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September 14, 2012 (3:00 p.m.)

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Market Learn Advocate Grow
September 14, 2012

Office of the Secretary
Rulemakings and Adjudications Staff
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Re: Economic Impact of Indian Point Units 2 and 3 License Renewal Application
NRC Docket Nos. 50-247-LR and 50-286-LR
ASLBP No. 07-858-03-LR-BD01

Dear Secretary:

I am writing to provide the Atomic Safety Licensing Board of the Nuclear Regulatory Commission with an addendum to the Business Council of Westchester's letter of support for license renewal of Units 2 and 3 at Indian Point Energy Center in Buchanan, New York. The addendum provides new evidence to further reinforce the business Council of Westchester's position that Indian Point's continued operation is essential to preserving land values in Westchester County.

Included with this letter is a copy of a study, released September 7, 2012, which indicates the major economic impacts to Westchester County resulting from the loss of Indian Point. The Business Council of Westchester commissioned Dr. Howard Axelrod of Energy Strategies, Inc., well-respected energy and economics consultant, to develop the study titled, "An Assessment of Energy Needs in Westchester County." Dr. Axelrod has more than 40 years of energy industry experience conducting business analysis and strategic planning for an array of clients including utilities, power suppliers, state and federal regulatory agencies, and large energy users.

The study concludes that if the operating licenses for Indian Point Units 2 and 3 are not renewed, and the plant is forced to cease operations, the impact to the region would be catastrophic, resulting in higher electric rates for businesses and consumers, more power outages, a rapid rise in carbon emissions, and a devastating blow to Westchester's economy.

Key study findings include:

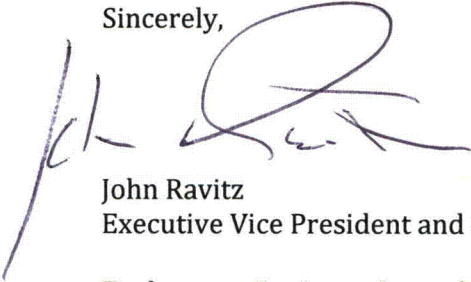
- Westchester County alone would lose more than 3,300 high-paying jobs if Indian Point were to close. In addition to the loss of 1,400 jobs at Indian Point via employees and contractors, sectors with heavy job losses include: construction; professional, scientific and technical services; and healthcare.
- Losing these 3,300 jobs means losing \$200 million annually in lost wages, much of which is put back in Westchester's economy. Cumulatively, these lost wages amount to \$4.15 billion over a 20-year period.
- The lost regional commercial output from Indian Point would also be enormous: \$11.5 billion over 20 years. Clearly, Indian Point is important for New York's economic infrastructure.

- Closing Indian Point means that Westchester residents alone will pay more than \$374 million per year in added electric charges, even if natural gas prices stay at their current, very low levels. Wholesale electric prices could increase by 13 percent.

Indian Point's significant economic output is an important contribution to the land values in Westchester, which would surely decrease if the facility were to shut down.

Thank you for your time and attention to this important and illuminating study.

Sincerely,

A handwritten signature in black ink, appearing to read 'John Ravitz', is written over a horizontal line. The signature is stylized and cursive.

John Ravitz
Executive Vice President and Chief Operating Officer

Enclosure - Business Council of Westchester Study

cc: Administrative Judge Lawrence G. McDade
c/o Anne Siarnacki, Law Clerk
Atomic Safety and Licensing Board Panel
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U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001
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An Assessment of Energy Needs in Westchester County

Prepared by:
Howard J. Axelrod, PhD
Energy Strategies, Inc.

Prepared for:
The Business Council of Westchester and
the Westchester Business Alliance
September 7, 2012

Summary of Study Findings

- **Electric Rates:** Electric rates could increase by 6.3% or more if the Indian Point Energy Center (IPEC) is closed. Consumers will pay over \$374 million per year in added electric charges.
 - **Reliability:** By 2020, the probability for significant electrical outages could increase by 280%.
 - **Environmental Impact:** Carbon emissions, a leading contributor to global warming could increase by over 6 million tons per year – the equivalent of adding 1,000,000 more vehicles on our roads.
 - **Economic Impact:** Westchester County could lose over 3,300 high-paying jobs, with over \$200 million per year in lost wages.
- Overall, some \$11.5 billion (inflation adjusted), could be drained from the downstate economy due to higher electric bills. Other losses to Westchester include:
- \$75 million per year in property taxes and revenue sharing with NYS
 - \$2 million per year in local charitable contributions

About this study

- Evaluating the impact of Indian Point's premature shut down is complex. At the present time there are no viable options on the table. The current scenario is that, while operating licenses for Units 2 and 3 expire in 2013 and 2015, respectively, the federal regulatory framework of timely renewal applies, as the owner/operator filed its application for license renewal more than five years before the current licenses expire (see next slide). This means that these units will not shut down in the near future, but instead will continue operating, at a minimum, until all license renewal proceedings are completed and the NRC makes a final decision on the license renewal application.
 - This analysis assumes that both units are not available in 2016, even though both are likely to continue to operate beyond that date.
 - For comparative purposes, we believe that the economic impacts associated with IPEC's early retirement would remain relatively constant regardless of actual date of closure as the minimal inflationary pressures would be offset by the time value of money.

The Timely Renewal Doctrine allows IPEC to continue to operate until the NRC makes its final decision.

“Section 9(b) of the Administrative Procedure Act (APA), referred to as the 'timely renewal doctrine,' provides that if a licensee of an activity of a continuing nature makes a 'timely and sufficient' application for renewal in accordance with agency rules, the existing license does not expire until the application has been finally determined by the agency. The timely renewal doctrine is embodied in the NRC's regulations at 10 CFR 2.109." 56 Fed. Reg. 64,943,64,962 (Dec. 13, 1991).

Section 2.109(b) states: "If the licensee of a nuclear power plant licensed under 10 CFR 50.21(b) or 50.22 files a sufficient application for renewal of an operating license at least 5 years prior to the expiration of the existing license, the existing license will not be deemed to have expired until the application has been finally determined."

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About Indian Point Energy Center (IPEC)

- The IPEC provides 2,065 MW of electric capacity for Westchester and the NYC region. IPEC produces over 16 billion kilowatt-hours per year – which represents 59% of Con Ed’s retail electric sales or 25% of all electric sales in NYC and Westchester.
- While the initial operating licenses expire in 2013 & 2015, under the NRC’s “Timely Renewal Doctrine” the plants will continue to operate until the NRC makes its final decision as to the requested 20 year license extension.
- Because the downstate area is transmission constrained, replacement generation and/or transmission interconnections from other regions will be required. Furthermore, this will require substantial investment and time to plan for, license and construct these facilities within a very short time frame. Alternative solutions such as distributed generation (e.g. wind and solar) and conservation measures will also take time and require additional funding.
- The impacts associated with IPEC’s closure include:
 - Loss of system reliability and voltage support
 - Higher electric prices
 - Deteriorating air quality
 - Loss of employment and economic output -
 - Electric prices influence economic activity including jobs and wages
 - The closure of a labor and capital intensive power plant on economic activity including employment, economic output and local tax revenues.

Key Observations

- As of mid-2012, there are no affirmative plans by any entity- public or private- to replace the electric energy and capacity produced at the Indian Point Energy Center.
- Projected energy efficiency, demand side management and renewable resources cannot be added in time to offset the output of IPEC at least for the foreseeable future. In fact, current plans for added renewable resources are behind schedule even with IPEC in operation.
- The NYISO has assessed the impact of Indian Point's potential closure in 2013 & 2015, respectively, and has found reliability issues that could potentially cause brownouts and blackouts.
- Leading specialists (CRA/NERA) have found the loss of IPEC would cause a:
 - Decline in reliability (see NYISO reliability reports)
 - Rise in energy costs (CRA report)
 - Increase in environmental emissions (NERA letter to DEC)

Summary of Economic Impacts without IPEC

- Electric rates could increase by 6.3% as early as 2016 above any other approved or anticipated rate increases including inflation.
- Wholesale electric prices could increase by 13% assuming currently low natural gas prices (Con Ed predicts 12%) Prices could rise even higher if gas prices begin to rise. Electric prices in the downstate region are highly correlated (about 90%) or driven by natural gas prices.
- The combined effects of higher electric prices and the closure of a major manufacturing facility (e.g. IPEC) will cause:
 - Lost Earnings in Westchester: \$200 million per year or \$4.15 billion (2011\$) from 2013 – 2032
 - Lost jobs in Westchester: 3,300+ jobs per year or 66,000 FTE jobs over 20 years
 - Lost regional commercial output: \$11.5 billion

What does IPEC provide to the Westchester region?

- IPEC is, for all practical purposes, a large industrial “factory” that produces electricity
- Number of employees: 1200 full-time employees at IPEC plus the White Plains office. In addition, over 200 contractors work on the site on a daily basis. Annual refueling outages in project/maintenance include bringing in additional individuals to work at Indian Point. Many of these individuals are union members including, but not limited to; Millwrights, ironworkers, Teamsters, boilermakers, carpenters, electricians, engineers, insulators, laborers, painters, divers and steamfitters
- Total annual wages and salary: \$130 million annual full-time employee payroll
- Property taxes paid in Westchester County: \$75 million in annual property taxes plus revenue sharing with New York State
- Annual charitable contributions made to local communities: \$2 million in annual charitable contributions
- Based on a 2002 study of direct effects including plant output secondary effects of operations, IPEC was found to contribute \$363 million in annual local purchases

Indian Point is a major regional employer, a consumer of local goods and services, a contributor to local charities and a payer of local and state taxes.

If not IPEC, then what? Should IPEC close, the energy produced by these power plants will need to be replaced by either alternative sources of generation or energy management and conservation.

- In the near term (2-3 years) not much can be done to address a premature shutdown, except to rely upon existing transmission and generation, regardless of costs, and to encourage consumers to conserve especially during peak periods. It is again noted that “timely renewal” mean that thankfully, local residents will not have to face these draconian choices in the near term.
- By 2016, if the plants were to retire, reliability levels would deteriorate to a point where outages could be expected. By 2020, the chance of an outage could quadruple. Electric power systems are designed to minimize outages to less than one day in 10 years or an LOLE of .1 days per year. Without IPEC, the LOLE rises to .38 by 2020. (LOLE = loss of load expectation)
- One scenario would be a portfolio of energy management, dispersed small-scale generation, new transmission and new base load capacity. The least cost, most efficient alternative is a combined cycle gas turbine (CCGT)
- However, these alternatives will take a years to implement and at a substantial additional cost to consumers. Under even the most the most optimistic assumptions, without IPEC, rates will rise, reliability will decline and air quality will be adversely affected.

Cumulatively, IPEC employs 1,200 full-time individuals plus 200 contractors, many high-paying jobs – in contrast to a similarly sized alternative- a combined cycle gas turbine- that would employ less than 20 individuals.

Study approach

- Only publicly available information was used in this study.
- Entergy played no role in the development of this report except for providing publicly available information on IPEC employment, payroll and taxes incurred at the facility.
- Alternatives to IPEC were based on best available information and power systems planning experience. Comparative economic models for nuclear and CCGT were based on best available industry projections including the US DOE Energy Information Administration's annual energy Outlook and ESI's proprietary generation risk assessment model. Con Edison electric information was obtained from Con Ed's annual reports in its FERC Form 1 filing.
- Those economic impacts evaluated:
 - The direct impact of the plant closing in Westchester – loss of employment, wages, etc., as well as secondary impacts caused by economic multiplier effect.
 - Impact of higher electric prices in Westchester. This was derived by estimating the component of costs associated with IPEC energy purchased by Con Edison
 - The economic multiplier effects were derived by applying US Bureau of Economic Analyses (BEA) RIMS II economic multipliers for Westchester County purchase from the BEA.
- Reliability impacts were obtained from the New York ISO website
- Environmental impacts were derived by Energy Strategies Inc.'s generation risk assessment model which compares both economic and environmental impacts of nuclear, coal and CCGT alternatives. The primary environmental parameters measured were CO₂ and NO_x and SO₂ emissions.

Summary of Findings

- The average cost of electricity derived by dividing total revenues by total sales was 17.37 cents/kwh. However, ~1/2 of its retail customers also need to procure their electricity from competitive suppliers which is an added expense.
- After allocating non-production costs, fully bundled retail rates averaged 22.7 cents/kwh
- Con Ed's IPEC purchases amounted to 41% of the total output of these plants (based on 2069 MW & 90% capacity factor). It is unknown, but other IPEC purchases could also have been made by competitive suppliers serving the downstate area. (see note)
- The average cost of IPEC including both energy & demand charges was \$77.6/MWH; the average cost for all other purchases was \$133/MWH
- IPEC expenses were ~9% of total electric revenues after removing sales to customers with competitive suppliers
- IPEC represents:
 - 26% of the production portfolio (kwh sales), but only 17% of production costs
 - 9% of adjusted electric revenues
- Every \$10/MW increase in IPEC replacement costs, produces ~\$68 million in added revenue requirements. Average rates would rise from \$.227/kwh to \$.230/kwh or 1.3%. If IPEC were replaced by other purchases at \$133/MWH, total costs would rise by 6.3% or \$374,000,000 per year. The \$133 amount is the average cost of all other power purchases made by Con Edison for its full service customers and includes both energy and capacity charges.

Note: Competitive suppliers who bid for electricity thru the NYISO real time markets pay the market clearing price, but do not know the source of the generation procured. Approximately, one half of all the electricity procured in New York is purchased on the NYISO open market. As a result, Entergy, the owner of IPEC would likely bid any surplus energy not committed under purchase power agreements on the NYISO market. Proximity to NYC and Westchester also limits competitive suppliers from incurring excessive transmission congestion charges.

Alternatives to IPEC

- There are several possible alternative scenarios to replace the 2,000 MW of electric generation from Indian Point; however, none can simply replace these plants by 2016 or even later in the decade, that is, without negatively impacting electricity prices, electric reliability, economic recovery and the environment.
- Primary alternatives include:
 - Constructing new, state-of-the-art natural gas fired combined cycle generation (CCGT);
 - Constructing new high voltage transmission networks from Canada and Upstate New York to the Hudson Valley and New York City;
 - Expediting the construction of extensive distributed generation including large scale wind and solar projects in the region;
 - Promulgating laws and regulations to try and foster great penetration of consumer orientated energy conservation and load management programs and hope that they will work;
 - A combination of all of the above.
- However, with downstate electricity usage expected to grow 1% per year, by 2016 demand should grow another 500 MW even after considering government subsidized conservation, demand management and new renewable resources

Factors that will limit the success of these alternatives

- First, any one of these alternatives will require near lightning speed in planning, licensing and construction in order to effectively replace IPEC.
- As of today, there are no affirmative programs to replace the power from Indian Point.
 - There are no sites approved for 2000 MW of new CCGT in the downstate region.
 - There are no plans for added natural gas pipelines, estimated to cost over \$350 million, to bring low cost gas to market
 - There are no approved plans to construct a super transmission highway to Upstate NY by 2013 or 2015
 - While the Governor's proposed Energy Highway Task Force has received a number of ideas to advance New York's energy infrastructure, the Task Force is still in the early planning stages with an Action Plan scheduled for the Fall of 2012.
 - On-going development of renewable resources is not keeping pace with targets for 2015 without consideration of the need to add another 2,000 MW
 - While economic recovery in New York State has been slow, recovery in New York City has been growing with projected electric load growth of about 1% (NYISO). From the beginning of 2012 thru the end of 2015, Con Ed's peak load could grow by over 500 MW and that already factors in aggressive conservation and load management initiatives
 - Such renewable and dispersed generation such as wind and solar are intermittent and while they are beneficial to the mix of supply of electric generation they cannot be depended upon as a reliable source of supply. Typically, wind and solar can produce electricity only 15–25 percent of the time; whereas, base load generation (IPEC or CCGT) generate electricity over 90% of the time. Even if there were available cost effective electric storage technologies, we would need nearly three times the capacity of wind to generate the same amount of electricity as a base load plant.
 - New York's aggressive Renewable Portfolio Standard (RPS) program funded by NYSERDA appears to be behind schedule and again, this does not take into account replacing 2,000MW of our current energy portfolio.

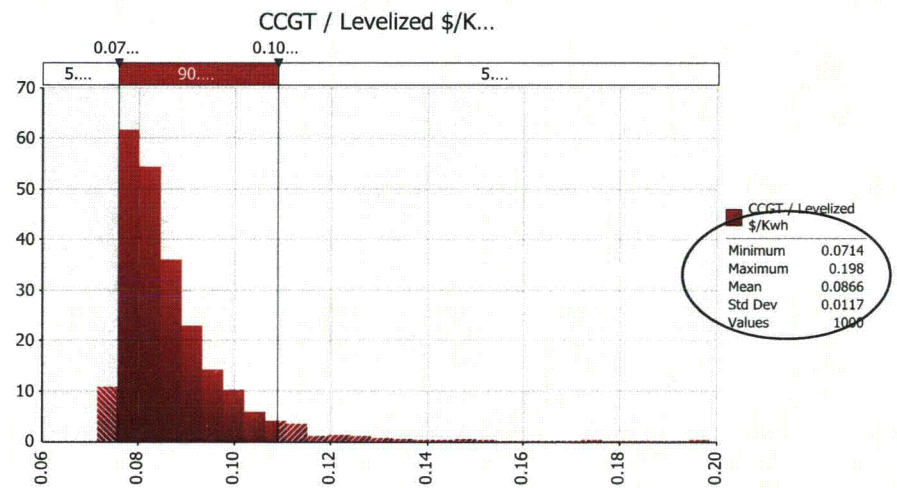
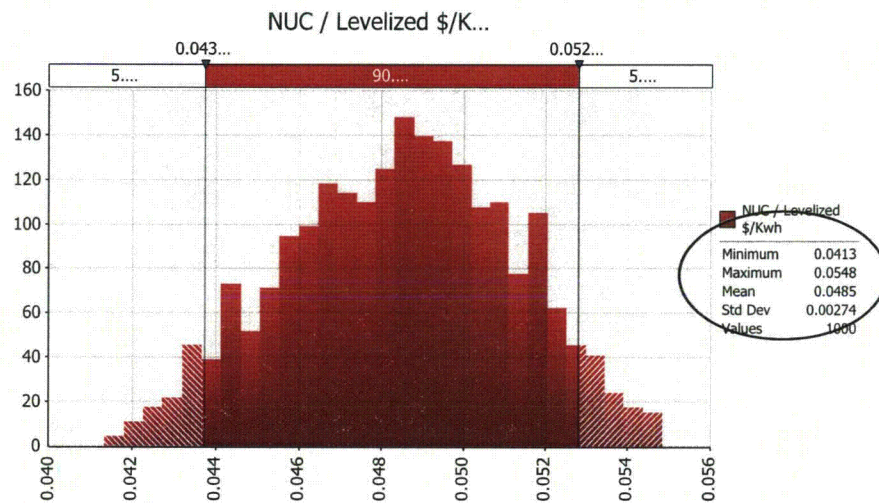
Impact on Reliability

- There are no affirmative plans to replace over 2000 MW of electric capacity that operates over 90%+ of the time. There's nothing in the 2012 - 2016 planning horizon that can be added that can displace all of this capacity.
- The New York ISO has studied the impact of closing IPEC and found that the electric reliability will deteriorate to a point where outages and other disturbances will increase in degree and frequency beginning in 2016 and significantly worsen by 2020. This is based on detailed engineering and power systems analysis of the New York electric energy infrastructure which evaluates the probability of a loss of load under a range of operational conditions. With IPEC, there are no conditions foreseen where the probability of loss of load (e.g., a brownout or blackout) exceeds design standards.
- However, the occurrences of widespread outages are four times greater without IPEC by 2020. (NYISO 2010 Comprehensive Reliability Plan and the NYISO 2010 Reliability Needs Assessment.) These studies assume that all available resources are available to mitigate system disturbances.
- It should be emphasized, these are not local disturbances resulting from a lightning strike or a falling tree, but regional outages caused by overloaded high-voltage transmission networks and associated substations that connect Westchester and New York City to available power plants in upstate New York as well as other regions.

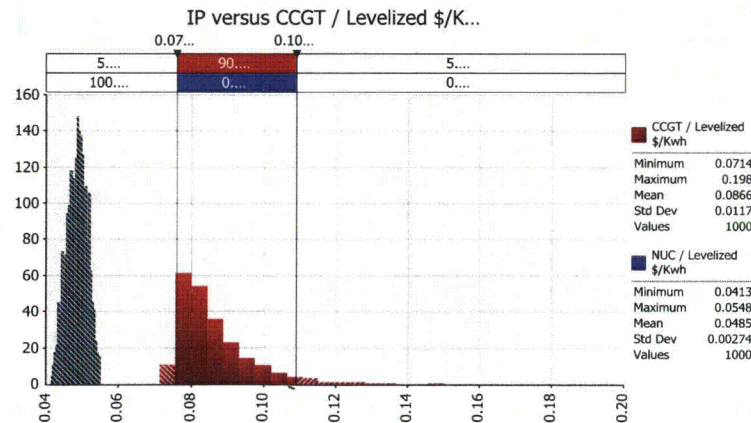
Impact on Electric Prices

- We found no scenario where electric prices decline without IPEC. Con Edison offers a bundled electric rate in which approximately ½ of its customers choose this service as opposed to a competitive energy supplier. With NYS PSC approval, Con Edison procures a portfolio of energy supplies including IPEC. Based on its FERC Form 1 report, the IPEC contract is among the lowest-cost resource in this portfolio.
Therefore, any replacement of IPEC energy would likely result in higher costs alternatives.
- It is important to note that the Con Edison region is already highly constrained which means that competition among suppliers is limited by the transmission constraints into the downstate region. The loss of 2000 MW of capacity within the constrained area would only further diminish this competitive environment and likely lead to even higher prices.
- The least cost alternative to IPEC would be a 2000 MW combined cycle gas turbine plant (CCGT) which would still cost as much as twice the cost of IPEC, and is of a scale that does not currently exist in the state.

Our risk analysis of lifetime costs demonstrates lifetime cost advantage of IPEC over a wide range of uncertainties. IPEC, on average, costs about one half the cost of the new CCGT including required natural gas pipeline extensions.



IPEC costs range between \$43.7 - \$52.8 per MWH within a 90% confidence band



A CCGT would cost between \$75.8 - \$108.8 per MWH within a 90% confidence band

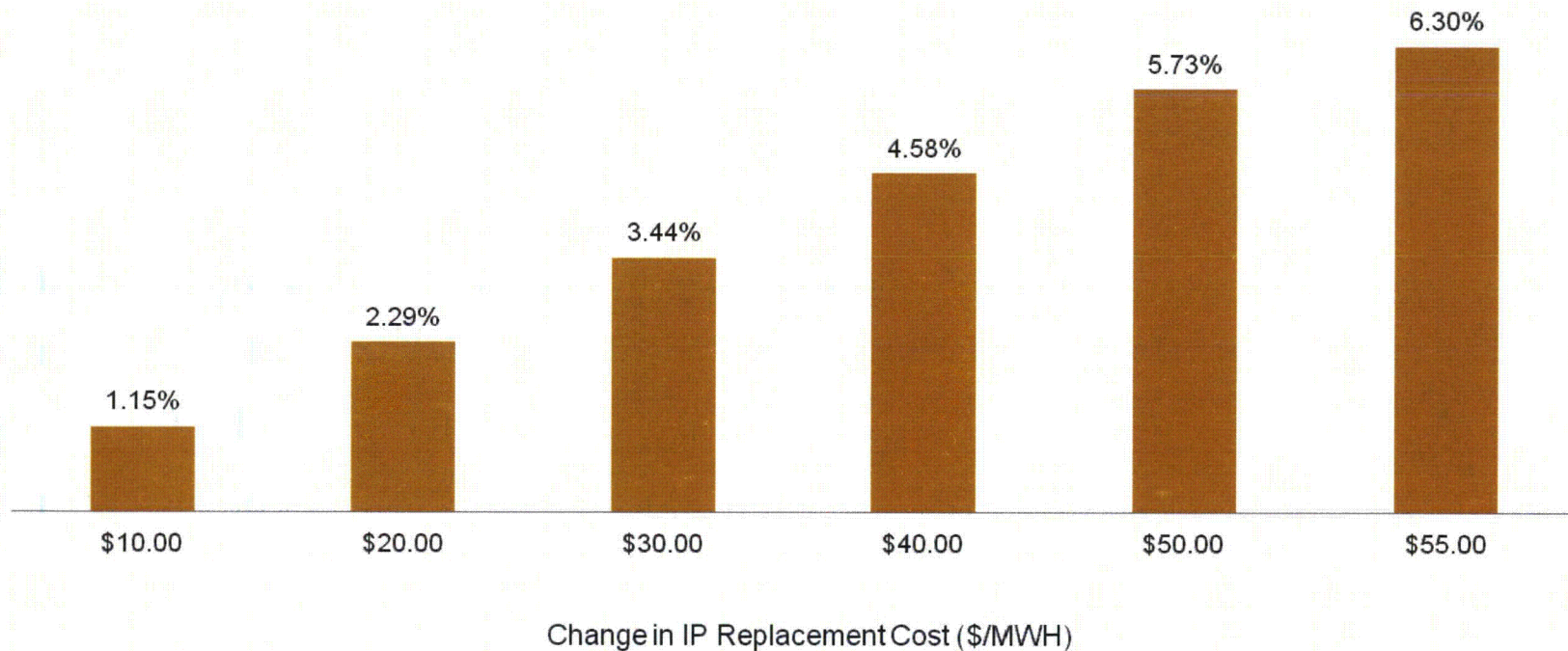
Computation of Con Edison Retail Rate

Impacts

- Source: 2010 FERC Annual Report filed by Con Ed on April 1, 2011 & Con Edison Facts (for 2009 and 2010)
- Background:
 - Con Ed serves 3.3 million retail customers in NYC and Westchester – approximately 10% or 345,000 in Westchester
 - Total electric revenues = \$8.4 billion
 - Approximately ½ of Con Ed's customers receive their electricity from competitive suppliers
 - The other ½ is provided by Con Ed using a portfolio of self owned and purchased power including IP
 - IPEC represented 29.7% of the portfolio as a % of kwh
 - IPEC represented 19.8% as a % of expenses
- Key Assumptions
 - The % of competitively-supplied electricity was based on the difference between Con Ed's total retail electric sales (MWH) and the total MWH generated by Con Ed (~10%) and purchased.
 - The proportion of T&D (Delivery charges) and all other non-production related expenses were allocated proportionately.

The average difference between Con Edison's purchased power agreement for IPEC power and other sources of energy is about \$55/MWH. The following graph translates each \$10 increment of added replacement cost into an overall electric rate increase.

% Increase in Retail Rates



Environmental Impact:

Replacing IPEC with a gas plant (CCGT) would have the same effect on global warming as adding 1 million cars in downstate NY.

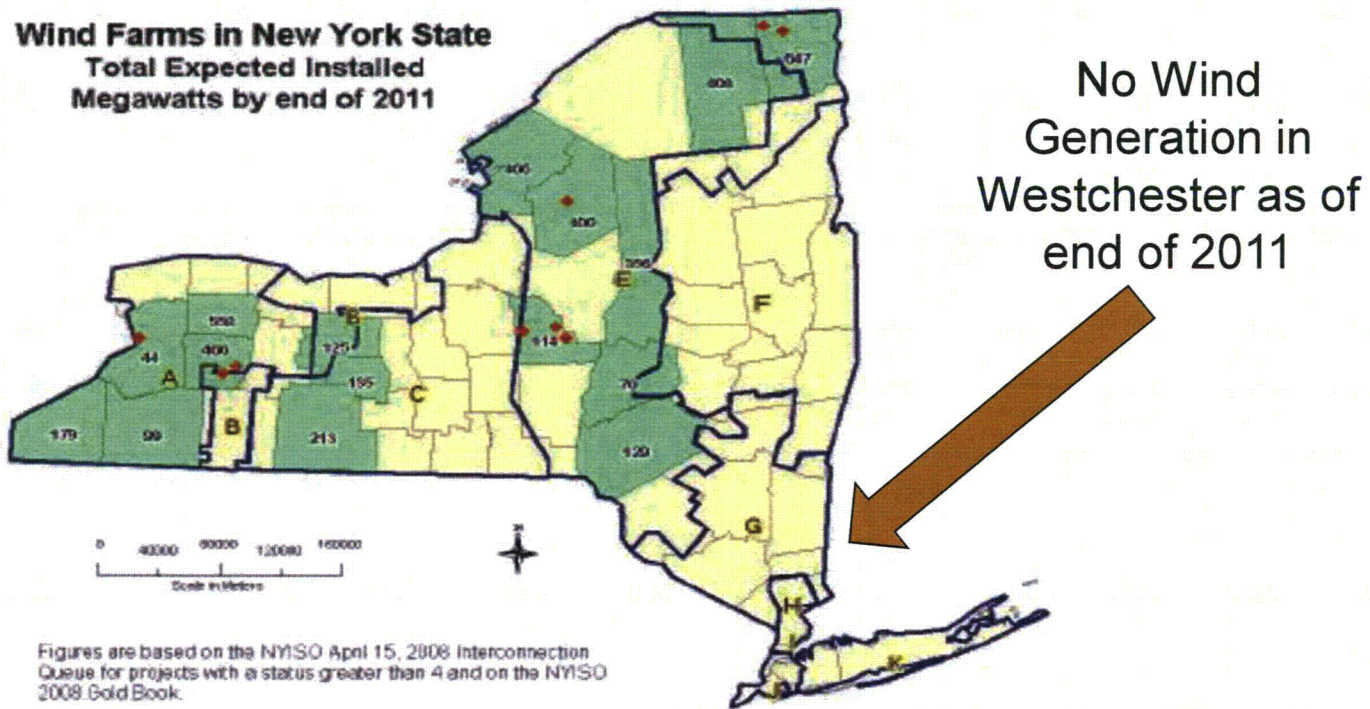
(Based on an average efficient car, 12,000 miles/yr and 6 tons of CO₂ per year)

- There is no question that manufacturing nuclear fuel and the disposal of nuclear waste has an environmental impact, just as a combined cycle gas turbine's use of shale gas would have an environment impact exogenous to the operation of either IPEC or a combined cycle gas turbine.
- However, when comparing localized air quality emissions, IPEC produces no significant amounts of carbon dioxide, nitrogen oxide, or sulfur dioxide. On the other hand, the most efficient combined cycle gas turbine, while emitting no SO₂, does produce significant levels of carbon dioxide and nitrogen oxide.
- Our models show that NO_x will increase by nearly 2,000 tons per year. A 2010 study by NERA found replacing IPEC would add 7,000 tons per year.
- Our models also show that carbon dioxide, the key driver of global warming, will rise by about 6 million tons per year where the NERA study computed 9.6 million tons.
- When using even the lower emission rates, the cost of noncompliance could amount to \$3 million per year for an NO_x emissions and up to \$150 million per year in SO_x compliance costs.

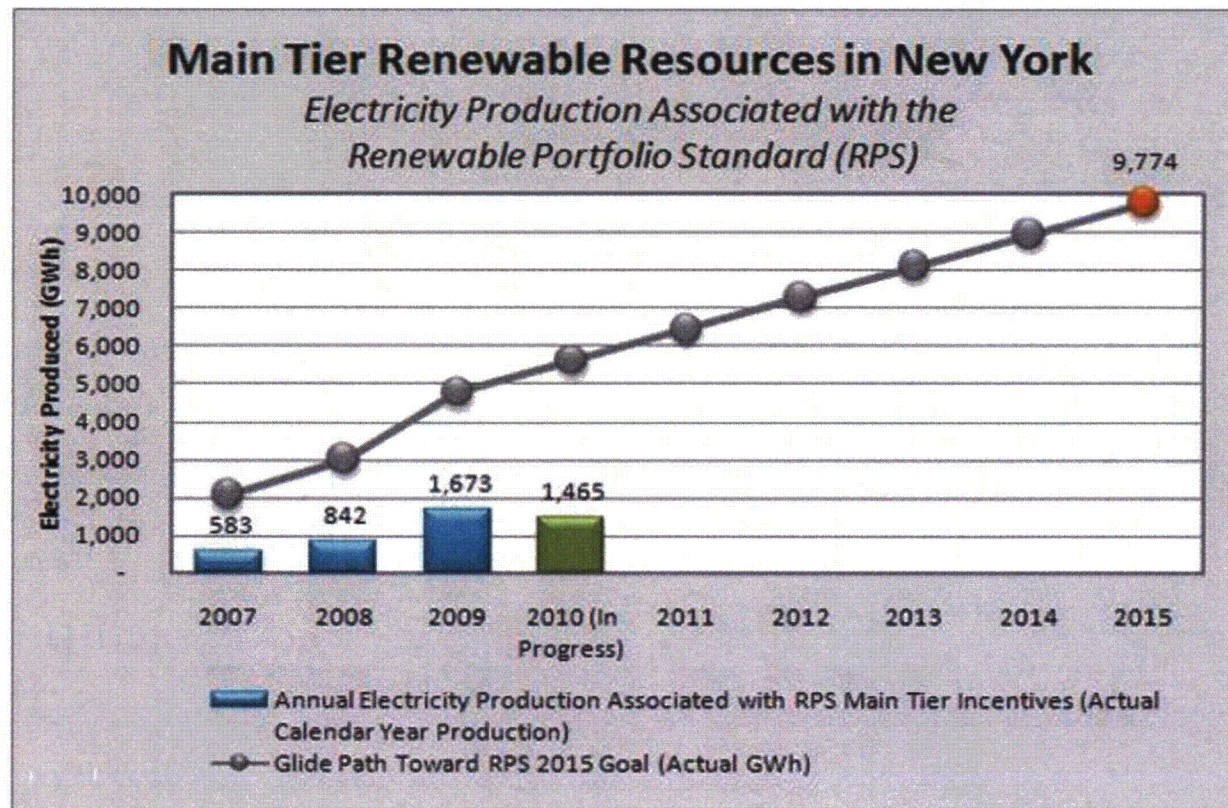
Can an aggressive renewable resource program also provide energy that has a minimal environmental impact?

- It is likely that, over time, the addition of such renewable resources as solar and wind generation will lower NY's dependence on fossil fuels and eventually be added at a cost comparable to conventional generation.
- However, to date, most renewable technologies are far more costly, require substantial subsidies and will take years to replace the capacity resulting from the IPEC closure.
- The following slides highlight the unlikelihood of relying on renewable technologies to replace IPEC.

Map of Wind Farms in New York as recorded by the. Transmission constraints limit the amount of wind generation that can be supplied to downstate New York from other parts of the state.



The Statewide Renewable Portfolio Standard (RPS) for 2015 is 9,774 GWh: As of 2010, the RPS was 75% below target. Even the statewide 9,774 GWh target for 2015 represents only 65% of the IPEC output.



Smaller scale renewable resource statewide amount to 29.77 MW. As of the end of 2009, actual installations were 11.45 MW. (The cost per kWh assuming no O&M charges equals \$153/MWh with a capital cost of approximately \$8800 per kilowatt)

Source: NYSERDA

Table 1-1. Funding Status of 2007 CST Operating Plan effective December 31, 2009

	Budgeted Funds	Encumbered and Pending Contracts	Balance
Photovoltaics	\$ 75,333,734	\$ 75,333,734	\$ --
Fuel Cells	\$ 5,794,420	\$ 2,507,860	\$ 3,286,560
Anaerobic Digesters	\$ 20,100,000	\$ 19,274,750	\$ 825,250
Small Wind	\$ 2,071,846	\$ 1,405,036	\$ 666,810
Metrics and Verification	\$ 4,300,000	\$ 2,359,400	\$ 1,940,600
Total:	\$ 107,600,000	\$ 100,880,780	\$ 6,711,220

Table 1-3. Actual and Expected Energy Production effective December 31, 2009 (MWh)

CST Program	Original Operating Plan: Target Annual Generation Encumbered by 12/31/09	Expected Production from Pending and Planned Contracts	Actual Energy Production from Installed Capacity	Total Expected Production Progress
Solar Photovoltaics	4,533	14,837	10,512	25,349
Fuel Cells	18,700	1,680	--	1,680
Anaerobic Digesters	25,700	41,775	22,243	64,018
Small Wind	3,945	604	170	774
Program Total	52,878	58,895	32,925	91,820

Table 1-2. Actual and Expected Installed Capacity effective December 31, 2009 (MW)

CST Program	Original Operating Plan: Target Encumbered Capacity by 12/31/09	Pending Contracts	Planned Capacity (w/remaining funds)	Actual Installed Capacity	Total Pending, Installed, and Planned Capacity
Solar Photovoltaics	3.5	11.44	--	8.11	19.55
Fuel Cells	2.7	.415	0.75	.005	1.36
Anaerobic Digesters	3.7	6.01	--	3.20	9.21
Small Wind	1.8	0.30	0.15	.140	0.59
Program Total	11.7	18.17	.90	11.45	29.77

Capacity (MW)	11.45
Output (kWh)	32,925,000.00
Initial Cost	\$ 101,000,000.00
Amortization (Yrs)	20
Annual cost (no O&M)	\$ 5,050,000.00
Average cost \$/kwh	\$ 0.153
Capital Cost/kw	\$ 8,820.96
Target (MW) by 2015	29.77
as of 1/1/2010	11.45

Economic Impact: An IPEC replacement strategy translates into lost jobs, salaries and other economic measures.

- The IPEC is a “factory” that produces electricity and annually:
 - Employees 1,200 people plus 200 contractors living in and around Westchester County
 - Pays over \$130 million in salaries
 - Pays over \$75 million in property taxes and revenue sharing with NYS
 - Contributes annually \$2 million to local charities
- **A similarly sized combined cycle gas turbine (CCGT) facility would employ as few as 20 workers.**
- The total regional impact when considering multiplier effect results in:
 - A total of 3,255 jobs lost each year
 - \$202 million in lost salaries and wages
- Replacing IPEC will increase Con Edison’s retail electric rates by about 6.3% which will further reduce employment in Westchester by approximately 50 – 100 jobs per year.
- Total lost jobs in Westchester County would amount to 3,300 jobs per year
- Total lost regional commercial output will decline by \$11.5 billion (2011\$) over a twenty year period.

Total Employment Impact in Westchester: Combined effects of higher electric prices & IPEC closing

Industry Group	Average Annual Lost Jobs	Total Lost Jobs (20 years)
Utility	1,436	28,720
Construction	274	5,480
Professional, Scientific & Technical Services	269	5,380
Healthcare	216	4,320
Retail Trade	192	3,840
Food Services	168	3,360
Admin & Waste Services	153	3,060
Real Estate, Rental & Leasing	147	2,940
Finance & Insurance	79	1,580
All others	390	7,800
Total	3,326	66,520

Sources of information used in this assessment of energy needs in Westchester County.

- Con Edison electric rates: 2010 FERC Form 1 Annual Report and Con Edison Facts: 2009 & 2010
- System Reliability Impacts: NYISO 2010 Comprehensive Reliability Report and the NYISO 2010 Reliability Needs Assessment
- Environmental Impacts: Energy Strategies, Inc. Generation Risk Model using current Energy Information Administration (EIA) Energy Outlook data. Also compared findings to a NERA 4/29/10 letter report to the NYS Department of Conservation on the “Effect of the Loss of Indian Point Nuclear Generating Units 2 and 3 Capacity and Generation on New York State Environmental, Economic and Energy Needs.”
- Economic Impact: The US Bureau of Economic Analysis (BEA) RIMS Input/Output Regional Economic Multipliers for Westchester County, NY.
 - The RIMS **Final Demand** Multipliers were used to estimate the impact of the IPEC plant closing on local jobs and salaries.
 - The RIMS **Direct Effect** Multipliers were used to estimate the impact of higher electric prices on NYC and Westchester business as measured by jobs, salaries and economic impact.
- Also compared findings to a Charles River Associates (CRA) study (8/2/11) entitled “Indian Point Energy Center Retirement Analysis” for the New York City Department of Environmental Protection

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 27 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, and 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.