Potential For Utilization of Existing Excess Back-up Generation Capacity

Phase – Estimation Of Available Excess Back-Up Generation Capacity

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Phase 1-Estimation Of Available Excess Back-up Generation Capacity

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Market Assessment, February 2002

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REPORT SUMMARY

Many large metropolitan areas in the United States are struggling with electricity shortages and power distribution challenges. To alleviate the supply limitations, utility companies are seeking ways to enlist participation from their customers in load curtailment and peak shaving activities. This report describes a survey aimed at quantifying the amount of excess back-up generation capacity that is potentially available for such activities in key metropolitan areas.

Background

EPRI and other entities believe that events such as bank mergers, Internet company failures, and relocations of organizations to areas outside of city limits could potentially result in considerable excess back-up generation capacity. The thought is that as companies are reorganized, some of the generators used to supply back-up power to critical operations are no longer needed, or they are needed only to serve a fraction of their intended load. This excess generation capacity could then be rewired to serve other building loads, and could enable the organizations to participate in load curtailment or peak shaving activities.

Objectives

- To identify metropolitan areas and target companies with the most potential for excess back-up generation capacity
- To quantify the excess back-up generation capacity that is potentially available for load curtailment or peak shaving activities in the selected cities

Approach

Investigators followed a systematic procedure to meet the desired objectives. First, criteria were developed by which the predominant metropolitan areas in the United States could be judged and compared. This initial screening process yielded the three metropolitan areas that seemed to have the most potential for excess generation capacity. The metropolitan areas were then prioritized, and a procedure to contact first one, and then the others based on the success of the first, was determined. Thus, the first area was considered the trial city. Next, target companies were identified within the metropolitan areas by using recommendations from utility personnel for the trial city, and by researching financial institutions within the city for a second metropolitan area. The step to identify target companies in the third city was not reached.

After the cities and companies were identified, the investigators developed the survey tool and methodology. For the first trial city, the prospective participants were approached in three steps. In the first step, the survey was sent in the mail along with an introductory letter describing the project. In the second step, the contacts were pursued by a series of telephone calls. In the third step, the contacts were sent a second, simplified, survey form with the incentive of a $5 gift certificate for returned surveys. Prospective participants in the second city were approached via email.

Results

The task to identify metropolitan areas yielded three primary cities of interest: New York, Chicago, and Atlanta. It was decided to survey New York City first, and then to continue with

Chicago and Atlanta if the results from New York proved fruitful. The target companies for New York were provided by Con Edison's Account Executive group, and consisted of 35 of their largest customers representing numerous buildings in New York City. Preliminary contacts were identified for Chicago, and they consisted of 18 financial institutions.

Survey results yielded 15 completed surveys out of 35 pursued contacts in New York, and three completed surveys out of 18 pursued contacts in Chicago. Of the New York City organizations that participated in the survey, only three had potentially available excess generation capacity; none of the Chicago financial institution participants had excess. The survey results indicate that available excess back-up generation capacity is more limited than anticipated at the start of the project. In addition, the low percentage of completed surveys shows the reluctance of contacts to supply information on their generators.

EPRI Perspective

In the face of capacity constraints, utility companies must develop creative means by which to make the best use of limited supplies. This report details an approach for identifying target customers, and for developing a survey tool and methodology for enlisting customer participation in load curtailment and peak shaving activities. Although the results of this project did not yield a large amount of potentially available excess generation capacity, EPRI believes this project provides an excellent example to utility companies. In particular, it demonstrates the implementation of a creative idea for dealing with capacity shortages and distribution problems, and it provides a valuable "lesson learned" for utilities in other metropolitan areas.

Keywords

Back-up generation
Stand-by generation
Excess generation capacity
Load curtailment
Peak shaving

CONTENTS

LIST OF FIGURES

LIST OF TABLES

1
INTRODUCTION

Recent mergers and acquisitions among financial institutions, high-technology companies, and Internet businesses have resulted in the consolidation of data centers, routing facilities, and trade floors. In addition, bankruptcies and downsizing in these segments have reduced the quantity of critical loads to be served by back-up generation systems. Moreover, high operating costs and competitive pressures have caused many operations to relocate outside of large metropolitan areas. As the organizations are consolidated, eliminated, or relocated, some of the original back-up generators used to supply power to life-safety and other critical loads are left idle or covering only a fraction of generators' designed capacity.

1.1 Relevancy

The underutilized or idle generators could be rewired to power other building loads, providing much needed electric resources for load curtailment programs or peak shaving activities. EPRI is interested in evaluating the potential for this opportunity in key metropolitan areas.

1.2 Objective of this Study

The purpose of the present study is to estimate the available excess back-up generation capacity in large metropolitan areas, and to provide a recommendation for whether the estimated capacity merits further, more detailed, analyses. Further analyses would include investigation of the costs associated with utilizing the excess generation capacity, such as costs to rewire the generation equipment to serve other building loads, and costs for purchasing and installing additional environmental control equipment to comply with air quality regulations.

1.3 Report Organization

Chapter 2 describes the procedures used to identify target metropolitan areas, as well as potential customers and buildings. Chapter 3 presents the survey instrument and the methodology undertaken to survey the appropriate personnel in each targeted site. Chapter 4 summarizes the results of the survey, and includes comments from the contacted personnel. Lastly, Chapter 5 presents a discussion of the survey results, and provides a recommendation to not proceed with further analyses.

2
IDENTIFICATION OF TARGET CITIES AND COMPANIES

This chapter describes the approach used to select key metropolitan areas and to identify target companies within the selected areas.

2.1 Selection of Metropolitan Areas

The first part of the study involved the development of criteria by which to choose the two or three metropolitan areas with the most potential for success. In this case, success is defined as a large quantity of excess generation capacity. Preliminary targets were thought to be New York City, Chicago, and San Francisco because of their very large sizes and their current energy supply and distribution challenges. These three cities and others were compared by investigation of the following criteria:

1. Does the city have a large population?
2. Have there been recent mergers or acquisitions of financial institutions within the city?
3. Does the city contain a major cluster of Internet companies?
4. Is a utility company representing the city an EPRI member of Target 17, 17.1, or 17.2?

Table 2-1 summarizes the main metropolitan areas in the United States, and whether or not they meet the four criteria. The cities involved in bank mergers were obtained from a list of major financial institution mergers (see Appendix A). The list is not exhaustive, but provides some of the most significant recent mergers. The cities in Table 2-1 that are high-lighted in black meet all of the first four criteria. However, note that San Francisco is not represented in Targets 17, 17.1, or 17.2 by PG&E; rather, it is represented to a small extent by Hetch Hetchy Water and Power. Chicago is highlighted in gray because of its importance as a very large metropolitan area, and the initial interest in targeting it.

From Table 2-1, four metropolitan areas of interest were identified: New York City, Chicago, San Francisco, and Atlanta. Of these, San Francisco was eliminated because of its stringent local environmental regulations. New York City, Chicago, and Atlanta remained for potential investigation. Since Con Edison showed significant interest in this project, and because of New York City's fitting business profile, it was decided that New York City buildings and businesses would be surveyed first. Depending on the outcome in New York City, applicable sites in Chicago and then perhaps Atlanta would be surveyed next.

Table 2-1
Summary of Metropolitan Area Selection Criteria

Metropolitan Area	Population[a] (million)	Recently Involved in Major Bank Merger	Internet Cluster	Served by EPRI Target 17, 17.1, 17.2 Members[b]
Atlanta, GA	3.9	X[c]	X	X
Austin-San Marcos, TX	1.1		X	P[d]
Boston, MA	3.3	X	X	
Buffalo-Niagara Fall, NY	1.1			P
Charlotte-Gastonia-Rock Hill, NC-SC	1.4	X		
Chicago, IL	8.0		X	
Cincinnati, OH	1.6	X		
Cleveland-Lorain-Elyria, OH	2.2			
Columbus, OH	1.5			
Dallas, TX	3.3		X	P
Fort Worth-Arlinton, TX	1.6			P
Denver, CO	2.0			P
Detroit, MI	4.5			P
Grand Rapids-Muskegon-Holland, MI	1.1	X		P
Greensboro-Winston-Salem-High Point, NC	1.2	X		
Hartford, CT	1.1			
Houston, TX	4.0			P
Indianapolis, IN	1.5			P
Jacksonville, FL	1.1			P
Kansas City, MO	1.8			X
Las Vegas, NV-AZ	1.4			
Los Angeles-Long Beach, CA	9.3	X	X	
Orange County, CA	2.8			
Riverside-San Bernardino, CA	3.2			
Louisville, KY-IN	1.0			P

Table 2-1
Summary of Metropolitan Area Selection Criteria, Continued

Metropolitan Area	Population[a] (million)	Recently Involved in Major Bank Merger	Internet Cluster	Served by EPRI Target 17, 17.1, 17.2 Members[b]
Memphis, TN-AR-MS	1.1			P
Fort Lauderdale, FL	1.5			P
Miami, FL	2.2		X	P
Milwaukee-Waukesha, WI	1.5	X		P
Minneapolis-St. Paul, MN-WI	2.9	X		P
Nashville, TN	1.2			P
New Orleans, LA	1.3			
Bergen-Passaic, NJ	1.3			P
Middlesex-Somerset-Hunterdon, NJ	1.1			P
Monmouth-Ocean, NJ	1.1			P
Nassau-Suffolk, NY	2.7			P
New York, NY	8.7	X	X	X
Neward, NJ	2.0			P
Norfolk-Virginia Beach-Newport News, VA-NC	1.6			
Oklahoma City, OK	1.0			
Orlando, FL	1.5			P
Philadelphia, PA-NJ	4.9			P
Phoenix-Mesa, AZ	3.0			
Pittsburgh, PA	2.3			P
Portland-Vancouver, OR-WA	1.8			
Providence-Fall River-Warwick, RI-MA	1.1			
Raleigh-Durham-Chapel Hill, NC	1.1		X	
Rochester, NY	1.1			P
Sacramento, CA	1.6			

Table 2-1
Summary of Metropolitan Area Selection Criteria, Continued

Metropolitan Area	Population[a] (million)	Recently Involved in Major Bank Merger	Internet Cluster	Served by EPRI Target 17, 17.1, 17.2 Members[b]
St. Louis, MO-IL	2.6			
Salt Lake City-Ogden, UT	1.3	X		
San Antonio, TX	1.6			X
San Diego, CA	2.8			
Oakland, CA	2.3			
San Francisco, CA	1.7	X	X	X[e]
San Jose, CA	1.6		X	
Seattle-Bellevue-Everett, WA	2.3	X	X	
Tampa-St. Petersburg, FL	2.3			P
Baltimore, MD	2.5			
Washington, D.C.	4.7		X	
West Palm Beach-Boca Raton, FL	1.0			P

[a] From www.census.gov/population/estimates/metro-city/ma99-02.txt
[b] Other cities may be served to some extent by non-local EPRI Target 17 members
[c] X = Match between category and city
[d] P = Utility exists in the state and may possibly serve city
[e] Hetch Hetchy Water and Power serves a small percentage of San Francisco

2.2 Identification of Target Companies

The second part of the study was to identify target businesses and buildings within the chosen metropolitan areas to be surveyed. For New York City, the Account Executive group at Con Edison supplied a list of 35 customers representing major businesses and properties within the city. Con Edison felt that these large organizations had the most potential for excess generation capacity. Operations within the buildings associated with these organizations rely heavily on back-up generation equipment. The types of companies provided include property management organizations, financial institutions, utility companies, and corporate offices for large manufacturing groups. As a rough estimate, the 35 organizations combine to represent 10 to 15% of Con Edison's total system load.

For Chicago, a preliminary list of 18 target companies consists of major Chicago financial institutions. The list was obtained by searching the Internet for Chicago-based financial groups. Financial institutions were targeted because they often have significant back-up generation

capacity for their critical data center operations. In addition, there is a trend toward bank mergers and acquisitions, and such activities can result in the relocation and consolidation of critical data operations. Since surveying of Chicago was to be done only if the results from New York City were encouraging, the list was not extended beyond the preliminary 18 contacts once surveying efforts were ceased due to the limited excess generation capacity found in New York City.

3
SURVEY INSTRUMENT AND METHODOLOGY

The survey instrument and procedures used to obtain information from the targeted companies in each city are described herein.

3.1 Survey Instrument

The survey form was designed to incorporate all of the key factors relating to the existence and use of back-up generation equipment in a given building. Emphasis was placed on the availability of excess generation capacity and current operating constraints. In particular, the survey addresses the location and capacity of existing generation equipment, and the current load being served. Other issues such as the type and age of the generation equipment, operating conditions, and pollution control measures are also questioned in the survey. The survey was generated as a Microsoft Word Form that could be filled out manually or electronically. Appendix B includes a blank survey form.

3.2 Survey Methodology

The surveying process began in New York City, and included three main steps. In the first step, an introductory letter was sent to all 35 organizations, along with a hard copy of the survey form and a self-addressed stamped envelope. Each letter was customized for the particular entity being contacted. The intention of the letter was to introduce the recipients to the project, and to hopefully enlist their participation in the survey via mail. An example introductory letter is provided in Appendix C. Unfortunately, no surveys were returned in the mail. In the second step, the contacts were approached by telephone, and when they were reached, they were interviewed over the phone line. This step typically involved a series of phone calls and voicemail messages, as it was very difficult to reach the contacts directly. Correspondence with New York City was abruptly halted on September 11, 2001, when the devastating terrorist attacks on the World Trade Center took place. Contact attempts did not resume until December 12, 2001. The investigators felt it was necessary to give New York residents sufficient time to mourn and to deal with the drastic changes that took place in New York as a result of the attacks. When telephone contact attempts resumed, it became apparent that it was nearly impossible to reach the contacts directly, and contacts rarely were compelled to return phone calls. As a result, a third step was developed to approach the prospective participants. In this step, a new, simplified survey form was devised to determine if the participants did, or did not, have excess generation capacity in any of their buildings. The revised form did not include many of the specifics of the original survey. In addition, a letter accompanied the survey form and stated that if the survey was received by January 15, 2002, the participant would receive a $5 gift certificate from their choice of three national franchises. Appendices D and E contain the simplified survey form and cover letter, respectively.

For Chicago, the 18 preliminary contacts were all financial institutions, and they were each approached initially by emailing their customer service (or similar) department directly from their website. The email briefly described the project, and requested contact information for the person in charge of energy generation and usage in the Chicago buildings associated with the financial institution. Once the contact information was received from a given institution, the correct person was approached and interviewed over the telephone or through a series of emails. During the process of identifying and surveying potential Chicago sites, the decision was made to discontinue the project based on the limited excess generation capacity, and low participation rate, found in the trial city of New York. Therefore, only a few surveys were completed for the Chicago area, and surveying did not begin in Atlanta.

4
SURVEY RESULTS

This chapter presents the survey results for New York City and Chicago. The organizations with available excess capacity are identified, and a preliminary estimate of the capacity that might be expected is given. The surveying process began in early August 2001, and lasted through mid-January 2002.

4.1 Summary of Contact Results for New York City

The surveying process for New York City culminated in 18 successful contacts out of a total of 35 customers pursued. Of the 18 people successfully contacted, 15 were willing to participate in the survey.

The remaining 17 customers were approached by mail and by telephone, but the contact attempts did not result in completed surveys. In 12 cases, the contacts did not respond to either of two letters, nor did they return repeated phone messages. In five cases, the contact information was erroneous, making it difficult to track down the appropriate personnel. Figure 4-1 is a pie chart that summarizes the results of contact attempts in New York City.

Figure 4-1
Results of Contact Attempts in New York City

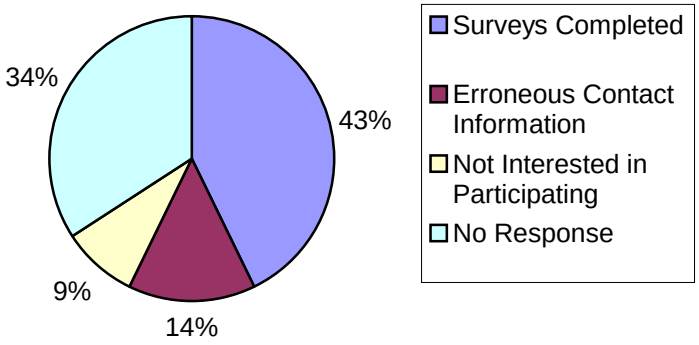

Table 4-1 summarizes the results for organizations that were successfully contacted. Of the organizations successfully contacted in New York City, only three of them had excess capacity that they would consider using for load curtailment or peak shaving activities. Twelve of the New York organizations either did not have excess capacity, or if they did, they were unwilling to use it for load curtailment or peak shaving programs. The remaining three New York companies did not want to participate in the survey.

Table 4-1
Summary of Results for Successful New York City Contacts

Contact #	Type of Organization	Final Contact Results	Date
1	Bank	~2000 kVA of potential excess capacity	23-Aug
2	Financial Group	3-4 MW (+ more in future) of potential excess capacity	4-Sep
3	Telecommunications Service	Undefined quantity of potential excess capacity	4-Sep
4	Computer Manufacturer and Retailer	Do not have excess	29-Aug
5	Petroleum Corporation	Do not have excess	29-Aug
6	Bank	They have required redundancy, not “excess”	5-Sep
7	Financial Group	Do not have excess	5-Sep
8	Hotel	Do not have excess	5-Sep
9	Telecommunications Service	They have some excess reserved for growth	27-Aug
10	Owner, Developer, and Manager of Office Towers	Curtail with smart load controls, not excess	6-Sep
11	Real Estate and Property Management Firm	Do not have excess	5-Sep
12	Property Management and Real Estate Investment Management Firm	Do not have excess	28-Aug
13	Large Commercial Center Occupied by Many Financial Institutions	Unwilling to operate excess for cost savings	6-Sep
14	Association of Building Owners and Managers	The energy committee will not participate in survey	4-Sep
15	Building Owner	Do not respond to surveys	29-Aug
16	Real Estate and Property Management Firm	Do not want to participate in survey	27-Aug
17	Telecommunications Service	Do not have buildings in New York City	12-Dec
18	Food and Beverage Manufacturer	Do not have excess	28-Dec

The three organizations that expressed interest in using some of their excess generation capacity for load curtailment or peak shaving activities are 1) a major bank, 2) a financial group, and 3) a telecommunications company. The bank has approximately 2000 kVA of excess capacity in their headquarters building. The excess is due to the relocation of data processing operations. The financial group has about 3-4 MW of excess capacity due to margin of safety, and may have more in the future when data centers are relocated. The locations and sizes of data centers to be moved are presently unknown. The financial group is also willing to run a portion of non-critical back-up generation for cost-saving programs if given the proper incentive. The telecommunications company has excess capacity due to margin of safety and redundancy. They currently participate in load curtailment activities, and would like to move toward participation in more programs. The quantity of excess capacity they would be willing to dedicate is undefined. More detailed survey results are provided in the following sections.

4.2 Summary of Contact Results for Chicago

A total of 18 financial institutions were approached in the city of Chicago. Of the institutions approached, only four were successfully contacted before survey attempts ceased due to limited excess generation capacity in the trial city of New York. Table 4-2 summarizes the survey results for the four successfully contacted banks. Of the financial institutions successfully contacted in Chicago, three did not have excess generation capacity, and one did not wish to participate in the survey. However, one of the participants currently participates in voluntary load curtailment programs.

Table 4-2
Summary of Results for Successful Chicago Contacts

Contact #	Type of Organization	Final Contact Results	Date
1	Bank	Do not have significant excess, but do participate in curtailment activities	4-Sep
2	Bank	No data centers in Chicago.	7-Sep
3	Bank	Do not have excess	12-Sep
4	Bank	Do not want to participate in survey	4-Sep

4.3 Profile of Survey Respondents

To gain insight on the types of New York organizations that agreed to participate in the survey, the respondents were separated into six categories (see Table 4-3). Of the 15 participants in New York City, five consist of financial institutions, three are building owners and/or property management and real estate organizations, three are telecommunications services, one is a petroleum corporation, one is a computer manufacturer and retailer, one is a hotel, and one is a food and beverage company. All of the targeted companies in Chicago are banks.

Table 4-3
Profile of New York City Survey Respondents

Type of Organization	Number of Respondents
Financial Institution or Financial Property	5
Building Owner or Real Estate and Property Management Organization	3
Telecommunication Service	3
Petroleum Corporation	1
Computer Manufacturer and Retailer	1
Hotel	1
Food and Beverage Company	1

4.4 Nature of Standby Generation Load

The types of loads served by the standby generation equipment in the surveyed organizations can be categorized into five main types: 1) life safety, 2) data processing, 3) non-specific critical operations, 4) miscellaneous building loads, and 5) UPS back-up. Table 4-4 lists the number of survey respondents for New York City and Chicago with generation equipment serving the five types of loads. The predominant type of load to be served is life safety, with seven organizations listing this as a reason for back-up generation equipment. Data processing and non-specific critical operations combined were listed as loads to be served by generators in a total of seven organizations. Miscellaneous building loads were cited as a reason for back-up generation for four organizations. Note that some organizations listed more than one type of load to be served.

Table 4-4
Nature of Standby Generation Load for New York City and Chicago Participants

Type of Load to be Served	Number of Respondents
Life Safety	7
Data Processing	3
Non-Specific Critical Operations	4
Miscellaneous Building Loads	4
UPS Back-Up	1

4.5 Reasons for Excess Capacity

Some of the reasons given for excess capacity in the New York City companies include redundancy, margin of safety, room for growth, and operation relocation. Table 4-5 lists the number of organizations citing the various reasons for excess capacity. A few organizations cited more than one reason for the excess.

Table 4-5
Reasons for Excess Capacity for New York City Participants

Reason for Excess Capacity	Number of Respondents
Redundancy	2
Margin of Safety	2
Room for Growth	1
Operation Relocation	2

4.6 Registration Status of Generators in New York Respondents

For the organizations that provided information regarding registration of their generators, the current status is listed in Table 4-6. In a few cases, organizations have some generation equipment that is exempt and some that is permitted. Generators that are registered as exempt can be operated during emergencies only for a maximum of 500 hours per year. Temporary power distribution problems are not considered emergencies. However, in the event of widespread power shortages, the ISO can declare a state of emergency, and then exempt generation equipment can be brought on-line. Permitted generation equipment can be used for non-emergency and emergency applications, as long as NOx emissions remain below a given level. Without additional pollution control equipment, the calculated hours of use per year for permitted generation equipment based on NOx limits are fewer than for exempt equipment. Many companies are not willing to permit their generation equipment to participate in load curtailment programs, as this would mean giving up valuable hours of emergency use, or it would require additional pollution control equipment to reduce NOx emissions.

Table 4-6
Registration Status of New York City Generators

Respondent		Registration Status of Generators	
Contact #	**Type of Organization**	**Exempt**	**Permitted**
1	Bank	√	
2	Financial Group		√
3	Telecommunications Service	√	√
6	Bank	√	
7	Financial Group	√	
9	Telecommunications Service	√	√
10	Owner, Developer, and Manager of Office Towers	√	
11	Real Estate and Property Management Firm	√	

4.7 Generator Characteristics

The survey form in Appendix B contains several questions related to specific generator characteristics. For example, the form asks for the manufacturer, model number, frequency, fuel type, RPM, age, and type of pollution controls, if any. After the survey process commenced, and insight was gained from the participants, it became obvious that most of the generator questions were too specific to be answered in a brief survey. The primary reason for this is that the contact personnel generally represented a large number of buildings, often equipped with a wide variety of generator types. Therefore, it was difficult for them to easily summarize the generator characteristics. In addition, since the majority of survey participants did not have available excess generation capacity, they were not prodded on the details of their generators.

4.8 Additional Comments from Survey Respondents

Many of the individuals spoken to had additional comments pertaining to the survey. These comments are provided below for the given institutions.

New York Organizations

Contact #1 - Bank

The representative from the bank is very interested in rewiring the generators to serve other building loads. He has done feasibility studies, and is trying to convince management. They currently have the exempt status on the generators, which entitles them to 500 hrs/yr of emergency only operation. He estimates that without additional pollution control equipment, he would lose about 300 hrs/year if they obtain a permit to operate equipment during load curtailment programs. (With this type of permit, their NOx emissions are limited.) The loss of operating hours is unacceptable; however, they would consider adding pollution control equipment and obtaining the appropriate permits if economically feasible.

Contact #2 – Financial Group

They are going to move data centers, but the representative does not know which ones, how many, and where they will be located at this time. He has all generators permitted by DEC. He is capable and willing to run excess and non-critical back-up to participate in programs, if given the proper incentive. He would need to evaluate how much he needs for emergency testing, etc., and the remaining allotment, he would consider contributing. The representative would also consider pollution control equipment if it was economically viable to increase the number of hours the equipment could operate. He would probably not consider converting from oil to gas unless it paid off. His feeling is that current programs do not provide enough incentive. When approached in the past, he felt the programs were poorly represented, and that he knew more about the programs than the person representing the programs. Currently, he "does his part" by running equipment during emergency situations.

Contact #3 – Telecommunications Service

This organization has many buildings with generators. They currently participate in some curtailment programs with a small fraction of their load. They are working with an Energy

Service Provider to help them participate in various programs. In the future, they would like to move toward participation in more programs, given adequate time and consideration of permitting procedures. This summer they participated in load curtailment during emergency conditions (while maintaining exempt status and by using ultra low sulfur diesel fuel). All of their generators are registered, and some have permits to allow them to participate in non-emergency load curtailment activities.

Contact #5 – Petroleum Corporation

Their generators are for emergency back-up only. They do not have excess for participating in utility programs.

Contact #6 - Bank

They have required redundancy with their generation equipment, and do not consider the redundant capacity to be excess. They are not interested in load curtailment programs at this time. All of their generators are registered as exempt, and can only be used for emergency operation.

Contact #7 – Financial Group

In each of two buildings there are four generators for life safety, trading floors, a percentage of office space, etc. At any given time the capacity may be only 3 generators, but they are all fired simultaneously, and are linked. The smaller buildings contain UPS systems. The representative is interested in fuel cells once the costs are competitive. He knows a lot about the buildings in New York City, and did not know of any with unutilized generation capacity.

Contact #8 - Hotel

They currently have only a small generator (200 kW), and they have no excess.

Contact #9 – Telecommunications Service

They operate at 100% backup. In one location, they have 4.5 MW of generation capacity, with a current demand of only about half of that. They are planning on growing, and want to reserve excess for growth. They currently participate in other programs with Con Edison, and Con Edison has a lot of information on their generators.

Contact #10 – Owner, Developer, and Manager of Office Towers

They do not feel it is environmentally conscious to use life safety generators for load curtailment. They participate in load curtailment activities by using smart load controls instead. They can come up with 2 MW to sell to the ISO with their control system in effect. Their generators do not have pollution control equipment, and any excess they have is far less that 2 MW. They are environmentally conscious, and prefer to avoid the use of generators.

Contact #11 – Real Estate and Property Management Firm

The generators are fully loaded for their operations.

Contact #12 – Property Management and Real Estate Investment Management Firm

The representative is not aware of any excess capacity in the buildings he manages. He knows of other organizations in New York that have programs to rewire generators to serve other building loads.

Contact #13 – Large Commercial Center Occupied by Many Financial Institutions

They do not have a significant amount of excess generation capacity, and there is an unwillingness to use the excess for cost saving activities.

Chicago Organizations

Contact #1 - Bank

They do not have significant excess generation capacity. They do, however, currently participate in voluntary load curtailment programs in Chicago.

Contact #3 - Bank

They are actually looking into installing a larger generation system because their system is too small for current critical loads.

5
DISCUSSION AND RECOMMENDATION

The results from the survey of 35 major New York City organizations and 18 Chicago financial institutions, yielded 18 survey participants. Fifteen participants were from New York City buildings and businesses, and three were from Chicago. Of the 18 organizations that participated in the survey, only three (all in New York City) indicated that they had excess generation capacity that they would consider using for load curtailment or peak shaving activities. These organizations consist of a bank, a financial group, and a telecommunications service. It is difficult to quantify the size of the excess capacity that could be expected from the organizations, but it appears to be on the order of 5-10 MW; this is rather small when compared to the sizes of the businesses surveyed. The bank has an excess of 2000 kVA, which depending on the load factor, could yield 1 to 2 MW. The financial group has 3-4 MW of excess capacity, but they are also willing to allot an additional percentage of their non-critical loads for cost saving programs. The capacity for the telecommunications service is unknown. They have a few excess megawatts, and they are interested in continued participation in load curtailment programs.

New York City was considered to be the trial city to demonstrate whether the concept of the excess generation survey should be extended to other metropolitan areas. In New York City, three steps were taken to contact customers over a 5-month period. In the first step, a detailed survey and cover letter were sent to all prospective participants. In the second step, the customers were contacted multiple times by telephone. In the third and final step, the customers were sent a second, simplified, survey form, with the incentive of a $5 gift certificate for returned surveys. Further attempts to pursue the remaining 17 customers were not made due to the insufficient quantity of excess generation capacity found with the 15 earlier survey participants. The earlier participants represent a sampling equal to roughly 5% of Con Edison's total system load, which equates to an estimated 400 MW. Therefore, the customers successfully contacted account for a significant portion of energy use in New York City, and can be considered representative for the city. Moreover, the operations associated with the contacted customers rely heavily on back-up generators, making the customers very good targets for this project. As a result, it was concluded that if there is not a significant quantity of excess generation capacity for the New York City participants surveyed to date, it is unlikely that the excess generation capacity would be significant citywide, or in other metropolitan areas.

For Chicago, attempts to further identify and survey target companies were discontinued based on the limited results obtained from the trial city of New York. For the same reason, the identification and surveying of target companies in Atlanta was not initiated.

In addition, the relatively small amount of excess generation capacity found during the survey indicates an insufficient potential to warrant further analysis into Tasks 2 and 3. Tasks 2 and 3 of the project were to be carried out if the results of Task 1 proved to be encouraging. The purpose

of Task 2 was to evaluate the costs associated with full utilization of the existing backup generation capacity, including rewiring costs and costs to purchase and install environmental control equipment. The goal of Task 3 was to define a strategy to present the survey results to energy and environmental regulatory agencies.

A
LOCATIONS OF RECENT MAJOR MERGERS OR ACQUISITIONS OF FINANCIAL INSTITUTIONS

Financial Institution Mergers or Acquisitions	Headquarters	2nd Location	3rd Location
Citicorp and Travelers Insurance (Citigroup)	New York, NY		
Bank of America and Nations Bank	Charlotte, NC		
Chase and J.P. Morgan	New York, NY	New York, NY	
(First Union and Core States) or SunTrust Bank with Wachovia (pending)	Charlotte, NC	Atlanta, GA	Winston-Salem, NC
(Wells Fargo and Norwest) and First Security	San Francisco, CA	Salt Lake City, UT	Minneapolis, MN
Washington Mutual and Dime Bancorp (pending)	Seattle, WA	New York, NY	
Cal Fed and Glendale Federal (Golden State Bancorp)	San Francisco, CA	Glendale, CA	
US Bancorp and (Firstar and Star Banc)	Minneapolis, MN	Milwaukee, WI	Cincinnati, OH
Fleet and Bank Boston (FleetBoston Financial Corp) and Summit Bancorp	Boston, MA	Princeton, NJ	
Fifth Third Bancorp and Old Kent Financial	Cincinnati, OH	Grand Rapids, MI	
BancWest Corp and BNP Paribas (pending)	Honolulu, HI		
Standard Fed Bancorp (ABN AMRO Holding) and Michigan National	Troy, MI	Farmington Hill, MI	

B
EXCESS STANDBY GENERATION CAPACITY SURVEY FORM

Global Energy Partners, LLC
AN EPRI, GRI, DMJM COMPANY

Excess Standby Generation Survey

for EPRI Commercial Applications Center

1. Respondent Information
    a. Your Name: _____
    b. Title: _____
    c. Affiliation: _____
    d. Phone Number: _____
2. Building Information
    a. Name: _____
    b. Nature of the Business: _____
    c. Street Address: _____
    d. City: _____
    e. State: _____
    f. Zip Code: _____
3. What electric utility company provides primary power to operations? _____
4. Are standby generators used for emergency backup? _____
5. What is the nature of the load on the generators (i.e., computers)? _____
6. What is the Power Rating of the generators (total kW capacity)? _____
7. Is the generation equipment underutilized (if "No", skip to 19)? _____
    a. Was it designed for a higher critical load? _____
    b. What load did it formerly power (kW)? _____
    c. What is the current critical load to be served (kW)? _____
    d. What is the reason for the excess capacity (i.e., margin of safety, room for growth, downsizing, mergers, change of location, etc.)? _____
8. Who has the authority to make decisions regarding the generator (please provide name and indicate if owner or operator)? _____
    _____
9. Who has the authority to make decisions regarding building energy use (please provide name and indicate if owner or property manager)? _____
    _____
10. If given the proper incentive, would the parties in Questions 8 and 9 be interested in sharing a percentage of the excess generator capacity for other building loads, and/or for load curtailment or peak shaving activities (if "No" skip to 19)? _____
    _____

11. What type(s) of generation equipment is used? _____
    a. Number of Generator Sets:_____
    b. Manufacturer and Model Number of Engine, Generator, and/or Set):
    _____
12. What is the frequency of the generator(s) (50 Hz, 60 Hz)?_____
13. What type of fuel is used in the engine(s) (i.e., gasoline, diesel, propane, natural gas)?
    _____
    a. What is the source of fuel?_____
    b. If fuel tank, what is the capacity of the fuel tank (gallons)?_____
14. What is the RPM of the generator(s)?_____
15. What is the age of the equipment?_____
16. Where is standby generation equipment located? _____
17. What are the current operating conditions (hours/year)?_____
    a. Is there a protocol for periodic testing of the standby system? _____
    b. If so, how often is equipment tested?_____
    c. How long can equipment be operated during an extended power outage (in terms of environmental restrictions)?_____
    d. How long can equipment be operated under normal (or non-emergency) conditions?
    _____
18. Is environmental air pollution control equipment installed on generator set(s)?_____
    a. Is pollution control equipment an integral part of the generator set or is it an add-on feature?_____
    b. What type of pollution control equipment is used?_____
19. Additional Comments:_____
_____
_____

Thank you very much for your time.

Please return survey forms to:

Excess Standby Generation Study
Global Energy Partners, LLC
3569 Mt. Diablo Blvd.
Lafayette, CA 94549
(925) 284-3780

For more information, please call one of the numbers below:

Kelly Parmenter (Santa Ynez Office): (805) 693-9292

Bettina Foster (Stinson Beach Office): (415) 868-9685

C
SAMPLE INTRODUCTORY LETTER SENT TO NEW YORK CITY CONTACTS

(Date)

(Contact)
(Title)
(Affiliation)
(Address)

Dear *(Contact)*:

Global Energy Partners is conducting a study for the Electric Power Research Institute (EPRI) to evaluate the quantity of excess back-up generation capacity in New York City buildings. EPRI is aware that recent trends in the Internet industry, as well as mergers among financial institutions, have resulted in consolidation of data storage facilities, routing facilities, and trading floors. In addition, it is EPRI's understanding that many operations have relocated outside of the city. As the operations are reduced or relocated, some of the back-up generators used to guarantee continuous power to critical functions are left idle, or covering only a fraction of the original load. EPRI's intent is to estimate the existing back-up generation capacity in New York City, and to determine the feasibility of rewiring the generators to meet other building loads during power shortages, and/or for peak shaving or curtailment programs.

If you are aware of excess back-up generation capacity in any of the buildings associated with *(affiliation)*, and you believe there may be interest in using the excess generation capacity to serve other building loads given the proper incentive, please fill out the attached survey and return it in the envelope provided. If you know of multiple buildings with excess generation capacity, please copy the form, and fill out one form for each building. If you are not aware of unutilized generation capacity, or you do not foresee an interest in using the excess capacity, we would greatly appreciate it if you could indicate any comments you may have on the survey, and return it for our informational purposes. Bettina Foster or I will follow up this letter with a phone call in the next couple of weeks to gage your thoughts on this subject.

Sincerely,

Kelly E. Parmenter, Ph.D.
Senior Associate

D
SIMPLIFIED SURVEY FORM

Excess Back-Up Generation Survey

for EPRI's Commercial Applications Center

Name
Affiliation
Address

1. Do any of the New York City buildings associated with your organization have excess back-up generation capacity? This would include any capacity that is above and beyond what is needed during back-up operation. Please check the appropriate response.

   ☐ Yes

   ☐ No

   ☐ I do not wish to provide information on our back-up generation systems

2. If you answered 'Yes' to question 1:

   a. What is the combined quantity of excess capacity for all of the New York City buildings associated with your organization? Please indicate the units (i.e., kW or MW) for your estimate. _____

   b. What is the reason for the excess capacity?

      ☐ Redundancy (extra generators are installed in case one fails)

      ☐ Margin of safety (generators are oversized to allow for future growth, or for a safety margin)

      ☐ Critical operations have been moved outside of the city

      ☐ Downsizing or merging has resulted in unutilized back-up generators

      ☐ Other: _____

   c. How are the generators registered?

      ☐ Exempt. They can only be used during emergencies.

      ☐ Permitted for emergency and non-emergency operation

      ☐ Some are exempt and some are permitted

   d. Would you consider rewiring (and permitting, if necessary) the generators to serve other building loads during power shortages and/or for load curtailment or peak shaving programs, if given the proper incentive?

      ☐ Yes

      ☐ No. Why not? _____

3. Thank you for your participation. Please select the type of $5 gift certificate you would like to receive.

   ☐ Starbucks Coffee ☐ Mrs. Fields Cookies ☐ Blockbuster Video

Additional Comments:_____

_____

_____

E
SECOND LETTER WITH INCENTIVE

(Date)

(Contact)
(Title)
(Affiliation)
(Address)

Dear *(Contact)*:

Global Energy Partners is conducting a study for the Electric Power Research Institute (EPRI) to evaluate the quantity of excess back-up generation capacity in New York City buildings. By excess generation capacity, we are referring to capacity that is above and beyond what is needed during back-up operation of generators. We have found that some organizations have excess back-up generation capacity in their New York City buildings because they have moved data centers or other critical operations outside of the city. Other organizations have excess for redundancy purposes, or to provide a margin of safety. EPRI's intent is to estimate the existing excess back-up generation capacity in New York City, and to determine how much of this excess might be available for powering other building loads during power shortages, and/or for peak shaving or load curtailment programs.

You may recall receiving an earlier, more detailed, survey last fall. We have now simplified the survey, and are encouraging your participation. **Participants that return surveys by January 15, 2002 will receive a $5 gift certificate to their choice of , , or .** Participation is greatly appreciated.

Sincerely,

Kelly E. Parmenter, Ph.D.

Senior Associate

About EPRI

EPRI creates science and technology solutions for the global energy and energy services industry. U.S. electric utilities established the Electric Power Research Institute in 1973 as a nonprofit research consortium for the benefit of utility members, their customers, and society. Now known simply as EPRI, the company provides a wide range of innovative products and services to more than 1000 energy-related organizations in 40 countries. EPRI's multidisciplinary team of scientists and engineers draws on a worldwide network of technical and business expertise to help solve today's toughest energy and environmental problems.

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