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- Unit type (steam, combined-cycle, combustion turbine, cogeneration, etc.)
- Heat rate values and curve
- Summer and Winter Capacity
- Variable Operation and Maintenance costs (all values are in real 1999 \$s)
- Fixed Operation and Maintenance costs
- Forced and planned outage rates
- Minimum up and down times
- Quick start and spinning reserves capabilities
- Startup costs

We have developed heat rate curves for different units based on technology type and data points obtained from the data sources described below.

**Data Sources:** Our primary data source for generation characteristics is the 1998 NERC Electricity, Supply and Demand (ES&D) database, which contains unit type, fuel type (primary and secondary), capacity and heat rate data (heat rate data as of 1996). We use the 1998 NERC Generation Availability Data System (GADS) database as a reference for forced and unforced outage rates, which bases outage rates on plant type, size and vintage. We estimate operation and maintenance costs based on plant size, technology and age, and supplement our data with FERC Form 1 submissions, particularly for nuclear units. Fixed Operation and Maintenance (FOM) costs are based on FERC Form 1 historical data and represent averages values over three years, averaged by unit type and size units (FERC Form 1, average of years 1995 – 1997, tables: “Steam – Elec Gen Plant Stats (Large Plants)” and “Generating Plant Statistics (Small Plants)”). The resulting values are increased to account for general and administrative costs (around 20%), then reduced by a similar amount to account for competitive market response.

**Fuel Switching Methodology:** A number of generators have the ability to utilize a secondary fuel type. We have modeled this ability with the following methodology:

**Natural Gas Primary:** Units with natural gas as their primary fuel may burn fuel oil at most in one month of the year. Since our gas prices are highest in the month of January, we allow the unit to switch to fuel oil for the month of January, if the oil price at that location is lower than the natural gas price.

**Fuel Oil Primary:** Units that primarily burn oil may switch to gas whenever it is economically justified. However we assume natural gas shortages prevent this from happening in the winter months (November – March). Also we assume a 3% heat rate degradation results when the unit switches to natural gas. Therefore we switch the fuels in any month from April-October when the price of natural gas plus 3% is less than the price of fuel oil.

### A.3 Planned Additions and Retirements

**Description:** Planned entry and retirements impact the fuel mix of installed capacity and composition of plants on the margin, since most retirements are oil or coal plants, which are likely to be replaced by combined cycle gas plants. New entry before 2004 is based on existing projects in development or projects in advanced stages of permitting, as indicated by environmental permit applications and internal knowledge. After 2004, in addition to known projects, we add capacity based on economic criteria and market conditions. That is, we enter only as much capacity as is profitable.

Below is a list of planned new and expanding generating facilities in Wisconsin. There are no planned retirements in Wisconsin for the study period.

Planned New and Expanded Generating Facilities in Wisconsin									
Pool	Owner	Year	Full Name	State	Type	Date	Capacity	Comment	
MAIN	MGE	2000	West Marinette	WI	CTg	01Jun2000	93.2		
MAIN	WEPCO	2000	Germantown 5	WI	GTg	01Jan2000	95		
MAIN	WEPCO	2000	Neenah	WI	CTg	01Jun2000	350		
MAIN	WP&L	2000	WPL Substations	WI	ICo	01Jan2000	90		
MAPP	Dairyland Power	2001	Elk Mound 1	WI	GTgo	01Jun2001	48		
MAPP	Dairyland Power	2001	Elk Mound 2	WI	GTgo	01Jun2001	48		
MAIN	WEPCO	2001	Concord 1	WI	GTgo	01Jan2001	95	Upgrade	
MAIN	WEPCO	2001	Concord 2	WI	GTgo	01Jan2001	95	Upgrade	
MAIN	WEPCO	2001	Germantown 1	WI	GTg	01Jan2001	78	Upgrade	
MAIN	WEPCO	2001	Germantown 2	WI	GTg	01Jan2001	78	Upgrade	
MAIN	WEPCO	2001	Germantown 3	WI	GTg	01Jan2001	78	Upgrade	
MAIN	WEPCO	2001	Germantown 4	WI	GTg	01Jan2001	78	Upgrade	
MAIN	WP&L	2001	Addison	WI	WND	01Jan2001	30		
MAIN	Polsky	2001	RockGen	WI	CTg	01Jul2001	500		
MAIN	WEPCO	2001	Paris 1	WI	GTgo	01Jan2001	95	Upgrade	
MAIN	WEPCO	2001	Paris 2	WI	GTgo	01Jan2001	95	Upgrade	
MAIN	WEPCO	2002	Concord 3	WI	GTgo	01Jan2002	95	Upgrade	
MAIN	WEPCO	2002	Concord 4	WI	GTgo	01Jan2002	95	Upgrade	
MAIN	WEPCO	2002	Paris 3	WI	GTgo	01Jan2002	95	Upgrade	
MAIN	WEPCO	2002	Paris 4	WI	GTgo	01Jan2002	95	Upgrade	
MAIN	WP&L	2002	Rock River 7	WI	GTg	01Jun2002	150		
MAIN	WP&L	2002	Rock River 8	WI	GTg	01Jun2002	150		
MAIN	Manitowoc	2003	Manitowoc 7	WI	STc	01Jun2003	95		
MAIN	Badger	2003	Pleasant Prarie	WI	CCg	01Jun2003	524		
MAIN	Badger	2003	Pleasant Prarie	WI	CCg	01Jun2003	524		
MAIN	Polsky	2004	Depere Expansion	WI	CCg	01Jan2004	230	Upgrade	

We track planned and announced retirements from power pool load and capacity reports as well as trade press announcements. Nuclear retirements are critical to the analysis and are discussed next. In addition, we monitor the profitability of units for every model run and retire those units that are not profitable, based on their performance in the model and external judgment about the likelihood of those plants improving profitability in later years.

**Data Sources:** Wisconsin Public Service Commission for units in Wisconsin. For the rest of the Midwest we use environmental permitting data from State Departments of Environmental Protection (DEP) as our primary source of planned projects that have a reasonably high degree of certainty. We also incorporate trade press announcements, power pool load and capacity reports and internal knowledge in our analysis to compile this list.

#### **A.4 Nuclear Unit Analysis**

**Description:** We use a combination of market knowledge, the Nuclear Regulatory Commission's (NRC) watch list and economic performance as reflected in model runs to determine whether any nuclear units should be retired prior to their license expiration. We use a four-year ('94-'97) average of O&M costs and revenue projections from model runs to assess units' economic performance. In the current analysis, the Zion units are assumed retired.

**Data Sources:** NRC (Nuclear Regulatory Commission), trade press announcements, FERC Form 1 data (for O&M costs) (FERC Form 1, average of years 1995 – 1997, tables: "Steam – Elec Gen Plant Stats (Large Plants)" and "Generating Plant Statistics (Small Plants)"), and announced retirements in power pool load and capacity reports are used.

#### **A.5 Fuel Price Forecasts**

**Description:** GE MAPS takes as input the monthly fuel price for each plant. We model fuel-switching capability of dual-fuel units and the seasonality of gas prices in order to accurately simulate dispatch behavior and cost. Our fundamental assumption of bidding behavior in competitive energy markets is that generators will bid in their marginal cost into the energy market. The marginal cost is the opportunity cost of fuel purchased (in addition to variable O&M and environmental adders), or the spot price of gas at the location closest to the plant. We therefore use forecasts of spot prices at regional hubs, and further refine these based on historical differentials between price points and their associated hubs. For oil and coal we use estimates of the price delivered to generators on a regional basis.

**Data Sources:** We use the Annual Energy Outlook 2000 (AEO-2000) as a source of the primary natural gas and oil price forecasts.

**Natural Gas.** We use AEO-2000 forecast of wellhead gas prices to which we add a historical differential between wellhead and Henry Hub. Next, we use the Gas Research Institute's (GRI) forecast of basis differential between Henry Hub and other specific hubs in the United States [GRI Baseline Projection Date Book, 2000 Edition, Vol.II, pp PRC 42]. Finally, we have historical data of monthly gas prices at every price point in the US for the last 9 years, which we use to develop differentials over the hub spot price on a locational basis [Gas Daily database].

Fuel Oil. We use AEO-2000 forecast of Refinery Acquisition Costs in the U.S. and an in-house regression model to estimate corresponding distillate and residual oil prices at the Boston Harbor location. Finally, we rely on GRI's forecast of price differentials for distillate and residual oil to electric generators between New England and each of the twelve oil price regions in the U.S., as well as of Canadian provinces [GRI Baseline Projection Date Book, 2000 Edition, Vol.II, pp PRC 37-38].

Coal. We use a plant-by-plant forecast of coal prices delivered to electric generators developed by RDI.

Wisconsin Fuel Prices (1999\$)										
Forecast Year:	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Natural Gas	\$2.56	\$2.60	\$2.64	\$2.68	\$2.72	\$2.77	\$2.82	\$2.87	\$2.92	\$2.98
Distillate Oil	\$4.89	\$4.88	\$4.94	\$4.95	\$4.97	\$5.01	\$5.05	\$5.10	\$5.18	\$5.16
Residual Oil	\$3.42	\$3.44	\$3.46	\$3.48	\$3.49	\$3.51	\$3.53	\$3.54	\$3.56	\$3.58

## **A.6 Transmission System Representation**

**Description:** We model the entire Midwest transmission system, including transformers, lines, phase shifters and buses. Most of the data are provided with GE MAPS in the form of a solved load flow case (PTI file). We identify and monitor potentially binding lines, interfaces and single-line-loss contingency constraints for the purpose of defining congestion zones and assessing congestion costs. GE provided the initial set of lines based on their contingency analysis. We verified, refined and added to this list of monitored transmission lines, interface and contingency definitions based on the data sources shown below.

**Data Sources:** We use the following studies to refine and add to the transmission database provided by GE:

- FERC 715 filings and load flow cases (1998, 1999)
- NERC published total transfer capabilities and transmission studies (NERC 2000 Summer Assessment, Reliability of Bulk Electricity Supply in North America)
- MAIN 1999/00 Winter Transmission Assessment Study, MAIN 2000 Summer Transmission Assessment Study, MAIN 2002 Summer Future Systems Study
- Wisconsin Public Service Commission documents regarded transmission system upgrades

## **A.7 Environmental Regulations**

**Description:** We model both NO<sub>x</sub> and SO<sub>x</sub> environmental regulations. We have added VOM values associated with scrubbers (SO<sub>x</sub> reduction) and NCRs (NO<sub>x</sub> reduction) to units that have already installed such equipment, and will incorporate these VOM values in the marginal cost bids. Further, we have added to the marginal cost bids the

opportunity cost of SO<sub>x</sub> tradable permits for all units, based on their current emission rates, and current allowance trading prices. We have assumed the cost of SO<sub>x</sub> tradable permits to be \$200/ton of Sulfur emission.

*Current NO<sub>x</sub> Regulation:* In 1997, the EPA issued the NO<sub>x</sub> SIP (State Implementation Plan) Call, which would require 22 states and the District of Columbia in the Eastern U.S to submit plans to address the transport of ozone across state boundaries, primarily targeting utility and industrial boilers. This proposal followed in the footsteps of the Memorandum of Understanding (MOU) in the 12-state Northeast Ozone Transport Region (OTR), where states volunteered to reduce emissions to a level almost as stringent as the SIP Call by 2003, through institution of a cap-and-trade program. Under the SIP Call, each state, including states in the OTR, was assigned a budget for NO<sub>x</sub> emissions based on an emission rate of 0.15 lb/MMBtu and projected levels of generation from existing electric generators. The total budget in the 22-state region is 544,000 tons, which represents an average reduction in seasonal NO<sub>x</sub> emissions of over 60 percent by 2007. Originally, states were to file compliance plans by September 1999 and demonstrate attainment between 2003-2007. However, the D.C Circuit Court of Appeals ruling in May of 1999 suspended implementation of the SIP Call. Finally, on March 3, 2000 the same court largely upheld the SIP Call. The litigation was finally sealed on June 22, when the court denied re-hearing of the March 3<sup>rd</sup> decision. We therefore assume that implementation of the SIP Call will be delayed by one year to 2004.

*Data Sources:* We use EPA's Emission Inventory showing unit and plant heat input, NO<sub>x</sub> annual emissions and emission rates for power plants that are required to comply with the Acid Rain program. Capital costs for NO<sub>x</sub> abatement technology were obtained from EPA's Regulatory Impact Assessment report for the NO<sub>x</sub> Budget Program, originally provided by Bechtel Corporation.

## **A.8 Conventional Hydro and Pumped Storage Units**

*Description:* GE MAPS has special provisions for modeling hydro units. These data do not require any significant analysis or manipulation, except to provide seasonal patterns of water flow for conventional hydro units.

*Data Sources:* ES&D database is used for all hydro unit information. Data provided by the Wisconsin Public Service Commission were used for Wisconsin hydro units.

## **A.9 External Region Supply Curves**

The model explicitly models the full Midwest system, including imports from Manitoba, Saskatchewan, and the Northeast. The interaction with regions outside this study area is modeled as a series of thermal units. The thermal capacities of these representational units determine either the maximum export capability across tie lines to the Northeast, or the maximum generation capacity available for export from the outside area. We use

historic exports, combined with our expectation of future conditions in these areas, to project export levels and prices for each of the forecast years.

**Data Sources:** We use Load, Capacity, Energy, Fuels and Transmission Report, Northeast Power Coordinating Council (NPCC), 1998, Electricity Exports and Imports, National Energy Board, Canada, 1997.

## **A.10 NUG Contracts**

**Description:** We model all Non-Utility Generation units effectively as must-run units in the short term by assigning them a very low fuel cost. We include all NUGs in the Midwest. Recently, there have been many market and structural changes that affect these contracts and many utilities are considering or are in the process of re-negotiation of these contracts. If the re-negotiations are successful then the associated generation units will run based on their economics only and thus become dispatchable. We assume all the NUGs in the Midwest will be dispatchable after 2003.

## **A.11 Dispatchable Demand (Interruptible Load)**

**Description:** We include in our modeling a representation of interruptible load to capture the effects on electricity prices. The presence of demand response is important to the energy and installed capacity prices. In the energy market the value of energy to interruptible load caps the prices and the capacity of interruptible load effectively replaces installed reserves and lowers the capacity value.

We spread this dispatchable demand among companies based on their load share of the total system load (unless we have more detailed information). The dispatchable demand units are modeled as generators with a dispatch price of \$600/MWh for the first block (50% of company's dispatchable demand) and \$800/Mwh for the second block. These units rarely run in our model, as the high energy prices they require are assumed to indicate a supply shortfall and prompt new entry to meet the local demand. These units play an insignificant role in the energy market, but an important role in the capacity market. If these loads can truly be interrupted during peak hours, they will be paid the capacity market-clearing price. Thus they have strong incentives to make themselves available during peak hours. When these units are included in the calculation of the required reserve margin they reduce the requirement of installed capacity and thus reduce the new entry and help increase the energy prices consistent with market behavior.

**Data Sources:** We used interruptible load values based on NERC EIA-411 filings (1999). These data are subject to some uncertainty as utilities report a combination of interruptible load and Demand Side Management reduction in peak load and total energy. We then distribute the interruptible load uniformly among the Load Serving Entities.

## **A.12 Market Model Assumptions**

*Marginal Cost Bidding:* We assume all generation units bid marginal cost (opportunity cost of fuel plus VOM plus opportunity cost of tradable permits). It is reasonable to assume that the real markets are not perfectly competitive and thus our prices tend to underestimate the prices in the real markets.

*Installed Capacity:* The installed capacity requirements are shown in the "Pools Capacity Balance" table in section A.13.

*ISO Boundaries:* The unit commitment, dispatch and reserve requirements are maintained on a geographic basis considering the whole of the Midwest as an ISO. The imports/exports between the ISO and neighboring systems reflect economy energy purchase/sales and incur wheeling charges. Transactions within the ISO boundary do not incur any transmission charge (we assumed selling/buying from the pool, and the load pays the transmission charge irrespective where it buys its energy from within the pool).

*Operating Reserves (spinning and standby):* The operating reserves are based on the specific requirements instituted by each NERC region. These requirements are based on the loss of the largest single generator or the largest single generator and half the second largest generator. The spinning reserves market affects the energy market prices since the units that spin cannot produce electricity under normal conditions. The energy prices are higher when reserves markets are modeled.

### A.13 Load and Energy forecast

Wisconsin Load and Energy Forecast by Company										
Company	Peak Load 2001 (MW)	Total Energy 2001 (GWh)	Peak Load 2002 (MW)	Total Energy 2002 (GWh)	Peak Load 2003 (MW)	Total Energy 2003 (GWh)	Peak Load 2004 (MW)	Total Energy 2004 (GWh)	Peak Load 2005 (MW)	Total Energy 2005 (GWh)
Madison Gas & Electric	673	3,107	687	3,180	702	3,255	718	3,333	734	3,431
Upper Peninsula Power	144	893	145	902	146	911	147	921	148	930
Wisconsin Electric Power	5,646	30,704	5,775	31,290	5,904	31,875	6,034	32,459	6,182	33,221
Wisconsin Power and Light	2,327	12,441	2,384	12,748	2,430	12,996	2,487	13,302	2,542	13,592
Wisconsin Public Service	1,899	11,817	1,881	11,972	1,891	12,162	1,902	12,356	1,913	12,546
Wisconsin Public Power	556	3,450	569	3,526	582	3,604	595	3,678	607	3,753

Wisconsin Load and Energy Forecast by Company										
Company	Peak Load 2006 (MW)	Total Energy 2006 (GWh)	Peak Load 2007 (MW)	Total Energy 2007 (GWh)	Peak Load 2008 (MW)	Total Energy 2008 (GWh)	Peak Load 2009 (MW)	Total Energy 2009 (GWh)	Peak Load 2010 (MW)	Total Energy 2010 (GWh)
Madison Gas & Electric	750	3,534	767	3,563	782	3,634	798	3,706	814	3,780
Upper Peninsula Power	149	940	150	949	150	959	151	969	152	978
Wisconsin Electric Power	6,301	33,806	6,425	34,474	6,572	35,150	6,721	35,839	6,875	36,542
Wisconsin Power and Light	2,579	13,794	2,608	13,944	2,657	14,199	2,707	14,459	2,758	14,724
Wisconsin Public Service	1,922	12,738	1,932	12,922	1,942	13,098	1,952	13,277	1,963	13,458
Wisconsin Public Power	620	3,820	635	3,907	650	3,996	666	4,088	682	4,181



Pool Capacity Balance												
Pool	Category	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
MAIN	Total Internal Demand	48,542	49,135	49,763	50,505	51,362	52,249	53,059	53,747	54,606	55,410	56,226
	Interruptible Demand	2,377	2,433	2,450	2,457	2,464	2,469	2,472	2,477	2,482	2,482	2,482
	Net Internal Demand	46,165	46,702	47,313	48,048	48,898	49,780	50,587	51,270	52,124	52,928	53,744
	Reserve Margin %	15	15	15	15	15	15	15	15	15	15	15
	Load + Reserve	53,090	53,707	54,410	55,255	56,233	57,247	58,175	58,961	59,943	60,867	61,806
	Purchases	3,617	4,126	3,545	3,985	4,175	4,540	4,688	4,385	4,911	4,911	4,911
	Sales	1,970	1,122	1,001	786	757	724	410	350	330	330	330
	EIA411 Capacity	51,960	51,972	53,432	53,768	54,413	54,824	55,373	56,621	56,535	56,535	56,535
	New Entry	1,619	1,484	2,682	752	0	0	0	0	460	460	0
	Retirement	212	342	0	0	137	0	0	0	0	0	0
	MAPS Capacity	52,814	54,545	56,885	57,637	57,637	57,500	57,500	57,500	57,960	58,420	58,420
	<b>Balance</b>	<b>1,371</b>	<b>3,842</b>	<b>5,019</b>	<b>5,581</b>	<b>4,822</b>	<b>4,069</b>	<b>3,603</b>	<b>2,575</b>	<b>2,598</b>	<b>2,134</b>	<b>1,195</b>

## Appendix B. Structural Analysis Results

The following tables present the HHI results for all utility service territories in Wisconsin.

### B.1 Economic Capacity Test Results

#### B.1.1 HHI for EC Test: Wisconsin Public Power Service Territory

Year	Winter			Summer			Shoulder		
	Super-Peak	Peak	Off-Peak	Super-Peak	Peak	Off-Peak	Super-Peak	Peak	Off-Peak
2001	2,134	2,216	1,875	2,152	2,165	2,088	2,116	2,235	1,854
2002	2,244	2,292	1,868	2,120	2,135	2,313	2,250	2,396	1,852
2003	1,901	2,150	1,862	2,068	2,000	2,143	1,993	1,969	1,776
2004	1,647	1,974	1,420	1,791	1,649	1,710	1,632	1,709	1,873
2005	1,660	1,968	1,374	1,804	1,682	1,701	1,883	1,735	1,711
2006	1,630	1,788	1,381	1,766	1,642	1,668	1,700	1,719	1,370
2007	1,647	1,783	1,375	1,766	1,622	1,709	1,674	1,703	1,376

#### B.1.2 HHI for EC Test: Upper Peninsula Power Service Territory

Year	Winter			Summer			Shoulder		
	Super-Peak	Peak	Off-Peak	Super-Peak	Peak	Off-Peak	Super-Peak	Peak	Off-Peak
2001	2,143	2,236	1,553	2,180	2,187	3,006	2,159	2,366	1,549
2002	2,376	2,474	1,547	2,157	2,103	2,229	2,268	2,773	1,546
2003	1,987	2,226	1,543	2,078	1,958	2,207	1,961	2,092	1,466
2004	1,695	2,036	1,370	1,791	1,695	2,260	1,749	2,018	1,637
2005	1,718	1,957	1,303	1,662	1,691	2,225	1,690	2,174	1,304
2006	1,681	1,933	1,303	1,661	1,687	2,228	1,710	1,997	1,268
2007	1,710	1,928	1,298	1,821	1,646	2,205	1,712	1,966	1,265

### B.1.3 HHI for EC Test: Wisconsin Power & Light Service Territory

Year	Winter			Summer			Shoulder		
	Super-Peak	Peak	Off-Peak	Super-Peak	Peak	Off-Peak	Super-Peak	Peak	Off-Peak
2001	2,076	1,937	2,027	2,139	2,145	2,282	1,961	2,190	1,787
2002	1,992	2,351	1,885	2,133	2,167	2,208	2,241	2,235	1,863
2003	1,931	1,933	1,732	2,008	2,035	2,041	1,937	1,946	1,735
2004	1,724	1,675	1,354	1,772	1,627	1,839	1,650	1,702	1,728
2005	1,914	1,699	1,672	1,726	1,631	1,827	1,653	1,769	1,708
2006	1,768	1,665	1,649	1,723	1,635	1,830	1,627	1,694	1,645
2007	1,623	1,661	1,645	1,757	1,632	1,815	1,664	1,689	1,640

### B.1.4 HHI for EC Test: Madison Gas & Electric Service Territory

Year	Winter			Summer			Shoulder		
	Super-Peak	Peak	Off-Peak	Super-Peak	Peak	Off-Peak	Super-Peak	Peak	Off-Peak
2001	2,090	1,967	2,230	2,155	2,161	2,373	2,116	2,227	2,325
2002	1,932	2,355	2,605	2,147	2,153	2,318	2,094	2,395	2,602
2003	2,014	1,977	2,252	2,073	2,078	2,158	1,953	1,974	2,256
2004	1,782	1,716	1,861	1,774	1,707	1,886	1,804	1,718	1,827
2005	1,661	1,930	1,917	1,769	1,700	1,878	1,713	1,726	1,337
2006	1,672	1,703	1,800	1,769	1,768	1,872	1,674	1,703	1,372
2007	1,769	1,668	1,795	1,768	1,764	1,857	1,627	1,706	1,994

**B.1.5 HHI for EC Test: Wisconsin Public Service Service Territory**

Year	Winter			Summer			Shoulder		
	Super-Peak	Peak	Off-Peak	Super-Peak	Peak	Off-Peak	Super-Peak	Peak	Off-Peak
2001	2,084	2,133	1,875	2,153	2,168	2,144	2,142	2,168	1,910
2002	1,976	2,314	1,129	2,144	1,995	2,435	2,250	2,104	1,115
2003	2,018	2,194	1,906	2,066	1,944	1,782	1,946	1,960	1,112
2004	1,786	1,975	1,455	1,784	1,689	1,687	1,709	1,813	1,418
2005	1,644	1,887	1,398	1,752	1,684	1,675	1,681	1,699	1,373
2006	1,810	1,960	1,399	1,748	1,679	1,684	1,707	1,852	1,392
2007	1,761	1,955	925	1,736	1,675	1,669	1,672	1,872	1,374

**B.1.6 HHI for EC Test: Wisconsin Electric Power Service Territory**

Year	Winter			Summer			Shoulder		
	Super-Peak	Peak	Off-Peak	Super-Peak	Peak	Off-Peak	Super-Peak	Peak	Off-Peak
2001	2,116	2,144	2,901	2,182	2,187	2,295	1,993	2,184	2,913
2002	1,994	2,405	3,088	2,172	2,188	2,551	2,023	2,295	3,083
2003	2,155	1,975	2,881	2,094	2,111	2,166	1,980	1,981	2,792
2004	1,811	1,710	2,298	1,799	1,742	1,799	1,818	1,717	2,234
2005	1,828	1,741	2,223	1,799	1,739	1,793	1,690	1,713	2,271
2006	1,685	1,702	2,214	1,796	1,804	1,788	1,748	1,709	2,210
2007	1,680	1,681	2,260	1,793	1,801	1,732	1,683	1,701	2,203

**B.1.7 HHI for EC Test: Northern States Power (WI) Service Territory**

Year	Winter			Summer			Shoulder		
	Super-Peak	Peak	Off-Peak	Super-Peak	Peak	Off-Peak	Super-Peak	Peak	Off-Peak
2001	848	861	1,263	867	871	859	876	853	966
2002	819	877	1,225	869	828	892	872	871	944
2003	816	860	1,174	849	829	919	823	821	934
2004	812	859	1,090	844	817	926	807	852	889
2005	822	858	1,070	837	823	924	857	822	887
2006	874	867	1,077	882	845	914	853	868	1,034
2007	879	879	1,054	897	884	914	877	856	1,018

## B.2 Available Economic Capacity Test Results

### B.2.1 HHI for AEC Test: Wisconsin Public Power Service Territory

Year	Winter			Summer			Shoulder		
	Super-Peak	Peak	Off-Peak	Super-Peak	Peak	Off-Peak	Super-Peak	Peak	Off-Peak
2001	2,334	2,430	2,215	2,307	2,322	2,344	2,314	2,455	2,179
2002	2,466	2,540	2,209	2,284	2,301	2,630	2,474	2,646	2,177
2003	2,041	2,368	2,203	2,204	2,149	2,416	2,170	2,142	2,066
2004	1,740	2,127	1,572	1,882	1,752	1,847	1,729	1,827	2,050
2005	1,769	2,121	1,525	1,898	1,797	1,838	2,032	1,856	1,880
2006	1,724	1,917	1,530	1,854	1,745	1,808	1,818	1,840	1,517
2007	1,740	1,913	1,524	1,854	1,719	1,849	1,787	1,822	1,522

### B.2.2 HHI for AEC Test: Upper Peninsula Power Service Territory

Year	Winter			Summer			Shoulder		
	Super-Peak	Peak	Off-Peak	Super-Peak	Peak	Off-Peak	Super-Peak	Peak	Off-Peak
2001	2,309	2,456	1,829	2,341	2,349	3,557	2,366	2,652	1,823
2002	2,621	2,763	1,822	2,310	2,281	2,746	2,497	3,198	1,818
2003	2,163	2,467	1,815	2,217	2,112	2,725	2,131	2,348	1,745
2004	1,793	2,201	1,444	1,890	1,811	2,519	1,873	2,192	1,838
2005	1,837	2,121	1,377	1,759	1,808	2,482	1,805	2,421	1,377
2006	1,795	2,082	1,375	1,761	1,803	2,484	1,830	2,198	1,341
2007	1,830	2,078	1,371	1,918	1,751	2,461	1,832	2,137	1,337

### B.2.3 HHI for AEC Test: Wisconsin Power & Light Service Territory

Year	Winter			Summer			Shoulder		
	Super-Peak	Peak	Off-Peak	Super-Peak	Peak	Off-Peak	Super-Peak	Peak	Off-Peak
2001	2,215	2,099	2,282	2,291	2,299	2,513	2,129	2,404	2,071
2002	2,146	2,590	2,199	2,283	2,324	2,475	2,463	2,471	2,179
2003	2,094	2,097	2,003	2,156	2,175	2,274	2,102	2,118	2,008
2004	1,816	1,786	1,483	1,859	1,721	1,984	1,757	1,819	1,880
2005	2,060	1,816	1,829	1,815	1,724	1,975	1,762	1,898	1,860
2006	1,852	1,776	1,791	1,812	1,727	1,976	1,723	1,811	1,787
2007	1,726	1,772	1,787	1,851	1,724	1,957	1,776	1,807	1,782

### B.2.4 HHI for AEC Test: Madison Gas & Electric Service Territory

Year	Winter			Summer			Shoulder		
	Super-Peak	Peak	Off-Peak	Super-Peak	Peak	Off-Peak	Super-Peak	Peak	Off-Peak
2001	2,232	2,136	2,535	2,310	2,318	2,626	2,281	2,448	2,661
2002	2,095	2,598	3,028	2,299	2,308	2,617	2,256	2,649	3,024
2003	2,141	2,151	2,565	2,209	2,217	2,426	2,122	2,150	2,570
2004	1,868	1,834	2,037	1,862	1,802	2,041	1,896	1,838	2,000
2005	1,755	2,078	2,111	1,858	1,796	2,032	1,833	1,848	1,484
2006	1,785	1,821	1,969	1,859	1,865	2,027	1,788	1,822	1,513
2007	1,855	1,781	1,965	1,858	1,862	2,008	1,723	1,825	2,203

**B.2.5 HHI for AEC Test: Wisconsin Public Service Service Territory**

Year	Winter			Summer			Shoulder		
	Super-Peak	Peak	Off-Peak	Super-Peak	Peak	Off-Peak	Super-Peak	Peak	Off-Peak
2001	2,226	2,334	2,215	2,308	2,327	2,412	2,344	2,390	2,279
2002	2,127	2,562	1,361	2,294	2,168	2,835	2,474	2,343	1,353
2003	2,146	2,414	2,273	2,202	2,097	2,081	2,113	2,171	1,350
2004	1,873	2,128	1,611	1,874	1,803	1,829	1,827	1,958	1,570
2005	1,735	2,035	1,554	1,847	1,799	1,817	1,795	1,837	1,523
2006	1,902	2,111	1,554	1,842	1,793	1,831	1,826	2,000	1,547
2007	1,853	2,107	1,000	1,829	1,789	1,810	1,786	2,021	1,522

**B.2.6 HHI for AEC Test: Wisconsin Electric Power Service Territory**

Year	Winter			Summer			Shoulder		
	Super-Peak	Peak	Off-Peak	Super-Peak	Peak	Off-Peak	Super-Peak	Peak	Off-Peak
2001	2,258	2,342	3,387	2,336	2,343	2,521	2,157	2,389	3,404
2002	2,165	2,649	3,628	2,323	2,343	2,848	2,201	2,523	3,624
2003	2,299	2,142	3,367	2,231	2,250	2,374	2,149	2,151	3,255
2004	1,899	1,824	2,558	1,887	1,840	1,927	1,916	1,832	2,484
2005	1,960	1,860	2,472	1,889	1,836	1,922	1,789	1,828	2,531
2006	1,795	1,815	2,463	1,886	1,902	1,916	1,845	1,824	2,459
2007	1,774	1,792	2,512	1,883	1,899	1,853	1,781	1,816	2,451



**B.2.7 HHI for AEC Test: Northern States Power (WI) Service Territory**

Year	Winter			Summer			Shoulder		
	Super-Peak	Peak	Off-Peak	Super-Peak	Peak	Off-Peak	Super-Peak	Peak	Off-Peak
2001	836	848	1,235	855	859	848	864	841	953
2002	807	865	1,198	858	816	880	860	858	931
2003	804	847	1,148	838	817	906	811	809	921
2004	801	846	1,069	832	805	912	795	840	877
2005	810	846	1,050	825	812	911	844	811	875
2006	861	855	1,056	870	832	901	841	856	1,015
2007	866	867	1,034	884	872	901	865	844	1,002

**Appendix C. Illustrative Example of Strategic Bidding**

Illustrative Example of Strategic Bidding: Input Data

Supply

Firm # 1	Capacity (MW)	Variable Cost (\$/MWh)
1	1000	\$ 10.00
4	300	\$ 25.00
5	100	\$ 30.00
Total	1400	

Firm # 2	Capacity (MW)	Variable Cost (\$/MWh)
2	380	\$ 15.00
3	320	\$ 18.00
6	60	\$ 32.00
Total	760	

Demand	Capacity (MW)
Peak hour	2,130
Mid hour	1,850
Low hour	1,540

Bidding strategies Production Cost Bidding (PCB) vs. Strategic Bidding (SB)

Unit #	Cumulative Capacity	PCB		SB Bid_Price	Basis= Var.Cost	Plus impacts of other units on bid price of each unit					
		Bid_Price	Bid_Price			1	2	3	4	5	6
1	1000	\$ 10.00	\$ 10.00	\$ 21.79	\$ 10.00	\$ -	\$ 3.84	\$ 1.94	\$ 2.22	\$ 2.72	\$ 1.06
2	1380	\$ 15.00	\$ 15.00	\$ 25.46	\$ 15.00	\$ -	\$ -	\$ 2.53	\$ 3.01	\$ 3.54	\$ 1.39
3	1700	\$ 18.00	\$ 18.00	\$ 27.73	\$ 18.00	\$ -	\$ -	\$ -	\$ 3.88	\$ 4.20	\$ 1.64
4	2000	\$ 25.00	\$ 25.00	\$ 31.68	\$ 25.00	\$ -	\$ -	\$ -	\$ -	\$ 4.80	\$ 1.88
5	2100	\$ 30.00	\$ 30.00	\$ 31.95	\$ 30.00	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 1.95
6	2160	\$ 32.00	\$ 32.00	\$ 32.00	\$ 32.00	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

Bid\_price of each unit under SB equals the sum of variable cost plus impacts of other units on the bid price  
 Computation of the Bid Price under SB is based on a simplified version of bidding algorithm implemented in COMPEL

Illustrative Example of Strategic Bidding: Summary of Results

High Load Hour

Profit Margin of Firm 1		Profit Margin of Firm 2	
Strategy of Firm 1	PCB	Strategy of Firm 2	SB
PCB	\$ 24,300	\$	24,300
SB	\$ 24,300	\$	24,300

Profit Margin of Firm 1		Profit Margin of Firm 2	
Strategy of Firm 1	PCB	Strategy of Firm 2	SB
PCB	\$ 10,940	\$	10,940
SB	\$ 10,940	\$	10,940

Mid Load Hour

Profit Margin of Firm 1		Profit Margin of Firm 2	
Strategy of Firm 1	PCB	Strategy of Firm 2	SB
PCB	\$ 15,000	\$	18,548
SB	\$ 22,684	\$	22,684

Profit Margin of Firm 1		Profit Margin of Firm 2	
Strategy of Firm 1	PCB	Strategy of Firm 2	SB
PCB	\$ 6,040	\$	6,491
SB	\$ 10,717	\$	10,717

Low Load Hour

Profit Margin of Firm 1		Profit Margin of Firm 2	
Strategy of Firm 1	PCB	Strategy of Firm 2	SB
PCB	\$ 8,000	\$	15,604
SB	\$ 9,901	\$	17,729

Profit Margin of Firm 1		Profit Margin of Firm 2	
Strategy of Firm 1	PCB	Strategy of Firm 2	SB
PCB	\$ 1,140	\$	2,511
SB	\$ 3,791	\$	6,394

Profit Margin = (Revenues - Variable Cost)

# Appendix C

High Load Hour 2130 MW

Firm 1	PCB
Firm 2	PCB

Firm 1		Firm 2	
Unit	Capacity	Unit	Capacity
1	1000	2	380
4	300	3	320
5	100	6	60
	Bid price		Bid price
	\$ 10.00		\$ 15.00
	\$ 25.00		\$ 18.00
	\$ 30.00		\$ 32.00

**Dispatch:**

Units dispatched	Bid Price	Capacity dispatched	Variable Cost	MCP		Revenues	
				Firm 1	Firm 2	Firm 1	Firm 2
1	\$ 10.00	1000	\$ 10,000	\$ 10,000	\$ 32.00	\$ 32,000	\$ 32,000
2	\$ 15.00	380	\$ 5,700	\$ 5,700	\$ 32.00	\$ 12,160	\$ 12,160
3	\$ 18.00	320	\$ 5,760	\$ 5,760	\$ 32.00	\$ 10,240	\$ 10,240
4	\$ 25.00	300	\$ 7,500	\$ 7,500	\$ 32.00	\$ 9,600	\$ 9,600
5	\$ 30.00	100	\$ 3,000	\$ 3,000	\$ 32.00	\$ 3,200	\$ 3,200
6	\$ 32.00	30	\$ 960	\$ 960	\$ 32.00	\$ 960	\$ 960
Total		2130	\$ 32,920	\$ 20,500	\$ 11,460	\$ 68,160	\$ 44,800
Profit Margin						\$ 35,240	\$ 24,300

Firm 1	SB
Firm 2	SB

Firm 1		Firm 2	
Unit	Capacity	Unit	Capacity
1	1000	2	380
4	300	3	320
5	100	6	60
	Bid price		Bid price
	\$ 21.79		\$ 25.46
	\$ 31.68		\$ 27.73
	\$ 31.95		\$ 32.00

**Dispatch:**

Units dispatched	Bid Price	Capacity dispatched	Variable Cost	MCP		Revenues	
				Firm 1	Firm 2	Firm 1	Firm 2
1	\$ 21.79	1000	\$ 10,000	\$ 10,000	\$ 32.00	\$ 32,000	\$ 32,000
2	\$ 25.46	380	\$ 5,700	\$ 5,700	\$ 32.00	\$ 12,160	\$ 12,160
3	\$ 27.73	320	\$ 5,760	\$ 5,760	\$ 32.00	\$ 10,240	\$ 10,240
4	\$ 31.68	300	\$ 7,500	\$ 7,500	\$ 32.00	\$ 9,600	\$ 9,600
5	\$ 31.95	100	\$ 3,000	\$ 3,000	\$ 32.00	\$ 3,200	\$ 3,200
6	\$ 32.00	30	\$ 960	\$ 960	\$ 32.00	\$ 960	\$ 960
Total		2130	\$ 32,920	\$ 20,500	\$ 12,420	\$ 68,160	\$ 44,800
Profit Margin						\$ 35,240	\$ 24,300

Firm 1	PCB
Firm 2	SB

Bids:

Firm 1		Firm 2		MCP		Firm 1		Firm 2	
Unit	Capacity	Unit	Capacity	Bid price	Bid price	Unit	Capacity	Unit	Capacity
1	1000	1	1000	\$ 10.00	\$ 10.00	2	380	2	380
4	300	4	300	\$ 25.00	\$ 25.00	3	320	3	320
5	100	5	100	\$ 30.00	\$ 30.00	6	60	6	60

Dispatch:

Units Dispatched	Bid Price	Capacity dispatched	Variable Cost	Costs	Firm 1	Firm 2	Revenues	Firm 1	Firm 2
1	\$ 10.00	1000	\$ 10.00	\$ 10,000	\$ 10,000	\$ 10,000	\$ 32,000	\$ 32,000	\$ 32,000
4	\$ 25.00	300	\$ 25.00	\$ 7,500	\$ 7,500	\$ 7,500	\$ 9,600	\$ 9,600	\$ 9,600
2	\$ 25.46	380	\$ 15.00	\$ 5,700	\$ 5,700	\$ 5,700	\$ 12,160	\$ 12,160	\$ 12,160
3	\$ 27.73	320	\$ 18.00	\$ 5,760	\$ 5,760	\$ 5,760	\$ 10,240	\$ 10,240	\$ 10,240
5	\$ 30.00	100	\$ 30.00	\$ 3,000	\$ 3,000	\$ 3,000	\$ 3,200	\$ 3,200	\$ 3,200
6	\$ 32.00	30	\$ 32.00	\$ 960	\$ 960	\$ 960	\$ 960	\$ 960	\$ 960
Total		2130		\$ 32,920	\$ 20,500	\$ 12,420	\$ 68,160	\$ 44,800	\$ 23,360
Profit Margin							\$ 35,240	\$ 24,300	\$ 10,940

Firm 1	SB
Firm 2	PCB

Bids:

Firm 1		Firm 2		MCP		Firm 1		Firm 2	
Unit	Capacity	Unit	Capacity	Bid price	Bid price	Unit	Capacity	Unit	Capacity
1	1000	1	1000	\$ 21.79	\$ 21.79	2	380	2	380
4	300	4	300	\$ 31.68	\$ 31.68	3	320	3	320
5	100	5	100	\$ 31.95	\$ 31.95	6	60	6	60

Dispatch:

Units Dispatched	Bid Price	Capacity dispatched	Variable Cost	Costs	Firm 1	Firm 2	Revenues	Firm 1	Firm 2
2	\$ 15.00	380	\$ 15.00	\$ 5,700	\$ 5,700	\$ 5,700	\$ 12,160	\$ 12,160	\$ 12,160
3	\$ 18.00	320	\$ 18.00	\$ 5,760	\$ 5,760	\$ 5,760	\$ 10,240	\$ 10,240	\$ 10,240
1	\$ 21.79	1000	\$ 10.00	\$ 10,000	\$ 10,000	\$ 10,000	\$ 32,000	\$ 32,000	\$ 32,000
4	\$ 31.68	300	\$ 25.00	\$ 7,500	\$ 7,500	\$ 7,500	\$ 9,600	\$ 9,600	\$ 9,600
5	\$ 31.95	100	\$ 30.00	\$ 3,000	\$ 3,000	\$ 3,000	\$ 3,200	\$ 3,200	\$ 3,200
6	\$ 32.00	30	\$ 32.00	\$ 960	\$ 960	\$ 960	\$ 960	\$ 960	\$ 960
Total		2130		\$ 32,920	\$ 20,500	\$ 12,420	\$ 68,160	\$ 44,800	\$ 23,360
Profit Margin							\$ 35,240	\$ 24,300	\$ 10,940

**Appendix C**

Mid Load Hour 1850 MW

<b>Firm 1</b>	<b>Bids:</b>
<b>Firm 2</b>	<b>PCB</b>
	<b>PCB</b>

Firm 1		Firm 2		MCP		Firm 1		Firm 2	
Unit	Capacity	Unit	Capacity	Bid price	Bid price	Unit	Capacity	Unit	Capacity
1	1000	1	1000	\$ 10.00	\$ 10.00	2	380	2	380
4	300	4	300	\$ 25.00	\$ 25.00	3	320	3	320
5	100	5	100	\$ 30.00	\$ 30.00	6	60	6	60

**Dispatch:**

Units dispatched	Bid Price	Capacity dispatched	Variable Cost	Costs	Firm 1	Firm 2	MCP	Revenues	Firm 1	Firm 2
1	\$ 10.00	1000	\$ 10.00	\$ 10,000	\$ 10,000	\$ 10,000	\$ 25.00	\$ 25,000	\$ 25,000	\$ 25,000
2	\$ 15.00	380	\$ 15.00	\$ 5,700	\$ 5,700	\$ 5,700	\$ 25.00	\$ 9,500	\$ 9,500	\$ 9,500
3	\$ 18.00	320	\$ 18.00	\$ 5,760	\$ 5,760	\$ 5,760	\$ 25.00	\$ 8,000	\$ 8,000	\$ 8,000
4	\$ 25.00	150	\$ 25.00	\$ 3,750	\$ 3,750	\$ 3,750	\$ 25.00	\$ 3,750	\$ 3,750	\$ 3,750
<b>Total</b>		<b>1850</b>		<b>\$ 25,210</b>	<b>\$ 13,750</b>	<b>\$ 11,460</b>		<b>\$ 46,250</b>	<b>\$ 28,750</b>	<b>\$ 17,500</b>
<b>Profit Margin</b>								<b>\$ 21,040</b>	<b>\$ 15,000</b>	<b>\$ 6,040</b>

<b>Firm 1</b>	<b>Bids:</b>
<b>Firm 2</b>	<b>SB</b>
	<b>SB</b>

Firm 1		Firm 2		MCP		Firm 1		Firm 2	
Unit	Capacity	Unit	Capacity	Bid price	Bid price	Unit	Capacity	Unit	Capacity
1	1000	1	1000	\$ 21.79	\$ 21.79	2	380	2	380
4	300	4	300	\$ 31.68	\$ 31.68	3	320	3	320
5	100	5	100	\$ 31.95	\$ 31.95	6	60	6	60

**Dispatch:**

Units dispatched	Bid Price	Capacity dispatched	Variable Cost	Costs	Firm 1	Firm 2	MCP	Revenues	Firm 1	Firm 2
1	\$ 21.79	1000	\$ 10.00	\$ 10,000	\$ 10,000	\$ 10,000	\$ 31.68	\$ 31,682	\$ 31,682	\$ 31,682
2	\$ 25.46	380	\$ 15.00	\$ 5,700	\$ 5,700	\$ 5,700	\$ 31.68	\$ 12,039	\$ 12,039	\$ 12,039
3	\$ 27.73	320	\$ 18.00	\$ 5,760	\$ 5,760	\$ 5,760	\$ 31.68	\$ 10,138	\$ 10,138	\$ 10,138
4	\$ 31.68	150	\$ 25.00	\$ 3,750	\$ 3,750	\$ 3,750	\$ 31.68	\$ 4,752	\$ 4,752	\$ 4,752
<b>Total</b>		<b>1850</b>		<b>\$ 25,210</b>	<b>\$ 13,750</b>	<b>\$ 11,460</b>		<b>\$ 58,611</b>	<b>\$ 36,434</b>	<b>\$ 22,177</b>
<b>Profit Margin</b>								<b>\$ 33,401</b>	<b>\$ 22,684</b>	<b>\$ 10,717</b>

**Appendix C**

<b>Firm 1</b>	<b>Bids:</b>
<b>Firm 2</b>	<b>PCB</b>
	<b>SB</b>

Firm 1		Firm 2		Firm 2		Firm 2	
Unit	Capacity	Bid price	Unit	Capacity	Unit	Capacity	Bid price
1	1000	\$ 10.00	2	380	2	380	\$ 25.46
4	300	\$ 25.00	3	320	3	320	\$ 27.73
5	100	\$ 30.00	6	60	6	60	\$ 32.00

**Dispatch:**

Units Dispatched	Bid Price	Capacity dispatched	Variable Cost	Costs		MCP		Revenues	
				Firm 1	Firm 2	Firm 1	Firm 2	Firm 1	Firm 2
1	\$ 10.00	1000	\$ 10.00	\$ 10,000	\$ 10,000	\$ 27.73	\$ 27,729	\$ 27,729	\$ 27,729
4	\$ 25.00	300	\$ 25.00	\$ 7,500	\$ 7,500	\$ 27.73	\$ 8,319	\$ 8,319	\$ 8,319
2	\$ 25.46	380	\$ 15.00	\$ 5,700	\$ 5,700	\$ 27.73	\$ 10,537	\$ 10,537	\$ 10,537
3	\$ 27.73	170	\$ 18.00	\$ 3,060	\$ 3,060	\$ 27.73	\$ 4,714	\$ 4,714	\$ 4,714
<b>Total</b>		<b>1850</b>		\$ 26,260	\$ 17,500	\$ 8,760	\$ 51,299	\$ 36,048	\$ 15,251
<b>Profit Margin</b>							\$ 25,039	\$ 18,548	\$ 6,491

<b>Firm 1</b>	<b>Bids:</b>
<b>Firm 2</b>	<b>SB</b>
	<b>PCB</b>

Firm 1		Firm 2		Firm 2		Firm 2	
Unit	Capacity	Bid price	Unit	Capacity	Unit	Capacity	Bid price
1	1000	\$ 21.79	2	380	2	380	\$ 15.00
4	300	\$ 31.68	3	320	3	320	\$ 18.00
5	100	\$ 31.95	6	60	6	60	\$ 32.00

**Dispatch:**

Units Dispatched	Bid Price	Capacity dispatched	Variable Cost	Costs		MCP		Revenues	
				Firm 1	Firm 2	Firm 1	Firm 2	Firm 1	Firm 2
2	\$ 15.00	380	\$ 15.00	\$ 5,700	\$ 5,700	\$ 31.68	\$ 12,039	\$ 12,039	\$ 12,039
3	\$ 18.00	320	\$ 18.00	\$ 5,760	\$ 5,760	\$ 31.68	\$ 10,138	\$ 10,138	\$ 10,138
1	\$ 21.79	1000	\$ 10.00	\$ 10,000	\$ 10,000	\$ 31.68	\$ 31,682	\$ 31,682	\$ 31,682
4	\$ 31.68	150	\$ 25.00	\$ 3,750	\$ 3,750	\$ 31.68	\$ 4,752	\$ 4,752	\$ 4,752
<b>Total</b>		<b>1850</b>		\$ 25,210	\$ 13,750	\$ 11,460	\$ 58,611	\$ 36,434	\$ 22,177
<b>Profit Margin</b>							\$ 33,401	\$ 22,684	\$ 10,717



**Appendix C**

Low Load Hour 1540 MW

<b>Firm 1</b>	<b>PCB</b>	<b>Bids:</b>
<b>Firm 2</b>	<b>PCB</b>	

<b>Firm 1</b>	Unit	Capacity	Bid price	<b>Firm 2</b>	Unit	Capacity	Bid price
	1	1000	\$ 10.00		2	380	\$ 15.00
	4	300	\$ 25.00		3	320	\$ 18.00
	5	100	\$ 30.00		6	60	\$ 32.00

**Dispatch:**

Units dispatched	Bid Price	Capacity dispatched	Variable Cost	Firm 1	Firm 2	MCP	Revenues	Firm 1	Firm 2
1	\$ 10.00	1000	\$ 10,000	\$ 10,000	\$ 10,000	\$ 18.00	\$ 18,000	\$ 18,000	\$ 18,000
2	\$ 15.00	380	\$ 5,700	\$ 5,700	\$ 5,700	\$ 18.00	\$ 6,840	\$ 6,840	\$ 6,840
3	\$ 18.00	160	\$ 2,880	\$ 2,880	\$ 2,880	\$ 18.00	\$ 2,880	\$ 2,880	\$ 2,880
<b>Total</b>		<b>1540</b>		<b>\$ 18,580</b>	<b>\$ 10,000</b>	<b>\$ 8,580</b>		<b>\$ 27,720</b>	<b>\$ 18,000</b>
<b>Profit Margin</b>								<b>\$ 9,140</b>	<b>\$ 1,140</b>

<b>Firm 1</b>	<b>SB</b>	<b>Bids:</b>
<b>Firm 2</b>	<b>SB</b>	

<b>Firm 1</b>	Unit	Capacity	Bid price	<b>Firm 2</b>	Unit	Capacity	Bid price
	1	1000	\$ 21.79		2	380	\$ 25.46
	4	300	\$ 31.68		3	320	\$ 27.73
	5	100	\$ 31.95		6	60	\$ 32.00

**Dispatch:**

Units dispatched	Bid Price	Capacity dispatched	Variable Cost	Firm 1	Firm 2	MCP	Revenues	Firm 1	Firm 2
1	\$ 21.79	1000	\$ 10,000	\$ 10,000	\$ -	\$ 27.73	\$ 27,729	\$ 27,729	\$ 27,729
2	\$ 25.46	380	\$ 5,700	\$ 5,700	\$ 5,700	\$ 27.73	\$ 10,537	\$ 10,537	\$ 10,537
3	\$ 27.73	160	\$ 2,880	\$ 2,880	\$ 2,880	\$ 27.73	\$ 4,437	\$ 4,437	\$ 4,437
<b>Total</b>		<b>1540</b>		<b>\$ 18,580</b>	<b>\$ 10,000</b>	<b>\$ 8,580</b>		<b>\$ 42,703</b>	<b>\$ 27,729</b>
<b>Profit Margin</b>								<b>\$ 24,123</b>	<b>\$ 6,394</b>

**Appendix C**

<b>Firm 1</b>	<b>Bids:</b>
<b>Firm 2</b>	<b>PCB</b>
	<b>SB</b>

<b>Firm 1</b>	<b>Unit</b>	<b>Capacity</b>	<b>Bid price</b>	<b>Firm 2</b>	<b>Unit</b>	<b>Capacity</b>	<b>Bid price</b>
	1	1000	\$ 10.00		2	380	\$ 25.46
	4	300	\$ 25.00		3	320	\$ 27.73
	5	100	\$ 30.00		6	60	\$ 32.00

**Dispatch:**

Units Dispatched	Bid Price	Capacity dispatched	Variable Cost	Firm 1	Firm 2	MCP	Revenues	Firm 1	Firm 2
1	\$ 10.00	1000	\$ 10,000	\$ 10,000	\$ 10,000	\$ 25.46	\$ 25,464	\$ 25,464	\$ 25,464
4	\$ 25.00	300	\$ 7,500	\$ 7,500	\$ 7,500	\$ 25.46	\$ 7,639	\$ 7,639	\$ 7,639
2	\$ 25.46	240	\$ 3,600	\$ 3,600	\$ 3,600	\$ 25.46	\$ 6,111	\$ 6,111	\$ 6,111
<b>Total</b>		<b>1540</b>		<b>\$ 21,100</b>	<b>\$ 17,500</b>	<b>\$ 3,600</b>	<b>\$ 39,215</b>	<b>\$ 33,104</b>	<b>\$ 6,111</b>
<b>Profit Margin</b>							<b>\$ 18,115</b>	<b>\$ 15,604</b>	<b>\$ 2,511</b>

<b>Firm 1</b>	<b>Bids:</b>
<b>Firm 2</b>	<b>SB</b>
	<b>PCB</b>

<b>Firm 1</b>	<b>Unit</b>	<b>Capacity</b>	<b>Bid price</b>	<b>Firm 2</b>	<b>Unit</b>	<b>Capacity</b>	<b>Bid price</b>
	1	1000	\$ 21.79		2	380	\$ 15.00
	4	300	\$ 31.68		3	320	\$ 18.00
	5	100	\$ 31.95		6	60	\$ 32.00

**Dispatch:**

Units Dispatched	Bid Price	Capacity dispatched	Variable Cost	Firm 1	Firm 2	MCP	Revenues	Firm 1	Firm 2
2	\$ 15.00	380	\$ 5,700	\$ 5,700	\$ 5,700	\$ 21.79	\$ 8,279	\$ 8,279	\$ 8,279
3	\$ 18.00	320	\$ 5,760	\$ 5,760	\$ 5,760	\$ 21.79	\$ 6,972	\$ 6,972	\$ 6,972
1	\$ 21.79	840	\$ 8,400	\$ 8,400	\$ 8,400	\$ 21.79	\$ 18,301	\$ 18,301	\$ 18,301
<b>Total</b>		<b>1540</b>		<b>\$ 19,860</b>	<b>\$ 8,400</b>	<b>\$ 11,460</b>	<b>\$ 33,551</b>	<b>\$ 18,301</b>	<b>\$ 15,251</b>
<b>Profit Margin</b>							<b>\$ 13,691</b>	<b>\$ 9,901</b>	<b>\$ 3,791</b>

## Appendix D. Behavioral Analysis Results: PCMI by Scenario

WUMS Base Case PCMI 2001-2002						
2001	Strategic Bidding			Capacity Withholding and Strategic Bidding		
	Off-Peak	On-Peak	All hours	Off-Peak	On-Peak	All hours
Month 1	22.99%	36.38%	29.54%	54.32%	99.87%	76.61%
Month 2	20.86%	33.26%	26.70%	47.31%	85.57%	65.34%
Month 3	26.78%	34.38%	30.41%	52.69%	78.40%	64.96%
Month 4	24.69%	32.20%	28.26%	46.45%	75.58%	60.29%
Month 5	20.18%	29.33%	24.66%	34.76%	63.51%	48.83%
Month 6	23.59%	32.80%	28.04%	39.42%	70.83%	54.61%
Month 7	24.85%	30.22%	27.49%	46.93%	70.18%	58.37%
Month 8	22.41%	26.76%	24.62%	42.23%	64.78%	53.69%
Month 9	25.84%	32.66%	28.96%	46.68%	78.57%	61.26%
Month 10	27.14%	37.24%	32.23%	54.02%	93.94%	74.15%
Month 11	18.49%	29.87%	24.06%	37.97%	79.36%	58.23%
Month 12	17.49%	25.54%	21.12%	33.78%	71.96%	50.98%
Total	22.90%	31.63%	27.12%	44.56%	77.39%	60.42%

2002	Strategic Bidding			Capacity Withholding and Strategic Bidding		
	Off-Peak	On-Peak	All hours	Off-Peak	On-Peak	All hours
Month 1	24.41%	39.56%	31.95%	55.01%	92.88%	73.88%
Month 2	19.24%	33.67%	26.00%	42.95%	81.85%	61.18%
Month 3	14.35%	25.81%	19.46%	30.33%	58.46%	42.89%
Month 4	13.27%	24.22%	18.58%	27.02%	58.51%	42.30%
Month 5	17.81%	26.49%	22.05%	32.69%	56.42%	44.28%
Month 6	20.72%	27.52%	23.88%	37.84%	63.83%	49.91%
Month 7	24.56%	29.51%	27.09%	44.96%	67.66%	56.55%
Month 8	22.89%	29.62%	26.19%	41.00%	62.56%	51.58%
Month 9	15.23%	29.03%	21.69%	32.94%	65.83%	48.35%
Month 10	17.51%	32.76%	25.15%	37.46%	74.52%	56.02%
Month 11	19.04%	34.78%	26.39%	44.45%	80.69%	61.38%
Month 12	18.03%	30.43%	23.91%	38.05%	73.53%	54.88%
Total	19.06%	30.38%	24.51%	38.88%	69.83%	53.77%

WUMS Base Case PCMI 2003-2004						
2003	Strategic Bidding			Capacity Withholding and Strategic Bidding		
	Off-Peak	On-Peak	All hours	Off-Peak	On-Peak	All hours
Month 1	25.47%	42.56%	33.83%	51.88%	97.70%	74.31%
2	23.10%	36.17%	29.32%	47.71%	89.97%	67.83%
3	15.34%	24.31%	19.36%	28.29%	65.47%	44.97%
4	14.00%	23.76%	18.74%	24.50%	59.04%	41.30%
5	16.83%	24.69%	20.57%	28.47%	54.57%	40.87%
6	15.19%	19.07%	17.06%	22.96%	38.65%	30.51%
7	18.32%	20.02%	19.17%	30.45%	45.37%	37.95%
8	16.55%	18.09%	17.26%	26.30%	42.30%	33.72%
9	12.82%	19.35%	16.03%	18.70%	43.27%	30.78%
10	14.78%	21.57%	18.20%	29.22%	51.31%	40.37%
11	13.80%	22.89%	17.84%	26.26%	56.46%	39.70%
12	12.19%	18.08%	15.10%	19.77%	44.35%	31.94%
Total	16.54%	24.05%	20.15%	29.50%	56.80%	42.62%

2004	Strategic Bidding			Capacity Withholding and Strategic Bidding		
	Off-Peak	On-Peak	All hours	Off-Peak	On-Peak	All hours
Month 1	10.35%	17.46%	13.67%	14.19%	23.39%	18.48%
2	8.63%	15.33%	11.70%	12.28%	21.34%	16.43%
3	7.93%	14.10%	10.96%	10.68%	21.13%	15.81%
4	7.33%	13.03%	10.11%	9.56%	20.66%	14.97%
5	9.35%	13.69%	11.32%	12.11%	21.00%	16.15%
6	11.45%	13.25%	12.37%	14.26%	19.86%	17.11%
7	13.20%	13.38%	13.29%	16.77%	21.83%	19.29%
8	11.82%	14.00%	12.90%	14.91%	22.02%	18.42%
9	9.98%	15.18%	12.52%	13.51%	22.31%	17.81%
10	8.99%	15.58%	11.98%	11.30%	22.88%	16.55%
11	9.47%	15.60%	12.45%	12.15%	23.10%	17.48%
12	8.81%	14.51%	11.61%	10.41%	21.51%	15.87%
Total	9.89%	14.53%	12.13%	12.82%	21.73%	17.11%

WUMS Base Case PCMI 2005-2006						
2005	Strategic Bidding			Capacity Withholding and Strategic Bidding		
	Off-Peak	On-Peak	All hours	Off-Peak	On-Peak	All hours
Month 1	11.39%	15.31%	13.15%	20.60%	54.44%	35.85%
2	8.84%	14.74%	11.62%	12.77%	29.81%	20.79%
3	8.70%	13.85%	11.21%	8.82%	14.31%	11.49%
4	7.89%	13.28%	10.38%	9.24%	13.48%	11.20%
5	6.31%	8.29%	7.25%	16.03%	21.09%	18.43%
6	6.71%	6.17%	6.44%	11.29%	11.27%	11.28%
7	7.63%	7.34%	7.50%	13.38%	14.56%	13.92%
8	6.80%	8.05%	7.43%	12.87%	15.62%	14.24%
9	3.19%	3.94%	3.55%	15.79%	22.01%	18.73%
10	9.12%	13.74%	11.21%	9.59%	18.59%	13.64%
11	9.68%	15.49%	12.50%	15.03%	44.30%	29.27%
12	8.46%	12.86%	10.53%	10.73%	24.59%	17.25%
Total	7.89%	10.85%	9.29%	13.11%	23.31%	17.94%

2006	Strategic Bidding			Capacity Withholding and Strategic Bidding		
	Off-Peak	On-Peak	All hours	Off-Peak	On-Peak	All hours
Month 1	1.93%	3.50%	2.66%	11.87%	25.12%	18.08%
2	1.94%	2.56%	2.24%	11.66%	20.64%	15.97%
3	9.04%	13.91%	11.41%	9.15%	14.12%	11.57%
4	8.26%	13.93%	10.77%	9.39%	14.26%	11.54%
5	2.27%	3.33%	2.80%	13.05%	16.67%	14.84%
6	2.44%	2.44%	2.44%	9.73%	10.69%	10.21%
7	2.89%	2.99%	2.94%	11.65%	13.07%	12.30%
8	2.57%	2.50%	2.53%	11.65%	11.10%	11.37%
9	2.28%	1.28%	1.83%	16.15%	23.60%	19.55%
10	1.39%	2.29%	1.82%	8.89%	22.12%	15.16%
11	1.95%	2.96%	2.44%	10.85%	24.56%	17.57%
12	10.13%	13.55%	11.67%	10.38%	14.45%	12.22%
Total	3.88%	5.17%	4.49%	11.23%	17.29%	14.12%

WUMS Base Case PCMI 2007						
2007	Strategic Bidding			Capacity Withholding and Strategic Bidding		
Month	Off-Peak	On-Peak	All hours	Off-Peak	On-Peak	All hours
1	14.93%	18.96%	16.91%	22.75%	50.90%	36.66%
2	11.53%	15.99%	13.66%	15.06%	23.85%	19.25%
3	9.97%	15.17%	12.41%	13.09%	21.03%	16.82%
4	8.47%	14.37%	11.20%	11.27%	23.21%	16.79%
5	7.34%	9.45%	8.39%	15.23%	18.46%	16.84%
6	8.32%	6.38%	7.39%	10.99%	9.47%	10.26%
7	9.31%	7.70%	8.53%	13.07%	11.95%	12.53%
8	8.18%	7.48%	7.83%	11.12%	11.12%	11.12%
9	11.96%	16.16%	13.78%	16.75%	24.81%	20.23%
10	10.83%	17.64%	14.19%	14.17%	30.22%	22.09%
11	11.91%	15.80%	13.82%	18.58%	37.64%	27.94%
12	10.48%	13.97%	12.06%	14.36%	26.42%	19.82%
Total	10.23%	12.95%	11.53%	14.64%	23.67%	18.97%

WUMS Contracts Scenario, PCMI 2001-2002						
2001	Strategic Bidding			Capacity Withholding and Strategic Bidding		
	Off-Peak	On-Peak	All hours	Off-Peak	On-Peak	All hours
Month 1	10.39%	20.55%	15.36%	14.15%	33.06%	23.40%
2	10.00%	19.97%	14.70%	14.01%	30.53%	21.79%
3	12.10%	20.90%	16.30%	15.35%	31.42%	23.02%
4	11.53%	20.01%	15.56%	15.40%	27.94%	21.36%
5	9.15%	17.33%	13.16%	12.46%	23.12%	17.68%
6	11.37%	21.75%	16.39%	15.25%	35.63%	25.11%
7	13.54%	21.45%	17.43%	17.88%	40.04%	28.78%
8	11.70%	18.49%	15.15%	14.82%	32.50%	23.81%
9	11.04%	20.93%	15.56%	13.40%	25.78%	19.06%
10	11.84%	23.38%	17.66%	13.62%	29.67%	21.71%
11	8.79%	18.22%	13.40%	10.71%	26.93%	18.65%
12	8.16%	15.11%	11.29%	8.86%	19.55%	13.68%
Total	10.82%	19.86%	15.19%	13.86%	30.04%	21.68%

2002	Strategic Bidding			Capacity Withholding and Strategic Bidding		
	Off-Peak	On-Peak	All hours	Off-Peak	On-Peak	All hours
Month 1	10.60%	22.91%	16.73%	14.10%	37.25%	25.63%
2	8.96%	20.94%	14.57%	12.74%	33.42%	22.43%
3	6.52%	14.20%	9.95%	9.43%	25.28%	16.50%
4	6.19%	13.55%	9.76%	7.48%	23.36%	15.18%
5	8.20%	15.86%	11.94%	10.89%	22.19%	16.41%
6	10.30%	18.62%	14.16%	13.07%	31.18%	21.48%
7	12.95%	20.28%	16.69%	16.52%	35.70%	26.31%
8	11.43%	19.98%	15.63%	15.02%	32.98%	23.83%
9	6.64%	16.45%	11.24%	8.64%	22.47%	15.12%
10	7.14%	18.17%	12.67%	8.85%	28.30%	18.59%
11	8.96%	21.65%	14.88%	11.14%	31.06%	20.44%
12	8.06%	18.14%	12.84%	10.14%	28.76%	18.97%
Total	8.91%	18.52%	13.54%	11.61%	29.61%	20.27%

WUMS Contracts Scenario, PCMI 2003-2004						
2003	Strategic Bidding			Capacity Withholding and Strategic Bidding		
	Off-Peak	On-Peak	All hours	Off-Peak	On-Peak	All hours
Month 1	11.15%	25.35%	18.10%	12.59%	33.42%	22.79%
2	11.29%	22.70%	16.72%	15.45%	33.76%	24.17%
3	7.23%	14.75%	10.60%	9.12%	19.62%	13.83%
4	6.71%	14.68%	10.58%	7.93%	18.35%	13.00%
5	8.33%	14.70%	11.36%	10.52%	19.71%	14.89%
6	8.03%	12.88%	10.36%	9.09%	18.61%	13.67%
7	10.14%	13.22%	11.68%	11.22%	20.51%	15.88%
8	8.80%	11.64%	10.12%	10.09%	18.10%	13.81%
9	5.83%	11.73%	8.73%	7.03%	14.00%	10.46%
10	6.92%	12.27%	9.62%	7.04%	18.56%	12.85%
11	7.35%	14.58%	10.57%	8.64%	19.52%	13.48%
12	6.03%	11.41%	8.70%	6.83%	15.83%	11.29%
Total	8.17%	14.89%	11.40%	9.63%	20.76%	14.98%

2004	Strategic Bidding			Capacity Withholding and Strategic Bidding		
	Off-Peak	On-Peak	All hours	Off-Peak	On-Peak	All hours
Month 1	13.72%	12.84%	13.29%	41.23%	76.04%	57.89%
2	11.88%	13.89%	12.82%	22.62%	54.50%	37.51%
3	11.05%	8.48%	9.78%	21.57%	45.65%	33.50%
4	10.76%	9.86%	10.33%	15.59%	49.95%	32.24%
5	12.27%	11.64%	11.99%	16.88%	30.39%	23.04%
6	12.88%	13.03%	12.96%	19.04%	38.37%	28.86%
7	13.54%	14.54%	14.03%	21.94%	44.88%	33.24%
8	12.73%	10.56%	11.65%	19.16%	36.35%	27.69%
9	11.04%	10.16%	10.61%	24.55%	55.73%	39.84%
10	11.47%	10.81%	11.17%	23.88%	58.10%	39.39%
11	11.96%	13.21%	12.57%	21.30%	53.44%	37.15%
12	11.30%	12.07%	11.68%	20.32%	47.85%	33.95%
Total	12.09%	11.80%	11.95%	22.39%	49.00%	35.29%



WUMS Contracts Scenario, PCMI 2005-2006						
2005	Strategic Bidding			Capacity Withholding and Strategic Bidding		
	Off-Peak	On-Peak	All hours	Off-Peak	On-Peak	All hours
Month 1	5.90%	8.73%	7.17%	6.72%	10.24%	8.30%
2	4.73%	10.29%	7.35%	5.89%	12.48%	8.99%
3	4.39%	9.12%	6.69%	3.87%	9.71%	6.71%
4	4.16%	8.79%	6.30%	3.12%	8.23%	5.48%
5	3.62%	5.24%	4.39%	5.27%	11.09%	8.02%
6	4.02%	4.25%	4.14%	5.43%	5.74%	5.59%
7	4.61%	5.00%	4.79%	5.90%	7.36%	6.56%
8	4.04%	5.37%	4.70%	5.17%	8.16%	6.67%
9	2.38%	2.76%	2.56%	2.95%	5.23%	4.03%
10	4.80%	9.92%	7.11%	4.29%	10.34%	7.02%
11	5.26%	10.33%	7.73%	5.90%	12.02%	8.88%
12	4.31%	8.54%	6.30%	4.80%	10.30%	7.39%
Total	4.36%	7.20%	5.70%	4.98%	9.13%	6.94%

2006	Strategic Bidding			Capacity Withholding and Strategic Bidding		
	Off-Peak	On-Peak	All hours	Off-Peak	On-Peak	All hours
Month 1	1.44%	2.58%	1.97%	4.03%	7.48%	5.64%
2	1.39%	1.88%	1.63%	3.03%	4.38%	3.68%
3	4.88%	9.55%	7.15%	3.79%	7.96%	5.82%
4	4.59%	9.57%	6.78%	3.01%	8.54%	5.45%
5	1.86%	2.63%	2.24%	3.56%	8.44%	5.97%
6	1.90%	1.81%	1.86%	3.31%	4.37%	3.84%
7	2.15%	2.18%	2.16%	4.18%	5.04%	4.57%
8	2.05%	1.84%	1.94%	2.88%	6.23%	4.57%
9	2.12%	1.02%	1.62%	2.98%	5.35%	4.06%
10	1.11%	1.75%	1.41%	2.79%	4.99%	3.83%
11	1.37%	2.17%	1.76%	3.29%	6.88%	5.05%
12	5.33%	8.90%	6.94%	3.80%	7.36%	5.40%
Total	2.50%	3.65%	3.05%	3.40%	6.37%	4.82%

WUMS Contracts Scenario, PCMI 2007						
2007	Strategic Bidding			Capacity Withholding and Strategic Bidding		
Month	Off-Peak	On-Peak	All hours	Off-Peak	On-Peak	All hours
1	7.81%	10.75%	9.26%	8.53%	11.62%	10.05%
2	6.25%	10.50%	8.28%	7.91%	11.43%	9.59%
3	5.17%	9.69%	7.29%	6.45%	10.12%	8.17%
4	4.44%	9.99%	7.01%	6.05%	11.39%	8.52%
5	4.30%	6.37%	5.33%	5.39%	9.36%	7.36%
6	5.11%	4.50%	4.82%	6.13%	6.38%	6.25%
7	5.64%	5.32%	5.49%	6.71%	6.55%	6.63%
8	4.67%	5.09%	4.88%	5.01%	7.32%	6.18%
9	6.49%	9.60%	7.83%	7.06%	11.88%	9.15%
10	5.79%	11.90%	8.81%	6.81%	12.35%	9.54%
11	6.82%	10.45%	8.61%	7.22%	11.92%	9.53%
12	5.55%	9.02%	7.12%	6.39%	10.36%	8.19%
Total	5.66%	8.41%	6.97%	6.62%	9.88%	8.18%

WUMS Divestiture Scenario, PCMI 2001-2002						
2001	Strategic Bidding			Capacity Withholding and Strategic Bidding		
	Off-Peak	On-Peak	All hours	Off-Peak	On-Peak	All hours
Month 1	1.80%	5.40%	3.56%	2.20%	9.91%	5.97%
2	1.67%	5.13%	3.30%	1.96%	8.90%	5.23%
3	4.49%	2.75%	3.66%	5.59%	9.53%	7.47%
4	4.59%	4.31%	4.45%	5.08%	8.21%	6.56%
5	1.68%	4.54%	3.08%	1.94%	7.51%	4.67%
6	2.12%	3.75%	2.91%	2.66%	9.03%	5.74%
7	2.90%	3.25%	3.07%	5.00%	10.77%	7.84%
8	2.43%	2.97%	2.71%	3.87%	10.24%	7.10%
9	4.16%	5.13%	4.60%	4.58%	10.13%	7.12%
10	3.01%	6.08%	4.56%	2.82%	10.19%	6.53%
11	1.91%	4.47%	3.16%	2.26%	9.41%	5.76%
12	2.50%	3.90%	3.13%	2.75%	5.72%	4.09%
Total	2.75%	4.27%	3.48%	3.40%	9.19%	6.19%

2002	Strategic Bidding			Capacity Withholding and Strategic Bidding		
	Off-Peak	On-Peak	All hours	Off-Peak	On-Peak	All hours
Month 1	2.45%	3.54%	2.98%	3.58%	6.45%	5.00%
2	1.69%	5.20%	3.34%	1.87%	10.09%	5.72%
3	1.90%	3.28%	2.51%	1.87%	5.27%	3.39%
4	2.70%	2.80%	2.75%	2.68%	4.11%	3.38%
5	1.57%	4.24%	2.88%	1.79%	7.54%	4.60%
6	2.30%	3.58%	2.89%	3.24%	8.53%	5.69%
7	2.95%	3.26%	3.11%	4.31%	10.72%	7.59%
8	2.63%	3.65%	3.13%	3.95%	10.75%	7.29%
9	1.92%	5.27%	3.49%	1.91%	9.03%	5.25%
10	1.80%	2.76%	2.28%	2.22%	5.23%	3.73%
11	2.08%	4.99%	3.44%	2.57%	8.91%	5.53%
12	2.12%	4.00%	3.01%	2.50%	6.68%	4.48%
Total	2.19%	3.84%	2.98%	2.74%	7.85%	5.20%

WUMS Divestiture Scenario, PCMI 2003-2004						
2003	Strategic Bidding			Capacity Withholding and Strategic Bidding		
	Off-Peak	On-Peak	All hours	Off-Peak	On-Peak	All hours
1	1.66%	4.28%	2.93%	2.22%	6.54%	4.33%
2	1.81%	4.30%	2.99%	2.03%	6.30%	4.06%
3	1.78%	4.05%	2.80%	1.78%	7.06%	4.15%
4	1.97%	3.59%	2.76%	1.96%	6.45%	4.14%
5	1.93%	3.74%	2.79%	2.11%	6.99%	4.43%
6	2.24%	2.60%	2.41%	2.63%	6.23%	4.36%
7	2.55%	2.40%	2.47%	3.43%	6.66%	5.05%
8	2.58%	2.65%	2.61%	3.94%	6.65%	5.20%
9	1.74%	4.31%	3.00%	1.82%	6.59%	4.17%
10	2.07%	1.35%	1.71%	3.37%	3.54%	3.45%
11	2.28%	4.56%	3.29%	2.64%	6.81%	4.50%
12	2.15%	3.75%	2.94%	2.21%	5.86%	4.02%
Total	2.08%	3.39%	2.71%	2.55%	6.27%	4.33%

2004	Strategic Bidding			Capacity Withholding and Strategic Bidding		
	Off-Peak	On-Peak	All hours	Off-Peak	On-Peak	All hours
1	1.61%	4.50%	2.95%	1.72%	7.77%	4.54%
2	2.19%	4.74%	3.36%	2.22%	8.05%	4.90%
3	2.44%	1.74%	2.10%	2.44%	1.74%	2.10%
4	2.97%	1.59%	2.30%	3.08%	1.67%	2.40%
5	1.33%	1.79%	1.53%	1.32%	3.64%	2.35%
6	2.01%	2.63%	2.32%	2.61%	3.92%	3.26%
7	1.98%	2.60%	2.28%	2.60%	3.75%	3.15%
8	1.87%	2.75%	2.29%	2.39%	4.00%	3.16%
9	1.16%	2.28%	1.70%	1.16%	2.85%	1.98%
10	2.33%	2.58%	2.45%	2.46%	4.60%	3.43%
11	2.15%	4.00%	3.05%	2.24%	5.98%	4.06%
12	2.23%	2.93%	2.57%	2.49%	3.80%	3.14%
Total	2.00%	2.83%	2.40%	2.22%	4.28%	3.20%

WUMS Divestiture Scenario, PCMI 2005-2006						
2005	Strategic Bidding			Capacity Withholding and Strategic Bidding		
Month	Off-Peak	On-Peak	All hours	Off-Peak	On-Peak	All hours
1	1.91%	3.18%	2.48%	2.59%	4.58%	3.48%
2	1.76%	4.25%	2.93%	1.76%	4.78%	3.18%
3	2.05%	2.66%	2.35%	2.04%	2.99%	2.50%
4	2.32%	2.11%	2.22%	2.32%	2.13%	2.23%
5	1.26%	1.29%	1.27%	1.25%	2.45%	1.82%
6	1.46%	1.48%	1.47%	2.57%	2.86%	2.71%
7	2.08%	2.04%	2.06%	3.03%	4.18%	3.55%
8	1.79%	2.09%	1.94%	2.59%	5.27%	3.93%
9	1.18%	1.75%	1.45%	1.23%	3.00%	2.07%
10	1.85%	4.40%	3.00%	1.65%	7.23%	4.17%
11	1.92%	4.04%	2.95%	2.01%	5.91%	3.91%
12	1.90%	3.19%	2.51%	2.06%	3.71%	2.84%
Total	1.79%	2.65%	2.19%	2.12%	4.08%	3.05%

2006	Strategic Bidding			Capacity Withholding and Strategic Bidding		
Month	Off-Peak	On-Peak	All hours	Off-Peak	On-Peak	All hours
1	1.16%	-0.27%	0.48%	1.83%	3.70%	2.70%
2	2.13%	0.26%	1.23%	3.27%	2.52%	2.91%
3	2.94%	3.80%	3.36%	2.77%	4.31%	3.52%
4	2.24%	1.82%	2.05%	2.24%	1.88%	2.08%
5	2.27%	-0.18%	1.06%	3.79%	2.71%	3.25%
6	2.20%	-0.61%	0.79%	3.54%	1.40%	2.46%
7	3.08%	4.02%	3.50%	4.38%	6.48%	5.32%
8	0.22%	8.15%	4.06%	0.94%	9.57%	5.12%
9	2.21%	3.73%	2.90%	2.53%	5.20%	3.73%
10	1.38%	6.39%	3.67%	2.52%	9.98%	5.93%
11	2.15%	6.34%	4.15%	2.73%	9.72%	6.06%
12	2.21%	7.85%	4.65%	2.21%	8.39%	4.88%
Total	2.01%	3.37%	2.65%	2.74%	5.44%	4.01%

WUMS Divestiture Scenario, PCMI 2007						
2007	Strategic Bidding			Capacity Withholding and Strategic Bidding		
Month	Off-Peak	On-Peak	All hours	Off-Peak	On-Peak	All hours
1	1.95%	2.60%	2.27%	2.97%	3.92%	3.43%
2	1.65%	3.91%	2.73%	1.74%	5.13%	3.35%
3	1.24%	3.65%	2.37%	1.26%	5.63%	3.31%
4	1.61%	3.17%	2.33%	1.59%	6.50%	3.86%
5	1.37%	1.77%	1.57%	1.40%	4.46%	2.92%
6	1.68%	1.35%	1.52%	2.38%	2.61%	2.49%
7	1.78%	1.30%	1.55%	3.58%	3.18%	3.39%
8	1.80%	1.60%	1.70%	2.08%	3.77%	2.94%
9	1.98%	1.69%	1.85%	1.99%	3.23%	2.53%
10	2.11%	4.92%	3.50%	2.20%	5.69%	3.92%
11	2.04%	3.15%	2.58%	2.39%	4.08%	3.22%
12	1.90%	2.92%	2.36%	2.11%	5.00%	3.42%
Total	1.76%	2.60%	2.16%	2.17%	4.36%	3.22%

WUMS Contracts & Divestiture Scenario, PCMI 2001-2002						
2001	Strategic Bidding			Capacity Withholding and Strategic Bidding		
Month	Off-Peak	On-Peak	All hours	Off-Peak	On-Peak	All hours
1	1.31%	3.82%	2.53%	1.33%	4.64%	2.94%
2	1.33%	3.65%	2.42%	1.37%	4.90%	3.03%
3	3.15%	1.85%	2.53%	3.15%	1.85%	2.53%
4	3.05%	2.77%	2.92%	3.06%	2.97%	3.02%
5	1.31%	3.25%	2.26%	1.31%	3.86%	2.56%
6	1.55%	2.65%	2.08%	1.65%	4.13%	2.85%
7	1.95%	2.13%	2.04%	2.37%	3.57%	2.96%
8	1.65%	1.94%	1.79%	1.89%	3.84%	2.88%
9	2.87%	3.26%	3.05%	2.87%	3.42%	3.12%
10	1.48%	4.07%	2.79%	1.49%	4.66%	3.09%
11	1.39%	3.21%	2.28%	1.39%	3.84%	2.59%
12	1.95%	2.89%	2.37%	1.96%	3.48%	2.64%
Total	1.90%	2.93%	2.40%	1.98%	3.78%	2.85%

2002	Strategic Bidding			Capacity Withholding and Strategic Bidding		
Month	Off-Peak	On-Peak	All hours	Off-Peak	On-Peak	All hours
1	1.62%	2.35%	1.97%	1.77%	2.98%	2.36%
2	1.28%	3.63%	2.38%	1.30%	4.65%	2.87%
3	1.55%	2.19%	1.84%	1.55%	2.31%	1.89%
4	2.23%	1.93%	2.08%	2.23%	1.95%	2.10%
5	1.22%	2.86%	2.02%	1.22%	3.55%	2.36%
6	1.63%	2.45%	2.01%	1.77%	4.23%	2.91%
7	1.88%	2.09%	1.99%	2.23%	3.65%	2.96%
8	1.69%	2.39%	2.03%	1.91%	4.09%	2.98%
9	1.52%	3.84%	2.61%	1.53%	4.79%	3.05%
10	1.19%	1.87%	1.53%	1.30%	3.21%	2.26%
11	1.51%	3.47%	2.42%	1.53%	4.83%	3.07%
12	1.46%	2.75%	2.07%	1.54%	3.34%	2.40%
Total	1.57%	2.62%	2.07%	1.66%	3.63%	2.61%

WUMS Contracts & Divestiture Scenario, PCMI 2003-2004						
2003	Strategic Bidding			Capacity Withholding and Strategic Bidding		
Month	Off-Peak	On-Peak	All hours	Off-Peak	On-Peak	All hours
1	1.04%	2.81%	1.90%	1.09%	4.06%	2.54%
2	1.40%	2.91%	2.12%	1.47%	4.62%	2.97%
3	1.35%	2.53%	1.88%	1.35%	3.44%	2.29%
4	1.44%	2.33%	1.87%	1.45%	2.99%	2.20%
5	1.41%	2.50%	1.93%	1.45%	3.55%	2.45%
6	1.50%	1.74%	1.61%	1.62%	2.94%	2.25%
7	1.59%	1.55%	1.57%	2.01%	3.17%	2.59%
8	1.61%	1.72%	1.66%	1.89%	2.50%	2.18%
9	1.28%	2.83%	2.04%	1.29%	4.29%	2.76%
10	1.34%	0.95%	1.14%	1.54%	1.84%	1.69%
11	1.63%	3.21%	2.33%	1.73%	4.84%	3.12%
12	1.43%	2.49%	1.95%	1.48%	3.22%	2.34%
Total	1.42%	2.25%	1.82%	1.54%	3.41%	2.44%

2004	Strategic Bidding			Capacity Withholding and Strategic Bidding		
Month	Off-Peak	On-Peak	All hours	Off-Peak	On-Peak	All hours
1	1.27%	3.21%	2.17%	1.28%	4.00%	2.55%
2	1.65%	3.08%	2.31%	1.67%	4.21%	2.83%
3	1.73%	1.16%	1.45%	1.72%	1.22%	1.48%
4	2.26%	0.92%	1.61%	2.26%	0.96%	1.62%
5	1.02%	2.33%	1.62%	1.02%	2.60%	1.74%
6	1.67%	1.97%	1.82%	1.73%	2.70%	2.22%
7	1.55%	1.72%	1.63%	1.81%	2.94%	2.37%
8	1.25%	1.76%	1.50%	1.32%	2.96%	2.13%
9	0.84%	1.38%	1.10%	0.84%	1.42%	1.12%
10	1.87%	1.82%	1.85%	1.87%	2.06%	1.95%
11	1.65%	2.76%	2.19%	1.67%	3.43%	2.53%
12	1.76%	2.12%	1.93%	1.76%	2.29%	2.02%
Total	1.53%	2.00%	1.76%	1.57%	2.58%	2.05%



2005	Strategic Bidding			Capacity Withholding and Strategic Bidding		
	Off-Peak	On-Peak	All hours	Off-Peak	On-Peak	All hours
Month 1	1.32%	2.32%	1.76%	1.45%	2.69%	2.00%
2	1.44%	3.18%	2.26%	1.44%	3.86%	2.58%
3	1.75%	1.77%	1.76%	1.74%	1.96%	1.84%
4	1.88%	1.47%	1.69%	1.79%	1.43%	1.62%
5	1.12%	0.86%	1.00%	1.12%	1.10%	1.11%
6	1.17%	1.22%	1.20%	1.36%	2.25%	1.80%
7	1.81%	1.75%	1.78%	2.04%	2.11%	2.08%
8	1.53%	1.88%	1.71%	1.61%	2.46%	2.04%
9	0.92%	1.64%	1.26%	0.92%	1.69%	1.29%
10	1.27%	3.04%	2.07%	1.15%	3.33%	2.13%
11	1.48%	3.03%	2.24%	1.53%	3.76%	2.61%
12	1.43%	2.33%	1.86%	1.44%	2.69%	2.03%
Total	1.43%	2.01%	1.70%	1.47%	2.42%	1.92%

2006	Strategic Bidding			Capacity Withholding and Strategic Bidding		
	Off-Peak	On-Peak	All hours	Off-Peak	On-Peak	All hours
Month 1	0.58%	1.25%	0.89%	0.58%	1.69%	1.09%
2	0.64%	1.01%	0.81%	0.68%	1.61%	1.13%
3	1.33%	3.03%	2.16%	1.30%	3.24%	2.24%
4	1.69%	1.67%	1.68%	1.67%	1.74%	1.70%
5	1.14%	1.65%	1.39%	1.21%	2.16%	1.68%
6	1.11%	0.96%	1.04%	1.37%	1.55%	1.46%
7	1.30%	1.07%	1.20%	1.57%	1.54%	1.55%
8	1.29%	1.27%	1.28%	1.33%	1.80%	1.57%
9	1.12%	0.95%	1.05%	1.22%	1.02%	1.12%
10	0.69%	1.10%	0.89%	0.69%	1.71%	1.18%
11	0.76%	0.97%	0.86%	0.77%	1.49%	1.13%
12	1.59%	2.53%	2.01%	1.61%	2.82%	2.16%
Total	1.11%	1.44%	1.26%	1.18%	1.86%	1.50%

WUMS Contracts & Divestiture Scenario, PCMI 2007						
2007	Strategic Bidding			Capacity Withholding and Strategic Bidding		
Month	Off-Peak	On-Peak	All hours	Off-Peak	On-Peak	All hours
1	1.34%	1.84%	1.58%	1.47%	2.25%	1.85%
2	1.29%	2.74%	1.98%	1.31%	3.10%	2.16%
3	0.96%	2.52%	1.70%	0.97%	3.15%	1.99%
4	1.19%	2.33%	1.72%	1.20%	2.70%	1.89%
5	1.14%	1.53%	1.33%	1.16%	1.76%	1.46%
6	1.44%	1.07%	1.26%	1.60%	1.52%	1.56%
7	1.49%	1.01%	1.26%	1.56%	1.22%	1.40%
8	1.50%	1.27%	1.38%	1.62%	1.83%	1.73%
9	1.68%	1.28%	1.51%	1.70%	1.32%	1.53%
10	1.71%	3.48%	2.58%	1.71%	4.10%	2.89%
11	1.51%	2.27%	1.88%	1.54%	2.88%	2.20%
12	1.39%	2.06%	1.70%	1.43%	2.26%	1.80%
Total	1.39%	1.91%	1.64%	1.45%	2.30%	1.85%

MAPP Base Case, PCMI 2001-2002						
2001	Strategic Bidding			Capacity Withholding and Strategic Bidding		
	Off-Peak	On-Peak	All hours	Off-Peak	On-Peak	All hours
Month 1	5.06%	7.10%	6.03%	6.31%	10.61%	8.36%
2	5.37%	5.76%	5.55%	6.36%	8.29%	7.26%
3	5.62%	4.11%	4.92%	6.60%	4.64%	5.68%
4	5.83%	3.64%	4.81%	7.83%	4.67%	6.36%
5	5.29%	4.29%	4.80%	6.18%	5.36%	5.78%
6	5.56%	6.11%	5.82%	6.67%	8.23%	7.40%
7	5.43%	6.67%	6.01%	6.37%	8.93%	7.57%
8	5.38%	6.69%	6.02%	6.39%	9.28%	7.80%
9	4.94%	5.65%	5.25%	6.04%	6.97%	6.45%
10	5.42%	5.00%	5.21%	6.01%	5.49%	5.76%
11	5.23%	6.16%	5.67%	6.09%	8.97%	7.47%
12	5.24%	6.01%	5.58%	6.54%	8.73%	7.51%
Total	5.36%	5.62%	5.48%	6.45%	7.54%	6.96%

2002	Strategic Bidding			Capacity Withholding and Strategic Bidding		
	Off-Peak	On-Peak	All hours	Off-Peak	On-Peak	All hours
Month 1	5.77%	7.57%	6.63%	7.22%	11.79%	9.42%
2	5.86%	5.22%	5.56%	6.85%	7.81%	7.30%
3	5.37%	4.14%	4.82%	7.01%	4.59%	5.92%
4	4.76%	3.99%	4.39%	7.29%	4.73%	6.04%
5	5.82%	4.71%	5.28%	6.64%	6.01%	6.33%
6	6.03%	6.28%	6.14%	7.17%	8.75%	7.88%
7	6.24%	6.53%	6.38%	7.18%	9.31%	8.23%
8	6.03%	6.48%	6.24%	6.95%	9.32%	8.07%
9	5.12%	5.44%	5.27%	6.23%	7.43%	6.79%
10	5.32%	5.84%	5.58%	6.25%	9.75%	7.97%
11	5.04%	6.27%	5.61%	6.19%	9.99%	7.94%
12	4.96%	5.75%	5.33%	6.90%	9.27%	8.01%
Total	5.54%	5.71%	5.62%	6.83%	8.28%	7.52%

MAPP Base Case, PCMI 2003-2004						
2003	Strategic Bidding			Capacity Withholding and Strategic Bidding		
	Off-Peak	On-Peak	All hours	Off-Peak	On-Peak	All hours
Month 1	6.38%	7.95%	7.13%	7.14%	9.84%	8.44%
2	6.36%	7.02%	6.67%	7.05%	10.08%	8.46%
3	7.14%	6.03%	6.64%	7.60%	7.69%	7.64%
4	6.90%	5.45%	6.19%	8.23%	6.48%	7.38%
5	6.78%	5.78%	6.31%	7.00%	7.38%	7.18%
6	6.99%	5.80%	6.43%	7.38%	6.82%	7.12%
7	7.19%	5.79%	6.50%	9.80%	6.03%	7.93%
8	6.68%	5.96%	6.35%	10.72%	2.89%	7.17%
9	6.24%	7.20%	6.71%	9.94%	5.37%	7.71%
10	5.97%	6.67%	6.31%	9.41%	5.56%	7.53%
11	6.02%	7.52%	6.67%	11.52%	7.43%	9.73%
12	5.91%	6.80%	6.35%	9.81%	5.17%	7.44%
Total	6.55%	6.49%	6.52%	8.83%	6.73%	7.82%

2004	Strategic Bidding			Capacity Withholding and Strategic Bidding		
	Off-Peak	On-Peak	All hours	Off-Peak	On-Peak	All hours
Month 1	5.59%	7.00%	6.24%	6.59%	10.72%	8.49%
2	5.91%	6.32%	6.09%	6.39%	8.99%	7.57%
3	6.28%	4.80%	5.56%	6.91%	7.13%	7.01%
4	6.32%	4.21%	5.29%	7.94%	5.97%	6.98%
5	4.68%	5.45%	5.02%	4.90%	7.78%	6.18%
6	6.16%	5.41%	5.79%	6.72%	7.38%	7.04%
7	6.12%	5.46%	5.81%	7.11%	7.38%	7.24%
8	5.48%	5.74%	5.60%	6.17%	7.63%	6.86%
9	5.38%	5.81%	5.59%	5.46%	8.90%	7.13%
10	5.80%	5.88%	5.83%	5.99%	9.04%	7.36%
11	5.69%	6.73%	6.19%	6.53%	10.25%	8.32%
12	5.54%	6.32%	5.92%	6.46%	9.49%	7.94%
Total	5.74%	5.76%	5.75%	6.42%	8.37%	7.34%

MAPP Base Case, PCMI 2005-2006						
2005	Strategic Bidding			Capacity Withholding and Strategic Bidding		
	Off-Peak	On-Peak	All hours	Off-Peak	On-Peak	All hours
Month 1	5.26%	6.01%	5.59%	7.03%	8.39%	7.62%
2	5.87%	6.52%	6.18%	6.46%	8.78%	7.55%
3	6.01%	5.86%	5.94%	6.50%	7.89%	7.18%
4	6.41%	5.36%	5.92%	7.25%	7.56%	7.39%
5	5.48%	5.72%	5.60%	5.78%	7.69%	6.67%
6	5.80%	5.56%	5.68%	6.28%	7.23%	6.75%
7	6.06%	5.60%	5.85%	6.98%	7.24%	7.10%
8	5.60%	5.84%	5.72%	6.28%	7.61%	6.94%
9	5.30%	6.05%	5.66%	5.55%	8.38%	6.90%
10	5.47%	6.67%	6.00%	5.75%	8.68%	7.06%
11	5.60%	6.21%	5.89%	6.48%	8.82%	7.61%
12	5.68%	6.28%	5.96%	6.80%	9.70%	8.16%
Total	5.71%	5.96%	5.83%	6.44%	8.15%	7.24%

2006	Strategic Bidding			Capacity Withholding and Strategic Bidding		
	Off-Peak	On-Peak	All hours	Off-Peak	On-Peak	All hours
Month 1	4.49%	8.60%	6.36%	7.42%	13.03%	9.97%
2	4.14%	8.34%	6.06%	6.12%	12.96%	9.26%
3	5.10%	6.35%	5.70%	5.88%	11.50%	8.59%
4	5.29%	5.47%	5.37%	5.52%	9.08%	7.08%
5	4.73%	6.42%	5.54%	5.61%	10.61%	8.03%
6	4.92%	5.29%	5.10%	5.64%	6.63%	6.12%
7	5.53%	5.61%	5.57%	7.09%	6.49%	6.82%
8	5.02%	6.14%	5.57%	6.20%	7.95%	7.06%
9	4.89%	6.15%	5.46%	5.68%	9.77%	7.53%
10	4.93%	7.56%	6.15%	6.14%	12.75%	9.20%
11	4.87%	7.76%	6.25%	6.93%	11.75%	9.23%
12	5.33%	7.15%	6.14%	6.56%	12.01%	8.98%
Total	4.95%	6.72%	5.77%	6.25%	10.31%	8.14%

MAPP Base Case, PCMI 2007						
2007	Strategic Bidding			Capacity Withholding and Strategic Bidding		
Month	Off-Peak	On-Peak	All hours	Off-Peak	On-Peak	All hours
1	5.80%	6.77%	6.27%	8.32%	8.81%	8.55%
2	4.71%	8.63%	6.52%	7.25%	13.13%	9.97%
3	5.31%	7.93%	6.52%	6.71%	13.18%	9.69%
4	5.11%	6.77%	5.87%	6.34%	11.90%	8.89%
5	5.18%	7.14%	6.13%	6.42%	11.22%	8.75%
6	5.70%	4.92%	5.33%	6.87%	6.37%	6.63%
7	6.06%	4.96%	5.54%	7.43%	5.93%	6.71%
8	5.69%	5.62%	5.66%	7.38%	7.38%	7.38%
9	5.41%	8.15%	6.59%	7.11%	12.53%	9.44%
10	5.61%	8.93%	7.22%	7.59%	12.64%	10.04%
11	5.37%	7.27%	6.28%	7.59%	10.08%	8.79%
12	5.82%	7.77%	6.68%	7.60%	11.82%	9.48%
Total	5.49%	7.01%	6.21%	7.22%	10.27%	8.65%

MAPP Contracts & Divestiture Scenario, PCMI 2001-2002						
2001	Strategic Bidding			Capacity Withholding and Strategic Bidding		
Month	Off-Peak	On-Peak	All hours	Off-Peak	On-Peak	All hours
1	3.21%	4.79%	3.96%	3.46%	7.62%	5.45%
2	3.61%	3.39%	3.51%	3.73%	6.15%	4.85%
3	3.59%	1.97%	2.83%	4.04%	2.27%	3.21%
4	3.89%	1.84%	2.93%	5.52%	2.23%	3.98%
5	3.37%	2.30%	2.85%	3.56%	2.77%	3.18%
6	3.58%	4.31%	3.92%	3.97%	6.13%	4.97%
7	3.35%	4.83%	4.05%	3.61%	7.28%	5.33%
8	3.27%	4.80%	4.02%	3.61%	7.01%	5.28%
9	2.90%	3.30%	3.08%	3.05%	4.66%	3.76%
10	3.43%	2.61%	3.03%	3.61%	3.12%	3.37%
11	3.24%	3.87%	3.54%	3.33%	6.04%	4.63%
12	3.19%	3.84%	3.48%	3.93%	6.01%	4.85%
Total	3.38%	3.51%	3.44%	3.78%	5.14%	4.42%

2002	Strategic Bidding			Capacity Withholding and Strategic Bidding		
Month	Off-Peak	On-Peak	All hours	Off-Peak	On-Peak	All hours
1	4.21%	6.17%	5.15%	5.39%	10.63%	7.91%
2	4.40%	3.78%	4.11%	5.21%	7.33%	6.20%
3	3.83%	2.83%	3.38%	5.39%	3.72%	4.63%
4	3.28%	2.76%	3.02%	5.84%	3.96%	4.92%
5	4.25%	3.30%	3.78%	5.07%	5.37%	5.21%
6	4.45%	5.15%	4.77%	5.68%	8.16%	6.79%
7	4.53%	5.40%	4.96%	5.57%	8.18%	6.86%
8	4.31%	5.20%	4.74%	5.03%	8.19%	6.53%
9	3.58%	4.00%	3.78%	4.32%	6.77%	5.46%
10	3.70%	4.38%	4.04%	4.29%	8.58%	6.39%
11	3.60%	4.91%	4.20%	4.44%	9.13%	6.60%
12	3.43%	4.29%	3.83%	5.07%	8.41%	6.63%
Total	3.97%	4.38%	4.16%	5.11%	7.41%	6.20%

MAPP Contracts & Divestiture Scenario, PCMI 2003-2004						
2003	Strategic Bidding			Capacity Withholding and Strategic Bidding		
Month	Off-Peak	On-Peak	All hours	Off-Peak	On-Peak	All hours
1	3.45%	5.33%	4.35%	4.22%	9.42%	6.73%
2	3.65%	4.35%	3.98%	3.73%	7.27%	5.38%
3	3.86%	2.80%	3.38%	4.45%	5.10%	4.74%
4	3.55%	2.37%	2.97%	5.35%	3.86%	4.62%
5	3.73%	2.73%	3.26%	3.84%	4.63%	4.21%
6	4.02%	3.61%	3.83%	4.53%	5.36%	4.92%
7	4.05%	3.73%	3.89%	4.82%	5.45%	5.13%
8	3.54%	3.73%	3.63%	4.18%	5.61%	4.83%
9	3.11%	4.13%	3.61%	3.28%	7.17%	5.18%
10	3.35%	3.92%	3.63%	3.46%	7.37%	5.37%
11	3.33%	4.86%	4.00%	3.76%	8.33%	5.76%
12	3.17%	4.24%	3.69%	4.04%	7.52%	5.74%
Total	3.57%	3.82%	3.69%	4.14%	6.43%	5.22%

2004	Strategic Bidding			Capacity Withholding and Strategic Bidding		
Month	Off-Peak	On-Peak	All hours	Off-Peak	On-Peak	All hours
1	3.44%	5.06%	4.18%	4.33%	8.90%	6.43%
2	4.06%	5.20%	4.58%	4.49%	8.19%	6.16%
3	3.65%	3.31%	3.48%	3.82%	5.96%	4.86%
4	4.53%	2.91%	3.74%	5.44%	5.05%	5.25%
5	2.85%	3.74%	3.25%	2.97%	6.08%	4.35%
6	4.31%	4.17%	4.24%	4.70%	5.90%	5.29%
7	4.19%	4.18%	4.19%	5.07%	5.90%	5.46%
8	3.39%	4.22%	3.78%	3.79%	6.15%	4.91%
9	3.26%	4.07%	3.66%	3.26%	7.06%	5.11%
10	3.42%	4.41%	3.87%	3.55%	7.33%	5.24%
11	3.48%	5.03%	4.22%	4.11%	8.79%	6.36%
12	3.67%	4.55%	4.10%	4.48%	7.72%	6.06%
Total	3.68%	4.23%	3.94%	4.16%	6.90%	5.46%



MAPP Contracts & Divestiture Scenario, PCMI 2005-2006						
2005	Strategic Bidding			Capacity Withholding and Strategic Bidding		
	Off-Peak	On-Peak	All hours	Off-Peak	On-Peak	All hours
Month 1	3.46%	4.28%	3.82%	4.90%	7.71%	6.14%
2	3.83%	4.66%	4.22%	4.19%	6.82%	5.42%
3	3.45%	4.35%	3.89%	3.70%	7.12%	5.36%
4	4.23%	3.98%	4.11%	4.46%	6.42%	5.37%
5	3.48%	3.82%	3.64%	3.60%	5.73%	4.60%
6	3.88%	4.11%	3.99%	4.15%	5.41%	4.77%
7	4.07%	4.26%	4.15%	4.90%	5.93%	5.36%
8	3.48%	4.33%	3.90%	4.00%	5.90%	4.94%
9	3.20%	4.03%	3.59%	3.26%	6.56%	4.84%
10	3.10%	4.84%	3.87%	3.27%	7.68%	5.24%
11	3.45%	4.25%	3.83%	4.42%	7.65%	5.97%
12	3.58%	4.48%	4.00%	4.07%	7.52%	5.68%
Total	3.60%	4.28%	3.92%	4.09%	6.69%	5.31%

2006	Strategic Bidding			Capacity Withholding and Strategic Bidding		
	Off-Peak	On-Peak	All hours	Off-Peak	On-Peak	All hours
Month 1	2.53%	6.01%	4.12%	5.50%	10.35%	7.72%
2	2.38%	6.14%	4.11%	4.53%	11.36%	7.67%
3	3.17%	4.80%	3.95%	3.85%	10.28%	6.93%
4	3.14%	3.81%	3.43%	3.52%	9.47%	6.11%
5	2.99%	4.24%	3.60%	3.56%	8.45%	5.92%
6	3.13%	3.70%	3.41%	3.97%	5.53%	4.74%
7	3.58%	4.25%	3.88%	5.01%	5.10%	5.05%
8	2.98%	4.53%	3.75%	4.34%	6.53%	5.42%
9	3.03%	3.54%	3.26%	3.66%	8.57%	5.88%
10	3.39%	6.27%	4.72%	4.68%	11.18%	7.69%
11	3.01%	5.52%	4.21%	5.06%	9.20%	7.04%
12	3.13%	5.10%	4.00%	4.53%	10.52%	7.17%
Total	3.05%	4.82%	3.87%	4.36%	8.80%	6.43%

MAPP Contracts & Divestiture Scenario, PCMI 2007						
2007 Month	Strategic Bidding			Capacity Withholding and Strategic Bidding		
	Off-Peak	On-Peak	All hours	Off-Peak	On-Peak	All hours
1	4.01%	4.95%	4.46%	6.70%	6.22%	6.46%
2	3.24%	6.80%	4.89%	5.43%	10.90%	7.96%
3	3.30%	6.64%	4.83%	4.31%	12.37%	8.02%
4	3.50%	5.97%	4.63%	4.07%	12.03%	7.70%
5	3.27%	5.10%	4.16%	4.14%	9.82%	6.90%
6	3.71%	3.12%	3.43%	4.89%	4.77%	4.83%
7	4.04%	3.38%	3.72%	5.39%	4.57%	5.00%
8	3.52%	3.84%	3.68%	5.17%	6.01%	5.58%
9	3.31%	5.60%	4.30%	4.54%	10.90%	7.28%
10	3.85%	7.04%	5.40%	5.33%	10.78%	7.97%
11	3.76%	5.28%	4.50%	5.97%	7.60%	6.76%
12	3.55%	5.52%	4.43%	5.16%	9.94%	7.28%
Total	3.59%	5.22%	4.36%	5.09%	8.67%	6.78%