The Feasibility of Re-Powering KeySpan's Long Island Electric Generating Plants To Meet Future Energy Needs

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LONG ISLAND UNIVERSITY

Center for Management Analysis

College of Management

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The Feasibility of Re-Powering KeySpan's Long Island Electric Generating Plants To Meet Future Energy Needs

Overview

The availability of an adequate supply of reasonably priced electricity continues to be a major issue that can adversely impact Long Island's future well - being and economic growth. There are a number of new so- called "greenfield projects" in the licensing stage to meet expected near term load growth. These include the 250 MW KeySpan facilities at Spagnoli Road, the 560 MW ANP Brookhaven facility and the 300 MW PPL facility at King's Park. It is expected that these projects will be operational by the end of 2004, providing some relief to the power supply shortage the Island presently faces. However, in the longer term additional capacity from either greenfield sites and/or re-powered existing facilities will be required- re-powering in this context referring to the conversion of the present steam electric plants to combined cycle technology. Whether re-powered or not, the existing KeySpan generating facilities will continue to be a part of Long Island's electric supply mix for the foreseeable future, whether KeySpan continues to own these units or they are purchased by LIPA or other entities.

The existing KeySpan steam electric facilities, although well maintained to ensure life extension, utilize an older technology which provides operating efficiencies around 35% . These plants are excellent candidates for conversion to state of the art combined cycle technology. For each unit converted, the generating capacity would almost triple and the operating efficiency would nearly double. The first conversion could be operational by 2006. At current projected increases in electric demand, this may be before the capacity of the presently proposed greenfield sites is fully required to meet total demand. This extra capacity could be available to cover the outages required for the initial conversions which have been estimated to take from 12 to 18 months, thereby providing a margin and insurance against unforeseen contingencies during the construction period. This is one more reason for completing the greenfield projects currently in licensing.

Re-powering, in some cases, entails the demolition of the existing oil/gas fired boilers but, in all cases, the installation of combustion turbines and waste heat recovery boilers in their place or in close proximity. Combined cycle conversions achieve higher efficiency by using the exhaust gas from the combustion turbine portion of the system to make steam that powers the conventional turbine generator carried over from the existing unit. The added capacity comes from the combined output of the existing generator and the capacity of the generation from the newly added combustion turbine components. Combined cycle technology is well proven and presently is utilized on Long Island in the New York Power Authority's Flynn Plant in Holtsville and on a smaller scale at Calpine's Plant in Bethpage and Trigen's Plant in Mitchell Field.

Currently major combustion turbine suppliers including General Electric and Siemens build large single units up to the 175 MW range. These units are available in sizes and combinations that complement well the capacity of the KeySpan units, including the largest on the system, the 375 MW Northport Units. For example, the steam turbine units at the Barrett Station in Island Park and the Port Jefferson Station are each rated at 175 MW and are an ideal match for the 175 size combustion turbine units. Typically, for a plant this size, two 175 MW Combustion turbines would be matched to the original steam turbine, resulting in a highly efficient 525 MW combined cycle plant. Similarly, four combustion turbines could be integrated with each Northport unit, resulting in a combined capacity of 1,050 MW per unit. If all of the existing steam electric plants were converted to combined cycle, Long Island's electric supply could potentially be increased to about 4,700 MW. In addition to the steam electric plants, it may also be possible to convert the simple cycle 240MW combustion turbine plant at the Shoreham Nuclear Plant site to combined cycle as gas becomes available at the site. This would result in 120 MW of increased capacity.

Clearly, an increase in generation of this magnitude could not occur without significant reinforcements of the electric transmission and natural gas transmission systems. The extent and timing of these reinforcements would vary according to the site-specific conversions undertaken. At some sites presently there may be adequate electric transmission and gas service to support at least some level of conversion. Other sites would require reinforcements commensurate with the magnitude of conversions undertaken and possibly have other constraints due to limited space. In any event, reinforcements of the electric transmission and gas supply system for re-powering existing plants would be no greater than and most likely less than required for greenfield sites. A detailed description of the possible conversion scenarios for each KeySpan site is included in the body of this report.

The re-powering option either alone or in concert with the construction of greenfield facilities, compares very favorably with conceivable alternative energy options. LIPA is strongly committed to a program of energy conservation and alternate energy sources. Much attention has recently been given to the development of wind generators off the South Shore of Long Island. A request for proposals for a 100 MW wind farm is in the planning stage for a fall 2002 project decision. LIPA has also initiated a sizeable fuel cell generation project at its West Babylon Site. Such alternate energy programs must be pursued if for no other reason than to "demonstrate" the longer term viability of these options. However, the maximum realistic capacity of these programs in MW with today's technology is small, perhaps 100-200MW as compared to about 4,700 MW for the ultimate re-powering scenario. Also, the capital costs of alternate energy sources must be evaluated against significantly lower re-powering costs. Best estimates show wind and fuel cell generation to cost more than 2 times and probably up to three times the cost of re-powering. Even if sufficient capacity could be generated by these alternate sources, the high initial development costs for a large block of power would place a significant burden on Long Island's rate payers.

Over the past year there has been a wave of new simple cycle combustion turbine plant construction in New York City and on Long Island by NYPA and private generating Companies. Depending on the tightness of the schedule and other project specific design issues, the installed or estimated cost of all these projects has been in the $1,000/KW range. A combined cycle plant would be expected to cost more than these simple cycle projects, probably in the range of $1,100/KW. Re-powering allows cost savings over a greenfield combined cycle project due to the many components and systems that are already in place and can be utilized at existing sites, such as land, cooling systems, electric and gas transmission systems and, most importantly, the turbine generator. As such, the estimated cost of re-powering an existing site is expected to be in the $700 to $900/KW range. This is a $200 to $400/KW savings over greenfield sites. A possible exception to this is Shoreham when viewed as a greenfield opportunity. This site has elements of infrastructure present due to its history as a nuclear power plant site and the new gas and electric transmission facilities being developed there.

In addition to providing cost effective generating capacity to carry Long Island at least into the next 20 to 40 years and beyond, the re-powering of existing sites offers compelling environmental benefits. Conversion to combined cycle nearly doubles operating efficiency thereby reducing the amount of natural gas or distillate fuel oil required to produce the same amount of electricity. It also results in reduced air emissions for the same sized plants through the inclusion of selective catalytic recombiners to meet single digit NOX and low CO limits required by the NYSDEC /EPA for new facilities. Re-powering provides new cleaner generation to meet Long Island's base electric load-by replacing the "higher emission" generation from the existing facilities as they are converted to lower emission combined cycle. Re-powering the existing units also allows the continued use of once-through cooling systems avoiding the use of cooling towers and their consumptive use of drinking water supplies.

There may also be an advantage to licensing proposed re-powering projects over greenfield facilities. At present New York State's Article X siting law governs the licensing of all new generation over 80 MW. As is usually the case on Long Island, licensing greenfield sites is very controversial and likely to require considerable time and resources to accomplish. There are indications in the current reauthorization process for the law that Article X licensing would be streamlined as it would apply to the re-powering option, presumably since there are no new siting issues at existing sites. The environmental benefits to re-powering are compelling and the data and operating experience of the existing plant is well known to the NYSDEC and other agencies. This should allow an expedited review cycle for the environmental analysis prepared by the project's sponsor.

In deciding on the most appropriate way to add new generation to Long Island's supply base, the potential to introduce competition must certainly be a consideration. Because re-powering requires the reuse of existing KeySpan plant sites and facilities, re-powering could fall to KeySpan to carryout, solidifying its hold on major generating plants on Long Island. An alternate program could be carried out by LIPA, which continues to have the option to purchase all or some of the KeySpan plants within the next three years. This purchase option should be considered in conjunction with the possibility of re-powering. An intermediate course of stimulating competition and re-powering could be for LIPA to purchase some of the KeySpan plants and structure a resale to competitive generating companies perhaps through an auction. A condition of the sale could be that the new owner is mandated to carry out a re-powering.

In summary, the re-powering of the existing KeySpan steam electric plants and, as the necessary gas supply becomes available, the conversion of the Shoreham simple cycle combustion turbines to combined cycle are very attractive options for meeting Long Island's ever increasing energy needs. The ability to convert these existing facilities to combined cycle technology adds considerable value to each of the KeySpan sites since it eliminates the need, over the next 20 to 40 years and beyond, for additional greenfield sites. This time frame could even be extended further if the existing sites are also used to construct new stand alone generation. The conversion to combined cycle, state of the art technology vastly improves operating efficiencies of the existing units and is cost effective compared to greenfield sites and other energy alternatives because it utilizes existing facilities such as gas and electric transmission lines, cooling systems and turbine-generators. The only greenfield site which might be an exception and warrant further consideration is Shoreham because it has elements of infrastructure in place. The greenfield projects currently in licensing should be completed to accommodate load growth and provide back-up for outages that may be necessary at existing plants during the re-powering process. Re-powering also does not necessarily preclude the potential for introducing competition to Long Island. The converted units in a re-powering are environmentally superior to operating the existing facilities, very similar in performance to new combined cycle installations and should be much easier to license than greenfield sites. All of these considerations when taken together point very favorably to the re-powering option over other alternatives for meeting Long Island's future energy needs.

INTRODUCTION

The existing Keyspan steam electric plants can be grouped into three categories by size; 100MW, 175MW and 375 MW. The facilities within these categories are essentially identical, each using turbine-generators manufactured by General Electric. In light of the continued growth in demand for electricity on Long Island and the difficulties in licensing new greenfield facilities and providing transmission interconnections, these older, less efficient plants will continue to remain in service for the foreseeable future. This is the case whether they are re-powered or simply operated in their present configurations. To ensure that these existing plants operate reliably and are available during the periods of highest demand for electricity, KeySpan should continue to provide each of these facilities with the appropriate maintenance and repair for “life extension”.

The re-powering of each of these older units entails the abandonment or removal of the boiler and the integration of modern combustion turbines and heat recovery steam generators with the existing turbine generator. This fairly straight forward and well proven “combined cycle” technology uses the exhaust gases from combustion turbines in heat recovery steam generators to operate the turbine generator carried over from the existing plant. The output from the existing generator is combined with the generation from the new combustion turbines. As such the total output of the converted unit is about two and a half to three times the original nameplate capacity, depending on the specifics of the facility converted. The nearly doubling in efficiency of the re-powered unit as compared to the existing unit comes from the fact that the exhaust from the combustion turbines, which normally would be a waste product, is utilized to make the steam used by the existing turbine–generator. In addition to the turbine generator many other components from the existing unit are retained, including the cooling system.

In addition to re-powering the existing steam electric plants, it would also be possible, as natural gas becomes available, to convert the existing 240 MW simple cycle combustion turbines at the Wading River (Shoreham) Site to combined cycle.

The environmental benefits of re-powering are compelling. Improvement in efficiency from about 35% to close to 60% in the conversion of fuel to electricity can be achieved. The resulting reduction in fuel burned for a given amount of generation will be significantly less nitrogen oxides and carbon monoxide emitted. Modern combined cycle units have state of the art emission control systems in contrast to the older steam electric units with no such controls. The re-powered units achieve emission reductions immediately since they replace higher emitting, older units that would likely continue to operate in an expansion program of new greenfield projects.

To support the contention that the re-powering of the existing KeySpan steam electric facilities and the Wading River Combustion Turbines is a very favorable option to building new generation at greenfield sites, the following site specific conceptual designs were developed to examine the feasibility of re-powering at each existing power station:

CONCEPTUAL DESIGN FOR E. F. BARRETT

The Island Park site for the E. F. Barrett Steam Electric Plant is large enough in size and is configured in a way to make it one of the best candidates for combined cycle re-powering. A conceptual design has been developed in which, initially, one of the two 175 MW units is converted to combined cycle operation. Two new 175 MW combustion turbines would be integrated with the existing steam turbine generator to produce 525MW or 350 MW more than the existing unit. Figure 1 is a heat balance diagram showing the significant operating parameters including heat rate (amount of energy required to produce a KWH of electricity), fuel consumption, steam production, condensate return and the electric output of the new plant configuration.

A site plan for the conversion project is presented in Figure 2. In the area west of the current units, there is ample space, without the removal of the existing boiler, for installation of the two new 175 MW combustion turbines, heat recovery steam generators, control room, step up transformers (for combustion turbines), and auxiliary systems. This new equipment would be designed and sized to integrate with the existing steam turbine generator, step up transformer (existing turbine generator), condenser cooling water system and turbine control room. The major interconnections would be steam piping from the new heat recovery steam generators to the existing steam turbine unit and condensate return piping. Control systems for the existing steam turbine generator and condenser cooling system would be re-routed to the new control room and upgraded to modern distributed control technology which matched the control design philosophy of the newly added combustion turbines and heat recovery boilers.

A twelve to eighteen month construction period for the installation of the new equipment would be required. During much of this period, the existing plant could operate routinely. At the end of the summer peak in September, the existing unit could be taken out of service and the re-powering tie-in completed before the next summer peak period beginning in June. After the combined cycle facility is operational, the old steam boiler, stack and auxiliary systems could be demolished. The available space at Barrett facilitates this schedule and would allow the operation of the existing unit while the construction is underway.

The new combustion turbines would use natural gas as their primary fuel with low sulfur distillate oil as a back up. The high pressure gas transmission line at the Barrett site is tied to the underwater pipeline that connects to New Jersey and interstate pipelines from the Gulf area.

With moderate augmentation, this line may be capable of supplying the incremental amount of gas needed by the larger, but more efficient combined cycle complex. Some of the existing residual oil tanks at the site could be converted to the storage of the distillate oil. In parallel with installation of the combined cycle components on the converted unit, transmission system upgrades could be completed to accommodate the additional 350 MW on the LIPA grid.

While the above focuses on converting one of the two Barrett Units, the site is large enough to easily encompass the re-powering of the second steam electric unit at a later time after the initial conversion. Re-powering the second unit would add a total of 700MW of additional capacity at this site, for a total site capacity of 1,050 MW from both conversions. The ultimate decision and sequence of re-powering the second unit relative to other conversions would depend on the extent of gas supply and electric transmission expansion necessary and the degree to which demolition would be required to accommodate the site's full capacity potential.

CONCEPTUAL DESIGN FOR PORT JEFFERSON

The 175MW Port Jefferson units are virtually identical to their sister units at the E. F. Barrett Station and the same conceptual design would apply. Each unit converted would generate 525 MW, 350 MW more than the present nameplate capacity of each Port Jefferson unit. However, the smaller size of the site would complicate the conversion scenario, particularly since additional space already has been taken by the installation of the two new simple cycle combustion turbines this past year. Therefore, it is very likely that before converting a unit, an existing boiler would have to be demolished to make way for the installation of the combustion turbines and heat recovery steam generators. The loss of this generating capacity over at least one peak season would have to be made up from elsewhere; possibly advancing the conversion of the second Barrett unit. Ultimately, both Port Jefferson Units can be re-powered, adding a total of 700 MW of additional capacity. A site plan for the conversion is presented in Figure 3. All other factors at Port Jefferson including electric transmission upgrades are similar to Barrett except for natural gas. Gas supply at Port Jefferson is dependent on the additional gas supplies from one of the new lines across Long Island Sound which have been proposed for the Shoreham area.

CONCEPTUAL DESIGN FOR FAR ROCKAWAY

The Far Rockaway Steam Electric Plant site is large enough and configured in such a way that would make it easily accept a re-powering project for the 100 MW steam generator size class. Two new 80 MW combustion turbine generators could be integrated with the existing turbine-generator to produce 240 MW. See Figure 4 for the Heat Balance for this unit. This would result in a new capacity for the re-powered unit of 140MW more than the existing 100MW plant.

As shown in Figure 5, the two new 80 MW combustion turbines, heat recovery steam generators, control room, step up transformers (for combustion turbines), and auxiliary systems would be constructed in the area south of the existing unit. All other design and construction factors would be conceptually similar to the E.F. Barrett scenario, including the fact that the new combined cycle equipment could be installed ahead of taking the plant out of service to demolish the boiler. Although the steam turbine generator at this plant has had some maintenance issues over the years, it still should be able to be economically refurbished to provide the necessary life extension for combined cycle operation.

Due to the Far Rockaway site's location in the extreme southwest corner of the LIPA service territory, electric transmission upgrades likely would be required to accommodate the added generation from this conversion. On the other hand, gas supply may be adequate based on earlier site usage even with the new peaking plant recently built there by Florida Power Light. Also, a back up distillate oil supply could be put in place by modifying the existing residual oil storage tank.

CONCEPTUAL DESIGN FOR THE GLENWOOD STATION

The Glenwood site has two existing 100 MW steam electric units which are the sister units to Far Rockaway. The site is fairly small and conversion of these units, like those at Port Jefferson, is more challenging. Here again, it is anticipated that the existing boiler would have to be demolished to make room for the conversion of the first unit. A second option would be the demolition of the two old, fairly inefficient 50 MW simple cycle combustion turbines south of the steam units. One re-powered unit would produce 140 MW more than the original; re-powering the second unit would add a total of 280 MW to the site. A site plan for the conversion is presented in Figure 6.

It is not anticipated that significant electric or gas transmission upgrades would be required at this site.

CONCEPTUAL DESIGN FOR THE NORTHPORT STATION

The Northport Steam Electric Station is the newest and largest of the KeySpan units. Its four 375 MW steam turbine generators each present a large nucleus for a combined cycle project. Four combustion turbines of 175 MW each could be integrated with one 375 MW steam turbine generator to produce 1050 MW, an increase of about 700 MW. See Figure 7 for the heat balance. The oldest unit is on the north of the complex and would be the first candidate at the site for re-powering. There is sufficient space north of the complex to locate the four combustion turbines, heat recovery steam generators, stacks, control room, step up transformers (for the combustion turbines) and auxiliary equipment as shown in Figure 8-Site Plan. Again all other design and construction factors would be similar in concept to the Barrett conversion.

It is conceivable that sufficient gas is available from the Iroquois pipeline that crosses the site for at least the conversion of one unit, however, it may be that additional compression would be required. Electric transmission upgrades would be necessary to accept the additional 700 MW on the LIPA grid from the re-powered first unit. As in the case for Barrett, there is sufficient space to allow parallel construction and tie in between annual summer peak periods.

A second steam generator could be re-powered for an additional 700 mw increase in station output by locating new equipment to the south of the existing plant. Ultimately, the third and fourth steam turbine generators also could be re-powered with combustion turbines located in the area of the existing boilers for those units following their demolition. Like the Port Jefferson and Glenwood cases, the construction schedule and outage times would be extended for the third and fourth units due to the need to first remove the boilers. Also, re-powering all four Northport Units would require significant electric transmission system upgrades to the existing underground cables and other overhead lines. Upgrade of the underwater transmission line to Norwalk, Connecticut that is currently under consideration would provide additional transmission exits for the combined cycle re-powering. Increased gas supply would be needed from the Iroquois system through a new pipeline and/or additional compression.

CONCEPTUAL DESIGN FOR THE WADING RIVER COMBUSTION TURBINE

KeySpan owns and operates a 240 MW simple cycle combustion turbine plant on the Shoreham Nuclear Plant site. The Wading River Station consists of three 80 MW General Electric combustion turbines. The units were constructed with space available so they could ultimately be converted to future combined cycle operation. This would involve the erection of three heat recovery steam generators (one for each combustion turbine) and a steam turbine generator. See Figure 9–Site Plan. The combined cycle output would increase by 120 MW for a total station capacity of 360 MW. Since these combustion turbines are a recent design, the efficiency of the combined cycle plant would nearly double, to about 60% from about 35% for the existing simple cycle facility. See Figure 10 for the heat balance analysis.

An added advantage of this conversion is that the combined cycle facility would also improve the air emissions from the existing units since the best available emission control technology would be required. The converted facility would be retrofitted with selective catalytic converters for nitrogen oxides and carbon monoxide reduction. The present units do not have these controls. The necessary gas supply would come from one of the new gas pipelines across Long Island Sound being proposed. Distillate fuel oil would be used as a back-up fuel.

Since significant new equipment would be required to re-power this facility as compared to a steam electric conversion, the cost to re-power the Wading River Simple Cycle would be comparable to the costs of converting a plant like E. F. Barrett.

OVERALL RE-POWERING CAPACITY INCREASE

In the maximum case where all of the existing capacity on the KeySpan system were converted to combined cycle, Long Island's electric supply could potentially be increased by about 4,700 MW. This would include the re-powering of all of the existing steam electric plants as well as the conversion of the simple cycle 240 MW combustion turbine at Shoreham to combined cycle. Figure 11 provides a breakdown of the capacities of the current facilities and the expected increase in capacity after conversion.

The numbers clearly show the significant role that re-powering the existing KeySpan facilities can play in meeting Long Island's growing energy needs for the next 20 to 40 years and beyond.

LIPA currently estimates that the Long Island peak summer load is increasing each year at a rate of 100 MW. Even at twice this annual increase, re-powering can provide the needed capacity for over the next 20 years.

The timing of installing new generation is generally tied to the expected yearly load growth. As such, a single Barrett or Port Jefferson Unit, for example would provide for about two years of growth at the least. Of course sequencing the projects would take into account site specifics such as available space for construction, demolition needed, electric transmission upgrades required, available gas supply and pipeline reinforcements, and the temporary loss of the unit's capacity during the construction and/or tie in period.

The addition of about 4,700 MW in generating capacity, even over a twenty year or greater period, would require that the electric transmission grid on Long Island be substantially upgraded. In all likelihood, LIPA would develop a timely transmission expansion plan to support new generation regardless of whether re-powering or other forms of generation expansion are selected. The same would be true for KeySpan and other suppliers when it comes to expanding the gas transmission system.

ALTERNATE ENERGY OPTIONS

LIPA is committed to a long-term program of conservation and alternate energy sources. Much attention has been given recently to the development of wind generators off the South Shore of Long Island. A request for proposals for a 100 MW wind farm is in the planning stage for a Fall 2002 project decision. LIPA has also initiated a sizeable fuel cell generation project at its West Babylon site. Such alternate energy programs must be pursued as a means of demonstrating the future viability of these energy sources. However, with today's technology, the ultimate capacity of these programs in MW is small and probably in the range of 100 to 200 MW as compared to about 4,700 MW for re-powering. Also, the cost of $2,000/KW or more for these alternate forms of generation is extremely high, as compared to about $700-900/KW for re-powering. This high cost becomes a significant ratepayer burden if it applies to a major block of generation and not a smaller scale "demonstration" project.

COST AND SCHEDULE FACTORS

Over the past year New York City and Long Island have experienced a wave of new combustion turbine plant construction to meet near term energy needs in this region. The New York Power Authority's (NYPA) 2001 Construction Program included the installation of eleven LM 6000 General Electric simple cycle units, ten in New York City and the eleventh at Brentwood, Long Island. These units were built on an accelerated schedule and, as a result, their capital cost was high, reported to be in the $1,000/KW. The 2002 class of LM 6000 units being completed for LIPA by private generating companies including KeySpan, Florida Power and Light, Calpine and PPL are also fast track projects and will likely cost about the same as the NYPA projects. The "as-built" costs for these recent facilities will certainly bear on the costs for greenfield combined cycle units such as Spagnoli Road and the ANP Brookhaven Project. The Spagnoli Road Project has been recently reported to cost $275 million or about $1,100/KW. The larger 560 MW ANP Brookhaven Project has been reported to cost $500 million, or approximately $1,000/KW. A combined cycle plant would be expected to cost more than simple cycle combustion turbine projects such as the NYPA and LIPA contracted plants.

Re-powering allows cost savings for the many features of an established power plant site, such as the land, electric interconnection, freshwater supply, security, oil storage tanks, and the most valuable components-an existing steam turbine generator and salt water condenser cooling system. The savings in capital costs for these facilities in a re-powering project are significant and estimated to be in the range of $200-$400/KW. It is projected that re-powering the 175 MW class units, for example, would cost from $700-900/KW. Similar costs would be expected for the other size classes of the KeySpan plants.

A typical construction schedule for a re-powering project would be twelve to eighteen months. Depending on the available space at the particular site, construction of the combined cycle components could occur while maintaining the existing steam unit in service for a considerable part of the construction period. The interconnection with the new combustion turbine/heat recovery steam generator could be accomplished between two consecutive summer peak periods, as probably would be for the Barrett conversions, Far Rockaway and at least two of the Northport Units.

REGULATORY ISSUES

The State legislature is presently considering the renewal of Article X law which presently governs the licensing of all power plants greater than 80 MW. As can be expected there is some interest in changing the regulations to apply to smaller than 80 MW facilities. This is largely due to the backlash from NYPA and LIPA building 79.9 MW facilities to take advantage of the shorter duration of State Environmental Quality Review Act (SEQRA) environmental licensing process.

There are indications in the current re-authorization process for the law that Article X licensing would be streamlined as it would apply to the re-powering option, presumably since there are few if any new siting issues at an existing plant site as compared to a greenfield site. The benefits are compelling and the data and operating history of the existing plant is well known to the NYSDEC and other federal, state and local agencies. All of this should allow an expedited review cycle for the environmental impact analysis prepared by the sponsor of the project.

CLIMATE FOR COMPETITION WITH RE-POWERING

Long Island's existing steam electric generating plants are all owned by KeySpan. LIPA purchases electricity and capacity from these plants under long-term power purchase agreements. There are only two mature proposals to add new combined cycle generating projects on Long Island: the 250 MW KeySpan Spagnoli Road Project and the 560 MW ANP Brookhaven Project. In addition, along with these projects a third simple cycle combustion turbine project, PPL's 300 MW Kings Park Project, is also progressing through Article X licensing process. It is expected that these projects will be licensed by the end of 2002 and operational by the end of 2004. If this indeed happens, the combined capacity of these facilities would be available to more than meet load growth during the period before the first re-powering project could be completed. Any uncommitted capacity from these units would further serve as margin and insurance against unforeseen contingencies during re-powering construction.

Because re-powering requires reuse of existing KeySpan plant sites and facilities, re-powering could generally fall to KeySpan to carry out in the future. This would solidify the KeySpan hold on major generating plants on Long Island in the future. An alternative program could be carried out by LIPA, which continues to have the option to purchase all or some of the KeySpan plants within the next three years. This purchase option must be considered in conjunction with the possibility of re-powering. An intermediate course of stimulating competition and re-powering could be to have LIPA purchase some of the KeySpan plants and structure a resale to competitive generating companies perhaps through an auction. The new owner could be required to carry out re-powering as a condition of purchase.

CONCLUSION

In order to meet Long Island's increasing need for electricity, additional capacity beyond the greenfield sites presently in the licensing stage will be required. The ability to re-power the existing KeySpan generating plants on Long Island by converting them to combined cycle units may eliminate the need over the next 20 to 40 years and beyond for additional greenfield sites. Possibly the only exception to this, when viewed as a greenfield site is Shoreham. This site has elements of infrastructure present due to its history as a nuclear power plant site and the fact that new electric and gas transmission facilities are being developed there.

Re-powering existing plants with combined cycle technology vastly improves operating efficiencies and is cost-effective compared to greenfield sites and other energy alternatives. It also produces environmental benefits because combined cycle units burn about half as much fuel per KWH than existing facilities and are equipped with advanced emission controls. It is also anticipated that re-powering projects could be licensed much more quickly than greenfield sites under a new Article X siting law.

In the transition to providing new capacity through re-powering, it is necessary to complete those greenfield projects currently in the midst of licensing. This capacity is needed to accommodate growth in electric demand between now and when the first re-powering could be brought on-line. It would also serve as back-up for outages that may be necessary or unanticipated at existing plants during the re-powering process.

Finally, re-powering can be accomplished while accommodating a need for competition on Long Island. With LIPA having an option to buy the KeySpan plants in the next three years, it could conceivably purchase some of these facilities and structure a resale to competing generating companies. This could be carried out by an auction where a condition of the purchase would be the re-powering of the facility.

When all these factors are taken into consideration, it makes a compelling case for pursuing re-powering of KeySpan's existing generating plants over other alternatives for meeting Long Island's future energy needs.

<u>FIGURES</u>

#1. E. F. BARRETT-PORT JEFFERSON HEAT BALANCE DIAGRAM

#2. E. F. BARRETT CONVERSION PROJECT SITE PLAN

#3. PORT JEFFERSON CONVERSION PROJECT SITE PLAN

#4. FAR ROCKAWAY-GLENWOOD STATION HEAT BALANCE DIAGRAM

#5. FAR ROCKAWAY CONVERSION PROJECT SITE PLAN

#6. GLENWOOD STATION CONVERSION PROJECT SITE PLAN

#7. NORTHPORT STATION HEAT BALANCE DIAGRAM

#8. NORTHPORT STATION CONVERSION PROJECT SITE PLAN

#9. WADING RIVER CT CONVERSION PROJECT SITE PLAN

#10. WADING RIVIER CT HEAT BALANCE DIAGRAM

#11. BREAKDOWN OF THE CAPACITIES OF THE CURRENT FACILITIES AND EXPECTED INCREASES IN CAPACITY AFTER CONVERSION

FIGURE 11-GENERATION SUMMARY

Facility	Current Output (MV)	Combined Cycle (MV)	Increase (MV)
Barrett Unit 1	175	525	350
Barrett Unit 2	175	525	350
Site Total	350	1050	700
Port Jefferson Unit 1	175	525	350
Port Jefferson Unit 2	175	525	350
Site Total	350	1050	700
Far Rockaway	100	240	140
Site Total	100	240	140
Glenwood Unit 1	100	240	140
Glenwood Unit 2	100	240	140
Site Total	200	480	280
Northport Unit 1	375	1075	700
Northport Unit 2	375	1075	700
Northport Unit 3	375	1075	700
Northport Unit 4	375	1075	700
Site Total	1500	4300	2800
Wading River CT	240	360	120
Site Total	240	360	120
Total	**2740**	**7480**	**4740**