Appendix A
Permits and Approvals that May Be Required for a Power Plant in Maryland

Appendix A Permits and Approvals That May be Required for a Power Plant in Maryland

Under Maryland regulations, most of the air quality permits and approvals that power plants in Maryland are required to obtain to construct new power plants or modify existing power plants are incorporated into the Certificate of Public Convenience and Necessity (CPCN). For example, air quality Permits to Construct for minor power plant sources and Prevention of Significant Deterioration (PSD) permits for new major power plant sources in Maryland are part of the CPCN. As with all major source permits issued by the State, the U.S. Environmental Protection Agency (EPA) Region III is provided the opportunity to review and comment on the draft licensing conditions during the CPCN process. On the other hand, several of the permits and approvals that power plants in Maryland need to operate in Maryland are issued and enforced by the Maryland Department of the Environment (MDE). For example, facility-wide Title V Operating Permits are administered by MDE.

The CPCN also encompasses the water appropriation permitting process for a new power plant. Obtaining a CPCN grants a facility developer the right to withdraw ground water and surface water, and relevant permit conditions are incorporated into the CPCN (for instance, flow monitoring and reporting).

The table below lists the permits and approvals that may be required for a new power plant in Maryland. The shaded rows indicate those permits that are included within the CPCN. While there are several permits that are issued separately from the CPCN, PPRP evaluates the entire suite of environmental and socioeconomic impacts during the consolidated licensing process (described in Chapter 1 of this report). It should also be noted that the CPCN process supersedes local zoning requirements. PPRP considers land use compatibility and zoning designation as part of the overall site evaluation; however, a power plant applicant does not need to obtain formal zoning approval from the local planning authority.

List of Permits and Approvals Typically Required for Construction and Operation of Power Plants in Maryland

Subject	Description	Regulatory Entity Issuing Permit or Addressing Requirements in Maryland	Comments
CPCN	Certificate of Public Convenience and Necessity	Maryland Public Service Commission (PSC)	Incorporates several State and federal permits and approvals — those incorporated into CPCN are highlighted
AIR QUALITY			
Air Quality Permit to Construct	Applies to any minor new, modified, or reconstructed sources of air pollution	PSC/Maryland Department of the Environment (MDE)	Constitutes "minor NSR construction permit"
Nonattainment Area New Source Review (NA-NSR) Approval	Required for major new or modified major sources in nonattainment areas; in MD covers VOCs & NO_x (for ozone) and PM2.5	PSC/MDE	Requires LAER, offsets, and alternatives analyses
Prevention of Significant Deterioration (PSD) of Air Quality	Required for major new or modified sources in attainment areas	PSC/MDE	Requires air quality monitoring, BACT, ambient impact and Class I area impact analyses
Title V Operating Permit	Facility-wide permit to operate	MDE	Application may be filed simultaneously with CPCN
Title IV - Acid Rain Permit	Covers "affected" power plant generating units	MDE	Requires continuous emission monitoring, recording and reporting; acquisition of SO_2 allowances
Clean Air Act Section 112(r)	Risk management plan for ammonia storage and other toxic substances listed in the rule	EPA	Could affect facilities that use ammonia in SCR systems to control NO_x
Combustion Turbine MACT	Required for new combustion turbines as major sources of hazardous air pollutants (HAPs)	PSC/MDE	Affects CTs that use fuel oil alone or in combination with natural gas

Note: Yellow highlighted rows indicate those permits and approvals that are incorporated into the CPCN.

Subject	Description	Regulatory Entity Issuing Permit or Addressing Requirements in Maryland	Comments
WATER QUALITY AND USE			
Erosion/Sediment Control Plan Approval	Plan to prevent erosion and stormwater pollution during construction	County	Required before construction disturbing 5,000+ square feet of area
Storm Water Management Plan	Plan to prevent storm water pollution associated with industrial activities.	County	Required prior to discharging storm water associated with industrial activity
Surface Water Discharge/ NPDES Permit	Combined state and federal (NPDES) permit for industrial wastewater and possibly storm water discharge to state waters. Must meet applicable federal effluent guidelines and satisfy state water quality standards. Must demonstrate compliance with new Section 316(b) regulations regarding surface withdrawals as well.	MDE	Individual NPDES permits may include discharge of storm water associated with industrial activities. If not, facility must apply for a general permit for these activities. The permit application is due 180 days before discharge commences.
General Storm Water Permit (Industrial Activity)	For discharges associated with industrial activity	MDE	MDE determines whether a facility can operate under a general storm water permit
General Storm Water Permit (Construction Activity)	For discharges associated with construction activity	MDE	For activities disturbing greater than 1 acre; MDE determines whether a facility can operate under a general storm water permit
Wellhead Protection Program	Ground water protection	State/municipal authority/county	Applies to public water supply wells and wells in ground water management areas
Water and Sewerage Construction Permit	Required before installing, extending or modifying community water supply and/or sewerage systems including treatment plants, pumping stations and major water mains and sanitary sewers	MDE, Water Quality Infrastructure Program	Required to ensure that infrastructure projects throughout the State are designed on sound engineering principles and comply with State design guidelines to protect water quality and public health

Note: Yellow highlighted rows indicate those permits and approvals that are incorporated into the CPCN.

Subject	Description	Regulatory Entity Issuing Permit or Addressing Requirements in Maryland	Comments
Sanitary Sewer Permit/Industrial User's Permit	For plant sanitary or process waste disposal to municipal facilities, a WWTP Permit must be obtained from the Publicly Owned Treatment Works (POTW)	Municipal Authorities	
Health Department Permit	If septic tanks are used for sanitary waste, a Health Department Permit must be obtained	County	
Spill Prevention Control and Countermeasure (SPCC)/Storage tank regulations	Plan to prevent and manage accidental spills of petroleum products stored on site	MDE	Typical threshold quantities of petroleum products: 1,320 total above ground gallons (for tanks 55 gallons or greater), and 4,200 gallons underground
Oil Operations Permit	State permit required for the operation of oil storage tanks	MDE	Required for storage of 10,000+ gallons of oil
Dam and Reservoir Safety Permit	If applicable, for any lake or pond used for non-process water	MDE	640 acre drainage area, 20 foot or greater embankment, high hazard class, natural trout water
Maryland Water Quality Certification	CWA Section 401, for construction in wetlands	MDE	Wetland impact determination necessary
Surface Water Withdrawal Permit/ Water Appropriation & Use Permit	Water Appropriation and Use is tracked by a Water Management Administration Permit	PSC/MDE	The appropriation of surface water is incorporated within the CPCN
Water Supply Line Permits	A variety of Clean Water Act permits, SHPO clearance, NRCS consultation, floodplain permitting, road boring permits	County	
Tidal Wetland Permit	Joint state-federal review and permitting for tidal wetland impacts	PSC/MDE Water Management Administration (WMA)	Wetland impact determination

Note: Yellow highlighted rows indicate those permits and approvals that are incorporated into the CPCN.

Subject	Description	Regulatory Entity Issuing Permit or Addressing Requirements in Maryland	Comments
Non-Tidal Wetlands Permit	Joint state-federal review and permitting for non-tidal wetland impacts	MDE Water Management Administration (WMA)	Wetland impact determination necessary
Facility Response Plan	For oil pollution prevention	EPA Regional Administrator	All owners/operators of non-transportation related onshore facilities with greater than 1,000 gallons of oil on-site and the potential to discharge oil into navigable waters must prepare and submit plan
Consumptive Use Review and Approval Process	Required for new consumptive water uses in the Susquehanna River basin	Susquehanna River Basin Commission (SRBC)	Requires approval by SRBC if consumptive use of water exceeds average of 20,000 gallons per day for any consecutive 30-day period
Ground Water Withdrawal	Required for any ground water withdrawal; ground water appropriation and use is tracked by a Water Management Administration Permit	PSC/MDE	Requires submittal of application to Water Management Administration for any withdrawal of ground water; must conduct impact assessment
OTHER APPROVALS AND NOTIFICATIONS			
Local building permits during construction	To be filed as necessary with County	County	For on-site buildings
Phase II Cultural Resources Investigation	Research potential significant impacts to cultural resources on site	MHT	Coordinate with MD State Historic Preservation Officer if necessary
Threatened and Endangered Species Clearance	Field investigations and data research	MDNR Heritage and Biodiversity Conservation Programs	Coordinate with US Fish & Wildlife Service and MDNR
Stack or Turbine Height Notification (FAA)	Notify Federal Aviation Administration (FAA) of stack or turbine height	FAA	200 feet above ground level and higher stacks or wind turbine structures

Note: Yellow highlighted rows indicate those permits and approvals that are incorporated into the CPCN.

Subject	Description	Regulatory Entity Issuing Permit or Addressing Requirements in Maryland	Comments
Oversize Equipment Delivery Permit	For delivery of oversize and/or super loads of construction equipment from rail to site	Maryland Department of Transportation	Threshold (only 1 needs to be exceeded to trigger permit) 16 ft. wide, 16 ft. high, 150 ft. overall length, 132,000 lb. weight
New Roadway Access Permit	To cover new road to plant	Maryland Department of Transportation	Letter of request, location sketch, overall site plan, scaled drawings, grading and drainage plan, entrance plan and method of restoring disturbed land
Solid Waste Disposal Permit for Construction and Demolition Debris	For removal and disposal of solid waste during construction	County	If waste is taken off site, it must be taken to a properly permitted facility

Note: Yellow highlighted rows indicate those permits and approvals that are incorporated into the CPCN.

Appendix B
Determinants of Electricity Demand Growth in Maryland

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PPRP has historically conducted a program of independent electric load forecasts as part of its efforts to both monitor the adequacy of future power supplies and to independently evaluate the potential for excess generating capacity. With the restructuring of the retail electric industry in Maryland brought about by the enactment of the Maryland Electric Customer Choice and Competitive Act of 1999, the preparation of load forecasts (energy sales and peak demands) for the individual investor-owned electric utilities operating within Maryland is not sufficient to provide the information required to assess the adequacy of planned supply.

Under restructuring, the primary issues relating to power supply affecting Maryland consumers are the adequacy of generating capacity and the adequacy of transmission system capacity. The issue of excess generating capacity was of extreme importance under historical regulatory arrangements since captive ratepayers shouldered the cost burden of the excess generating capacity. Under restructuring, ratepayers no longer bear the cost of excess capacity, but certain non-monetary costs (e.g., socioeconomic and environmental impacts) are potentially imposed on Maryland from excess generating capacity. To assess and monitor the sufficiency of generating and transmission capacity, PPRP has modified its load forecasting program. Rather than focusing on the individual electric utilities serving consumers in the state, PPRP now forecasts energy requirements and peak demands for the state as a whole and for the various regions within the state.

The PPRP forecast studies, including those historically performed for the service areas of the individual utilities as well as the state-wide forecast, use economic theory as the organizing principle to model the demand for electricity, and rely on econometric methods for estimation and projection. The data that are used to run these models, both historical and projected, are comprised of variables assumed *a priori* to significantly affect the demand for electricity. Economic variables include income, the price of electricity, and employment; non-economic variables include population and weather. Historical information is required for estimation purposes, while projected data are necessary to forecast the demand for power econometrically.

This appendix provides an overview of the basic theoretical foundations upon which these forecast studies rest, and an analysis of the trends of some of the economic and non-economic determinants of the demand for electricity. The Maryland data presented here have been obtained from the Maryland Department of Planning, the Bureau of Economic Analysis of the U.S. Department of Commerce, and the Bureau of Labor Statistics of the U.S.

Department of Labor. For comparison, some national data are also included. The national data were obtained from the U.S. Departments of Commerce and Labor.

This appendix is composed of five sections. The following section presents a brief discussion of the theoretical foundations used for modeling the demand for electricity econometrically. This section sets the stage for the rest of the appendix, which examines economic and demographic trends for Maryland by region. For purposes of presentation, the state has been divided into five regions, as shown in Table B-1. These regions correspond to the regional definitions used in the PPRP state-wide forecast, but differ from those used by the Maryland Department of Planning.* The section covering the theoretical foundations is followed by a section discussing trends in per capita income which in turn is followed by a section discussing trends in employment. Trends in population and the number of households follow the employment section. The final section presents a brief summary.

Theoretical Foundations for Econometrically Modeling the Demand for Electricity

The PPRP forecast studies use the economic theory of demand as the organizing principle to econometrically model the demand for electricity. The total demand for any good or service, including electricity, is simply the sum of the demands of the individual consumers in the market. The portion of market demand for residential use of electricity is driven by factors to which individual residential consumers are sensitive. Similarly, for the commercial and industrial sectors of the market demand for electricity, the factors affecting demand are those to which producers are sensitive.

In the case of residential demand, electricity forms part of the basket of goods and services purchased by the consumer. The residential demand for electricity is assumed to result from the exercise of choice by which the consumer maximizes his welfare subject to a budget constraint. Consumer demand for electricity is taken to be a function of its price, consumer income, weather, and the price of related commodities (i.e., substitutes and complements). It is important to note that electricity, in and of itself, conveys no benefits to the consumer. Rather, the consumer benefits from the services of the stock of appliances that require electricity. These services include space conditioning, refrigeration, cooking, clothes washing and drying, and numerous other services and functions. Consequently, the demand for electricity can be appropriately viewed as a derived demand; that is, it results from the demand for the services provided by electricity-consuming appliances.

For commercial and industrial customers, electricity is a factor of production, i.e., an input. In the PPRP forecast studies, the demand for electricity is assumed to

* The Maryland Department of Planning divides the state into six regions (the Eastern Shore is separated into Upper and Lower Eastern Shore). Further, Frederick County is included in the Washington Suburban region whereas the state-wide forecasting methodology places Frederick County in the Baltimore region.

result from decisions made by the producer to maximize profits. For the profit-maximizing producer, demand for a commodity (including electricity) is driven by its price, the price of related inputs, and the level of output. Producer demand for electricity is also driven by other factors, including weather.

Both the residential and non-residential demand for electric power are discussed above in terms of the individual consumer or producer. The market demand for electric power, for example, in Maryland or within regions in Maryland, is also dependent on the number of consumers (households) and the level of goods and services produced in the region. Residential demand is therefore forecasted on a per-customer basis which, when multiplied by the projected number of residential customers, provides a forecast of total residential demand. Commercial and industrial electric sales are projected per employee, which is then multiplied by the number of forecasted employees to project total commercial and industrial demand for electricity. Employment is used in lieu of, and as a proxy for, output since no satisfactory time series of output data are available at a suitably disaggregated level.

Per Capita Income Trends

Income is an important determinant of the residential demand for electricity, and changes in income will affect the quantity of electricity purchased. Changes in income affect electric power consumption in two ways. First, a change in income will induce a change in the intensity of use of the existing stock of electricity-consuming appliances. Second, an income change will induce changes in the stock of electricity-consuming appliances. As income changes, therefore, the demand for electricity will rise or fall. The PPRP forecast studies demonstrate a positive and, typically, statistically significant relationship between income and the residential demand for electricity.

The PPRP forecast studies (the historical service area forecasts as well as the state-wide forecasts conducted following industry restructuring) use real (i.e., inflation adjusted) per capita income as an explanatory variable. Real per capita income figures are reported in Table B-2 for the Maryland regions defined in Table B-1. Table B-2 summarizes historical and projected data as well as average annual growth rates for the period 1985 through 2015. As shown by the historical data, all regions within the state, with the exception of Western Maryland, experienced a substantial slowing in the growth of real per capita income during the 1995 to 2005 period in comparison to the 1985 to 1995 period. For the state as a whole, growth in real per capita income declined to 1.71% per year between 1995 and 2005, compared to an average annual growth rate of 2.36% between 1985 and 1995. The projections for the 2005 to 2015 period are generally lower than the rates experienced during both the 1985 to 1995 period and the 1995 to 2005 period. Between 2005 and 2015, real per capita income is expected to increase at an average annual rate of 1.56% for the state as a whole. The most rapid increase in real per capita income is expected in the Southern Maryland region (1.83% per year), with the slowest growth over the 2005 to 2015 period projected for the Washington suburban region (1.42% per year).

Employment Trends

The non-residential demand for electricity is largely driven by the level of output. The PPRP forecast studies, however, do not use output as an explanatory variable because quarterly output data at the county level are not available on a consistent basis. Hence, a proxy for output must be used. Non-farm employment has typically been relied upon for this purpose. It is a sound alternative and it is not subject to data consistency problems. Employment data by major employment sector are reported in Table B-3.

Table B-3 reports historical employment for Maryland for 1990 and 2000 and projected employment for 2005, 2010, and 2015. As shown in Table B-3, every region of the state is expected to experience employment growth. Growth is projected to be most rapid in the Southern Maryland region and slowest in Western Maryland and Baltimore, which is consistent with recent historical relationships. For the state as a whole, average annual growth in employment for the 2000 to 2010 period is expected to be slightly higher than the growth over the 1990 to 2000 period (1.30% per year compared to 1.14%). Growth in employment for all of the regions in Maryland during the 2000 to 2010 period is projected to be higher than experienced during the 1990's, with the exception of Southern Maryland and Western Maryland.

Population Trends

Population is an important causal variable in the PPRP electricity consumption forecast models because population trends are used to project the number of residential customers. Two demographic concepts closely related to population are the number of households and average household size. These concepts can be important since the number of households affects the number of residential customers purchasing electricity, and changes in average household size can affect usage per customer. Population growth and the rate of household formation are closely related, and both affect the residential use of electricity. Increases in population lead to increases in the number of households (and hence residential customers) although rates of change need not coincide due to changes in the size of households. Population and household data are reported in Tables B-4 and B-5.

Population data at regional and state levels are reported in Table B-4. The table summarizes historical and projected data, as well as average annual rates of growth for the period 1985 through 2015. The rates of growth in population have been positive since 1985 for every region of Maryland. Between 1995 and 2005, population growth in Maryland has been 1.11% per year on average. The growth in population for the state is projected to slow to approximately 0.78% between 2005 and 2015. The pattern of slowing growth for the state as a whole also characterizes the expected pattern of growth in most of the five separate regions. The exception is Western Maryland. In Western Maryland, growth in population increased at an average annual rate of 0.53% between 1995 and 2005 compared to average annual growth of 0.37% between 1985 and 1995. Forecasted population is expected to grow at an average annual rate of 0.40% between 2005 and 2015.

Western Maryland population represents about 4% of total state population. Consequently, the population growth rate trend for this region does not significantly affect the trend expected for the state as a whole.

Projected growth in the Baltimore region shows a different pattern of expected change. Between 1995 and 2005, population in the Baltimore region grew at an average annual rate of 0.86%; the growth rate is projected to decline over the 2005 to 2015 period to about 0.67% per year.

As suggested by the discussion of population growth in Western Maryland and the Baltimore region, the rates of growth in population are uneven across the state. Historically, the largest growth rates were reported for Southern Maryland and the smallest rates for Western Maryland. Between 1985 and 1995, the population growth rate for Southern Maryland was approximately 7 times that of Western Maryland. While disparities are expected to continue, it is anticipated that there will be a narrowing of the growth rate differentials over the 2005 to 2015 period compared to the earlier period.

Household data for the state and for regions within the state are shown in Table B-5. The table shows a summary of historical and projected data, as well as average annual rates of growth for the period 1985 through 2015. Average annual growth for the state in the number of households was 1.55% between 1985 and 1995, declined to 1.30% between 1995 and 2005, and is expected to further decline to approximately 1.05% through 2015. The pattern of slowing growth in the number of households for the state also characterizes the pattern of growth in each of the five regions of Maryland. As was the case for population, growth in the number of households is projected to be most rapid in Southern Maryland and least rapid in Western Maryland.

Since 1985, household size in each of the five Maryland regions has been declining, and the rate of decline is forecasted to increase slightly. For the state, the average household size was 2.74 people in 1985, declined to 2.64 in 1995 (representing an average rate of decline of about 0.40% per year) and further declined to 2.58 in 2005 (a decline of 0.21% per year, on average, compared to 1995). The rate of decline is expected to be approximately 0.29% per year between 2005 and 2010. The largest declines in average household size are projected for Southern Maryland and the smallest for Western Maryland.

Summary

This appendix provides a review of the theoretical foundations used for modeling the demand for electricity econometrically in the PPRP forecast studies. In doing so, emphasis is placed on some of the key determinants of the demand for electric power. The determinants of demand are classified into residential and non-residential, as well as into economic and non-economic for purposes of exposition. Per capita income is an explanatory economic variable that influences the residential demand for electricity; population, the number of households, and average household size are non-economic explanatory variables affecting residential electricity consumption. This appendix also shows trends in employment, which affect the non-residential demand for electricity. Selected data on these determinants of demand are reported and trend analyses

presented. The broad conclusion to emerge from these trends is that the demand for electricity should continue to grow in Maryland.

Table B-1 Principal Regions in Maryland

Region	Counties	Predominant Electric Distribution Utility
Baltimore	Anne Arundel Baltimore Baltimore City Carroll Frederick Harford Howard	Baltimore Gas and Electric Company
Washington Suburban	Montgomery Prince George's	Potomac Electric Power Company
Southern Maryland	Calvert Charles St. Mary's	Southern Maryland Electric Cooperative
Western Maryland	Allegany Garrett Washington	Potomac Edison Company
Eastern Shore	Caroline Cecil Dorchester Kent Queen Anne's Somerset Talbot Wicomico Worcester	Delmarva Power and Choptank Electric

Table B-2 Historical and Projected Per Capita Income for Maryland, 1985-2015 (Dollars)

Region	1985	1995	2005	2015	Annual Rate of Growth (%) 1985-1995	1995-2005	2005-2015
Maryland	24,751	31,257	37,033	43,236	2.36%	1.71%	1.56%
Baltimore	23,925	29,988	36,137	42,417	2.28%	1.88%	1.62%
Washington Suburban	29,119	36,823	42,303	48,729	2.38%	1.40%	1.42%
Southern Maryland	21,191	27,660	33,525	40,171	2.70%	1.94%	1.83%
Western Maryland	17,999	21,367	25,630	30,113	1.73%	1.84%	1.62%
Eastern Shore	19,209	25,031	29,953	35,281	2.68%	1.81%	1.65%

Prepared by the Maryland Department of Planning, Planning Data Services, May 2004. Historical data, 1970 - 2000 from the U.S. BEA.

Table B-3 Historical and Projected Employment for Maryland, 1980 – 2015 (Thousands)

Region	Total Nonfarm Employment 1980	1990	2000	2005	2010	2015	Annual Rate of Growth (%) 1980-1990	1990-2000	2000-2010	2010-2015
Maryland	2,074.5	2,759.9	3,091.5	3,268.7	3,518.7	3,650.9	2.90	1.14	1.30	0.74
Baltimore	1,177.5	1,475.8	1,633.1	1,711.4	1,825.4	1,883.1	2.28	1.02	1.12	0.62
Washington Suburban	614.6	892.5	992.3	1048.0	1,136.4	1,185.8	3.80	1.07	1.37	0.85
Southern Maryland	51.0	93.0	125.4	144.4	162.5	175.2	6.19	3.03	2.63	1.52
Western Maryland	97.0	117.7	131.3	135.6	143.8	146.3	1.95	1.10	0.91	0.35
Eastern Shore	140.5	180.8	209.8	229.3	250.6	260.5	2.56	1.50	1.79	0.78

Source: Maryland Department of Planning, Planning Data Services, July 2004.

Table B-4 Historical and Projected Population for Maryland, 1985–2015 (Thousands)

Region	1985	1995	2005	2015	Annual Rate of Growth (%) 1985-1995	1995-2005	2005-2015
Maryland	4,480	5,025	5,611	6,061	1.15	1.11	0.78
Baltimore	2,385	2,595	2,828	3,024	0.85	0.86	0.67
Washington Suburban	1,358	1,577	1,792	1,941	1.51	1.29	0.80
Southern Maryland	195	253	322	375	2.63	2.44	1.53
Western Maryland	222	230	243	253	0.37	0.53	0.40
Eastern Shore	319	369	425	467	1.45	1.44	0.95

Prepared by the Maryland Department of Planning, Planning Data Services, May 2004.

Table B-5 Historical and Projected Number of Households and Average Size of Households in Maryland, 1985-2015

Region	1985	1995	2005	2015	Annual Rate of Growth (%) 1985-1995	1995-2005	2005-2015
	Number of Households (thousands)						
Maryland	1,595	1,859	2,116	2,349	1.55	1.30	1.05
Baltimore	853	971	1,088	1,201	1.31	1.14	0.99
Washington Suburban	483	575	653	724	1.76	1.29	1.0
Southern Maryland	62	86	114	138	3.31	2.89	1.91
Western Maryland	81	87	94	100	0.72	0.73	0.59
Eastern Shore	116	140	166	187	1.88	1.73	1.19
	Average Household Size						
Maryland	2.74	2.64	2.58	2.51	-0.40	-0.21	-0.29
Baltimore	2.73	2.60	2.53	2.44	-0.47	-0.30	-0.33
Washington Suburban	2.77	2.70	2.70	2.63	-0.24	-0.02	-0.24
Southern Maryland	3.10	2.90	2.78	2.67	-0.6	-0.42	-0.39
Western Maryland	2.61	2.48	2.40	2.35	-0.52	-0.30	-0.25
Eastern Shore	2.66	2.54	2.47	2.41	-0.46	-0.30	-0.26

Prepared by the Maryland Department of Planning, Planning Data Services, May 2004. Projections for the Baltimore Region based on Round 6A from the Baltimore Metropolitan Council of Government's Cooperative Forecasting Committee. Projections for the Washington Suburban and Southern Maryland Regions based on Round 6.4 of the Metropolitan Council of Government's Cooperative Forecasting Committee.

Appendix C
Statewide Forecast of Energy Consumption and Peak Demand in Maryland

Appendix C Statewide Forecast of Energy Consumption and Peak Demand in Maryland

Introduction

From the early 1980s through the enactment of Maryland's Electric Customer Choice and Competition Act of 1999, the Power Plant Research Program (PPRP) has undertaken the development of independent, long-range forecasts of electric energy sales and peak demands for each of the four investor-owned electric utilities that operated in the state.* With the enactment of competitive restructuring, Maryland's traditional electric utilities no longer had the responsibility of ensuring adequate electricity generation in their respective service areas. As a consequence, developing independent forecasts of electric energy sales and peak demands on a utility-by-utility basis no longer served the purpose of allowing an independent assessment of utility planning to meet future power supply requirements. The availability of generating capacity to meet the state's power needs, however, remains a concern. To accommodate the new electric utility industry structure, PPRP has modified its forecasting to take instead a statewide approach to forecasting demand.

This appendix provides the results of the most recent (2005) statewide forecast of electric energy consumption and peak demand in Maryland. The statewide totals developed through the forecasting process were disaggregated by region within the state, thus providing projections of energy consumption and peak demands in each of the following regions: Maryland's Eastern Shore, the Baltimore region, the Washington suburban region, Southern Maryland, and Western Maryland. For the state as a whole and for each of the regions, base case, high case, and low case forecasts were prepared. Only the base case results are presented in this appendix.

* The four investor-owned electric utilities operating in Maryland through the enactment of the 1999 legislation were Baltimore Gas and Electric Company, Potomac Electric Power Company, Delmarva Power and Light Company, and Potomac Edison Company.

Methodological Summary

The forecast of energy consumption was predominantly developed using econometric techniques. Econometrics is an approach that provides estimates of the quantitative relationships between historical levels of a dependent variable, in this case energy consumption, and historical values of those factors that importantly influence the dependent variable. The factors importantly influencing energy consumption include income, the price of electricity, weather, and employment. By forecasting the values of the factors that affect electric energy consumption and inserting those forecasted values into the estimated econometric equations that relate those factors to energy consumption, a projection of energy consumption can be developed.

Econometric forecasting models were developed for the following categories of energy consumption in Maryland:

1. Residential;
2. Commercial;
3. Industrial; and
4. Streetlighting.

The econometric models were developed using the electricity consumption data from Baltimore Gas and Electric (BGE), PEPCO, Delmarva Power and Light, Potomac Edison, and the Southern Maryland Electric Cooperative. The data were adjusted upwards to reflect the electricity consumption in the areas served by the small electricity providers in the state. Non-econometric techniques were used to develop forecasts of consumption for BGE's natural gas operations, Mittal Steel's Sparrows Point plant, Amtrak, Eastalco Aluminum Company, and electric company own-use and losses.

Energy Consumption Projections

The base case projections of energy consumption for the state and the various regions in the state are shown in Table C-1, below. The base case forecast is developed using a set of forecasting assumptions regarding future growth in the factors that affect energy consumption (e.g., income, price) that are judged to represent the most reasonable path of growth for those variables over the 2003 to 2013 forecast horizon.

Table C-1 Maryland and regional electric energy consumption -- base case (thousands of MWh)

	Maryland	Baltimore Region	Washington Suburban	Southern Maryland	Western Maryland	Eastern Shore
2003*	64,847	34,574	15,042	3,100	6,760	5,371
2005	67,637	35,956	15,790	3,327	6,931	5,633
2007	69,162	36,473	16,320	3,507	7,031	5,831
2009	70,662	37,065	16,857	3,666	7,041	6,035
2011	72,007	37,646	17,307	3,798	7,040	6,217
2013	73,112	38,131	17,644	3,901	7,064	6,372
Average Annual Growth Rates (percent)						
2003-2005	1.41	1.32	1.63	2.39	0.84	1.60
2005-2007	0.75	0.48	1.11	1.77	0.48	1.16
2007-2009	0.72	0.54	1.08	1.49	0.04	1.15
2009-2011	0.63	0.52	0.88	1.19	0.00	1.00
2011-2013	0.51	0.43	0.64	0.90	0.11	0.82
2003-2008	1.52	1.23	1.97	2.97	0.89	2.01
2008-2013	0.90	0.74	1.24	1.69	0.00	1.44
2003-2013	1.21	0.98	1.61	2.33	0.44	1.72

*Actuals.

As shown in Table C-1, energy consumption in Maryland is projected to increase at an average annual rate of 1.21 percent between 2003 and 2013. Over the forecasting period, total energy consumption in the Southern Maryland region is projected to grow more rapidly (2.33 percent per year) than consumption in the other four regions. This result reflects relatively high demographic and economic projections for this region when compared to the rest of the state. The Western Maryland region has the slowest average annual growth rate of total energy consumption, a rate of 0.44 percent.

The 1.21 percent growth in energy consumption for the state over the 2003 to 2013 period compares with average annual growth in energy consumption of approximately 2.05 percent for the 1990 to 1999 period. The slower rate of growth in the forecast period relative to the historical period is largely attributable to the projected increases in the real price of electricity over the forecast period resulting from the expiration of fixed prices for power purchased from the local investor-owned distribution utilities that prevailed following implementation of the Act. The expiration of fixed prices, combined with market factors that have served to put upward pressure on wholesale electricity prices (e.g., fuel price increases) have resulted in significant increases in electricity

prices for those customer classes that have experienced the expiration of the fixed-price offerings. Additional price increases will be borne by those customers that continue to be served under the frozen rates, which are all set to expire early-to-midway through the forecast period.

Peak Demand Projections

Peak demand projections for Maryland are shown in Table C-2. Under the base case set of forecasting assumptions, Maryland peak demand is projected to increase at an average annual rate of 1.10 percent between 2003 and 2013.

Table C-2 Peak Demand Projections for Maryland

Maryland Base Case Forecasted Peak Demand (MW)		
Base Year	2003	13,475
	2013	15,333
Average Annual Growth Rates (percent)		
2003-2013		1.10

Appendix D
Internet Resources

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Federal Agencies

- Department of Energy (DOE): http://www.energy.gov/
  - Energy Prices & Trends: http://www.energy.gov/engine/content.do?BT_CODE=PRICESTRENDS
  - Office of Scientific and Technical Information (OSTI): http://www.osti.gov
  - National Renewable Energy Laboratory (NREL): http://www.nrel.gov

- Energy Information Administration (EIA), DOE: http://www.eia.doe.gov/
  - The Changing Structure of the Electric Power Industry 2000: An Update: http://www.eia.doe.gov/cneaf/electricity/chg_stru_update/update2000.html
  - Electric Power Industry Restructuring and Deregulations: http://www.eia.doe.gov/cneaf/electricity/page/restructure.html
  - Electricity Statistics: http://www.eia.doe.gov/fuelelectric.html

- Environmental Protection Agency (EPA): http://www.epa.gov/
  - Toxic Release Inventory (TRI) Program: http://www.epa.gov/tri/

- Federal Energy Regulatory Commission: http://www.ferc.gov/

- Nuclear Regulatory Commission: http://www.nrc.gov/

Maryland Agencies

- Maryland Department of the Environment: http://www.mde.state.md.us/

- Maryland Energy Administration: http://www.energy.state.md.us/

- Maryland Power Plant Research Program: http://www.dnr.state.md.us/bay/pprp/

- Maryland Public Service Commission: http://www.psc.state.md.us/psc/home.htm
  - Electric Choice Information: http://www.md-electric-info.com/

National & Regional Associations

- American Nuclear Society: http://www.ans.org/
- National Association of Regulatory Utility Commissioners (NARUC): http://www.naruc.org/
- National Rural Electric Cooperative Association: http://www.nreca.org/
- North American Electric Reliability Council: http://www.nerc.com/
- Nuclear Energy Institute: http://www.nei.org/
- PJM Interconnection: http://www.pjm.com/

Research

- Electric Power Research Institute (EPRI): http://www.epri.com/
- National Regulatory Research Institute (NRRI), NARUC: http://www.nrri.ohio-state.edu/

Power Industry

- AES: http://www.aes.com/aes/index?page=home
- Allegheny Energy: http://www.alleghenyenergy.com/
  - Allegheny Energy Supply: http://www.alleghenyenergysupply.com/
  - Allegheny Power: http://www.alleghenypower.com/
- Brascan Power Corporation: http://www.brascanpower.com/
- Constellation Energy: http://www.constellation.com/
  - Constellation Generation Group: http://www.constellation.com/generation/
  - Baltimore Gas & Electric Company: http://www.bge.com/
- Easton Utilities: http://www.eastonutilities.com/
- Exelon Companies: http://www.exeloncorp.com/
- Mirant: http://www.mirant.com/
- NRG Energy: http://www.nrgenergy.com/
- Old Dominion Electric Cooperative (ODEC): http://www.odec.com/

- Panda Energy International: http://www.pandaenergy.com/home.htm

- Pepco Holdings, Inc: http://www.pepcoholdings.com/
  - Pepco: http://www.pepco.com/
  - Delmarva Power: http://www.delmarva.com/dp/index.cfm
  - Atlantic City Electric: http://www.atlanticcityelectric.com/ace/index.cfm

- Southern Maryland Electric Cooperative: http://www.smeco.com/

- Trigen-Cinergy Solutions: http://www.cinergy-solutions.com/