

STATE OF MARYLAND
Public Service Commission

ELECTRIC SUPPLY ADEQUACY REPORT

**In compliance with Section 7-505(e) of
the Public Utility Companies Article**

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TABLE OF CONTENTS

LIST OF TABLES ii

I. EXECUTIVE SUMMARY 1

II. ELECTRIC POWER INDUSTRY IN MARYLAND..... 2

 (A) Review of Electric Restructuring..... 2

 (1) Movement to Competition 2

 (2) Supplier Licensing Process 2

 (B) Generation Issues 3

 (1) Old Generating Resources..... 3

 (2) New Generating Resources 3

 (3) Adequacy of Generating Resources 4

 (C) Transmission Issues 4

 (1) July 1999 Blackouts in the Delmarva Peninsula..... 4

 (2) Adequacy of Transmission Facilities 5

 (D) Distribution Issues 5

 (1) Responding to Major Outages..... 5

 (2) Adequacy of Distribution Facilities 7

III. REGIONAL ORGANIZATIONS AND ISSUES 8

 (A) Regional Organizations 8

 (1) Mid-Atlantic Area Council 8

 (2) PJM Interconnection, L.L.C..... 9

 (3) PJM West 9

 (4) East Central Area Reliability Council 10

 (B) Generation Issues 10

 (1) Sources for Electric Generation 10

 (2) Load Forecasting..... 11

 (3) Installed Obligation Reserve 11

 (4) Generation Additions 11

 (5) PJM Generation Adequacy 12

 (6) Active Load Management and Distributed Generation 13

 (C) Transmission Issues 14

 (1) Regional Transmission Expansion Plan..... 14

 (2) PJM Transmission Adequacy..... 14

 (D) Future Adequacy Working Group and Capacity Issues 15

IV. CALIFORNIA'S EXPERIENCE IN 2000..... 16

 (A) Summary of Events in California 16

 (B) Possibility of the California Experience in Maryland..... 17

V. CONCLUSIONS..... 18

LIST OF TABLES

Table 1: New Generating Resources Planned for Construction in Maryland 4

Table 2: DP&L's Major Projects Since Summer 1999..... 5

Table 3: Calculation of PJM Installed Obligation Reserve Requirement 11

Table 4: Actual and Proposed Generation (MW) Additions..... 12

Table 5: PJM RTEP Baseline Transmission Upgrades 14

I. Executive Summary

Section 7-505(e)(1) of the Public Utility Companies Article requires the Public Service Commission (PSC or Commission) to "assess the amount of electricity generated in Maryland as well as the amount of electricity imported from other states in order to determine whether a sufficient supply of electricity is available to customers in the State." This report is to be filed with the General Assembly every two years beginning January 2001 until January 2007.

The Electric Supply Adequacy Report (Report) covers issues that the Commission considers timely for an understanding of the electric power generation industry in Maryland. This Report first presents the state of the electric power industry in Maryland in the newly restructured environment. Within that section, there is a review of the restructuring activities within the State, followed by discussions on generation, transmission, and distribution issues. The Report then covers several regional issues that affect Maryland. Since the State is part of two regional grids, Mid-Atlantic Area Council (MAAC)¹ and East Coast Area Reliability Council (ECAR), there is a discussion on each of those and other related issues.

A section of this Report covers the recent power cost increases and power supply shortages in California. This issue has been widely covered in the media and has raised concerns for policymakers. This Report explains the differences in the electric industry between California and the Mid-Atlantic region (which includes Maryland), and the reasons -- elaborated in later sections -- that lead the Commission to believe that it is unlikely Maryland will face California-type events in the near future.

Finally, the data shows that there is adequate electricity supply in Maryland for the near future. Projected construction of new generation should allow electricity generators to meet established supply reliability criteria. This does not mean that events such as a prolonged heat wave, unanticipated losses of large generation units or transmission lines, failure of proposed projects to be completed, or severe storms might not result in wholesale price spikes or some outages over the next two years. Retail residential electricity will be supplied at prices that have been frozen for at least four years. At the end of the transition period to full competition, electricity prices will be set at market levels. This Report contains enough information to allow Maryland policymakers to monitor the supply situation for the next two years, at which time the next report is due.

¹ MAAC and ECAR are two of the ten regional reliability councils that comprise the North American Electric Reliability Council (NERC). [See Section III for further discussion on NERC, MAAC, and ECAR.]

II. Electric Power Industry in Maryland

(A) Review of Electric Restructuring

On July 1, 1999, Maryland's Electric Customer Choice and Competition Act (Act) went into effect. This law established the legal framework for the restructuring and regulation of the electric utility industry in Maryland. The Act deregulates "the generation, supply, and pricing of electricity". The Act provides that retail electric choice will be fully available to all customers by July 2002.

(1) Movement to Competition

On July 1, 2000, all retail electric customers of investor-owned utilities in the State of Maryland were given the opportunity to choose their electric supplier. In the restructured marketplace, if customers choose to remain with their distribution utility, the utility companies will continue to offer Standard Offer Service for a period of not less than four years. Standard Offer Service rates are on average 6.5 percent lower than those in effect prior to electric restructuring for residential customers. A customer may save more money by switching to an alternative supplier. Customer choice holds the potential for the availability of new products and services from competitive electricity suppliers.

Unfortunately, customer choice in Maryland began at a time when energy prices were volatile due to high peak loads² and rising fuel prices. As of November 2000, electricity choice is off to a slow start, with just under 9,000 accounts (or nearly 3% of the peak load obligation) being served by licensed electricity suppliers. Although over 30 suppliers are licensed to do business in Maryland, many suppliers are choosing to wait to enter the marketplace due to the uncertainty of summer pricing and lack of available capacity within PJM for serving switching loads. A related issue is that of rising natural gas prices, which has increased the cost of incremental electricity generation. As additional generation comes on-line within the region, more competition should develop. The Commission will continue to monitor the status of retail choice in Maryland as it develops.

(2) Supplier Licensing Process

Commission Order No. 75608 (Case No. 8738, issued September 10, 1999) approved the procedures developed by the Supplier Authorization Working Group to license electric suppliers or electric generation service providers in Maryland pursuant to §7-507 of the Public Utility Companies Article. The licensing process approved by the Commission requires an applicant to provide proof of:

- technical and managerial competence;
- compliance with applicable requirements of FERC, and any ISO or transmission operator to be used;

² Maryland in general is a summer peaking state.

- compliance with applicable federal and State environmental laws and regulations that relate to the generation of electricity; and,
- financial integrity and qualification to do business in the State of Maryland.

To date, the Commission has granted 33 licenses for suppliers and brokers to operate in the service territories served by Baltimore Gas & Electric (BG&E), Delmarva Power & Light Company (DP&L or Conectiv), Potomac Electric Power Company (PEPCO), and Potomac Edison Company/Allegheny Power (Potomac Edison or Allegheny).

(B) Generation Issues

(1) Old Generating Resources

Prior to electric restructuring, generating resources in Maryland were owned by Maryland electric utilities. Under the phased restructuring process, investor-owned utilities have initiated the movement of these generating resources to unregulated affiliates or independent companies. PEPCO chose to divest itself of generation putting a majority of its generating units³ up for sale. The bulk of these plants were sold to affiliates of Southern Energy Company. Potomac Edison transferred all its interests in Allegheny Power generating plants to the Allegheny Energy Supply, L.L.C.,⁴ an affiliate of Allegheny Power System. BG&E transferred its Calvert Cliffs nuclear generating plant and its fossil units to Constellation Power Source Generation,⁵ an affiliate of the Constellation Power Company, the holding company. Constellation Power Company has announced that it is separating its generating affiliates into a new corporation that will be severed from the affiliate holding the regulated operation of BG&E. DP&L transferred its Crisfield, Maryland, generating assets to Conectiv Delmarva Generation, Inc. an affiliate of Conectiv, the holding company. DP&L's Vienna plant is under contract to be sold to NRG, Inc.⁶

Of the four cooperatively-owned electric utilities in Maryland, only Southern Maryland Electric Cooperative (SMECO) owns generating resources. The disposition of SMECO's generating resources is still undetermined. Finally, two municipally-owned utilities, the Towns of Berlin and Easton, continue ownership of generating resources.

(2) New Generating Resources

Since the advent of competition in Maryland, the Commission has initiated seven Certificate of Public Convenience and Necessity (CPCN) cases for new generating resources. Some generating resource projects had already begun construction prior to July 1, 1999, and were not required to apply for a CPCN. Other new generating resources are permitted to operate under a prior CPCN. While some of the resources are being constructed for interconnection with regional markets, others are only intended to provide electricity for use by the resource developer. Projects that are not currently planning for regional interconnection may be able to interconnect in the future. The expected in-service dates may change due to changes in

³ Exceptions are the Benning and Buzzard plants located in Washington, D.C.

⁴ U.S. Energy Information Administration, *Electric Power Monthly*, December 2000.

⁵ *Ibid.*

⁶ Staff telephone contact with Conectiv official.

construction schedules. New generating resources planned for construction in Maryland are included in Table 1.

Table 1: New Generating Resources Planned for Construction in Maryland

Resource Developer or Location	Capacity (MW)	Expected In-Service Date	Inter-connected with Regional Market
Allen Family Foods, Inc.; Dorchester County	4.0	2001	No
Bethlehem Steel, Sparrows Point; Baltimore County	2.5	In service	Yes
Conowingo Dam Power Plant; Harford County	36.0	2001	Yes
Dickerson Power Plant, Station "H"; Montgomery County	518.0	2004	Yes
Free State Electric, LLC; Kelson Ridge, Charles County	1,100.0	2002	Yes
Free State Electric, LLC; Kelson Ridge, Charles County	550.0	2004	Yes
Morgantown Power Plant; Charles County	80.0	In service	Yes
National Institutes of Health; Montgomery County	22.0	2003	Yes
Old Dominion Electric Cooperative; Rock Springs, Cecil County	465.0	2002	Yes
Old Dominion Electric Cooperative; Rock Springs, Cecil County	465.0	2003	Yes
Perryman Power Plant; Harford County	750.0	2004	Yes
Prince George's County Government; Brown Station Rd. Landfill	4.2	2001	No
Sweetheart Holdings, Inc.; Baltimore County	11.6	2001	No
Trigen Inner Harbor East, LLC; Baltimore City	2.0	2001	No
University of Maryland, College Park; Prince George's County	26.0	2001	No

(3) Adequacy of Generating Resources

The adequacy of electric generating resources is assessed at the regional level, since many generating resources serving Maryland customers are located out-of-state. Generation adequacy is discussed in Section III (B).

(C) Transmission Issues

(1) July 1999 Blackouts in the Delmarva Peninsula

On July 6, 1999, DP&L interrupted electric service to many customers by initiating rolling blackouts on the Delmarva Peninsula. The rolling blackouts were necessary to prevent the collapse of the entire electric system on the Peninsula. Reactive power resources must be supplied to the electric system in adequate quantities at strategic locations to maintain the integrity of the system. On July 6, 1999, DP&L simply did not have sufficient reactive power resources to support the transfer of electricity that was required to meet the extremely high customer demand.

The Commission conducted an investigation into the causes of this blackout and how to prevent future occurrences. At the hearing, DP&L alleged that several causal factors contributed to the initiation of rolling blackouts. July 6 was the fourth day of a sustained period of heat and humidity, which resulted in electricity demand being higher than expected. Several DP&L

generating resources were unavailable due to equipment problems. Finally, the regional transmission system supplying the Peninsula from the north sustained an unexpected decrease in system voltage, which restricted the ability to import electric power onto the Peninsula.

To prevent future occurrences of similar blackouts, DP&L stated at the hearing that it had installed two Static Var Compensators (SVCs) to provide reactive power support. In addition to the SVCs, DP&L has installed capacitors, added several transformers and enhanced existing transmission facilities to improve the overall performance of its electric system. Table 2 summarizes DP&L's major projects since the summer of 1999.

Table 2: DP&L's Major Projects Since Summer 1999

Project Description	Cost
Install two SVCs	\$22.0 million
Transmission and distribution capacitors	\$5.2 million
New transformers	\$5.5 million
Upgraded transmission facilities	\$0.3 million
Total	\$33.0 million

In addition to DP&L's major projects, three new generating resources will improve the performance of DP&L's electric system. A generating resource in Oak Hall, Virginia, provided 135 MW of energy during the summer of 2000. This generating resource is expected to provide an additional 180 MW of energy during the summer of 2001. The other two generating resources are expected to be in service by the summer of 2001. They are a 100 MW resource in Dover, Delaware, and a 350 MW resource in Wilmington, Delaware. These facilities reduce the need for reactive power on the Peninsula.

The major projects completed by DP&L and the new Peninsula generating resources should provide adequate energy for the Peninsula. Also, the Commission Staff has been directed to work with DP&L to modify electric system reliability modeling to ensure the future reliability of electricity on the Peninsula.

(2) Adequacy of Transmission Facilities

As with electric generating resources, the adequacy of transmission facilities is assessed at the regional level. Transmission adequacy is discussed in Section III (C).

(D) Distribution Issues

(1) Responding to Major Outages

During 1999, Maryland utility customers experienced major outages resulting from natural disasters and other emergencies including a January ice storm, a July heat wave, and a September hurricane. Breakdowns in utility responsiveness to these events caused the Commission to begin an investigation into the preparedness of utilities for system emergencies. After hearings held in October 1999, the Commission issued an order in Case No. 8826, *Investigation into the Preparedness of Maryland Utilities for Responding to Major Outages*, that

established seven working groups composed of representatives of all interested parties. The following working group reports have been filed with the Commission:

- Electric Utility Uniform Reporting Standards Working Group, *Final Report* (2/7/00);
- Customer Communication and Assistance Working Group, *Final Report* (2/3/00);
- Tree Trimming Working Group, *Preliminary Report* (2/7/00) and *Final Report* (4/3/00);
- Coordination with Emergency Management Agencies Working Group, *Final Report* (2/7/00);
- Operation and Performance Standards (Electric Only) Working Group, *Preliminary Report* (2/3/00) and *Final Report* (4/25/00);
- Selective Undergrounding Working Group, *Final Report* (2/14/00); and,
- Telecommunications Uniform Reporting Standards Working Group, *Preliminary Report* (2/7/00) and *Final Report* (4/7/00).

This order also directed the six largest electric utilities to file quarterly self-assessments, starting on January 31, 2000. These self-assessments allowed the Commission to track the progress made by the various electric utilities to improve responses to major outages. Since December 1999, electric utilities have made substantial increases in customer call center capability, which allows customers to contact the utility in a timely manner. The six largest electric utilities in Maryland have, or are currently developing, computerized Outage Management Systems. These systems quickly analyze system damage and prioritize restoration assignments.

All Maryland electric utilities were directed to improve procedures for the exchange of crews to restore service after major weather events. The four investor-owned electric utilities were also directed to consult with out-of-state electric utilities and cooperatives to improve procedures for the exchange of crews and other resources in a timely manner. The Maryland electric utilities have improved their mutual assistance programs and have established a conference call procedure to improve communication among the utilities before, during, and after major outages.

Finally, Staff was directed to examine whether management incentives to reduce costs eroded the ability of companies to adequately maintain distribution systems and perform storm restoration in a timely manner. Staff provided a report to the Commission and the issue was set for further hearings under Case No. 8839, *Investigation into the Impact of Management Services on Reliability of Utility Distribution Systems*. A pre-hearing conference was held on December 7, 2000, and an order is expected in early 2001.

Governor Glendening established a Task Force to Ensure Utility Services (Task Force), which met during the same time period as the groups established by Commission Order No. 75823. In May 2000, the Task Force published its Final Report. The recommendations in the Final Report are bifurcated into recovery and resiliency. The Commission has supported the Maryland Emergency Management Agency's efforts to implement recovery recommendations. Responsibility for implementing the resiliency recommendations is shared by several State agencies, including the Commission, the Maryland Energy Administration, and the Maryland Departments of Business and Economic Development, Environment, General Services, Housing and Community Development, Natural Resources, Planning, and Transportation.

(2) Adequacy of Distribution Facilities

The electric distribution function remains fully regulated by the Commission. Each Maryland electric utility is responsible for ensuring adequate electric distribution facilities to provide electricity to its customers. Electric utilities typically design distribution facilities to serve more than the normally expected load. During an outage, this reserve capacity often allows the utility to quickly restore service to a large number of customers. Through its traditional regulatory oversight, the Commission will ensure that electric distribution services in Maryland remain safe, adequate, and reliable.

III. Regional Organizations and Issues

On November 9, 1965, a blackout left 30 million people across the northeastern United States and Ontario, Canada, without power. In an effort to prevent this type of blackout from ever happening again, electric utilities formed the North American Electric Reliability Council (NERC) in 1968 as a voluntary, not-for-profit corporation to promote the reliability of the electricity supply for North America. NERC has ten regional councils and its members represent all segments of the electric industry: investor-owned; federal; rural electric cooperatives; state/municipal and provincial utilities; independent power producers; and power marketers. These entities account for virtually all of the electricity supplied in the United States, Canada, and a portion of Baja California Norte, Mexico. Below is a discussion of the two regional councils -- Mid-Atlantic Area Council (MAAC) and East Central Area Reliability Council (ECAR) -- under which Maryland's electric utilities operate.

(A) Regional Organizations

(1) Mid-Atlantic Area Council

MAAC is comprised of investor-owned electric utilities, power marketers and independent power producers and serves over 23 million people in a nearly 50,000 square mile area, which includes all of Delaware and the District of Columbia, major portions of Pennsylvania, New Jersey and Maryland, and a small part of Virginia. MAAC comprises less than 2 percent of the land area of the contiguous United States but serves about 8 percent of the electric load.

MAAC was established in December 1967 to augment the reliability of the bulk electric supply systems of its members through coordinated planning of generation and transmission facilities. PJM Interconnection, L.L.C., (PJM) is the only control area in MAAC. The MAAC signatory systems operate on a "free flowing ties" basis under the PJM Operating Agreement and in accordance with the PJM Open Access Transmission Tariff filed at FERC. This means that each signatory will use its generating resources to support the total electric loads of the group and not just its native load.

MAAC signatory members participate in the PJM energy and capacity market, obtain transmission service through PJM, enter into bilateral transactions coordinated between PJM and other control areas and participate in PJM emergency procedures. Under the MAAC and PJM Operating Agreements, MAAC and PJM members are obligated to comply with MAAC and NERC operating and planning principles and standards.

The PJM Reliability Committee has established 19.5% as the obligation reserve for the 2000-01 planning period, 19.0% for the 2001-02 and 2002-03 planning periods. These obligation reserves must be met by all load-serving entities (LSEs) in PJM as signatories to the Reliability Assurance Agreement (RAA). An obligation reserve or reserve margin is the amount of generation in excess of the peak demand for a load that a supplier must maintain. For example, if a LSE has a 10 MW load, it must demonstrate that it has roughly 12 MW of generation capacity to support this load.

(2) PJM Interconnection, L.L.C.

Originally, PJM was established in 1927 as an association of utilities in Pennsylvania, New Jersey, and Maryland. Later, utilities serving Delaware, the District of Columbia, and Virginia joined the association. On March 31, 1997, PJM became independent and formed the PJM Interconnection, L.L.C. The PJM region is contiguous to the MAAC region (and the only NERC regional council to have such a status). PJM is the largest centrally dispatched electric control area in North America and third largest in the world. In order to meet its customers' electric demand, PJM has at its disposal just over 58,000 MW of generating capacity resources. The organization has the overall responsibility of operating and managing the bulk power electric system throughout much of the Mid-Atlantic region. On January 1, 1998, PJM became the first operational Independent System Operator (ISO) in the U.S. With the initiation of its Open Access Transmission Tariff, PJM became the nation's first regional, bid-based energy market. Market participants can buy and sell energy, schedule bilateral transactions and reserve transmission service.

An Independent Board of Managers administers the ISO. The Board is responsible for the appointment of the President and CEO who have the charge of handling day-to-day operations. A PJM Members Committee has been developed in order to advise the Board of Managers concerning business practices and policy issues. PJM coordinates with its member companies to meet the load requirements of the region. PJM also uses bilateral contracts and the spot energy market to secure power to meet electric load. In order to meet its load requirement reliably, PJM must monitor and assess its 8,000 miles of transmission lines for congestion concerns or physical capability problems.

(3) PJM West⁷

On October 5, 2000, PJM and Allegheny Power (the energy delivery business of Allegheny Energy, Inc.) announced an agreement to develop a new electric transmission system affiliation. Potomac Edison, an operating company of Allegheny Power serving western Maryland, is the only service area in the State not currently controlled by PJM. Through this affiliation, PJM will expand its regional scope and illustrate the ability of its energy market and congestion management systems to function over multiple control areas. Allegheny Power will satisfy the FERC's independence requirement for its transmission system operations while continuing to pursue the development of a large, regional, independent transmission entity. This affiliation will be known as "PJM West". The new agreement will provide transmission service to all market participants in accordance with FERC Order 2000 while simultaneously expanding the PJM market. The arrangement expands the PJM system beyond a single control area with the potential to result in a significantly larger energy market.

The current timeline for the agreement includes negotiation for a definitive contract to be completed by February 1, 2001, execution prior to March 1, 2001, and implementation by December 15, 2001. An administrative office would be created and the PJM West Transmission Owners would transfer monitoring and functional control of their transmission systems to PJM.

⁷ Allegheny Energy website, News release, October 5, 2000.

On December 5, 2000, Duquesne Light, joined Allegheny Power in the development of PJM West by executing a similar joint agreement with PJM as did Allegheny Power.⁸ This agreement broadens PJM's transmission system affiliation throughout southwestern Pennsylvania.

Completion of PJM West will bring all of Maryland within the control of PJM. The expansion of PJM is an important step in creating robust wholesale markets necessary for retail competition. Marketers have cited the difficulty of trading and moving electricity among various control areas as a reason why the benefits of electricity competition are not materializing. An expanded PJM allows more generation resources to easily reach our regional market.

(4) East Central Area Reliability Council⁹

ECAR is also a regional reliability council and serves parts of western Maryland. ECAR was formed in 1967 to augment bulk power supply reliability through coordination of planning and operation of member companies' generation and transmission facilities. Currently, full members include 16 systems (27 companies) serving either all or parts of the states of Indiana, Kentucky, Maryland, Michigan, Ohio, Pennsylvania, Tennessee, Virginia and West Virginia. Allegheny Power (Monongahela Power Company, The Potomac Edison Company, and West Penn Power Company) is one of the members and serves western Maryland.

Control of the generating units and the bulk power transmission networks within the ECAR region is directed by 19 Power Control Centers that include Allegheny Power and Duquesne Light Company. However, as mentioned above, these two entities have joined with PJM to form PJM West for operational purposes. Average annual generation availability in ECAR has been 81.6 percent over the last 10 years and was 82 percent during 1998. ECAR believes that the aging of generating capacity will necessitate increased maintenance and lengthened outages. By the year 2008, about two-thirds of the capacity in ECAR will be 30 or more years old and just above a quarter will be 40 or more years old.

(B) Generation Issues

The adequacy of electric generating resources for Maryland is assessed at the regional level. Based on the discussion above regarding Allegheny Power and PJM West, all major electric utilities serving Maryland will soon be participants in the PJM regional market. The following discussion focuses on the PJM process for ensuring regional capacity adequacy and the expected near term adequacy of the existing PJM control area.

(1) Sources for Electric Generation

The PJM load is met by generating resources within PJM and electricity imported from other regional markets. A generating resource may qualify to be either an installed capacity (ICAP) resource or an energy-only (energy) resource. Only ICAP resources can sell generating

⁸ PJM website, 2000 News section.

⁹ Pennsylvania Public Utility Commission, *Electric Power Outlook for Pennsylvania*, July 2000.

capacity in the PJM capacity market. During emergency conditions, the electricity generated by ICAP resources must be provided to the PJM market upon request by PJM.

However, the owner of an ICAP resource can notify PJM that the resource is “delisted” with as little as one day of notice. The day after this notification, neither the capacity nor the energy from this resource may be required to be available to PJM’s markets, even under emergency conditions. Energy from such resources, if available, may be purchased back into PJM pursuant to PJM’s emergency procedures. “Delisting” is discussed in more detail in section III.D.

(2) Load Forecasting

The peak load forecast represents the highest amount of energy anticipated for customers within PJM. The PJM RAA prescribes the peak load forecasting methodology used within PJM. The peak load from the previous year -- usually that of the summer -- is “weather normalized” to develop obligations for the upcoming summer peak period. In 2000,¹⁰ the summer was mild, resulting in a lower actual peak than in 1999. The RAA weather normalization methodology accounts for last year’s mild summer and sets a PJM load obligation for the summer of 2001. Until the summer peak for 2001 is known, the RAA weather normalization method cannot be applied to determine obligations for 2002. Accordingly, PJM staff’s peak load forecast is used for 2002 in the following section.

(3) Installed Obligation Reserve

In order to ensure adequate generating resources, the RAA requires a 19 percent installed obligation reserve for the summer peaks in 2001 and 2002. The installed obligation reserve recognizes that some generating resources may be unavailable during the peak. Only ICAP resources are used to determine if the 19 percent requirement will be met. Energy resources may not be able to deliver energy due to transmission congestion. Electricity imported from other markets may be unavailable due to emergency conditions in the originating market. Table 3 shows the required installed obligation reserve for the PJM system.

Table 3: Calculation of PJM Installed Obligation Reserve Requirement

	RAA Peak Load Obligation	PJM Staff Forecasted Peak Load	PJM-Controlled Active Load Management	Reserve Requirement
2001	52,350 MW	51,717 MW (not used)	1,600 MW	60,393 MW
2002	(not known yet)	52,464 MW	1,600 MW	60,528 MW (est.)

(4) Generation Additions

PJM has grouped generation interconnection requests into queues based on the date the request was made. Table 4 shows the actual generation additions for 2000 and the proposed generation additions for ensuing years. Proposed generating resources representing 98 percent of the current total MW have applied for interconnection as ICAP resources. A significant number of projects in Queues B–E may be withdrawn by the developer due to transmission system

¹⁰ Discussions refer to calendar year unless otherwise noted.

upgrade requirements or a range of business or siting related issues. Also, changes to construction schedules may result in changes to the in-service dates.

Table 4: Actual and Proposed Generation (MW) Additions

Queue	2000	2001	2002	2003	2004	2005 & beyond	TOTAL
A	469	2,241	7,787	4,160	720	500	15,877
B	475	1,874	4,675	1,959	1,698	0	10,681
C	0	210	550	436	1,097	1,100	3,393
D	66	523	676	2,222	4,100	0	7,587
E	52	1,140	406	1,341	2,647	500	6,086
F	0	0	0	0	0	650	650
TOTAL	1,062	5,988	14,094	10,118	10,262	2,750	44,274

(5) PJM Generation Adequacy

As of January 4, 2001, there were 58,126 MW of ICAP resources committed to PJM. To meet the obligation reserve for 2001, an additional 2,267 MW of ICAP resources are required. Table 4 shows 5,987 MW of generation proposed for interconnection in 2001. Also, some capacity exports will be terminating prior to the summer period. Based on these generating resource additions, both PJM staff and the Commission expect that at least an additional 2,267 MW of ICAP resources will be available prior to the 2001 summer peak. In addition, the PJM Future Adequacy Working Group is discussing changes to the obligation setting methodology (see details in III.D.). The ICAP requirement is the critical control element for maintaining reliability. Any new methodology must preserve the obligation of LSEs to maintain adequate generation reserves. The Commission will closely monitor the completion of new generating resources planned for interconnection in 2001.

The obligation reserve for 2002 is only 135 MW higher than that for 2001. This minimal increase is due to the differences in the obligation load basis discussed in section III.B.(2) above. After the 2001 summer peak is known, the RAA weather normalization methodology may result in a higher 2002 obligation reserve. PJM staff has expressed a desire to modify the RAA to base obligations on forecast load as opposed to using weather normalized loads from the previous year. The Commission will monitor both the load forecasting methodology (which directly affects the MW obligation reserve) and the generation interconnections planned for 2002.

Although new generation should be sufficient to meet established reliability criteria within the region, the Commission is concerned about the lack of fuel diversity exhibited by generation additions. Combustion turbine capacity within the MAAC/PJM region is expected to remain relatively steady over the forecast period. However, generation from gas-fired combustion turbines is expected to increase by 440 percent by 2007. Likewise, without a substantial increase in installed capacity, gas-fired combined cycle capacity by 2007 is expected to produce nearly five times the 1997 generation. Gas-fired steam units are expected to increase generation by nearly 900 percent by 2007. Overall, gas-fired generation will account for nearly two-thirds of the net increase in generation, followed by nuclear (23.5%). This level of gas-fired

generation will require an increase in gas pipeline infrastructure to meet its needs. In addition, the Commission has seen extreme volatility in gas prices over the past year. This trend of sole reliance on gas as a fuel resource must be closely monitored.

(6) Active Load Management and Distributed Generation

PJM's Active Load Management (ALM)¹¹ Working Group developed business rules and measurement techniques to implement ALM in a retail choice environment. The various aspects of the ALM program were incorporated into various PJM Manuals. As proposed, LSEs will receive ALM credits for delivering load management to the power pool, to be used in times of system emergencies in the June through September period. These ALM credits will act to lower the load obligations of LSEs which hold them. In the October through May period, LSEs will continue to receive ALM credits based upon the amount of ALM delivered in the June through September period. To ensure compliance with PJM-initiated ALM events, a performance review will be conducted of each system emergency event.

In response to a FERC order in May 2000, a Distributed Generation User Group (DGUG) was formed by the PJM Members Committee to support reliability initiatives for the summer of 2000. The purpose behind formation of the group was the development of a process by which distributed generation¹² could be utilized in support of reliable operations over the peak summer period. For this, the DGUG developed and implemented the Customer Load Reduction Pilot Program. This program is voluntary, representing a consensus of the DGUG, and was approved by the full membership of PJM.

The Pilot Program has two options. The first option is designed to provide a method by which end-use customers may be compensated for reducing load in an emergency. The second option will provide a mechanism by which any qualified market participant may offer end-use customers the opportunity to reduce the load they draw from the PJM system during times of high prices and share the relative savings. Neither option is intended to be a replacement for ALM, but rather an alternate method by which distributed resources and customers capable of reducing load, can participate in PJM operations and markets. Of the 52 customer sites for which applications were submitted, 43 were approved for participation in the program. The total voluntary reducible load of these 43 locations was approximately 80 MW. Of the 80 MW of voluntary load reduction approved for participation in the pilot, approximately 40 MW would have been served by backup generation after being disconnected from the grid. Due the summer of 2000, PJM issued maximum emergency generation alerts on three different days, but the system load levels that would have required actual emergency procedure declaration did not materialize. Therefore, customer response to an actual PJM request for load reduction could not be gauged.

¹¹ ALM: Devices that can be used to reduce electric load upon demand such as air conditioner and water heater controls.

¹² Distributed generation is typically defined as generators with capacity under 30 MW.

(C) Transmission Issues

As with generation adequacy, the adequacy of electric transmission facilities for Maryland is assessed at the regional level. Based on Allegheny Power's impending affiliation with PJM, this report will focus on the PJM process for ensuring adequate transmission facilities.

(1) Regional Transmission Expansion Plan

PJM uses the MAAC Reliability, Principles, Standards, and Procedures, as well as PJM criteria, to evaluate the future adequacy of transmission facilities. PJM also uses these same reliability criteria to assess the impact of proposed generating resources. These criteria are used to analyze forward-looking electric system modeling to determine if any violations will occur in the future. When violations of the criteria are found, transmission system upgrades or new generating resources are planned to eliminate the violation. All of these transmission upgrades are collectively called the Regional Transmission Expansion Plan (RTEP).

(2) PJM Transmission Adequacy

On August 1, 2000, the PJM Board of Managers approved an RTEP consisting of over \$300 million in transmission upgrades. Baseline upgrades, estimated to cost approximately \$44 million (Table 5), are required to eliminate future reliability and stability criteria violations. The remaining transmission upgrades are required to interconnect the generating resources in the PJM generator interconnection queues. As stated earlier, many of the generating resources in Queues B-E may never be built. Therefore, the required interconnection transmission upgrades will change as generator projects drop from the interconnection process. The RTEP will continue to evolve as the generator interconnection process continues. PJM expects that its Board of Managers will approve a new RTEP in 2001.

Table 5: PJM RTEP Baseline Transmission Upgrades

Project Description (approved 8/1/00)	Estimated Cost (\$ million)	In-Service Date
Install second East Windsor 500/230 kV transformer	9.5	June 2001
Replace seven 230 kV breakers at Shawville	0.6	2001
Upgrade four 230 kV breakers at Whippany	0.1	2001
Upgrade two 230 kV breakers at Whitpain	0.2	2001
Various Capacitor projects in Southern Delmarva	1.4 per year	2001-05
Install second 100 MVAR capacitor at South Akron 230 kV	1.3	June 2004
Yorkanna–Otter Creek 230 kV circuit and Otter Creek Substation	22.3	June 2004
Rebuild Vienna – Nelson 138 kV circuit	0.3 to 1.3	2006
Replace Church 138/69 kV transformer	2.0	2006

(D) Future Adequacy Working Group and Capacity Issues

The PJM Future Adequacy Working Group (FAWG) was formed in the summer of 2000 to assess the merits of converting the existing adequacy approach in PJM to a market-based adequacy model.¹³ The FAWG was also charged with addressing identified shortcomings in the existing adequacy model in PJM, which is governed by the RAA among the PJM market participants.

The RAA was executed in 1997, at the time when PJM became an ISO under FERC's jurisdiction. The RAA was designed to ensure adequate generating resources for the PJM region. Under the RAA, each LSE in PJM has a pro rata share of a PJM pool-wide capacity obligation, which is equal to an estimated aggregate peak load of the LSE's customers. If an LSE does not satisfy its capacity obligation, it is sanctioned in accordance with the terms of the RAA. The sanction was designed to provide a proper incentive to LSEs to either build sufficient capacity resources or contract with an owner of such resources so as to avoid the RAA sanction. The capacity obligation for the PJM pool is established two years in advance to provide sufficient time to allow for the construction of new generating resources if necessary.

With over three years of experience under the RAA, several shortcomings have been identified in the markets rules for the PJM capacity markets. The FAWG is currently addressing these issues. The most significant concern is that of "delisting", which is explained as follows. In order to maintain an adequate system, one needs not only sufficient generating resources within the system, but also assurance that the output (electric energy) of the resources located within the system is dedicated to the region as well. In PJM, there are sufficient generating resources located within the region to maintain system adequacy. However, as evidenced by the 2000 summer, at certain times of the year, it is more profitable to commit the output of generating resources located in the PJM region to customers outside of the PJM region. This is known as delisting.

The FAWG is assessing ways to discourage delisting. Short-term solutions focus on the business rules of existing capacity markets and the terms and condition contained in the RAA. The longer-term solutions include significantly modifying the market structure in PJM, including eliminating the capacity obligation and capacity markets, and relying instead on the price signals in the energy markets. A market that relies on price signals, the market-based approach, must be designed with adequate safeguards to ensure that should there be mismatch between market price signals and system adequacy, the latter is not jeopardized. The Commission is participating and monitoring the FAWG.

¹³ Adequacy is a measure of the probability of having sufficient generating resources to meet customer demand.

IV. California's Experience in 2000

During the summer of 2000, California experienced widespread increases in its wholesale electricity market, first affecting San Diego Gas & Electric (SDGE), and later affecting two major utilities, Pacific Gas & Electric (PGE) and Southern California Edison (SCE). While these events were initially reported in the industry media, over the summer these were widely reported in the national media. Since California was the first state in the nation to comprehensively restructure its electric industry, there is now a national interest to examine those events and find if the same will happen in other states that have recently restructured or are contemplating restructuring their own electric industries. Below is a summary of the events in California and an examination of possibilities of similar events affecting Maryland.

(A) Summary of Events in California ¹⁴

The dramatic impact of increased electricity prices in California during the summer of 2000 is underscored by the fact that in just one week (June 11-15), power purchasers spent over \$1 billion to buy electricity: this amount was an eighth of their spending for all of 1999. The effects of such price increases varied from amongst electricity suppliers. Retail customers of PG&E and SCE are under a rate freeze as part of California's restructuring law. However, in January 2001, both the utilities were allowed temporary rate increase of 7-15 percent, which was much less than the 25-30 percent they had requested. Customers of municipal utilities may face higher prices depending on the actions of each municipality. Retail customers of non-utility electricity marketers may have seen higher bills if their electricity rate is set as some percentage of the Power Exchange (PX) price. As part of the restructuring law, SDGE fully collected its stranded costs earlier than expected. This resulted in the removal of the retail price freeze, i.e., its customers had full competitive choice and would pay market rates. As such, June bills more than doubled because of the increase in the supply portion of the bill from approximately 5 cents to 15 cents per kWh.

Under the federal "filed rate doctrine", states are required to pass through to utility customers the costs of electricity that are purchased at the wholesale market, which subject to federal tariffs. California's restructuring law required utilities to divest their generation resources and buy power from the PX. Thus, whatever a utility pays for wholesale power allowed under a federal tariff is passed through to its customers. The California Public Utilities Commission (CPUC) in its report¹⁵ indicated that the price increases could not be attributed to "increased costs, weather, volumes or even the existence of a much higher wholesale price cap in 2000." When it compared certain days during the summers of 1999 and 2000, it did not find any significant difference in peak loads. However, it found that the wholesale market was structured such that sellers may have been withholding power in order to drive up prices in other parallel markets. The ISO makes premium payments for replacement reserve that can be called upon when supplies are short, and such payments can be 50 percent higher than the already increased prices. One final point is that significant generation plants have not been built in California for

¹⁴ Most of the material in this section has been drawn from Michael Kahn (Chairman, Electricity Oversight Board) and Loretta Lynch (President, California Public Utilities Commission), *California's Electricity Options And Challenges: Report To Governor Gray Davis*. www.cpuc.ca.gov/published/report/gov_report.htm

¹⁵ *Ibid.*

the past decade due to its strict environmental regulations. As such, supply has not kept pace with demand within that state.

(B) Possibility of the California Experience in Maryland

The situation in California differs to a great extent from that of Maryland. Such differences range from the status of the restructuring efforts in the two states to regional institutions in place. California's power pool is one of the newest in the nation with regulators still adjusting price caps and market rules. The transmission grid operator -- California ISO -- is a separate entity from the PX. Also, nearly a quarter of that state's load does not come under the ISO control. Conversely, Maryland is part of the oldest power pool in the nation -- PJM. PJM's wholesale markets are well established and stable, and it is also the ISO for the region.

In contrast to the comment earlier about California's strict environmental regulations, Maryland does have stringent regulations but these allow for new power plants to be built. The result of the lack of supply in California is low reserve margins and greater dependence on supply from outside its power pool. In the PJM region, the historical capacity reserve margin has been 15-20 percent higher than the predicted peak load.

In terms of restructuring, California required all its utilities to divest their generation assets and buy power from the PX but with certain rate caps for a compressed transition period to full competition. Under Maryland law, divestiture is optional. All residential customers have received a rate reduction of approximately 6.5 percent on July 1, 1999, and these rates are fixed for at least four years. This is important because a market needs time to develop as well as customers have to become familiar with the competitive environment of an erstwhile monopoly service. Unlike California, utilities in Maryland (and PJM) do not have to buy all their power from the wholesale market; rather they have the option of acquiring power under long-term contracts and agreements. Therefore, the spot market should not affect the default or standard offer service.

For all of the reasons above, it is unlikely that Maryland will face California-type events in the near future. While the situation under a fully competitive retail electric market cannot be predicted at this time, it is the time during the transition period that will allow the Commission to ensure that retail electric customers are not swamped with volatile price increases after the transition period ends. Therefore, the Commission will closely monitor such situations around the nation (in general) and within the region (in particular), and, if any legislative action needs to be taken to avert such serious events, the Commission will bring forth appropriate issues immediately to the General Assembly.

V. Conclusions

There is electric supply adequacy in Maryland for the near future. The entities responsible for generation adequacy have sufficient resources in place or coming on-line in the next two years to meet established reliability criteria. Maryland is well situated in the Mid-Atlantic region within a well-integrated power pool that allows access to several generation assets. To the extent that PJM's planning process stays on course, Maryland customers will have available power supply. This does not mean that events such as a prolonged heat wave, unanticipated losses of large generation units or transmission lines, failure of proposed projects to be completed, or severe storms might not result in wholesale price spikes or some outages over the next two years.

California's situation most likely will not occur here in Maryland. The Commission sees its role as an entity that will monitor the supply, distribution, and transmission conditions within the State as well as the region. Currently, the Commission is involved with various regional and national entities in this arena. What will not be clear, until full retail competition is in place and after each utility's respective transition period is over, is the price at which such supply will be available. Needless to mention that the Commission will monitor the electric industry in the coming years to ascertain that there is electric supply adequacy for Maryland customers, and that the final transition to competitive markets does not expose retail residential customers in Maryland to the same price volatility experienced in California.