Power Generation, Transmission, and Usage in Maryland

As a basis for discussing the impacts of power plants in Maryland, it is helpful to understand how electricity is generated and used within the state. This chapter examines Maryland's electricity "footprint," from generation to end users, and provides information on the electric power industry in Maryland.

Consumption and Generation

Consumption

In 2000, Maryland customers consumed about 61 million megawatt-hours (MWh) of electricity.* As shown in Figure 2-1 and Table 2-1, this represents an average annual increase of 2.0 percent from 1990 and an average annual increase of 1.7 percent from 1995 for the state. Over the period 1990 to 2000, the growth rate in electricity consumption in Maryland was slightly below the growth rate in the United States as a whole. This is due to Maryland's slower growth in population, employment, and per capita income over the 1990 to 2000 period relative to growth in these same factors across the country (see Figure 2-2).

The shares of electric energy consumption in Maryland going to the residential, commercial and industrial sectors differ significantly from the corresponding shares for the United States as a whole (see Figure 2-3). Residential consumption in Maryland represented about 39 percent of total electricity consumption in 2000 but only 35 percent for the United States. Commercial customers consumed approximately 43 percent of electricity in Maryland in 2000 compared to 31 percent nationally. The share of electricity consumption going to the industrial sector in Maryland was only 17 percent of total state consumption compared with 31 percent for the nation as a whole. Other electricity sales

Section Highlights

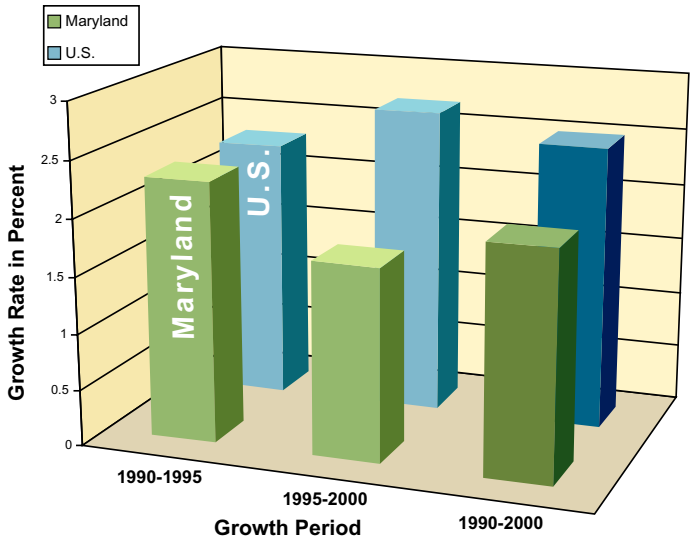
Demand for electricity has grown steadily in Maryland and is expected to continue growing as population increases and employment expands. Even if electricity prices rise, demand will likely grow by up to 2 percent per year. While Maryland customers (industrial, commercial, and residential combined) use more electricity than the amount generated by Maryland power plants, the reliability of our power supply is backed up by the strong regional network of Pennsylvania-New Jersey-Maryland Interconnection (PJM).

Table 2-1 Maryland and U.S. Electricity Consumption

	Maryland (million MWh)	U.S. (million MWh)
1990	50.1	2,817
1995	56.2	3,162
2000	61.1	3,621
Average Annual Growth Rates (Percent)		
1990-1995	2.3	2.3
1995-2000	1.7	2.7
1990-2000	*2.0*	*2.5*

* One megawatt-hour of electrical energy is approximately the amount of energy that a typical household uses in a month. A megawatt of electrical capacity is sufficient to meet the peak demands of 1,000 homes.

Figure 2-1
Maryland and U.S. Average Annual Rates of Growth in Electricity Consumption

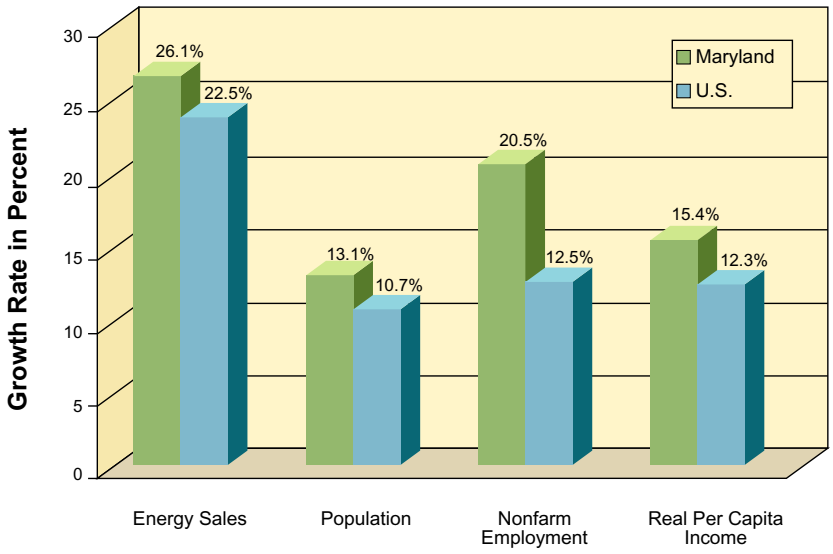


(e.g., streetlighting) made up 1 percent of the state's electricity sales and 3 percent of the nation's.

There are two principal reasons for these differences. First, the federal government has a significant presence in Maryland owing to the state's proximity to Washington, D.C. Electric energy usage for federal facilities is generally classified as commercial sector usage. Second, Maryland has a small industrial sector compared to the United States as a whole. The small size of the industrial sector share means that a larger proportion of use is attributable to both the commercial and residential sectors.

Figure 2-4 illustrates the forecasted increases in electricity consumption (from PPRP's statewide base case forecast of electricity consumption and peak demands in Maryland) across various types of end users in the state. Electric energy consumption in Maryland is forecasted to increase at an average annual rate of approximately 2.6 percent between 2000 and 2010 (see Table 2-2), which is above Maryland's historical growth rate of about 2.0 percent during the decade of the 1990s. The more rapid growth in electric energy consumption projected over the 2000 to 2010 period is largely attributable to projected declines in the real price of electricity in the state that are included in the base case forecasting assumptions. The projected declines in the real price of electricity (i.e., the price of electricity adjusted for inflation) incorporated into the base case forecast were predicated on U.S. Department of Energy projections and Maryland-specific institutional considerations. Regarding Maryland-specific factors, electric prices for most Maryland customers are subject to a price freeze to prevail over a portion of the 2000 to 2010 period, varying by region and customer class. Frozen nominal prices translate into declining real prices due to the effects of inflation. Regional market

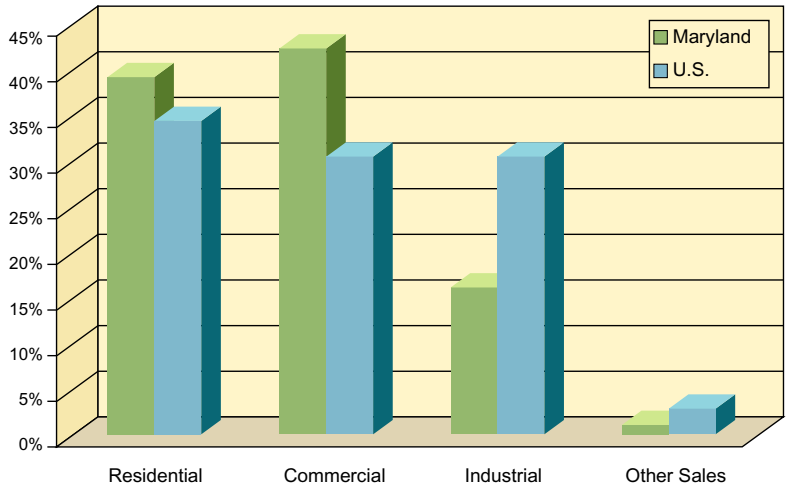
Figure 2-2
Comparison of U.S. and Maryland Growth in Factors Affecting Electricity Consumption (1990 to 2000)



Source: Bureau of Economic Analysis and the Energy Information Administration

prices for electricity in the mid-Atlantic were forecasted by the U.S. Department of Energy to decline throughout the 2000 to 2010 period as more electric generating capacity was to come on line in the region. The impact of declining electric prices combined with growth in Maryland population, employment, and income over the 2000 to 2010 period are the primary factors driving the expected growth in electric energy consumption in the state.

Figure 2-3
2000 Electricity Sales by Customer Class, Maryland and U.S.



Source: Energy Information Administration

More recent information and unfolding events suggest that the projected declines in real electricity prices for the years following Maryland's price freeze period may be overstated. The reasons for this assessment include the cancellation, downsizing, or postponement of several large generating facilities that were anticipated to be brought on-line within the next few years and the recent significant increases in natural gas prices.

Figure 2-4
Forecasted Electricity Consumption in Maryland

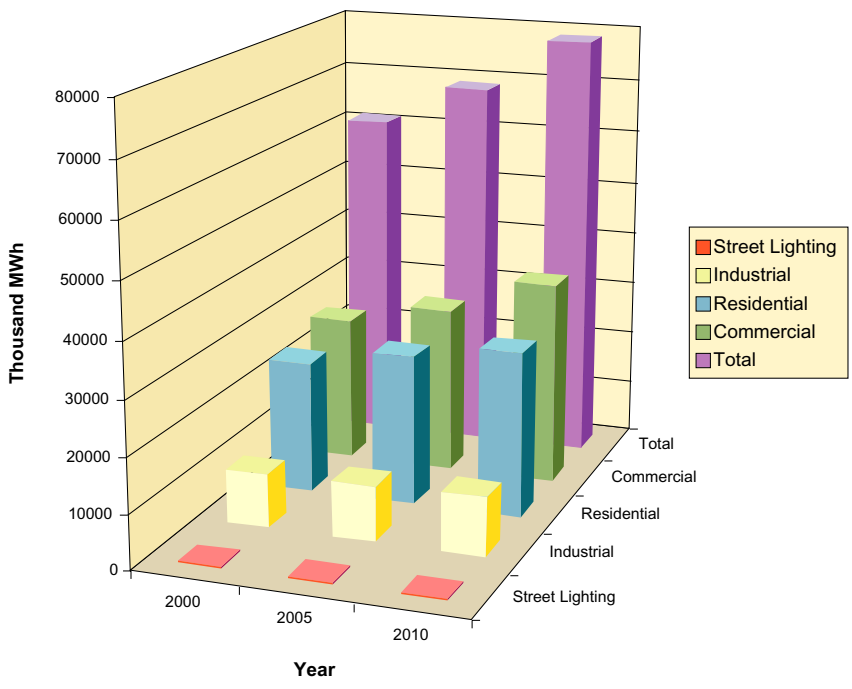


Table 2-2 Forecasted Electricity Consumption (Thousand MWh)

	Residential	Commercial	Industrial	Street Lighting	Total**
2000	23,895	26,789	9,710	299	60,693
2005	27,522	30,674	10,106	337	68,639
2010	30,274	37,390	10,757	351	78,772
Average Annual Growth Rates (percent)					
2000-2005	2.9	2.7	0.8	2.4	2.5
2005-2010	1.9	4.0	1.3	0.8	2.8
2000-2010	*2.4*	*3.4*	*1.0*	*1.6*	*2.6*

* These figures exclude company use and losses and therefore differ from the results in Table 2-3.

** Totals may not add due to independent rounding.

Nationally, the electric generation industry largely remains in financial distress and as a consequence, power plant construction projects in Maryland and elsewhere have been re-evaluated (see sidebar). While generating capacity in the mid-Atlantic is sufficient to serve load, the cancellations and delays of new power plant construction reduces downward pressure on electric power prices relative to the competitive pressure that would exist were power plant construction activity more robust.

A second factor affecting future electricity prices (and hence consumption of electricity) is the recent increases in natural gas prices. June 2003 natural gas prices were approximately 85 percent higher than June 2002 prices. While natural gas generation accounts for only a small percentage of electric energy produced in Maryland (less than 10 percent), natural gas fired-facilities are often the marginal resources within the PJM and, therefore, strongly influence market prices. The degree to which high gas prices will persist into the future, affecting electric power prices over the long term, is uncertain.

Power Plant Cancellations

Project	Status	Planned Capacity (MW)
NRG - Vienna expansion	Cancelled	1500
Duke - Frederick County	Filed CPCN application - cancelled	640
Free State - Kelson Ridge	Received CPCN - construction halted	1650
Dynegy - Blue Ridge	Cancelled	600
Total capacity lost or delayed		4390

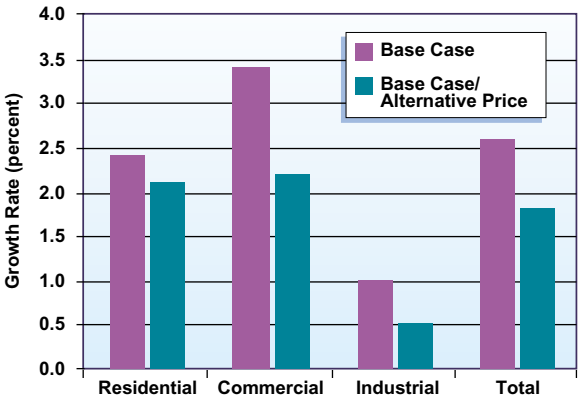
To recognize the inherent uncertainty associated with future electricity prices, the state-wide projection of electric energy consumption in Maryland includes an alternative forecasting scenario that reflects all of the base case assumptions with the exception of electric power prices after the relevant price freeze periods. The electric power prices in the alternative scenario are higher than those contained in the base case scenario.

Under the base case/alternative price scenario, electric energy consumption in Maryland is forecasted to increase at an average annual rate of 1.8 percent between 2000 and 2100 (compared to 2.6 percent under the base case set of forecasting assumptions). The 1.8 percent rate of growth under the alternative

price scenario is below the 2.0 percent rate of growth in electricity consumption in Maryland experienced during the 1990s.

Figure 2-5 illustrates how higher electricity prices may slow down the rate at which demand grows during the current decade. The alternative (higher) price assumptions are seen to have a more significant impact on the industrial and commercial projections of energy consumption than on residential consumption due to the higher price sensitivity in the commercial and industrial sectors relative to the residential sector.

Figure 2-5
Forecasted Growth in Electricity Consumption, 2000 - 2010



Note: Base case/alternative price scenario assumes higher electricity prices compared to the base case.

Generation: Comparison with Consumption and Future Outlook

Currently, electric energy consumption in Maryland exceeds electric energy generation in the state by about 27 percent, making Maryland a net importer of electric energy. Table 2-3 compares actual (2000) and projected (2005) electricity consumption and generation in Maryland, assuming that proposed generating capacity additions are constructed and come on-line by 2005[1]. By 2005, electric consumption in Maryland is expected to be about 71.9 million MWh, or approximately 25 percent larger than the 57.6 million MWh that could be generated in the state annually.

Table 2-3 Total Maryland Electric Energy Consumption and Generation (thousands of MWh)

	Consumption			Generation
	Base Case	**Low Case**	**High Case**	**All Existing and Planned***
2000**	63,837	63,463	64,205	50,262
2005	71,937	68,862	75,139	57,647 (estimated)
Growth	8,100	5,399	10,934	7,385
Percent	12.7	8.5	17.0	14.7
	Average annual growth rates (percent)			
2000-2005	2.42	1.65	3.20	2.78

* All facilities listed in Tables 2-6 and 2-7.

** 2000 consumption figures are calculated using 1999 actuals and the 1999-2003 average annual growth rate.

[1] See Table 2-7 on page 17 of this report for a list of expected capacity expansions in Maryland. The projected generation in MWh from these plants, shown in Table 2-3, was calculated by multiplying each facility's projected generating capacity in the year 2005, in MW, by the number of hours that they are projected to operate over the course of the year. Projected hours of operation vary from facility to facility; furthermore, once a facility is on-line, hours of operation and actual generated output can vary significantly from year to year.

Many companies interested in power plant development have been forced to retreat and focus instead on refinancing debt, selling assets, and exiting regional and international markets as a result of decreasing revenues and credit rating downgrades. Mirant, with proposals for the Chalk Point and Dickerson power plant facilities, is one such company and is currently restructuring its finances and selling assets to remain a viable concern. To the extent that the Mirant proposals are likely to be scaled back or withdrawn, the estimates of future in-state energy generation will decrease. In the case of Mirant's total withdrawal, electric consumption in Maryland would be approximately 38 percent greater than the amount of electricity expected to be generated in the state for 2005, versus 25 percent.

Consequently, Maryland does not cover its own consumption of electricity with in-state generation supplies. Rather, Maryland relies to a significant degree on power sources located elsewhere in the Pennsylvania-New Jersey-Maryland Interconnection (PJM) region to support its own internal electric power needs. Moreover, the gap between available in-state capacity and the state's consumption of electricity could potentially increase through 2005 if additional power plant proposals are withdrawn.

Nevertheless, it should be noted that the provision of adequate levels of electric power generation for Maryland consumers does not require that the level of power generation within Maryland's borders match or exceed the state's consumption. Maryland, as part of PJM, relies not just on in-state resources, but on the generating resources within PJM as a whole, as well as electric power that can be imported into the PJM area. Currently, PJM encompasses all or parts of Pennsylvania, New Jersey, Maryland, Delaware, the District of Columbia, Ohio, West Virginia, and Virginia and dispatches electricity for the region. It is expected that PJM will soon expand substantially to cover a large portion of the South and the Midwest. Consequently, imbalances between Maryland consumption and generation need not be viewed as adversely affecting electric reliability or availability in Maryland.

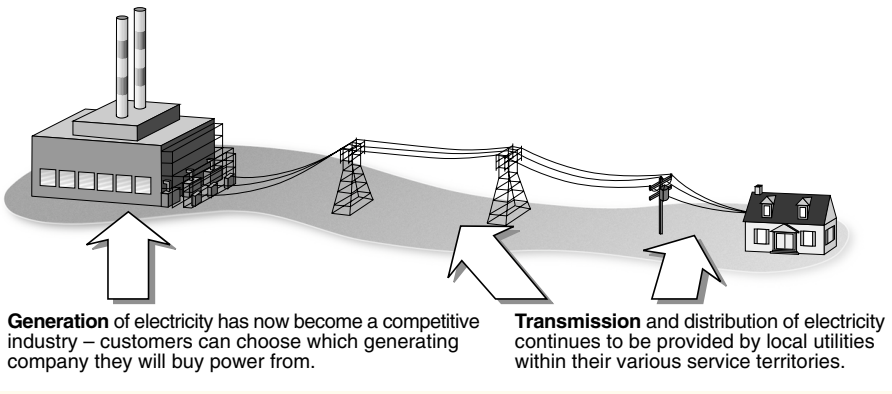
SECTION HIGHLIGHTS

In 1999, Maryland passed legislation that changes the way electricity is sold here. Power generation is now separated from transmission and distribution, and customers can choose from among different suppliers of electric generation. However, progress toward a competitive retail market has been slower than originally envisioned when the restructuring legislation passed in 1999.

Restructuring and Competition

Effective July 2000, the Maryland Electric Customer Choice and Competition Act of 1999 restructured the electric utility industry in the state to allow electric retail customers to shop for electric power from various electric power suppliers. Prior to restructuring, the local electric utility, operating as a regulated, franchised monopoly, supplied all end-use customers within its franchised service area with the three principal components of electric power service: generation, transmission, and distribution. With Maryland's restructuring of the electric power industry, *generation* of electricity is offered in a competitive marketplace (transmission and distribution remain regulated monopolies). Prices for power supply are therefore determined by a competitive electric power supply market rather than being determined by the Maryland Public Service Commission in a regulated environment.

To facilitate a competitive market for electric power supply in Maryland, the local electric utilities have either transferred their electric generation assets (i.e.,



Under competitive restructuring, power generation is separated from the transport and delivery of electricity.

power plants) to unregulated subsidiaries or have sold the assets to unaffiliated companies. The local electric utilities that previously owned the generation assets are therefore limited to providing transmission and distribution services. The transmission and distribution of electricity will continue to be functions that are subject to regulation, including price regulation. Companies now owning the electric generation resources in Maryland remain subject to the applicable environmental, socioeconomic, and land-use requirements and regulations. Table 2-4 presents the utility service providers in Maryland that sold or transferred their power plants to generating companies.

Table 2-4 Power Plant Transfers Resulting from Restructuring Maryland's Electric Industry

Maryland Generating Assets Of...	Are Now Owned By...	Transaction Type
Allegheny Energy (formerly known as Allegheny Power System)	Allegheny Energy Supply	Transfer to unregulated affiliate
Conectiv (formerly known as Delmarva Power & Light Company)	NRG	Sale
Constellation Energy Group (formerly known as Baltimore Gas and Electric Company)	Constellation Generation Group	Transfer to unregulated affiliate
Potomac Electric Power Company	Mirant	Sale

Today, merchant generators or unregulated utility affiliates own most of the power plants in Maryland. Consequently, residential, commercial, and industrial customers can purchase power from electric suppliers other than their local regulated electric utility. Power purchased from electric suppliers owning generation assets (or that have themselves purchased power in the competitive market) will be delivered to retail customers by the local distribution utilities.

The Restructured Market — Extending the Transition

The pace of movement to a competitive retail electric power supply market has been slower than originally envisioned at the time restructuring legislation was enacted in 1999. During the period of transition from a regulated to a competitive environment, market prices for electric power have tended to be roughly equivalent to, or slightly higher than, the fixed prices for generation that the utilities have provided to customers choosing not to competitively shop. Because of the relationship between fixed generation prices and the prices available in the competitive market, there was little economic incentive on the part of end-use customers to arrange for alternative supply and little competitive activity on the part of potential suppliers.

Since the passage of Maryland's restructuring act in 1999, several events have transpired that have affected, to varying degrees, the transition from regulation to retail competition. Some of these events have adversely affected the construction of new generating capacity. In the late 1990s, the interest in installing additional power plants had been accelerating at a rapid pace across the mid-Atlantic region, given changes in regulations that allowed power plant developers to bear the business risk, and benefit from the economic rewards, of generation projects. Over the past few years, external shocks have significantly affected electricity markets and the economy generally, and as of late the interest in building power plants in virtually any region of the country has dwindled significantly. These external shocks affecting energy markets include the following:

- *The Northeast blackout of 2003;*
- *The California electricity crisis of 2000-2001;*
- *The terrorist attacks of September 11, 2001;*
- *The economic recession that emerged at the close of 2000;*
- *Erosion of stock market wealth;*
- *Collapse of confidence in key electricity market players; and*
- *Declining liquidity and the drying up of credit for investments in the power industry.*

Furthermore, many would-be suppliers were hesitant to offer service recognizing that there existed little opportunity to earn reasonable profits, particularly with respect to retail residential service. At the end of 2002, very few Maryland end-use customers were receiving power from alternative suppliers and those that were tended to be non-residential customers, including federal, state, and local governments and large commercial and industrial customers. Maryland's experience in this regard mirrors the experience of most other states that have recently implemented electric industry restructuring.

Most Maryland electric customers today may obtain their generation supply from either the competitive retail market or from their local utility under frozen rates. Those rate freezes were set to expire in 2004 for business customers and at that time or later (2006 for BGE and 2008 for Allegheny) for residential customers. Given these expiring rate freezes and the fact that the vast majority of Maryland customers continue to purchase generation supply from their local utility, the PSC established Case No. 8908. The parties to that case (representing utility, consumer and unregulated supplier interests) reached a comprehensive settlement in 2002 on a framework that would allow the utilities to continue as the supplier of generation for those customers not "choosing to shop." For these customers, the utilities will acquire the requisite power supply from the wholesale market and flow through these markets costs to customers, along with a profit margin and the utility's administrative costs. The settlement therefore establishes and extends a stable-priced utility-supplied generation service (as an option to competitive service) for all customer groups covering the periods shown in Table 2-5. For residential customers and the smallest of the non-residential customers, the settlement establishes terms of four years, beginning when the current (original) rate freeze expires for each utility. The programs for the larger non-residential customers are for periods of two years or one year, depending on customer size. In addition, there is an Hourly Priced service available to large non-residential customers with hourly metering that has no fixed expiration date. The settlement also establishes a Working Group to investigate and develop optional demand response programs and "green power" product offerings. In April 2003, the PSC approved the settlement.

The Eastern Interconnection Power Outage of August 14-15, 2003

On August 14 and 15, 2003, the northeastern U.S. and southern Canada suffered the worst power blackout in history. Areas affected extended from New York, Massachusetts, and New Jersey west to Michigan, and from Ohio north to Toronto and Ottawa, Ontario. Approximately 50 million customers were impacted, and the economic costs will be staggering.

An international task force has been convened to oversee a comprehensive inventory of the causes of the outage, including the cascading effects that shed loads throughout eight states. The task force will also be asked to provide recommendations for ensuring that a blackout of such magnitude will not occur again.

Maryland, along with Pennsylvania, Delaware, Washington, DC, and New Jersey, is part of the PJM Regional Transmission Organization, which (among other things) controls the high-voltage electric transmission grid in the multi-state area. Automatic devices built into PJM operations caused PJM to physically separate from the grid connecting to the areas affected by the blackout, thus permitting the vast bulk of PJM to avoid the outages. PJM's grid protections worked as designed and the Mid-Atlantic was largely spared the service outage experienced by the Northeast U.S., Ontario, and portions of the Midwest. As more information is learned about the blackout, PPRP will continue to share this information with interested parties.

Table 2-5 Length of Utility Generation Service Extensions for Maryland Residential and Non-residential Customers*

	Residential	Non-residential (Varies by customer class)
Allegheny Power	Jan. 1, 2009 to Dec. 31, 2012	Jan. 1, 2005 up to Dec. 31, 2008
BGE	July 1, 2006 to May 31, 2010	July 1, 2004 up to May 31, 2008
Conectiv	July 1, 2004 to May 31, 2008	June 30, 2003 up to May 31, 2008
PEPCO	July 1, 2004 to May 31, 2008	July 1, 2004 up to May 31, 2008

*Note: This settlement does not include any Maryland rural cooperatives or municipal utilities.

SECTION HIGHLIGHTS

Generation and distribution of electricity is carried out by several different entities in Maryland, including independent power companies, traditional utilities and their affiliates, large industrial facilities, counties, and muncipalities. The regional transmission operator, PJM, is a key player in coordinating how generation resources are used to meet demand throughout the mid-Atlantic region.

Composition of Electric Industry

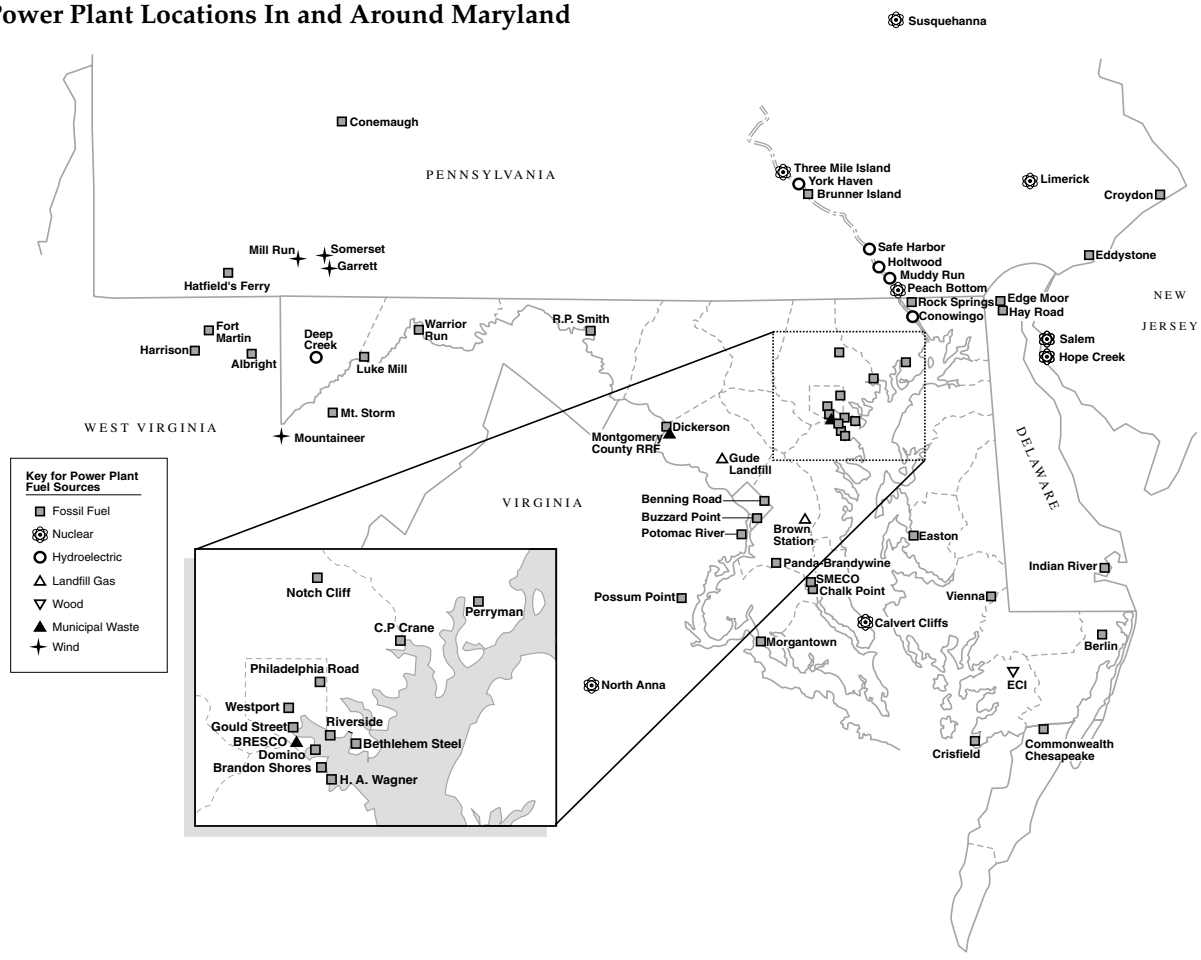
The electricity industry has three major components: generation (supply), transmission (high-voltage transport of electricity over power lines), and distribution (delivery of transmitted electricity to the end-use customer). Details of the three major components of the electrical industry are provided below.

Maryland's Electricity Generating Resources

Electricity generated in Maryland is derived from energy sources such as coal (56 percent), nuclear (28 percent), natural gas (7 percent), oil (4 percent), and other miscellaneous sources including wind, solar, hydro, and the burning of municipal waste (5 percent, cumulative).

There are 32 power plants (2 MW or greater) located in Maryland, representing over 12,000 MW of operational generating capacity. Table 2-6 lists these power plants; see Figure 2-6 for plant locations. Generating facility owners in Maryland fall into one of the four categories described below:

Figure 2-6
Power Plant Locations In and Around Maryland



1. ***Affiliates of traditional distribution companies***—*Companies in this category operating in Maryland are Allegheny Energy Supply, Conectiv Energy Supply, Constellation Generation Group, and PEPCO Energy Services.*

2. ***Independent power producers***—*These are generators that have no corporate ties to transmission or distribution networks owned by Maryland-based utilities. These independent power producers can be subsidiaries of the electric utility companies established in other states. Examples include Exelon, Panda Brandywine, and Mirant.*

3. ***Publicly owned electric companies***—*This category includes the municipal power systems, such as Berlin and Easton; electric power cooperatives (e.g., the Southern Maryland Electric Cooperative); and the generation facilities owned and operated by Montgomery and Prince George's Counties.*

4. ***Self-generators***—*These are industry- (or government-) owned or operated power plants were constructed at or adjacent to existing industrial (or government) facilities to meet the need for electricity or steam at these facilities. They may also sell excess power into the market. Examples include Domino Sugar, Westvaco, and the Eastern Correctional Institution.*

In addition, there are approximately 1,000 MW of new power projects being proposed in the state; Table 2-7 lists these potential future facilities and their current estimates of new capacity. Besides the Easton project for 9 MW, the other capacity amounts for the other individual projects are listed as the maximum potential in capacity additions. Developers may scale back on the amount of capacity installed at the proposed generation facilities due to regulatory requirements or economic conditions.

Table 2-6 Operational Generating Capacity in Maryland

Owner	Plant Name	Major Fuel Type	Capacity (MW)
Utility Affiliates			
Allegheny Energy Supply	R.P. Smith	Coal	114
Conectiv Energy Supply	Vienna*	Oil	168
	Crisfield	Oil	10
Constellation Generation Group	Brandon Shores	Coal	1,298
	Calvert Cliffs	Nuclear	1,721
	C.P. Crane	Coal	397
	Gould Street	Oil/Natural gas	104
	Notch Cliff	Natural gas	132
	Perryman	Oil/Natural gas	348
	Riverside	Oil/Natural gas	251
	H.A. Wagner	Coal/Oil/Natural gas	1,011
	Westport	Natural gas	134
	Philadelphia Road	Oil	68

(Continued on next page)

Table 2-6 (Continued)

Owner	Plant Name	Major Fuel Type	Capacity (MW)
Independent Power Producers			
AES Enterprise	Warrior Run	Coal	180
BRESCO	BRESCO	Waste	57
Exelon Generation Co.	Conowingo	Hydroelectric	550
Mirant	Chalk Point	Coal/Natural gas	2,350
	Dickerson	Coal/Natural gas	913
	Morgantown	Coal	1,491
Montgomery County	Resource Recovery Facility	Waste	50
	Gude Landfill	Landfill gas	3
Panda Energy	Brandywine	Natural gas	230
Prince George's County	Brown Station Road	Landfill gas	2
Reliant Energy	Deep Creek Lake	Hydroelectric	19
University of Maryland	Trigen-College Park	Natural gas	27
Publicly Owned Electric Companies			
Berlin	Berlin	Oil	8
Easton Utilities	Easton	Oil	57
ODEC	Rock Springs	Natural gas	340
SMECO	SMECO	Natural gas	84
Self-generators			
American Sugar Refining Co.	Domino Sugar	Oil/Natural gas	10
Bethlehem Steel	Bethlehem Steel	Natural gas/Blast furnace gas	169
MD Department of Public Safety and Corrections	ECI Cogeneration Facility	Wood	5
Westvaco	Luke Mill	Coal	60
Total			**12,323**

*Conectiv has announced the sale of its Vienna Station to NRG Energy.

Electricity Transmission in Maryland

The network of high-voltage lines, transformers, and other equipment that connect power plants to the distribution systems serving end-use customers is referred to as transmission facilities. In Maryland there are roughly three thousand miles of transmission lines operating at voltages between 115 kV and 500 kV (distribution systems typically operate at 69 kV or below). Figure 2-7 shows a map of this high-voltage transmission grid in Maryland.

Historically, the transmission system enabled vertically integrated utilities — companies that generate, transmit, and distribute electricity for sale to consumers — to locate power plants in locations near inexpensive sources of fuel, and transmit the electricity long distances to the consumers. For example, the high-voltage transmission system allowed BGE, Conectiv, and PEPCO to import their ownership shares of the Keystone and Conemaugh coal units in western Penn-

Table 2-7 Proposed Generating Capacity Additions

Project	Developer	Location (County)	Primary Fuel	Capacity (MW)
Berlin	Town of Berlin	Worcester	No. 2 oil	15
Criterion	Clipper	Garrett	Wind	100
Chalk Point	Mirant	Prince George's	Natural gas	340
Dickerson	Mirant	Montgomery	Natural gas	726
Easton	Easton Utilities	Talbot	No. 2 oil/Natural gas	9
Rock Springs	ODEC	Cecil	Natural gas	680
Savage Mountain	US Wind Force	Allegany	Wind	40
Total				1,910

sylvania. By interconnecting distribution systems, transmission lines also enabled traditional utilities to improve reliability by backing up each other's generation capacity. Eventually, utilities began to buy electricity from each other when that was less expensive than generating it themselves.

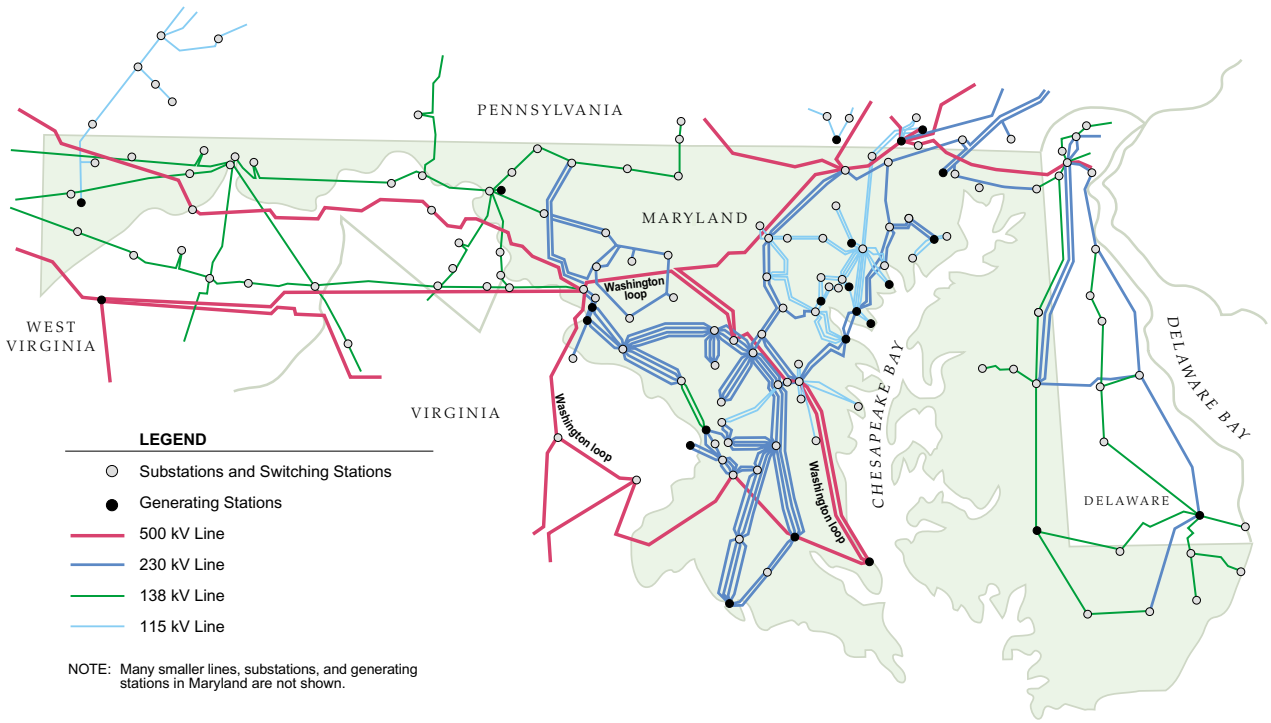
Transmission facilities are now owned by investor-owned distribution companies, separate from the generating companies. The transmission grid serves as the basis for the competitive wholesale electricity market. Throughout the mid-Atlantic region, electricity dispatching is handled by the independent operator of the transmission grid, the PJM.

PJM Interconnection, LLC

PJM is an independent system operator, regulated by the Federal Energy Regulatory Commission (FERC). PJM originally managed all or part of the transmission systems in Pennsylvania, New Jersey, and Maryland, but has expanded to other states including Delaware, the District of Columbia, Ohio, West Virginia, and Virginia. Efforts to join PJM by American Electric Power, Dayton Power & Light, Commonwealth Edison, and Dominion Virginia Power are pending regulatory approval. This would extend PJM to Illinois, Indiana, Kentucky, and Michigan. By providing nondiscriminatory access to the transmission grid, as well as operating day-ahead and real-time energy markets, and markets for a variety of ancillary services, PJM improves regional reliability and reduces the cost of electricity for all consumers within its territory.

PJM's energy markets operate on the basis of locational marginal prices — electricity prices that may be differentiated by geographic location. Each day, all the generating resources in the PJM service area submit bids for power to be delivered the following day. In each hour, the highest bid needed to serve loads becomes the market price; load-serving entities purchasing energy from the PJM market in that hour pay that price. Similarly, all generating units selected to supply power in a given hour receive the market price established for that hour. When a transmission facility capacity limit interferes with the free flow of electricity, as determined by this bid-based dispatch, congestion occurs. Energy prices on one side of the constraint will diverge from prices on the other side. This design feature established by PJM is intended to both manage congestion and create the appropriate price signals for market participants to take steps to alleviate congestion. Such actions could take the form of demand response, locating new generation in load pockets, or making transmission enhancements.

Figure 2-7
Transmission Lines in Maryland



Transmission Congestion in Maryland

Statewide, transmission congestion has not been a chronic or widespread problem. However, significant congestion on the Delmarva Peninsula has developed at certain times, exposing market participants to congestion charges and increased energy costs. Demand in this area continues to grow, and transmission capacity southward through the Peninsula on Conectiv's lines is limited. The financial impacts to customers of the distribution company Choptank Electric Cooperative are substantial; Choptank is dependent on Conectiv-owned transmission lines to deliver electricity to Choptank customers on the lower Peninsula. While currently insulated by generation rate caps, which expire by December 2008, Conectiv's Maryland customers could face sizeable financial impacts from congestion costs when the rate caps expire.

Despite PJM's locational marginal pricing feature and market for fixed transmission rights, Delmarva congestion continues in varying degrees. Potential solutions to the congestion problem include:

- *Implementing system upgrades to address the five leading causes of Peninsula congestion. The upgrades have either been installed or will be installed by June 2004. PJM expects these upgrades to significantly reduce, if not eliminate, congestion during normal system operations. Events such as forced outages, however, can continue to produce periods of congestion.*
- *Investigating merchant transmission projects. Since the PJM filed its merchant transmission tariff with the FERC on March 12, 2003, six (of eleven) merchant*

transmission projects formally submitted under the tariff would directly affect the Delmarva Peninsula. These proposed projects are not required in order to maintain reliability under PJM's regional transmission expansion plan; rather, these are projects that market entities have tentatively decided warrant further investigation as viable business ventures and, as such, could potentially decrease congestion impacts on the Peninsula.

- *Developing proposals to reassign congestion costs. The PJM will introduce proposals to PJM standing committees to consider a reassignment of costs when construction-related outages result in congestion. Additionally, PJM is proposing to investigate dispatching high-cost generators on the Peninsula in a different manner than has historically been employed as a means of shortening the period of time these high-cost power plants set the congested area's Locational Marginal Prices (LMPs).*

Maryland's Electric Distribution Companies

There are 13 utilities distributing electricity to customers in Maryland. Four are investor-owned through three holding companies, five are municipally owned, and four are cooperatives. The investor-owned utilities serve approximately 90 percent of customers in the state and serve large urban, suburban, and rural areas. The municipal utilities, which own the local distribution facilities in a specific town or city, generate or purchase electricity and distribute it to local citizens. Cooperatives are customer-owned utilities, established to provide electricity to rural areas. Cooperatives serve larger geographical areas than do municipal utilities and tend to be located in less populated areas of the state. See Figure 2-8 for a map of distribution service territories.

Investor Owned — Allegheny Power (AP), a subsidiary of Allegheny Energy, provides electricity distribution services to 3.5 million people in Maryland, Pennsylvania, Ohio, Virginia, and West Virginia. In Maryland, AP serves approximately 218,000 electricity customers in a 2,500 square-mile area consisting of all or parts of Allegany, Carroll, Frederick, Garrett, Howard, Montgomery, and Washington Counties. Industrial customers account for more than 50 percent of AP deliveries in Maryland, due in large part to the Eastalco Aluminum Company's facility in Frederick, with a peak demand of over 300 MW. In 2001, the peak demand of AP's customers in Maryland was approximately 1,800 MW.

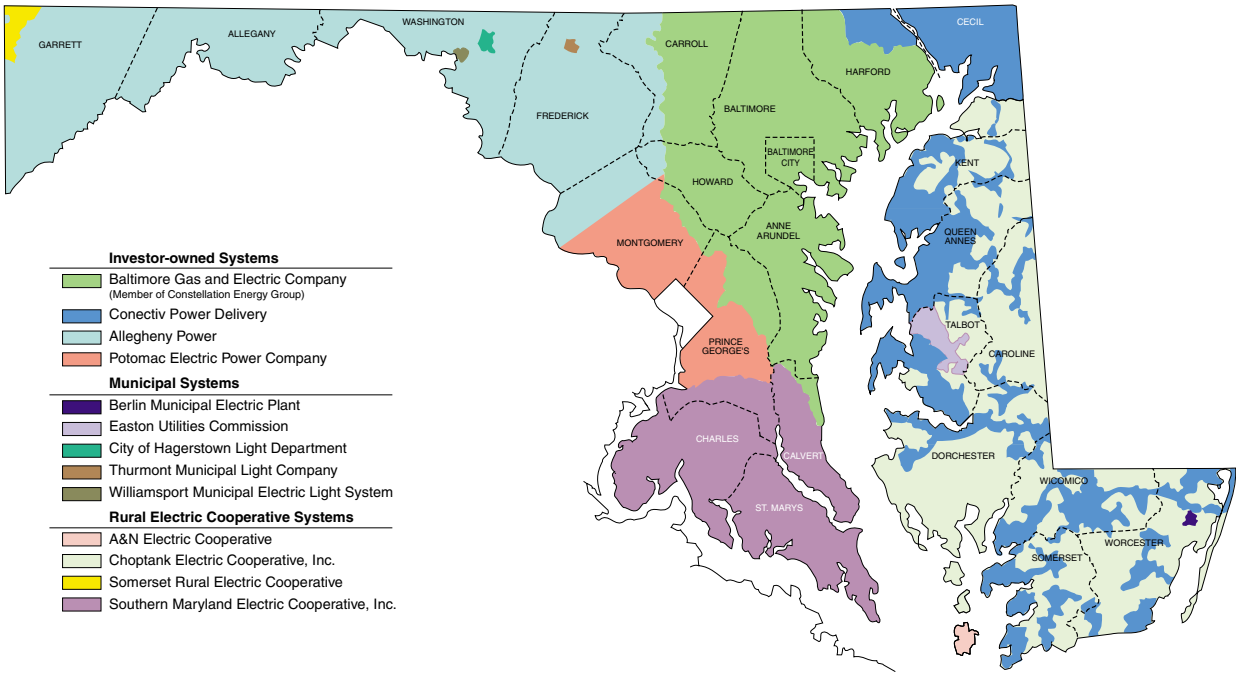
Baltimore Gas and Electric (BGE), a subsidiary of Constellation Energy Group, serves approximately 1.1 million electricity customers in a 2,300 square-mile area that includes Baltimore City and the surrounding counties. In 2001, BGE served a peak demand of 6,490 MW.

The distribution utilities Potomac Electric Power Company (PEPCO) and Conectiv Power Delivery (Conectiv) are both subsidiaries of Pepco Holdings. PEPCO serves approximately 489,000 customers in 575 square-miles of Montgomery and Prince George's Counties, as well as additional customers in the District of Columbia. In 2001, the company delivered at peak approximately 4,200 MW to its Maryland customers. PEPCO has no major industrial customers. Its customer base does, however, include large commercial and government facilities, including the National Institutes of Health and Andrews Air Force Base. Conectiv serves

Load Serving Entities

Companies that sell electricity (also known as generation service) to retail consumers are referred to by PJM as Load Serving Entities (LSEs). LSEs must schedule generation to meet their load in the PJM-run wholesale market, purchase sufficient transmission capacity from PJM, and pay the cost of transmission congestion between their generation and load. LSEs must also arrange for the dedication of generation capacity in a quantity exceeding the maximum demand of their customers by a margin set by PJM (currently 17 percent). State law requires that LSEs must be approved by the Public Service Commission in order to serve retail customers.

Figure 2-8
Electricity Distribution Service Areas



approximately 181,000 customers in Maryland's portion of the Delmarva Peninsula and Harford County. Conectiv also serves customers in the Delaware and Virginia portions of the Peninsula, and customers in Atlantic City, New Jersey. Maryland customers account for approximately 30 percent of the company's retail energy deliveries. In 2001, Conectiv's Maryland customers had a peak demand of about 1,075 MW.

Municipally Owned — The largest of Maryland's municipal electric utility systems is the City of Hagerstown Light Department. It serves approximately 17,200 customers in a 9 square-mile area of Washington County. The other four municipal utilities are Berlin Municipal Electric Plant (serving about 1,800 customers), Easton Utilities Commission (9,100 customers), Thurmont Municipal Light Company (2,700 customers), and Williamsport Municipal Electric Light System (890 customers). The municipalities of Berlin and Easton each possess some of their own generating capacity whereas the rest purchase their customer requirements from the market.

Cooperatively Owned — Southern Maryland Electric Cooperative (SMECO) serves approximately 123,000 customers across 1,150 square miles of Charles, St. Mary's, Calvert, and Prince George's Counties. It owns one generating unit located at Mirant's Chalk Point site and purchases additional power from the market. The three other cooperatives, A&N Electric Cooperative (serving approximately 360 customers), Choptank Electric Cooperative (42,000 customers), and Somerset Rural Electric Cooperative (800 customers), do not possess any of their own generating capacity. Old Dominion Electric Cooperative (ODEC) is the wholesale power supplier to A&N and Choptank, as well as to ten other regional electric distribution cooperatives.