

# AN ASSESSMENT OF ENERGY NEEDS IN WESTCHESTER COUNTY

THE ECONOMIC IMPACT OF RISING ENERGY PRICES  
AND SHORTAGES IN SUPPLIES

PREPARED FOR  
WESTCHESTER  
BUSINESS ALLIANCE

## MEMBERS

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## *Statement of Purpose*

The Westchester Business Alliance is deeply concerned that rising energy prices coupled with the inadequate supply of electricity projected in this report will have long-lasting and significant economic consequences for Westchester County, its residents and businesses. This report presents two scenarios of significant electric supply shortages within the next decade which neither state nor local leaders are addressing. It calls for a strategic plan to be developed *now* to assure that Westchester and regional energy consumers have a reliable and reasonably priced energy supply for at least the next twenty years.

The first scenario assumes neither the addition nor retirement of conventional electric generation within the Westchester area through 2015. It assumes, as reported by the NYISO<sup>1</sup>, that by 2015 anticipated economic growth will create new electric demand of approximately 800 megawatts<sup>2</sup>. It also recognizes that aggressive energy conservation and renewable resource goals set by the New York State Public Service Commission may defer the need to build conventional base load types of power generation, such as combined cycle gas turbines.

The second scenario identified is far more draconian. If, as some would prefer, the Indian Point nuclear plants are retired by 2015 and no new base load generation is built to replace the 2,000 megawatts they generate, the economic consequences for Westchester are staggering. Given construction and startup requirements for new power plants in New York State, it is neither technologically nor economically feasible to replace this degree of shortage. This planning horizon is too short for creation of new base-load generation, expansion of transmission service, or development of renewable resources such as wind or solar power.

At present, the Nuclear Regulatory Commission is not scheduled to make its final decision on Indian Point until late 2009. (See Appendix A for the Indian Point re-licensing schedule.)

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<sup>1</sup> The New York Independent System Operator (NYISO) is authorized by the Federal Energy Regulatory Commission to operate the competitive wholesale electricity markets in New York State.

<sup>2</sup> The 800 MW of expected growth in electric demand is an extrapolation of the NYISO assessment as reported in its "Summer 2007 Electricity Review", October 25, 2007.

Without a definitive plan in place, it is highly unlikely that 2,000 megawatts of generation – conventional and renewable - could be built in time for the 2015 summer peak period.

To further complicate matters, New York State currently has no centralized certification process to consider the environmental impacts of new electric generation. Without one in place, power plant investors are unlikely to commit resources for new base load generation that meet Westchester’s energy demand growth of 800 megawatts over the next decade, much less the more catastrophic requirement of an additional 2,000 megawatts if the Indian Point plants are retired in 2013 and 2015, respectively.

Unless these issues are addressed now, as discussed in this report, electricity costs will rise considerably and diminish future growth. Westchester’s ability to compete for new business growth and jobs will suffer and the tax base will shrink as old businesses leave for more affordable areas. In this scenario, projections show that by 2017, there will be as many as 9,000 estimated job losses due to higher energy prices, yielding \$2.1 billion in cumulative lost wages and \$5.5 billion in cumulative<sup>3</sup> lost business output.

Yet, local and state officials show little urgency in dealing with energy shortages and these negative effects. The Westchester Business Alliance offers this report to provide guidance for a resounding call to action by all concerned interests. How soon and in what manner Westchester and State governments respond, can and will make a significant difference.

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<sup>3</sup> 2008 through 2017.

## ***Introduction***

### ***About the Westchester Business Alliance***

Four organizations comprise the *Westchester Business Alliance* (“*Alliance*”):

- Building and Realty Institute, Inc.
- Construction Industry Council/Construction Advancement Institute, Inc.
- The Business Council of Westchester
- Westchester County Board of Realtors, Inc.

The Alliance retained Energy Strategies, Inc., to perform an independent assessment of the energy requirements in Westchester County. The purpose of the study was to:

1. Estimate the cost of electricity (as well as other energy sources) in Westchester if the Indian Point plants are retired in 2013 and 2015, as projected.
2. Evaluate the impact of higher energy prices on Westchester’s economy as measured by employment, wages and salaries, and business output.
3. Recommend possible solutions to mitigate energy price escalation and the resultant impact on the Westchester economy.

This study was prepared by Dr. Howard J. Axelrod, President of Energy Strategies, Inc, based on an economic forecast prepared by Regional Dynamics. Energy Strategies, Inc. takes no position on whether the Indian Point Nuclear plants should be retired, but only addresses the potential impact such a decision would have on energy prices and Westchester’s economic landscape.

### ***Westchester Energy Concerns***

The Alliance is concerned that energy prices will continue to escalate in Westchester at a pace far exceeding both the New York State and national averages. Although Westchester County does not have a large base of energy intensive industries and manufacturers, it has large energy needs. Its substantial commercial, research and medical facilities use significant quantities of

energy for such end uses as space heating, air conditioning, refrigeration, equipment operations and lighting. With few competitive energy alternatives in the short run, rising energy prices could result in:

- 1) Declining profitability as costs are absorbed.
- 2) Reductions in employment as production is curtailed.
- 3) Spiraling wholesale/retail prices as costs are passed through to consumers.

In the long run, if energy prices continue to rise above the national average, the picture could get worse if businesses begin to leave Westchester County and relocate to lower cost regions to facilitate their growth and profitability.

Clearly energy conservation would aid in the reduction of waste or introduction of more efficient uses. Yet, reduced needs caused by the closure or relocation of Westchester businesses is **neither an effective nor palatable public policy to follow.**

### ***Role of Indian Point***

For this study, it was assumed that both Indian Point plants would continue operating, at least through their current license terms. It is further assumed that replacement of 2,000 megawatts generated by these plants would have to be made up with primarily natural gas fired combined cycle power plants<sup>4</sup>, the only option of such scale that could possibly meet the 2013 – 2015 planning horizon. Other solutions like those listed below must also be considered.

- Additional transmission to upstate New York, New England and New Jersey (PJM) to provide access to a broader generation market.
- Installation of renewable resources including wind and solar generation.

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<sup>4</sup> Combined cycle power plants are large scale generating stations that are among the most efficient conventional forms of electric generation. Most combined cycle power plants burn natural gas as their primary fuel.

- Energy management and conservation through building retrofits and improved building design standards.

However, it is clear these alone will not meet Westchester's electric supply needs within the time frame. Regardless of independent views on Indian Point nuclear power generation, the reality is that these plants:

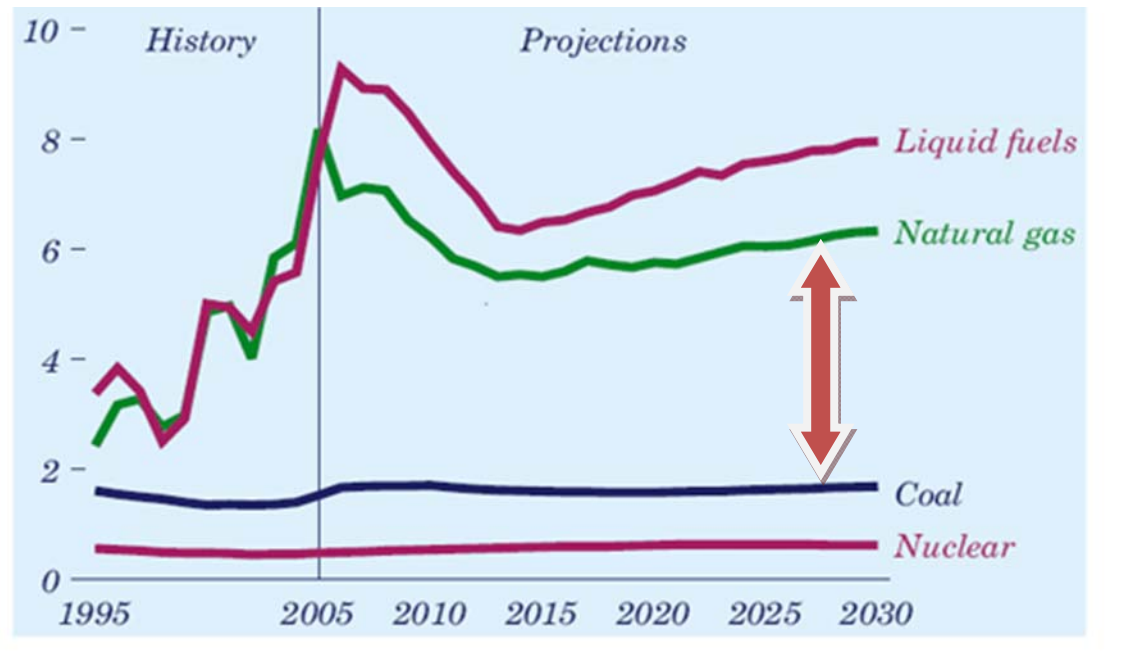
1. Are literally the only base load power plants in Westchester County.
2. Represent over 40% of the peak demand of the Lower Hudson Valley<sup>5</sup> region including Westchester and over 75% of the electric energy consumed within the region.<sup>6</sup>
3. Any replacement of generation, as noted above, will likely be combined cycle gas turbines in which case the replacement costs will far exceed the current operating cost of the Indian Point units. The following graph (Chart 1) extracted from the 2007 Annual Energy Outlook Study, provides a stark comparison of forecasted nuclear versus fossil fuel prices. As illustrated below, the replacement cost for fuel would immediately increase by six fold.

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<sup>5</sup> The electricity requirements of Westchester County are no longer published by the State or Consolidated Edison. However, the NYISO does forecast peak demands for the Lower Hudson Valley region which are predominately driven by the Westchester economy.

<sup>6</sup> Over the last several years, the Indian Point units have operated virtually 100% of the time, while the typical fossil plant operated at about 50- 60% capacity. As a result, the amount of electricity produced by Indian Point is about double that of a comparably sized fossil power plant.

**Chart 1**  
**Annual Energy Outlook 2007 with Projections to 2030**



Based on the U.S Energy Information Administration's 2007 Energy Outlook, fuel prices for nuclear and coal generation will range between \$.75 and \$2 per million BTU. The cost to replace these sources of generation with natural gas could exceed \$8 per mmBTU or about six times the cost of nuclear and coal.

Assuming the majority of electric generation replacing Indian Point is derived from combined cycle gas turbines, the increased demand for natural gas could further produce an upward spiral in the price of natural gas delivered to Northeast markets.

### ***Westchester Economic Expansion and Energy Needs***

An additional point to consider is that as the regional economy expands, the demand for electricity will likely increase by over 2% a year. This equates to between 100 and 150 megawatts of new electric load growth per year. By 2015, unrestricted peak demand could increase by 800 additional megawatts for the Lower Hudson Valley region.

**Although Consolidated Edison no longer publishes historical and projected data on consumer** electricity usage and demand<sup>7</sup> for Westchester County, this anticipated 2% increase is supported by regional data which suggests a projected growth in Westchester's economic output, including up to 36,000 new jobs by 2017.

### ***Indian Point and Alternatives***

It is unrealistic to believe that electric capacity derived from the Indian Point plants could be totally replaced by energy conservation, energy management and renewable power resources. The 2,000 megawatts of IP replacement plus 800 megawatts of new generation is a massive amount of energy.

Wind generators are one possible source of replacement power. Under optimal conditions, however, they run only 15-30% of the time. To replace the 2,000 megawatts of continuous power now generated by IP, we would need 3,000-4,000 windmills as well as the appropriate location to sites them.

Other challenges created by wind generators as an energy resource include:

- Need for diverse locations to spread the wind power availability twenty-four hours a day, each and every day<sup>8</sup>.
- Unfeasible to install 3,000 – 4,000 large wind generators each with a typical size of 300 to 400 feet (1 to 2 megawatts) throughout Westchester by 2015, especially given current environmental considerations.

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<sup>7</sup> The term energy refers to the amount of electricity consumed over a period of time; i.e. a kilowatt-hour is 1,000 watts of electricity consumed in an hour. The term demand refers to the instantaneous amount of electricity used at any given point in time; i.e. a kilowatt is 1,000 watts of demand being used at that moment in time. Peak demand is typically referred to as the maximum demand occurring over a one year period.

<sup>8</sup> At the moment, there are few economically viable energy storage technologies which would help spread the energy produced by wind and solar generation throughout the day. Pumped storage generation is expensive and presents its own list of environmental issues and large scale battery storage is only in the development stage.

- Lack of ideal locations within Westchester or the lower Hudson Valley.
- It is cost prohibitive to connect dispersed generators into the electric grid to meet energy transmission needs, especially if underground installation is a mandate.

This report acknowledges that a broad portfolio of renewable resources and aggressive energy conservation would surely help defer the anticipated growth in new demand, yet the ability to forestall even the 800 megawatts of projected growth is a formidable challenge. Just to illustrate, New York State has a very aggressive renewable resource goal of 25% renewable electricity supplies by the year 2013 – up from the current 19%. This translates into a **total statewide goal** equal to the amount of energy supplied by the Indian Point units.

## *Statement of Findings*

### *Overview*

While there are several initiatives recommended in this report to help mitigate the rise in energy prices and reduce the need for higher priced energy, there is no “silver bullet” or simple solution to this fast approaching problem. The continued operation of the Indian Point units will go a long way in meeting the region’s continuing energy needs. This decision, however, rests with the Nuclear Regulatory Commission (NRC).

Although conservation and energy management remain the best defense against rising prices, the introduction of renewable resources such as wind and solar power will produce new energy resources that at best close the gap of the projected new capacity needs of 800 megawatts. Both are costly remedies to new energy demand<sup>9</sup>.

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<sup>9</sup> While the Indian Point units run virtually continuously, a typical wind generator runs only 20 – 30% of the time. Because there are very limited means to store electricity, such as pumped storage, wind generation provides only a partial solution to a well balanced generation supply portfolio.

The findings make it clear that:

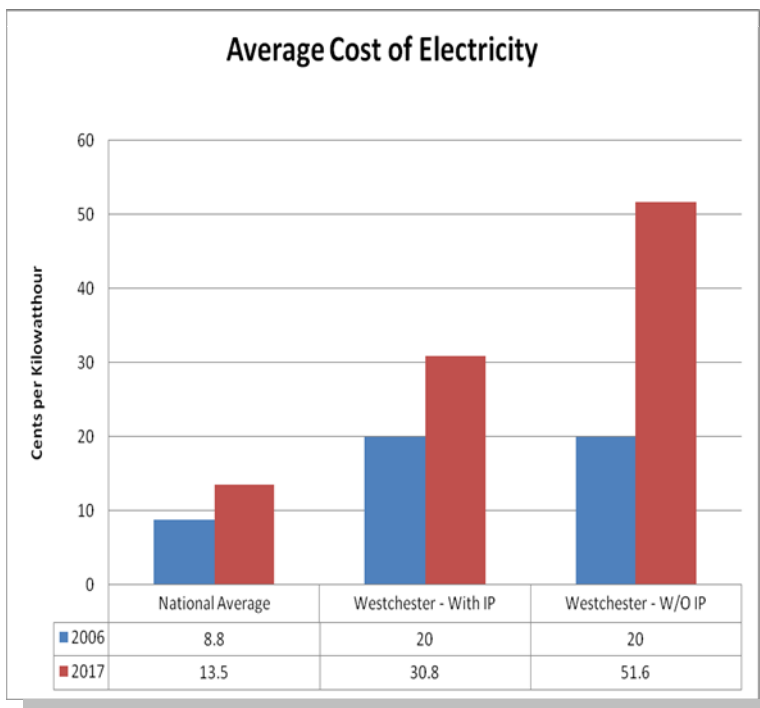
1. Demand for electricity is increasing.
2. Supply of electricity is declining.
3. Cost of energy is escalating.
4. No meaningful strategic planning has been undertaken to resolve one through three.

### ***Projected Energy Cost Increases***

The average price of electricity for residential and commercial customers in Westchester County was approximately \$.20 per kilowatt-hour in 2006<sup>10</sup> and among the highest in the nation. The cost of electricity is currently over twice (2.3 times) the national average. By 2017, just ten years from now, Westchester’s electric prices could rise to over \$.50 per kilowatt-hour **or over three and one half times** the projected national average should the Indian Point plants be retired.

For a typical Consolidated Edison residential customer, the annual electricity bill will rise more than

**Chart 2**



<sup>10</sup> Source: Consolidated Edison FERC Form 1: Sales of Electricity by Rate Schedule, 2006.

150% by 2017 from \$1,000 to over \$2,500.<sup>11</sup> For the typical small business owner with 4,000 square feet of rental space, the annual electricity bill could rise even more, from \$11,000<sup>12</sup> to \$27,500. Furthermore, the average price for all energy sources would rise between 30 to 60% exclusive of inflation over the next decade.

Clearly, retirement of the Indian Point plants would result in substantially higher electric costs and possibly even higher natural gas prices as combined cycle gas turbines will be necessary to replace some or all of the 2,000 megawatts provided by Indian Point plants.

### *Increasing Energy Capacity*

**At present, there are no identified plans to replace the Indian Point units by 2015.** Moreover, Westchester County would face a serious electrical energy shortfall long before any realistic solution can be developed – because any new (“Green Field”) combined cycle power plant site could take up to eight years for planning and design, state environmental certification, construction and testing. At this juncture, this is next to impossible because laws designed to regulate environmental and “siting” requirements (known as an Article X certification process) for these facilities has been allowed to lapse by state government. As a result, no new power plants are being installed or planned. Moreover, **without the Article X “one-stop” certification process, it is unlikely that any private interest would risk the billions of dollars required to build such a massive set of power plants.**

As illustrated on Chart 3<sup>13</sup>, planning should have begun in early 2007 for 2,000 megawatts of replacement capacity by 2015. However, without an Article X or an NRC decision on Indian Point re-licensing, no one has yet to begin the “planning – to – construction” cycle. Without the

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<sup>11</sup> While Con Ed does not disaggregate Westchester & NYC, it is estimated that average electricity usage in Westchester is about double that of a NYC residential customer.

<sup>12</sup> Based on a current square footage rate of \$2.75 for energy.

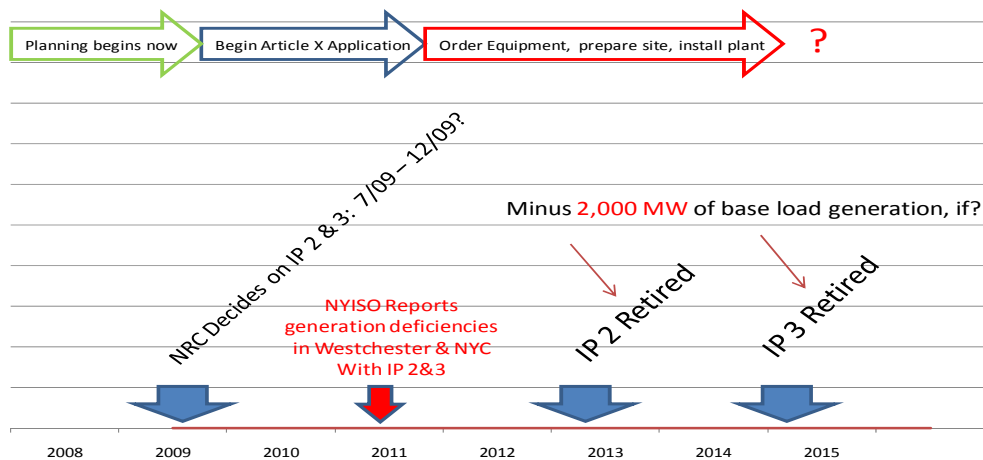
<sup>13</sup> This timeline was prepared to illustrate the likely events that will occur in Westchester through the time period when the IP units are retired. The most important point is that energy developers should have already begun the planning process to replace IP2&3 in order to meet the County’s electricity needs as projected for 2013 – 2015.

support of a detailed planning process to at least lay the groundwork for the need for this capacity, it is unrealistic to assume that any independent power supplier would commit to such a financial investment before late 2009 when the NRC is expected to make its final decision. By then, of course, it would be highly problematic, if not impossible to have 1,000 megawatts of replacement capacity by 2013, much less another 1,000 by 2015.

**Chart 3**

**Timeline assuming IP 2 & 3 are retired in 2013 & 2015:**

1. We will not know until late 2009 if the NRC rejects Entergy’s relicensing application
2. In order to have replacement generation installed in time planning should have begun in 2007
3. This assumes an Article X Application Process in place – which it is not.



This timeline was prepared to illustrate the likely events that will occur in Westchester through the time period when the IP units are retired. The most important point is that energy developers should have already begun the planning process to replace IP2&3 in order to meet the County’s electricity needs as projected for the 2013 – 2015 peak period.

***Energy Capacity and Economic Growth***

While Westchester’s long-term economic outlook is promising with projected employment growth of as high as 36,000 new jobs by 2017, higher energy prices will surely reduce this

forecast. **As many as 11,000<sup>14</sup> fewer jobs; \$2.1 billion in cumulative lost wages<sup>15</sup> and nearly \$5.5 billion in cumulative lost economic output could result from higher energy costs.**

Westchester County's energy costs are among the highest in the nation, and cited as a reason for losing thousands of manufacturing and other industrial jobs over the past two decades. Fortunately, the growth of less energy intensive commercial businesses that either absorbed this cost or could pass it through to customers replaced many of these jobs. However, as Westchester energy prices continue to rise, the stark comparison to other regions with lower energy costs will certainly be a factor in future business location decisions and job creation.

Westchester's circumstance is not entirely unique. NYISO forecasts that southeastern New York could be capacity-short by 2011. Indian Point unit retirements were not contemplated by NYISO and would significantly exacerbate this condition. Plus, as stated earlier, without an Article X process, New York State continues to operate in an environment lacking adequate regulations to support added energy infrastructure for the state's growing energy needs.

### ***Challenges Facing Electric Supply***

Energy price estimating is always fraught with uncertainty. Given our nation's significant reliance on foreign derived fuels, there is declining certainty of reliable supply or rational pricing of petroleum-based fuels. Supply disruption will result in wide variances in fuel prices.

Westchester County's location in the tri-state area and proximity to New York City pose other challenges. Being located between New York City and the Hudson Valley, Westchester competes for electricity generated elsewhere. Given New York City's far greater demand, projected capacity needs<sup>16</sup> and constrained availability from in-city generation sites, it will absorb huge amounts of lower cost electricity and transmission capacity from upstate New York.

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<sup>14</sup> Full time (8,700) and part time (2,300.)

<sup>15</sup> Lost wages from 2009 – 2017 in real dollars (inflation adjusted to 2006 dollars).

<sup>16</sup> Reference: Electricity Outlook, Powering New York City's Economic Needs.

Other constraints on the County's ability to attract low cost electricity include:

- Projected expansive growth in the lower Hudson Valley where both commercial and industrial users demand electricity
- Proximity to southern Connecticut and Long Island, which in their own right are among the nation's most congested regions for energy distribution, make them unlikely sources of future energy.

**There are few, if any, technological solutions available within the current planning horizon.**

Early retirement of IP 2 and IP 3 would, in effect, concentrate replacement costs solely on New York consumers, especially in the Westchester/New York City area.

### *Projecting Westchester's Electricity Costs*

This analysis of Westchester's electricity prices is based on two components:

1. The projected costs of basic distribution and transmission services provided by Consolidated Edison, and
2. The projected cost of wholesale electric production costs should IP 2 and IP 3 be retired in 2013 and 2015, respectively.

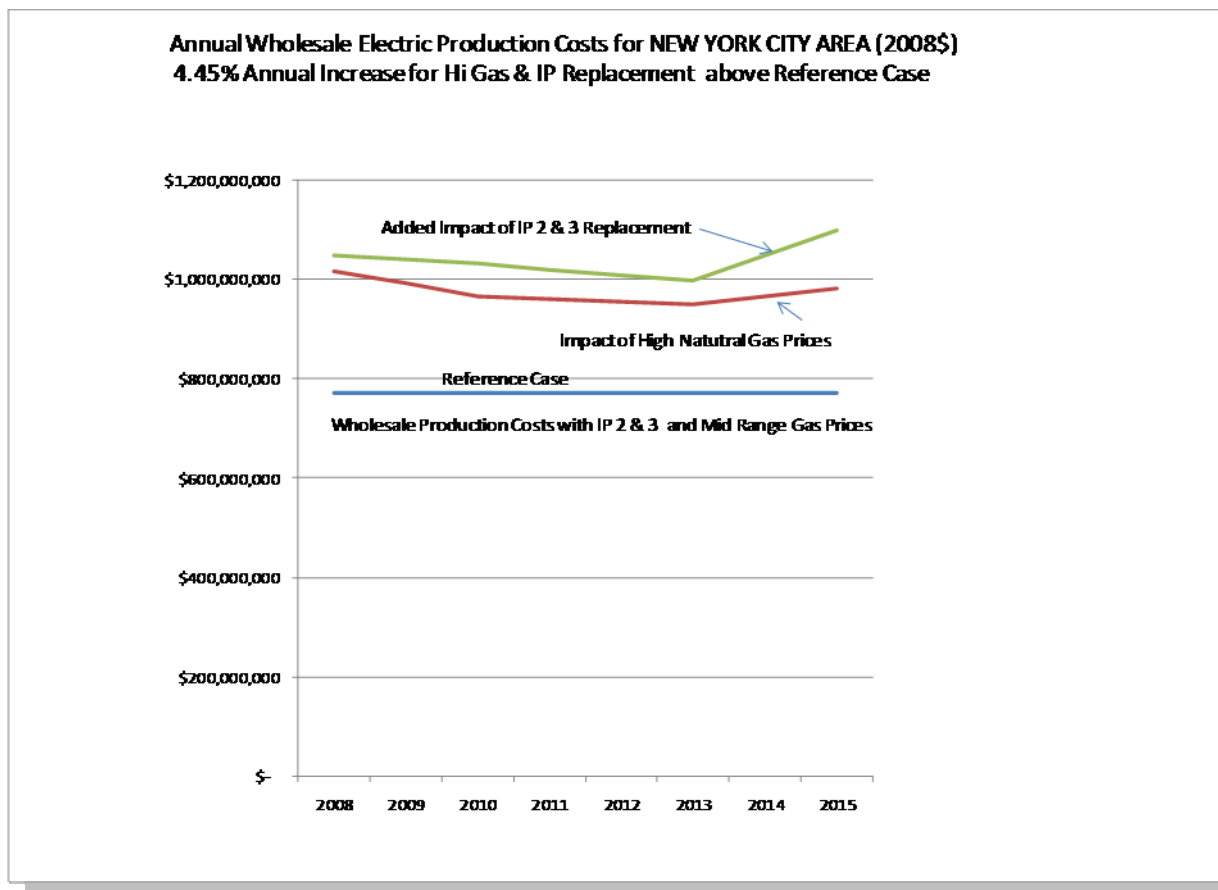
Our sources of information included publicly available studies and reports. For the IP 2 and IP 3 retirement replacement costs, the report entitled "Alternatives to the Indian Point Energy Center for Meeting New York Electric Power Needs" funded by the National Research Council of the National Academies was heavily relied upon. The EIA's 2007 Energy Outlook and the most recent Short Term Outlook (January, 2008) were also relied upon.

Our bottom line finding was that wholesale production costs for electricity would rise by 4.54% a year (excluding inflation) above the current forecast, as the market adjusts for the loss of the

Indian Point units. This assumes both replacement costs and higher natural gas prices caused by the increased demand of combined cycle generation.

Chart 4 is a projection of the wholesale electric production costs for the New York City Area, including Westchester. Wholesale production costs account for 60 – 70% of the total electricity bill, with the remainder allocated to Consolidated Edison’s delivery charges. When combining the electric production costs, Consolidated Edison delivery charges, and the costs of other non-automotive fuels like natural gas, propane and home heating oil, the price of total energy supply is projected to rise between 1 and 5% a year.

**Chart 4**



### *Economic Analysis Findings*

To fully appreciate how the rise in energy prices will impact Westchester's economy, a comprehensive analysis was performed. A nationally recognized economic model was used to project job losses, wages and business output by adjusting the prices for energy (excluding transportation fuels) over the next 10 years. For our base case, we compared alternative energy price forecast scenarios, using the EIA's base energy price forecast.

For each forecast, this national economic model tracked the flow of goods and services produced in the United States for some 700 different industry groups. As energy prices rose in Westchester, for example, the model would predict intermediate and final costs, and ultimately industry-specific profitability. Using such information, the model could then adjust output to reflect shifts in demand from one region to the next. This was based on the impact input costs would have on local output as production shifted to more profitable regions.

We found that the Baseline forecast demonstrates that Westchester's economy as measured by growth in total employment, full and part time, is expected to increase by approximately 1.94% per year through 2017. This assumes continued operation of IP 2 and IP 3. The early retirement of IP 2 and 3 could increase electric prices by as much as 150% by 2017 and would consequently reduce economic growth by as much as 20% per year from an annual growth rate of 1.94%, down to 1.55% a year.

Other key findings include:

- In a worst case scenario, higher energy prices would cause the loss of about 11,000 full and part time jobs by 2017.
- Using historic trending methods, the county would add 36,000 new full time jobs by 2017. However, factoring in a 5% added increase in energy prices, this number would be reduced to 27,200, over a 24% loss in new jobs.
- Certain sectors are more affected than others by increased energy costs. When it comes to job loss, business sectors affected from most to least, are as follows:

- Health care
- Real estate
- Service industries (golf, fitness, country clubs, restaurants, etc.)
- State and local governments
- Education
- Retail

See Appendix B for a full discussion of the methodology and analysis.

### *Call to Action*

This study confirms the legitimacy of the Alliance’s conviction -- that Westchester’s government and business leaders need to get behind a comprehensive energy plan for the county. The county needs leadership to develop and implement a strategy that will:

- Accelerate the pace at which energy conservation and energy management are deployed.
- Foster the introduction of renewable energy resources, especially within Westchester, to reduce reliance on out-of-region generation and transmission.
- Support the enactment of streamlined generation and “siting” regulations (Article X) to balance the need for economical supplies of electricity with mitigating environmental impacts
- Support the continued safe and reliable operation of the Indian Point Nuclear units

There are no quick solutions to reduce electrical energy prices in Westchester County. Early retirement of the Indian Point Units could increase the cost of electricity in Westchester as much as 150% or more over the next decade. New York State’s goals of (1) attaining a projected

increase in renewable generation resources from 19% to 25% by 2013, and (2) further reduction of growth in electric consumption of 15% by 2015<sup>17</sup>, will certainly help Westchester's electrical energy needs and price stability. However, without a realistic energy master plan along with a streamlined environmental certification Article X process, this is highly unlikely.

Given this scenario the following recommendations are offered:

- 1. Capitalize on NYS Financial Resources for Renewable Generation and Conservation:** Westchester should take full advantage of New York State's call for substantial increases in renewable resources, aggressive conservation and load management. The State of New York, through New York Energy Research and Development Authority (NYSERDA) provides substantial financial incentives for conservation and energy management. These initiatives via the System Benefit Charges (SBC) and the Renewable Generation Resources via the Renewable Portfolio Standard (RPS) are funded through a direct usage fee collected by Consolidated Edison. *To maximize the amount of funding available, Westchester County should prepare a comprehensive strategic plan identifying and cataloging potential conservation, load management and renewable resources acceptable to NYSERDA. The County should also serve as a "lightning rod" to entice renewable energy suppliers and efficiency entrepreneurs to investment in Westchester.*
- 2. Take Proactive Role In Generation and Transmission Planning:** New York State needs a comprehensive generation "siting" law to assure the timely development of electricity supplies. *Westchester County should take a proactive role by participating at New York Public Service Commission and the New York Independent System Operator proceedings for generation and transmission planning, energy management, conservation and renewable portfolio standards. The County should also impress upon its state legislative delegation the need for quick passage of a comprehensive generation "siting" bill.*

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<sup>17</sup> See NYPSC Case 17-M-0548

**3. Understand Indian Point’s Role Now and in the Future:** The Indian Point debate is an important community discourse. However, based on economic factors we have examined, Indian Point Units 2 and 3 are vital current and future electricity resources for Westchester County. As Entergy pursues its license extension application before the Nuclear Regulatory Commission, the Alliance believes Westchester County government should recognize the current owner/operator’s repeated commitments to safety and judge the application on sound economic principals, reliability and environmental factors.

**4. Participate in Integrated Resource Planning:** Westchester County should agree to participate in a stakeholders’ task force composed of representatives of the Westchester Business Alliance, along with key business, community and governmental leaders, to develop the parameters for a comprehensive integrated energy resource plan with annual updates. The plan should:

- Project energy demand growth within the County for a 10 to 20 year horizon.
- Cover the level of existing and planned supply resources, including transmission requirements, renewable resources, and the impacts of energy management and conservation.
- Include environmental impacts and costs.

This process will facilitate the analysis and identification of the County’s energy resource requirements to support projected economic and demographic growth. Moreover, critical shortages in supply would be “red-flagged” and an immediate action plan recommended.

Left unresolved, Westchester’s energy challenges will create one of two basic scenarios:

1. IP remains running and continued economic growth increases economic demand by 800 megawatts by 2015. We can attempt to meet the additional demand only with power generated through conservation efforts.

2. IP is closed down and we have a shortage of 2,800 megawatts accompanied by rapidly rising energy prices.

This report is intended to provide the beginning of an energy blueprint for government to implement to protect the future of Westchester County. **It's imperative that action on the energy planning front be taken NOW to improve the present and future economic consequences for Westchester County residents and businesses.**

### *About the Author*

Dr. Howard J. Axelrod is President of Energy Strategies, Inc. an Albany-based management consulting firm established in 1993. Dr. Axelrod has been a management consultant for over 23 years serving such local clients as the New York Public Service Commission, the New York Independent System Operator and the New York Power Authority. He specialized in power systems planning, economic analysis and risk management.

Prior to his consulting career, he served over thirteen years for the State of New York in various capacities including Director of Utility Intervention for the New York State Consumer Protection Board, Project Manager for the New York State Energy Research & Development Authority Chief Economist for the Shoreham Commission and senior analysis for the New York Public Service Commission.

Dr. Axelrod was awarded his PhD in Managerial Economics from Rensselaer Polytechnic Institute, an MBA from SUNY Albany and BSEE and MSEE degrees in Powers Systems Engineering from Northeastern University. Dr. Axelrod was also an Adjunct Professor at RPI and Russell Sage College. He is author of numerous papers and articles. In a recent public letter, Dr. Axelrod joined with Nobel Laureate Vernon Smith and noted economists Alfred Kahn (Cornell University), Paul Joskow (MIT) and William Hogan (Harvard) calling for the continued support of competitive energy markets.

## APPENDIX A

### Indian Point Re-Licensing Schedule per the Nuclear regulatory Commission<sup>18</sup>

Milestone	Schedule	Actual
Receive License Renewal (LR) Application	4/30/07	4/30/07
Federal Register Notice (FRN) Published - Receipt & Availability	5/14/07	5/11/07
Public Meeting - LR Overview	6/27/07	6/27/07
FRN Published - Notice of Acceptability/Opportunity for Hearing	8/1/07	8/1/07
FRN Published - Notice of Intent to Conduct Environmental Scoping	8/10/07	8/10/07
Audit - Aging Management Programs (AMPs/TLAAs)	8/27-31/07	8/27-31/07
Audit – Environmental	9/10-13/07 9/24-27/07	9/10-13/07
Public Meeting - Environmental Scoping	9/19/07	9/19/07
Audit - Scoping & Screening Methodology	10/9-12/07	10/9-12/07
Environmental Scoping Period Ends	10/12/07	10/12/07
Audit - Aging Management Reviews (AMRs)	10/22-26/07	10/22-26/07
Audit - 3rd AMP/TLAA/AMR	11/27-29/07	11/27-29/07
Deadline for Filing Hearing Requests and Petitions for Intervention	11/30/07	11/30/07
Environmental Requests for Additional Information (RAIs) Issued	12/10/07	
Safety RAIs – Issued	12/14/07	
Environmental RAIs - Response Received	1/14/08	
Safety RAI - Responses Received	1/17/08	
Inspection - Scoping Screening/AMP	1/28-2/1/08 2/11-15/08	
Audit - 4th Optional AMP/TLAA/AMR	2/08	
Entergy Commitment to install SBO/Appendix R Diesel Generator for Unit 2	04/30/08	
Inspection - Scoping Screening/AMP - Exit Meeting	TBD	
Draft Supplemental Environment Impact Statement (SEIS) Issued	7/25/08	
FRN Published - Availability/Comment on Draft SEIS	8/4/08	
Public Meeting - Draft SEIS	9/10/08	
Safety Evaluation Report (SER) with Open Items – Issued	9/5/08	
End of Draft SEIS Comment Period	10/20/08	
ACRS Subcommittee Meeting on SER with Open Items	10/08	
SER Open Items - Responses Received	11/3/08	
SER – Issued	3/27/09	
Final SEIS – Issued	4/3/09	

<sup>18</sup> See: <http://www.nrc.gov/reactors/operating/licensing/renewal/applications/indian-point.html>

FRN Published - Availability of Final SEIS	4/13/09	
ACRS Full Committee Meeting on SER	5/09	
Staff Recommendation to Director, NRR	7/09	
NRR Director Decision (if no hearing is granted)	7/09	
Commission Decision (if hearing is granted)	TBD	

## APPENDIX B

### Economic Analysis Methodology

Energy Strategies Inc. retained Regional Dynamics to perform six economic case studies for Westchester County<sup>19</sup> which included a Base Case using the REDYN standard forecast of energy prices of the most current federal projections for the metropolitan New York region. For each projected increase (e.g. a 1% increase, 2% increase, etc.) the assumption was made that the energy prices would rise by that same percentage above the base case. For example, a “1% Increase Case” assumed energy prices would rise by an additional 1% above the Base Case. The study separately analyzed each one percentage point increase from one through five.

Using a National Research Council study of Westchester’s energy future, as well as the current Consolidated Edison rate plan, a midrange electric price forecast of 4.54% annual increase was assumed. Combining the EIA high forecast for natural gas and the midrange forecast for all other fuels, a midrange total energy price forecast of 3% a year was derived.

For this analysis, three basic economic barometers were used to assess the impact of higher energy prices on the Westchester economy, including:

- Level of employment<sup>20</sup>
- Wages and Salaries

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<sup>19</sup> Regional Dynamics ([www.redyn.com](http://www.redyn.com)) offers REDYN, a multiregional, dynamic, nonlinear New Economic Geography analysis engine with a complete economic database and baseline forecast. The REDYN model applies a fresh I-O methodology based on very detailed make-and-use tables with social accounting matrix features for all entities, a comprehensive commodity production transformation function, and impedance-based commodity trade flows by five transport modes<sup>19</sup>.

REDYN excels at offering a uniquely complete and consistent model-building edge that no other modeling process can replicate for configuring and assessing plans, events, and risks fully and rapidly across regions and years. The REDYN model estimates employment, output, wages, occupations, income, gross product, demand, self-supply, trade flow, etc. for up to 703 industry groups (North American Industrial Classification System.)

<sup>20</sup> The REDYN model predicts total number of jobs filled including part time and military service.

- Business Output

The results from the REDYN model were validated by computing various economic multipliers found to be consistent with those prepared by the U.S Bureau of Economic Analysis (BEA) Regional Input-Output Modeling System (RIMS II) model for Westchester County.

The REDYN economic model forecasts the total number of jobs in Westchester including part time employment, governmental and military. As a note, the total numbers of jobs filled varies from both the Westchester Data Book and the New York State Labor Department’s tabulation of the Westchester Work Force due in large part to each source’s definition of workforce. To illustrate, the employment levels for 2007 (projected) as derived from each of these three sources were as follows:

Source	2007 Workforce	Difference from Databook	Explanation
Databook Westchester County, Nov. 2005	404,000	N/A	N/A
NYS Department of Labor	467,000	+63,000	DOL includes governmental jobs
REDYN Economic Model	600,000	+196,000	REDYN includes both governmental and part-time jobs

Because the REDYN model cannot segregate an employee who has a full time job from one who has both a full time and a part time position, a three step process was used to forecast the impact of rising energy prices on future employment levels.

1. First -- the REDYN model was used to evaluate the relative impact that higher energy prices had on total employment. Chart 1 below illustrates the impact of higher energy prices as the average annual increase in energy prices is raised an additional 1 to 5

percent a year. Under the worst case scenario, by 2017 approximately 11,000 total jobs, full and part time are lost due to higher energy prices.

2. Second -- total employment based on the New York State Labor Department's definition of Workforce was forecasted. Chart 2 is a graph of the historic workforce in Westchester along with a trend line derived using regression analysis. The correlation coefficient ( $R^2$ ) is .933 which demonstrates a very high consistency or correlation between the annual growth rates over time. Using the derived regression equation, the baseline forecast of employment was projected for the 2008 – 2017 period as provided on the table below. Based on historic trending it is projected that Westchester will add some 36,000 new full time jobs by 2017.

Chart 1

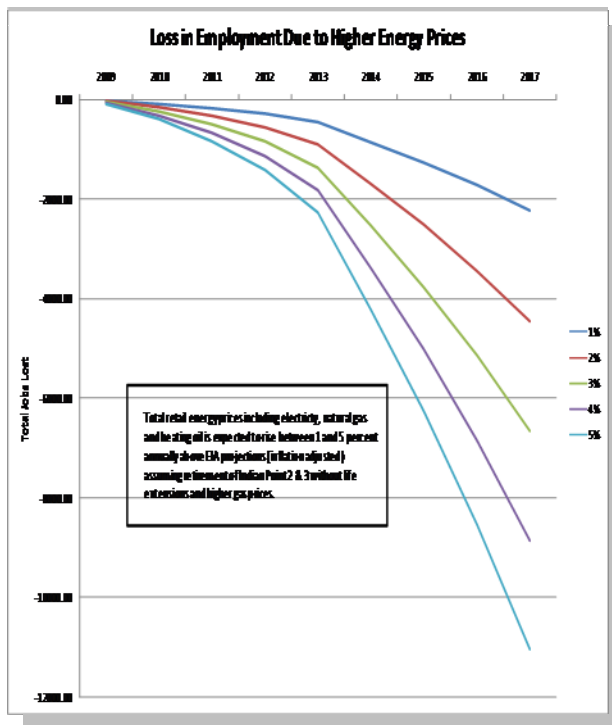
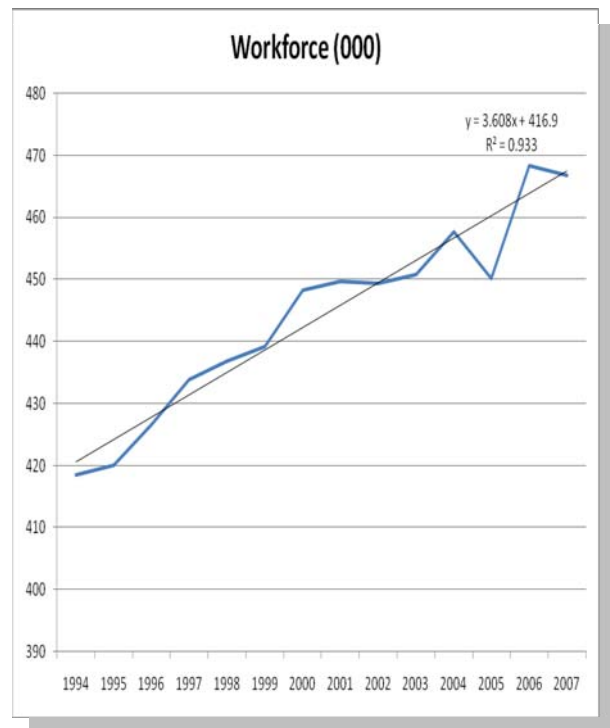


Chart 2



Projected Workforce using regression equation derived from Chart 2 which assumes continued increases in energy costs as experienced during the historic period.

Year	Workforce (000)
2007	468
2008	471
2009	475
2010	478
2011	482
2012	486
2013	489
2014	493
2015	496
2016	500
2017	504

This forecast projects a total workforce on 504,000 by 2017, an increase of 36,000 new full time jobs.

- Third -- the baseline forecast was adjusted by the proportional decrease in full and part-time jobs caused solely by higher energy prices. The REDYN model forecasted a decline in this base increase by approximately 11,000 jobs, 8,700 were full time and 2,300 part time. As a result, the 5% added increase in annual energy prices reduced the projected workforce from 36,000 to 27,200 or by over 24 percent.

Of the 582 business categories (NAIC code) studied in the REDYN model, the following 25 business sectors were the most affected by higher energy prices<sup>21</sup>. The following table was based on the 5% Increase Case.

#### Impact on Employment in 2017 for Selected Business Sectors

NAICS	Real Estate	
53111	Lessors of Residential Buildings and Dwellings	-334
53112	Lessors of Nonresidential Buildings (except Miniwarehouses)	-170
53121	Offices of Real Estate Agents and Brokers	-202
53131	Real Estate Property Managers	-323
53139	Other Activities Related to Real Estate	-159
	Total	-1187

<sup>21</sup> The 25 business sectors listed represented 44% of the total lost jobs (4,870 out of 11,000)

	<b>Retail</b>	
44111	New Car Dealers	-84
44511	Supermarkets and Other Grocery (except Convenience) Stores	-174
45211	Department Stores	-95
	Total	-353
	<b>Education</b>	
61111	Elementary and Secondary Schools	-332
61131	Colleges, Universities, and Professional Schools	-482
	Total	-814
	<b>Health Care</b>	
62211	General Medical and Surgical Hospitals	-405
62221	Psychiatric and Substance Abuse Hospitals	-80
62311	Nursing Care Facilities	-324
62321	Residential Mental Retardation Facilities	-83
62331	Community Care Facilities for the Elderly	-82
62399	Other Residential Care Facilities	-131
62441	Child Day Care Services	-163
	Total	-1268
	<b>Service Industries</b>	
71391	Golf Courses and Country Clubs	-132
71394	Fitness and Recreational Sports Centers	-208
72111	Hotels (except Casino Hotels) and Motels	-121
72211	Full-Service Restaurants	-310
72221	Limited-Service Eating Places	-179
72231	Food Service Contractors	-74
72232	Caterers	-58
	Total	-1082
81311	<b>Religious Organizations</b>	-352
93211	<b>State and Local Government, NEC</b>	-1000

The relative impact on Total Wages ranged between \$135 million and \$667 million by 2017. Given the fact that most workers live in Westchester County, the cumulative loss of salaries and wages amounts to nearly \$2.1 billion by 2017, under the worst-case scenario. A cumulative loss of wages amounts to \$1.2 billion under the midrange or expected scenario.

Finally, the impact of higher energy prices on Total Output, a measure of total commercial and industrial production in Westchester, ranged between \$367 million and over \$1.8 billion by

2017. The cumulative loss in Total Output was approximately \$5.5 billion by 2017 assuming 5% added energy price escalation and \$3.3 billion for the Expected Case.