in emissions from loss of IP would exceed the annual New York RGGI reduction target by about 50 percent. This result implies that the annual burden on New York sources to reduce emissions under RGGI would more than double if IP were not in operation.

In the same comments, NERA estimated that loss of IP would increase annual NO_X emissions by about 7,000 tons. As noted above, CAIR was promulgated in 2005 and established caps on NO_X emissions that EPA estimated would reduce emissions in New

[22] NERA Economic Consulting. *Economic Comments on the Nuclear Regulatory Commission DSEIS for Indian Point Energy Center*. March 2009.

[23] New York's official RGGI rule (NYSDEC 2008, pp. 45-46) notes that the state's cap for 2009 through 2014 is 64,310,805 tons; its cap for 2018 and subsequent years is 57,879,725 tons. The difference is 6,431,080 tons. *See* pp. 45-46, New York State Department of Environmental Conservation. Express Terms: Part 242 CO2 Budget. 2008.

York by about 10,000 tons[24] in 2015. The estimated annual increase in NO_X emissions resulting from a loss of IP would represent about 70 percent of the estimated reduction required by CAIR in New York in 2015. Thus, the reduction required to meet the cap would be 70 percent larger than otherwise.

In sum, quantitative information on the effects of the loss of IP generation on CO_2 and NO_X emissions confirms the NYISO conclusion that removal of IP would make it much more difficult for New York State to reach major air quality and climate change goals.

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Thank you for considering our comments. Please let us know if you have any questions regarding these comments or if there is any other information we can provide.

Sincerely yours,

David Harrison, Jr., Ph.D.
Senior Vice President

Eugene Meehan
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cc: Kelli Dowell, Esq., Entergy
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[24] U.S. Environmental Protection Agency. Clean Air Interstate Rule: New York. http://www.epa.gov/interstateairquality/ny.html.