PEAKERS AS A STEP TO RE-POWERING

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LONG ISLAND
UNIVERSITY

Center for Management Analysis

College of Management

School of Public Service

Long Island University/C.W. Post Campus

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The Center for Management Analysis

The Center for Management Analysis (CMA) is an academically based organization designed to serve the diverse needs of government, business and the community. Its purpose is to provide a climate for research, consultation and problem solving by uniting educators and practitioners in addressing public issues through reasoned dialogue and analysis rather than political rhetoric.

The CMA is a unit of the College of Management at the Long Island University's C.W. Post campus. It has evolved since 1981 through conducting management analyses for many New York State, Nassau and Suffolk County, and town agencies, while attracting funds through wide community support.

As the CMA developed, its scope of services has expanded beyond research to include evaluation, technical assistance, publications and conferences. The present focus of the Center is on issues related to energy, environmental management and economic development.

The CMA's efforts to enhance the quality of public service and apply the resources of academia in confronting real world problems and challenges are available to government, business and the community at large.

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Introduction

In September 2002, LIPA announced plans for the construction of 200 MW of emergency generation for the summer of 2003. This new program is in response to the high 2002 summer peak load demand for electricity. LIPA is working with power plant developers to identify sites and designs for such projects. The authority has also carried out a similar program for the summer of 2002 that added 400 MW of simple cycle peaking units at six sites. If the summer 2003 program follows what was done in 2002, it will mean building small simple cycle combustion turbine plants using 45-50 MW units. While these units, either GE LM 6000s (45 MW) or Pratt & Whitney Twin Pacs (50 MW), can be licensed and built in a nine-month cycle, they may not be the best choice of equipment for the new program. Further, there have been questions raised about the need for additional peaking generation for summer 2003.

Simple cycle combustion turbine peaking units (Peakers) as employed for the 2002 program are less efficient than combustion turbines used as part of a combined cycle design. Such a plant consists of multiple combustion turbines coupled to heat recovery steam generators that convert exhaust heat from the turbine into usable steam that drives a steam turbine generator adding to the

output of combustion turbine generators. Combined cycle units operate typically in the high 50% efficiency range whereas simple cycle units are in the 30% range.

Low efficiency generating units operated in simple cycle use more fuel and thus drive up the cost of electricity production. The use of more fuel per unit of generation also increases the impact on the environment through greater air emissions than in the combined cycle case. In addition, the capital cost of the simple cycle plants recently completed on Long Island has proven to be high due to an accelerated project licensing and construction schedule. The combination of higher capital cost and low efficiency ultimately translates into higher electricity cost from peaking plants. Also very important, the small size and layout of the 2002 Fast Track simple cycle units has virtually eliminated the option of converting them to combined cycle operation at some time in the future.

The addition of 400 MW of peaking units in 2002 by LIPA has already increased significantly the balance of peaking units to base load generators on Long Island. Adding 200 MW of peakers for 2003 aggravates the peaker balance further, and results in a less than optimum generation supply mix which could increase the price of electricity over what it might otherwise be. This must also be viewed knowing that last summer there were no blackouts or even voltage reductions

(brownouts), and that the TransEnergie 300 MW cable is now available to help meet peak level requirements.

Nevertheless, there is a way to provide for more peaking capacity during summer 2003, and yet still put the prospect of more economical combined cycle technology within closer reach. The Center for Management Analysis (CMA) study titled, "The Feasibility of Re-Powering KeySpan's Long Island Electric Generating Plants to Meet Future Energy Needs," completed in August 2002, discussed the desirability of Re-Powering existing KeySpan plants with combined cycle technology to achieve increased efficiency and environmental benefits and to make use of existing plant sites.

Fuel savings from the higher efficiency of combined cycle plants plus savings in plant cost realized by using existing power plant infrastructure in a Re-Powering can improve the current economics of electric production on Long Island. An environmental premium is also obtainable when large combined cycle Re-Powered plants replace the existing KeySpan steam units by taking advantage of state of the art emission controls. These benefits are not part of a scenario where more peakers are built and the old KeySpan steam units continue to operate without significant improvements in emission control systems.

A start down the road to combined cycle Re-Powering can be made now by building simple cycle combustion turbines for 2003 that can be converted to combined cycle as part of a program to Re-Power the KeySpan plants at some time in the future.

A Step to Re-Powering

The CMA Re-Powering study developed combined cycle Re-Powering design concepts for each of the KeySpan steam electric generating plants. There are five KeySpan Plants: Glenwood and Far Rockaway with 100 MW units; Barrett and Port Jefferson with 175 MW units; and Northport with 375 MW units.

Re-Powering such units would typically use 80 or 175 MW combustion turbines as the central plant component. Either of these combustion turbines can be erected in simple cycle mode in the same time as the smaller LM 6000 or Twin Pac units. An 80 MW unit would meet the NYS Siting Board Criteria for Fast Track licensing of a unit that is small in size (79.9 MW). This involves employing the State Environmental Quality Review Act (SEQRA) procedure as was done for the 2002 peaking projects. Thus, a single 80 MW combustion turbine could be placed in operation in simple cycle by June 2003 and used for peaking generation. Beyond that, it is feasible for a unit of this size to be included in a combined cycle conversion at some point in time, perhaps as early as the following year.

Due to the post Enron power market situation, 80 and 175 MW combustion turbines are readily available and can be obtained at attractive prices. These units could also be shipped and erected in sufficient time to meet the summer 2003 peak demand.

A very attractive site to employ an 80 MW combustion turbine in this manner would be the Far Rockaway Power Station. At this location there is ample room to build a simple cycle unit without disturbing the existing 100 MW steam unit or other units at the site. In subsequent years, a second combustion turbine could be added along with the other components to Re-Power the steam plant with a combined cycle unit, increasing the capacity of the existing steam unit to 240 MW. This ultimate Re-Powering at Far Rockaway could also be accomplished with minimal demolition which would keep down the cost of the project.

Another favorable site to employ this concept for peaking generation would be KeySpan's E. F. Barrett Power Station. While the CMA Study adopted a 175 MW combustion turbine as the base unit for the Re-Powering of the Barrett units, 80 MW combustion turbines could be used as well. Instead of having two 175 MW combustion turbines coupled to the 175 MW existing steam turbine of one of the steam units, four 80 MW combustion turbines could be utilized. This results in a slightly less efficient configuration but would accommodate the need to use Fast-Track Article X licensing to have peaking generation available for summer 2003.

Again, all of this work could be done without impacting the operation of the existing steam units because of the large size of the Barrett site. The ultimate re-powering of one of the Barrett units would increase its capacity to 525 MW.

Of course, the optimum alternative would be to build a 175 MW combustion turbine at the Barrett site for simple cycle operation in 2003. This, however, would require some modification to the NYS Article X Power Plant Siting regulations to support the summer 2003 need for peaking generation. Even though the siting law is currently under review for revision and re-authorization, there is some question whether it could be modified in time to allow units larger than 80 MW units to be licensed on a Fast Track basis, presumably because of the long term environmental benefits of an eventual Re-Powering. For this reason, and to ensure that peaking generation would be available at Barrett for summer 2003, it would probably be advisable to proceed with one or two 80 MW units at this site. Going to two units, however, would depend on each 80 MW unit being considered as a "separate" project under Article X, each still qualifying for Fast Track licensing.

As far as the other KeySpan sites, since the Glenwood and Port Jefferson stations are smaller and more congested, it is unlikely that large simple cycle units could be built at them for 2003 operation. In reviewing these sites for Re-Powering, the CMA study suggested that there may be a need to demolish the old steam

generators to make room for combined cycle equipment. On the other hand, the Northport Power Station is large enough to locate a number of 175 MW combustion turbine units in simple cycle, as well as combined cycle, without disturbing the existing steam units. If the Article X licensing process could be modified, then Northport could become an ideal site for a 2003 peaking/ combined cycle Re-Powering program. But again, the prospects of revising Article X in time to allow peaking generation for summer 2003 are not likely.

Conclusion

There is a way to provide for additional peaking generation in summer 2003 and at the same time temper the criticism that this would further unbalance the proportion of peaking and baseload power on Long Island. That way is to install 80 MW simple cycle combustion turbines at existing generating plants with a plan to eventually incorporate them in combined cycle Re-Powering projects. In time this would result in greater capacity, as well as economic and environmental benefits at existing sites.

There is a window of opportunity that will be open for the next few months, to move forward with simple cycle combustion turbines for summer 2003, as the first phase of Re-Powering one or more of KeySpan's steam generating units. LIPA and KeySpan should explore this opportunity and commit to a program for 2003 emergency generation that ultimately includes the construction of

combined cycle plants, to achieve higher efficiency, improved economics, and environmental benefits for the region. Long Island needs to look beyond just more peaking units and take advantages of the benefits of combined cycle technology to revitalize an aging electric supply infrastructure.