2006 Integrated Resource Plan

Electric System

Burbank Water and Power

July 2006

DRAFT

2006 Integrated Resource Plan

For Electric System

EXECUTIVE SUMMARY

The most pressing resource planning issue facing Burbank Water and Power (BWP) is the challenge of meeting the City's commitment to development of energy efficiency and renewable energy resources economically while continuing to integrate recent and renewed energy generation. The majority of the analysis in this Integrated Resource Plan (IRP) addresses these issues.

Since the completion of the 2002 IRP, BWP has completed the following resource-related accomplishments:

- A sharp increase in our programs for energy efficiency measures, with conservation now meeting about one-half of our projected load growth;
- Upgrades to several distribution circuits and substations, providing for increased reliability and reduced energy and peak capacity losses;
- Completion of the Lake power plant, a 47 megawatt peaking unit, in 2002, providing a highly reliable low-emission replacement for three obsolete generating units;
- Completion of the Magnolia Power Project, a 250 megawatt combined-cycle generating unit, jointly owned with five other municipal utilities.

Magnolia Power Project

Where We Go From Here

All of these have been accomplished without increasing electric rates in Burbank since the 2000-2001 power crisis forced rate hikes in 2001. These are no small accomplishments.

BWP plans to meet substantially all of its load growth requirements over the next 20 years with a combination of energy efficiency measures and renewable energy supplies. Our dependence on fossil fuels is expected to be stable or declining, even though we expect the number of customers we serve and the amount of electricity they require to continue to increase.

The challenges for the immediate future include:

- Identifying the most cost-effective energy efficiency options to allow BWP customers to reduce their total cost of energy service;
- Identifying and acquiring the most cost-effective renewable energy resources to meet the City's commitment to meet 20% of our load with renewable energy sources by the year 2017;
- Finding the most economical way to meet our electric generation reliability reserve obligations – providing backup generating plants that can immediately provide relief in the event that one of our primary units suddenly goes offline.

This IRP addresses each of these issues in greater detail. In each case, the plan identifies a combination of immediate actions and study elements that will facilitate BWP moving forward quickly on each of these challenges.

Burbank Load Growth

Consistent with our experience in the past decade, BWP expects that its peak demand and energy requirements will continue to grow slowly, around 1% per year. The limited amount of developable land in Burbank means that nearly all new customer growth results from redevelopment – removing existing buildings and replacing them with newer, larger but more energy efficient facilities.

Section 4 of this IRP reviews the drivers of load change in Burbank, the characteristics of new customers and new load, and the relationship between that new load and the resource acquisition decisions that BWP must make.

BWP can meet the increased energy requirements through any combination of new conventional power generation, renewable resources, energy efficiency, and, in the case of peak demand needs, demand-side management measures. This IRP explores all of these options.

Existing Resources

BWP power needs are met with a combination of generating facilities some local some located throughout the Southwestern U.S. These include coal, natural gas, nuclear, and large hydro resources. The principal resources meeting our needs currently include:

Burbank's Existing Resource Portfolio

Name	Type		Capacity @ Source (MW)	Typical Annual Energy Output (MWh/yr)
IPP	Coal	- Baseload	75.000	576,000
Magnolia	Natural Gas	- Intermediate	75.600	300,000
Olive 2	Natural Gas	- Intermediate	50.000	50,000
Lake	Natural Gas	- Peaking	45.000	60,000
Olive 1	Natural Gas	- Intermediate	40.000	45,000
Palo Verde	Nuclear	- Baseload	9.400	70,000
Hoover	Hydro	- Peaking	20.125	26,600
BPA - Exchange	Purchase	- Peaking	18.000	-

The only one of these that is predicted with certainty to change in the next few years is the expiration of the long-term seasonal exchange contract with the Bonneville Power Administration in 2008. Expiration of this contract creates a need for additional peaking power supply for BWP, which can be achieved either by acquiring additional facilities, meeting our reserve obligations in a different way, or by lowering our peak demand. This is addressed in sections 5, 12, 14, and 15 of this IRP.

Intermountain Power Project Issues

The other significant risk related to existing resources is the proposal to add a third generating unit at the Intermountain Power Project (IPP) coal-fired generating unit in Utah. While BWP does not expect to acquire any additional rights to coal-fired power (consistent with out commitment to renewable resources), the addition of a third unit may result in a decreased share of the existing IPP power flowing to BWP. Section 7 of this IRP explores the issues related to IPP in detail; identifying particular decisions BWP will need to make in order to minimize any adverse impact on the utility should our entitlement to IPP output change.

Renewable Resources

Burbank has adopted a policy that BWP meet 20% of its power supply energy needs with renewable resources by the year 2017. BWP is planning to meet this commitment by acquiring a combination of wind, solar, and geothermal energy resources.

To the extent that these resources are more expensive than the cost of operating existing power plants, there is likely to be upward rate pressure. If these resources can also meet our peak demand requirements, they may displace otherwise needed investment and this will help to offset the upward rate pressure.

Section 8 of this IRP explores a variety of potential renewable resources BWP might acquire, and evaluate the impact on customer bills and customer rates that would result from acquisition of these new resources.

The most promising renewable resources appear to be located a considerable distance from Burbank. This poses the additional challenge and cost of obtaining transmission to bring the power to Burbank.

Energy Efficiency Programs

Since 2000, BWP has steadily increased its funding of energy efficiency programs that enable our customers to meet their energy requirements while consuming less electricity. Section 9 of this IRP explores in detail the programs we are currently funding, and identifies opportunities for increased commitment to energy efficiency options. We have explored an option of maintaining the current level of efficiency investment (on the order of 2% of annual revenues) as well as an option of doubling that level of effort.

Because energy efficiency investments increase the utility's costs and decrease its revenues, these programs can have a significant adverse impact on utility rates. This may occur even where the programs are cost-effective and reduce customer bills. Section 15 of this IRP examines how investment in energy efficiency and renewable energy options are likely to affect BWP rates and the energy bills of our consumers. Options that have significant rate impacts may create political challenges for a locally regulated utility like BWP, and will tend to compete with our acquisition of renewable energy resources. The trade-off between these options may be the most challenging decision that this IRP poses.

This IRP, for the first time, quantifies the peak capacity savings that we have achieved through past investments in distribution system efficiency improvements. BWP has upgraded circuits, lines, and transformers in recent years, and the generating capacity savings from these activities are significant.

In addition, BWP has improved the power factor of its system dramatically. This has major impacts on our peak capacity requirements, and minor impacts on our energy supply needs. Our system power factor was about 90% two decades ago, meaning we needed 10% more generation and distribution capacity than the real power demand of our customers, due to erratic usage patterns, primarily by motors that did not synchronize perfectly to the grid. By installing capacitors and providing financial incentives for customers to stabilize their usage means that we need about 20 megawatts less peak capacity to meet the same level of customer power requirements, about a 7% reduction in our peak demand requirements.

This IRP examines the remaining potential on the system for distribution system efficiency improvements to help meet future power needs.

Demand Side Management

Measures which focus on reducing peak period energy consumption are referred to as Demand Side Management, or DSM. Burbank has several options in this regard, each of which would require that customers make a sacrifice that they are not currently accustomed to making.

Section 10 of this IRP explores three specific options for DSM on the BWP system:

- Utility-imposed interruption of the air-conditioning systems of large customers on short notice;
- Installation of equipment to allow interruption of the air conditioning systems of smaller customers on short notice;
- Implementing "critical peak pricing" rates for our largest customers, providing them with a strong price incentive to reduce all of their usage during a limited number of hours per year when the system is under stress.

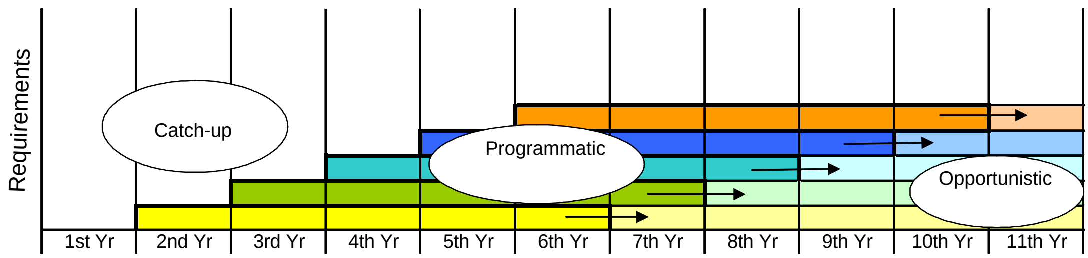
Each of these has the potential to reduce peak demand and help meet the peaking capacity requirements of the utility. All of them impose a burden on consumers that may or may not be welcome.

This IRP includes study recommendations to explore the customer acceptance of these types of measures to determine if they are viable options. Other utilities are currently implementing some of these options on a pilot basis, and we can learn from their experience. In the event that we cannot find a lower-cost means to meet our reserve obligations, these options may become priorities for BWP.

Hedging and Fuel Management

BWP is quite dependent on natural gas as a fuel. It provides nearly half of the electricity we sell. The price of natural gas can be extremely volatile, and has varied over a range of $2 to $20 per million British Thermal Units (BTUs) over the past six years. Therefore, a major challenge to BWP is to plan, anticipate, and manage our exposure to this volatility.

Section 13 of this IRP discusses a systematic approach to hedging natural gas to manage our exposure to volatile fuel prices. After a catch-up phase, BWP will initiate a programmatic buying program and take advantage of opportunistic purchases when the market is attractive.



BWP's Proposed Hedging Strategy

The general recommendation of this IRP is that BWP should

- Acquire ownership of gas reserves through joint participation with other municipal utilities;
- Annually acquire a multi-year contract for a portion of our remaining fuel needs, so that we are not exposed to market-driven swings in prices;
- Leave only a small portion of our gas requirements unhedged at the beginning of each fiscal year;
- Select gas trading partners with high credit quality, so that we can be reasonably sure they will deliver what we buy;
- Purchase as-available renewable energy resources like wind generation where they are lower in cost than our expected cost for natural gas, and back down our conventional generating resources when these renewable resources are delivering power.

Reserve Planning

BWP is a component of the Los Angeles Department of Water and Power (LADWP) grid, known as a "control area." In this situation, we are required by the regulations of the Western Energy Coordinating Council (WECC) to maintain generation reserves at all times equal to our largest single contingency. For BWP, this is normally our 75 megawatt share of Magnolia.

Prior to operation of Magnolia, our largest single contingency was somewhat smaller, and our required reserves were correspondingly lower. Maintaining a generating unit "spinning" involves a significant commitment of capital, and consumption of expensive fuel. Sections 12 and 14 of this IRP examine several alternatives to meet this obligation, including:

- Enter into a reserve-sharing agreement with another utility to reduce our peak reliance on Magnolia;
- Purchase reserves from another utility, most likely LADWP;
- Sell, or swap, a share of Magnolia, and acquire an alternative resource;
- Join the California Independent System Operator (ISO).

In addition, Section 10 of this IRP looks at non-generation alternatives to meet a portion of our reserve obligation.

Each of these has significant benefits and each has significant drawbacks. <u>The principal recommendation of this IRP is to aggressively pursue reserve-sharing opportunities in order to reduce our need to burn fuel at power plants that would otherwise be kept in a cold standby mode.</u> If these efforts are not successful, the other alternatives would become relatively more attractive.

Transmission Issues

BWP holds rights to transmission facilities linking our system to other major points on the west coast transmission network. Some of these link our remote generating units in Utah and Arizona to the Southern California grid, while some provide us with access to wholesale market points where we can purchase low-cost power, or make sales to other utilities that produce economic benefits for BWP.

<u>BWP generally does not plan to acquire additional transmission assets in the next five years, with the exceptions of potentially as required to bring renewable energy resources to our service territory and participation in an upgrade of the Southern Transmission System.</u> We generally believe that our existing transmission rights to the Pacific Northwest and to Utah can provide most of the need, but certain segments may need reinforcement.

BWP continues to manage its transmission assets to bring value to the BWP system. Often there are price differentials between Arizona and the Pacific Northwest. Because we are connected to both systems, we are often able to facilitate transactions between the two that use our transmission assets. Section 11 of this IRP identifies many of these opportunities and recommends continue efforts to use these assets productively.

Joining the California ISO

The 2002 IRP identified significant economic benefits from joining the California ISO. These included both transmission savings and reserve sharing benefits, and recommended intensive study of this option. The transmission savings would result from merging the relatively more expensive BWP transmission assets into the larger, lower-cost ISO transmission pool. The reserve sharing benefits would be a natural consequence of membership, with a reserve obligation based on a percentage of our load, rather than the size of our largest generating unit.

For a variety of reasons but primarily related to issues involving loss of control of resources and forced service interruptions to BWP's customers, BWP did not join the California ISO during the intervening years.

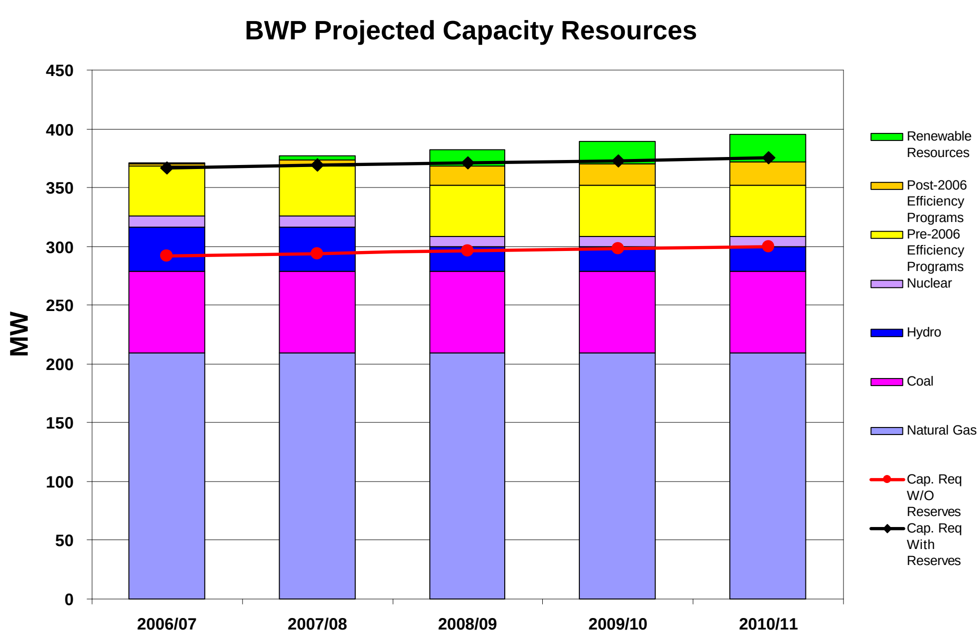
Section 14 of this IRP re-examines this option, and concludes that the transmission benefits previously estimated would likely not be realized. This is due to potential exclusion of certain BWP transmission assets from the ISO pricing scheme, and planned investment by other utilities in several transmission assets that would be included in the ISO pricing system. The result would be convergence of ISO and BWP transmission costs.

The principal attraction to the ISO would appear to be reserve sharing, and Section 12 of this IRP identifies a number of other options to achieve these reserve benefits that the ISO could offer.

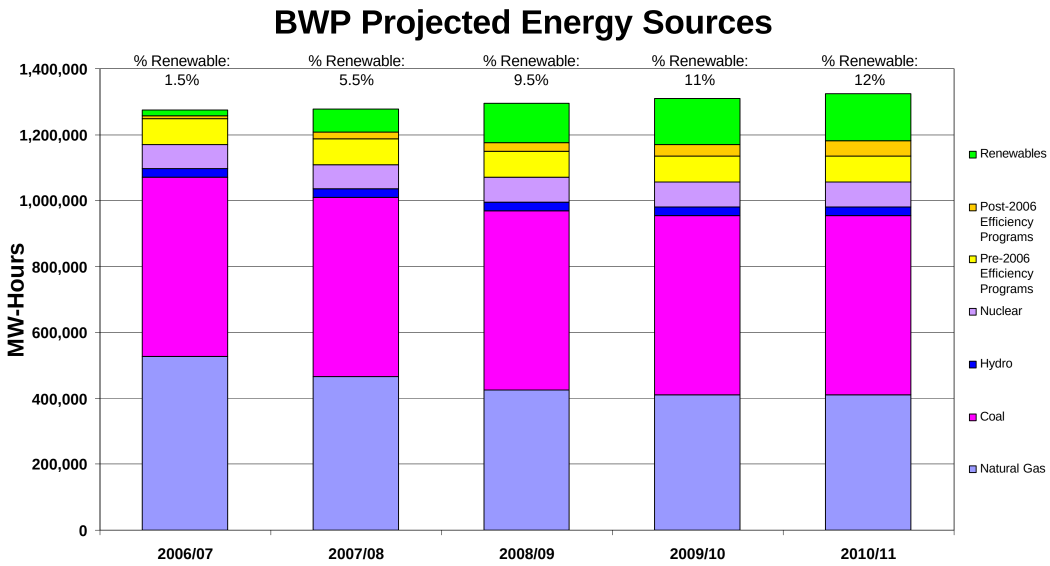
This IRP does not recommend pursuit of membership in the California ISO.

Resource Adequacy

Based on the resource assumptions in this IRP, Burbank Water and Power will meet all of its load growth, and will displace a significant amount of generation from natural gas by investing in energy efficiency and renewable resources over the period 2006 – 2011. A total of about 22% of the BWP peak electric demand is projected to be met with these environmentally preferable resources. The following figure shows the capacity balance for the system. By 2011, it consists of 44 megawatts of capacity provided by efficiency measures installed prior to 2006, 20 megawatts of capacity provided by new efficiency measures, and 24 megawatts provided by renewable resources.



Similarly, the focus on efficiency and renewable resources will reduce the BWP reliance on fossil fuels to meet our energy requirements. A total of 21% of our system electricity requirements in 2011 will be met with environmentally preferable resources. The following figure shows the energy balance for the system over the next five years according to the base scenario of this IRP. This is projected to include 78,000 megawatt-hours of efficiency acquired prior to 2006, 47,000 megawatt-hours of efficiency acquired over the next five years, and 151,000 megawatt-hours of renewable resources. By 2011, our conventional resources will be supplying a smaller absolute and percentage share of our customer's energy requirements than is the case today.



The rate impacts of this scenario are projected to be measurable, but manageable. We estimate that this level of acquisition of preferable resources will increase our customer rates by no more than about 6% compared with using existing power supply resources to meet our load growth. This is based on a range of estimates of the cost of fuel and conventional power resources.

Public Participation

There was full public involvement in preparation of this IRP. A draft of the plan was posted in the BWP web site and discussion of the plan was publicly noticed prior to Burbank Water and Power's Board meeting in April 2006. At that meeting staff reviewed the document and took into consideration comments received from the Board which represent the public as well as members of the public. Similarly prior to the Council meeting at which a Resolution adopting the plan was considered, a draft of the plan was posted on the City web site, a public notice indicating that the plan would be discussed was posted, and members of the Council and public were given an opportunity to ask questions and present their views.

Principal Study and Action Items for This IRP

Section 17 of this IRP is a multi-year action plan to guide BWP over the coming five years. The summary below touches on the most significant of these items, but they are described in much greater detail in the text of the Plan.

This IRP identifies the following action items for BWP to complete in the next two years:

- Implement a long-term reserve sharing agreement for Magnolia, or pursue one of the alternatives identified in this IRP;
- Acquire renewable resources to meet at least 10% of our system energy requirements not later than 2011 as progress toward a goal of 20% by 2017;
- Implement a multi-year fuel hedging program for natural gas;
- Continue to implement system efficiency improvements to reduce distribution losses;
- Maintain or augment our current energy efficiency programs;
- Study the feasibility of relicenseing the Olive 3 and 4 units for emergency use, or reserves.

This IRP identifies the following significant study elements for BWP to examine in the two to five year horizon:

- Resolve issues relating to our future entitlement from the IPP generating unit, in order to more effectively plan for energy and capacity needs;
- Explore with customers the potential impacts of a critical peak pricing program on curtailing loads during periods of extreme stress;
- Inventory the large HVAC demand in our service territory for potential use for capacity interruption for reserves;
- Explore the cost of installing a system for remote interruption of customer loads for reserve purposes;
- Explore with customers the option of interruption of customer loads and/or critical period pricing to constrain loads during times of extreme system stress;
- Inventory the number of oversized transformers on the BWP distribution system, and estimate the costs and benefits of right-sizing these units;
- Review the rate and bill impacts of increasing the BWP commitment to energy efficiency with our customers and the Burbank City Council, to determine if the level of effort should increase.

2006 Integrated Resource Plan

For Electric System

Table of Contents

2006 Integrated Resource Plan

For Electric System

1.0 BACKGROUND

1.1 Purpose

Burbank Water and Power (BWP) continues to find itself in the midst of significant changes in the electric utility industry. The purpose of this Integrated Power Resource Plan ("Plan") is to present the resource plan which BWP will implement to provide safe, reliable and low-cost energy services to its customers consistent with good environmental stewardship.

The Plan addresses how:

a) we will respond to future changes in loads;

b) power rates will remain competitive;

c) demand side management, conservation and energy efficiency improvements, and renewable energy will fill an increasing portion of BWP's energy portfolio.

1.2 Location

The City of Burbank is located in Los Angeles County at the southeast end of the San Fernando Valley. Burbank is 17.1 square miles and is adjacent to Glendale and Hollywood and surrounded on other edges by the City of Los Angeles. The City of Burbank's population is approximately 100,000.

The City of Burbank is a charter city with a City Manager-Council form of government and provides full services to the community including police, fire, and utilities.

BWP was formed in 1913 after the acquisition of local privately owned water and electric systems. BWP operates the city's electric and water utility and has been a major player in the development of Burbank.

BWP's role in the City of Burbank's Development

During the 1980s, the City of Burbank experienced a significant amount of growth with new commercial and industrial expansion related to the aerospace industry. As the need for energy and its related services developed so did BWP.

Then in the 1990s, Southern California experienced a general decline in aerospace and its supporting industries. BWP was impacted by this decline as Lockheed Martin began to leave during the early to mid 1990s. With Lockheed

Martin's departure there was a significant decline in our industrial load. BWP had to make major adjustments to our load portfolio.

However, over time, this fall off in sales was more than offset by a substantial growth in the entertainment and media industry-related business, especially in the field of computer animation and digital processing. Burbank's high-profile media hub includes Disney World Headquarters, ABC television, NBC/Universal production studios, Warner Bros. Studios, and numerous record and affiliated industries.

In addition to the entertainment and media industries, Burbank has transformed into a leading residential and commercial center, and lately, into a burgeoning commercial office and retail center. Burbank has many high-profile businesses including the Empire Center, a retail powerhouse; manufacturing; transportation; and communications.

It took over seven years for the 325 acres of vacant Lockheed land to develop into new retail and commercial office load. In the early 2000s, BWP began providing service to the Empire Center, a major shopping center that occupies a large portion of this property, with about 15-20 MW of new retail and commercial office load. Today, the Empire Center consists of 1.4 million square feet of some of the largest stores like Target, The Great Indoors, Lowe's, Best Buy and Costco.

1.3 Major Historical Developments and Trends in the BWP's History

Burbank has historically been on the cutting edge of providing reliable and competitively priced power to its ratepayers. This section highlights major developments in BWP's history that are discussed in more detail in later sections of this IRP.

The first power distributed within the City of Burbank was supplied by Southern California Edison Company (SCE) prior to 1913. Wholesale power was purchased from SCE until power from Hoover Dam became available in 1937. In response to growing load, Burbank began a program of installing local generation facilities in the 1940s. The first steam turbine, Magnolia Unit 1, commenced operation in 1941 on the present Magnolia-Olive site. Five other steam units were installed on this site between 1941 and 1964. The first combustion turbine peaking unit was placed in service in 1969, followed by two other such units by 1975. In the summer of 1984, a combined cycle generating unit comprised of one active combustion turbine, Olive 4, and one formerly retired steam turbine, Magnolia 2, were completed. Because of changing market conditions and availability of other lower-cost resources, this unit did not prove economically feasible.

In recognition that there were opportunities to obtain inexpensive power located outside of Burbank that would provide benefits to its customers, BWP began a program of acquiring transmission facilities to distant generating facilities. In the mid-1960s, the City of Burbank joined with SCE, the Los Angeles Department of Water and Power (LADWP), the City of Glendale, and the City of Pasadena to construct a ±400 kV, 850-mile, 1,400 MW DC transmission line linking this area with the Pacific Northwest. This line, which went into service in

May 1970, has provided savings of many millions of dollars to Burbank ratepayers through significant import of lower-cost surplus hydro power from the Pacific Northwest, especially during the spring and early summer.

Because of environmental changes in the 1980s it was very difficult to locate new generation in California. BWP joined with other entities to develop generation facilities located outside the State. The 1,600 MW Intermountain Power Project (IPP), of which BWP has approximately 75 MW was completed in the mid 1980s. Another major milestone in BWP's power supply program was reached with the successful completion of the third unit of the Palo Verde Nuclear Generating Station in 1988. BWP's share of this 3,667 MW project is a total of 9.5 MW in the three Palo Verde units.

When the California Public Utilities Commission (CPUC) adopted a plan for staged deregulation of the private electric utilities in the state, BWP adopted a wait-and-see approach. This proved to be an extremely wise and beneficial decision. BWP established 24-hour energy trading and used its transmission, generation, and natural gas resources to earn significant revenue for its ratepayers and avoided significant electric rates increases and blackouts unlike many other electric utilities.

In 2002, BWP developed a new, state-of-the-art, 47 MW on-site combustion turbine generating unit, the Lake generating plant. This unit is used for peaking purposes and as needed for reliability.

In 2003, the Olive units underwent major upgrades. They were recently retrofitted with new state-of-the-art selective catalytic systems (SCRs) to reduce nitrogen oxide (NOx) emissions and new digital control systems. These improvements will enable us to control the units better, reduce air emissions, and operate at lower levels during off-peak periods conserving fuel. These units are primarily used to provide reserves and for peaking purposes during the summer.

Most recently, BWP took the lead in developing a 250 MW combined cycle power plant, the Magnolia Power Project with several partners. The plant became operational in September 2005 and is discussed in greater detail in a later section of this report.

With this IRP, Burbank embarks on a new era with the modernization and redevelopment and related reliability, efficiency and environmental benefits achieved it re-affirms BWP’s commitment to evaluating conservation and demand side management to meet future needs, and the introduction of an ambitious program to add renewable energy into BWP’s resource portfolio.

2.0 THE RESOURCE CHALLENGES FACING BURBANK

Since Burbank prepared its last Integrated Power Resource Plan in 2002, there have been a number of significant changes in BWP’s power resource portfolio. This Plan identifies those changes, explains the challenges they pose, and identifies potential solutions.

Changes
The most significant accomplishment has been the completion of the Magnolia Power Project (Magnolia) combined cycle power project as proposed in the 2002 plan. Magnolia has brought BWP the benefits of more local generation, improved efficiency, lower emissions, and additional economies and sources of revenue. With Magnolia, BWP finds itself in a position of being adequately resourced except for a few hundred hours each year during extreme peak load conditions.

Another recent change, since the last IRP, is the State of California in 2002 passed a mandate for all utilities to develop and implement Renewable Energy Portfolio Standards. The standard that BWP developed and the City of Council adopted as a consequence of this legislation can be found in Appendix A.

Another initiative that went into effect in the state is Assembly Bill (AB) 380, which established resource adequacy requirements for all utilities. Fortunately, BWP's resource planning standards are already consistent with the AB 380 requirement.

Challenges
Magnolia has also brought several challenges that this IRP addresses. These include the operating challenges associated with managing our single largest resource and how to adequately provide "back-up" power in the event Magnolia becomes inoperable. Also, Magnolia burns a lot of fuel. So, a challenge is how to provide for a reliable and stable priced fuel supply.

We are also in the challenging position of adding more renewable energy to our portfolio. This is challenging for a number of reasons including:

- System efficiency and conservation have successfully reduced Burbank's future energy requirements;
- BWP is fully resourced and new resources are generally needed only during relatively rare periods of extremely high load;
- Renewable resources are typically located remotely from Burbank so ways must be found to bring the power to our service territory;
- Burbank is a smaller utility and our resource needs are less than usually offered by renewable project developers, so we need to participate in joint developments to obtain economies of scale and bring the costs down.

Several factors create volatility and risk for BWP's resource planning. First and foremost, the supply and price of natural gas creates uncertainty for the utility's financial planning. In the past decade, natural gas has sold for as little as $1 per million BTU and as much as $50 per million BTU (a million BTU is enough to supply home water heating for about two weeks). Another factor is the rain and snowfall in the Pacific Northwest in Canada. While BWP does not own any hydroelectric capacity in that region, in wet years the Northwest is a major exporter of power to California, and wholesale prices decline, while in dry years they are a net importer, and wholesale power prices can soar. In 2000-2001, a combination of dry conditions in the Northwest natural gas supply constraints, failed deregulation design and air regulation administration triggered unprecedented price rises in the California electricity market.

Despite these challenges, this IRP reaffirms BWP's commitment to continue to add more renewable energy to meet our RPS goals.

Solutions

BWP is committed to the notion of doing more while using less energy. The solution to meeting our resource needs in the future relies on this notion. To that end, this IRP identifies and examines past achievements and new opportunities for conservation and energy efficiency. This plan takes a more detailed analysis of conservation, demand side management, and more renewable energy then its predecessor.

A final area, where we think we there is room for improvement involves managing our assets better. Possible solutions explored here are potential cost saving initiatives. The IRP explores the benefits and costs of a more integrated operation with other utilities through such means as reserve sharing, short term sales, and a look at the issue of whether or not we should become a part of the California Independent System Operator (ISO).

3.0 OVERVIEW OF IRP

This IRP report is organized in the following sections:

- The Executive Summary provides a non-technical overview of the resource plan.
- Section 1: Introduction describes the purpose of the plan.
- Section 2: The Resource Challenges Facing Burbank provides a brief description of the major issues that this plan addresses.
- Section 3: Overview of IRP presents an outline of the report.
- Section 4: Load Forecast provides a summary of BWP's forecasting process and results.
- Section 5: Existing Resources identifies the supply-side and power purchase arrangements currently in existence; and, the transmission resources owned by Burbank.
- Section 6: Natural Gas Fired Generation Issues presents a description of the benefits and challenges presented by the Magnolia Power Project and the possible restoration and retrofitting of the Olive 3 and 4 combustion turbines.
- Section 7: Intermountain Power Project Related Developments gives an update on the development status of the proposed Unit 3 and the Southern Transmission System upgrade.

- Section 8: Renewable Resources describes Burbank's legal requirements, future resource requirement, and opportunities for renewable energy additions.

- Section 9: Energy Efficiency and Conservation identifies existing programs, historical expenditures and savings, and future opportunities.

- Section 10: Interruptibility / Demand Side Management identifies existing programs, historical expenditures and savings, and future opportunities.

- Section 11: Transmission and Distribution Improvements the feasibility of making improvements on the transmission and distribution system to lower peak demand and energy losses.

- Section 12: Operating Reserves and Operational Issues discusses the Western Energy Coordinating Council operating reserve requirement and ways of potentially reducing the costs associated with providing operating reserves.

- Section 13: Hedging / Fuel Management describes the practice of hedging and why hedging is import to the utility; and presents a hedging strategy to reduce or manage the volatility of energy costs and electric rates.

- Section 14: Should Burbank Join the Independent System Operator (ISO) discusses the pros and cons of Burbank joining the California ISO.

- Section 15: Resource Analysis defines the plans reviewed by BWP, including the integration of supply and demand resources, the uncertainty analyses undertaken to quantify risks, the incorporation of environmental externality costs, the selection of a preferred resource plan, and identifies what resources need to be added over the study period. This section also defines the conservation, demand-side management, supply-side resource options considered by BWP in the IRP process, describes the methodology, tools and assumptions used in its resource planning process.

- Section 16: Asset Management discusses how BWP can pro-actively manage its assets to realize margins (cost savings.)

- Section 17: Action Plan provides the list and schedule of activities by which the preferred resource plan will be implemented.

4.0 LOAD FORECAST

Load is the amount of energy our customers require to meet their energy needs for air conditioning, heaters, lighting, and motors. As part of our obligation to serve our customers, BWP has to be ready to meet any demand that our customers ask for and at any time of the day or night.

A load forecast helps us plan for achieving this. A load forecast is an estimate or projection of the amount of energy that must be generated to meet our load, including estimates of electricity use for each of our customer classes.

Our load forecast is comprised of two components:

1. the rate of use of electricity (peak demand forecast) and,
2. the consumption of electric energy (energy forecast).

Together, they are an aggregation of BWP's customer classes of service as shown on Table 1.

Customer Classes

Class	Annual Energy kWh	Annual Revenues - $	No. of Meters
Residential	250,162,571	32,748,512	41,878
Lifeline	9,119,151	568,459	2,157
Commercial	240,078,684	34,758,716	6,302
Industrial	441,638,885	52,424,124	175
Contract / Time of Use	118,696,268	11,436,158	3
Schools	11,551,778	1,815,792	41
Signal Lights	310,188	14,059	
City Departments	9,161,906	1,287,990	128
Street Lights	8,850,072	1,164,544	
Temporary Service	492,571	68,421	83
Municipal Pumping	1,656,751	251,207	30
Other	290,080	584,432	
Total	1,092,008,905	137,122,414	50,797

Table 1

Burbank's typical residential customer resides in a small single-family home, and uses about 500 kWh per month for lights, appliances, and entertainment equipment, and limited air conditioning. Most BWP residential customers use natural gas for space and water heating. Our commercial customers are generally a mix of office and retail establishments. The classification between "commercial" and "industrial" is based on load size, not the type of activity. Our "industrial" customers therefore include major office buildings, large retail malls, and many businesses engaged in the media industry. There are a relatively small number of more traditional manufacturing and fabricating firms operating in Burbank; these are classified as "commercial" or "industrial" based upon their load size.

4.1 Load Forecasting Process

For system operations, resource planning, rate setting, and financial planning purposes, BWP uses various methods of calculating amounts of electricity that our consumers may use in the future. Electricity usage is weather dependent. More accurate weather forecasting allows the most cost-effective set of resources to be available. In addition, it is important to know as much as possible about our customers and the way they use energy. Burbank undertakes the following steps in preparing its forecasts:

1. We review the actual weather and adjust it for energy supplied to our customers to see how it compares to the existing forecast.

2. We review data provided by the Burbank Community Development and Planning Department regarding future trends in residential, commercial, and industrial development.

3. We review plans and reports regarding additional load by large customers or major new loads to be developed.

4. We review the previous forecast to determine whether or not the assumptions used remain valid.

5. Based on these factors, a judgment is made to determine if the current load forecast needs adjusting. If an adjustment is warranted a new forecast is prepared. If not, the existing forecast is used.

In addition to the energy forecasts, BWP also reviews our peak load and determines a forecast. The energy forecast tells us the amount of fuel we need to plan to buy, and also helps guide the type of resources we should acquire. Stable year-round loads justify investment in baseload power plants with higher fixed costs and lower variable costs per unit, while weather-sensitive extreme peak demands require investment in options that have lower fixed costs, even if the variable running costs are higher.

4.2 Peak Demand Forecast

The peak demand forecast is an estimate of the maximum rate of use of electricity measured in megawatts (MW) that need to be available to BWP. BWP must be capable of generating, transmitting, and distributing energy to meet demand, otherwise loads would need to be cut back to prevent overloads and/or system failure (blackouts).

As the City of Burbank has transitioned away from the aeronautics industry when Lockheed Martin was headquartered here to a high-profile media, entertainment and retail hub complete with a revitalized Downtown area, our energy needs have changed. BWP has to be poised to grow and change with the demands of our customers.

For example, BWP's peak demand forecast is shown in Figure 1. It is important to mention that the squares correspond to the actual annual system peak loads that have been experienced since 1994. This 1994 starting point has been chosen for BWP's forecast because it represents the post-Lockheed era. Lockheed's sudden and unexpected departure from Burbank in the late 1980s resulted in the peak demand dropping 15 to 20 percent in the years prior to 1994. Thus, future projections that incorporated the effects of departing Lockheed load prior to 1994 would obscure current trends.

In looking at Figure 1, the line on the graph is a linear regression of the historical loads (squares). The resulting trend line represents a forecast annual peak demand that has a 50% probability of occurring. The line of diamonds that is shifted above the trend line and parallel to it represents annual peak demand levels that have a 1 in 10 year probability of being exceeded. (BWP's planning standard is to use a peak load we expect will occur in 1 in 10 years to ensure that there is sufficient capacity available to meet the annual peak demand.) From the graph it can be seen that, for example in 2010, there is a 50% probability of an annual peak demand of 285 MW occurring and a 10% chance that the peak will be higher than 300 MW. For planning purposes, BWP makes sure that there is sufficient capacity available to avoid shortages and system outages.

There is a small possibility of loads exceeding this 1-in-10-year criteria, or multiple generating units failing simultaneously. Experience has shown that BWP customers will generally respond quickly to an urgent appeal for voluntary curtailment. Such an appeal remains as a resource of last resort prior to imposing rolling blackouts or other electricity rationing schemes in Burbank. For that reason, we intentionally do NOT plan on the use of this option to meet predicted loads under our 1-in-10-year planning criteria.

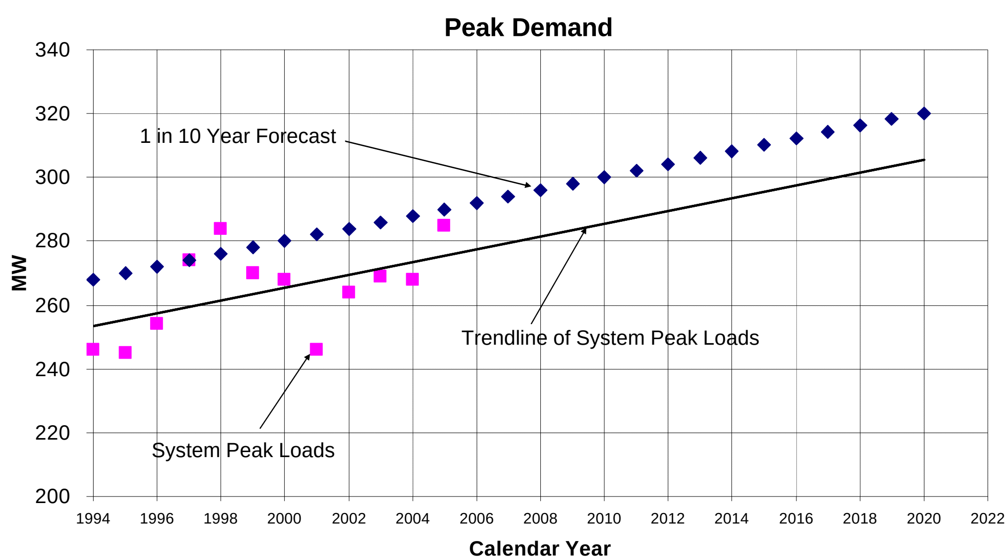


Figure 1

4.3 System Energy Forecast

Another helpful forecast is the system energy forecast. This forecast is an estimate of the total annual consumption of electric energy measured in megawatt hours (MWh). It is made up of forecasts of sales to customers and associated transmission, distribution and transformer losses, which together make up the total electric energy requirements that must be supplied by BWP to meet customer needs.

Burbank's historical consumption of energy going back to 1980 along with a forecast of future requirements is shown on Figure 2. The purple squares and blue triangles correspond to historical consumption based for each calendar year and fiscal year respectively. The bold line comprised of red dots corresponds to the current forecast. And, the lines on the upper right correspond to load forecasts made over the last five years that gradually reduce down to the current forecast, which is shown in red.

As mentioned previously, weather plays a key role in predicting how much energy our customers will need throughout the year. BWP uses a 50/50 energy forecast as the basis for planning our energy requirements. BWP's energy forecast is weather normalized making it a 50/50 forecast or one that has a 1 in 2 year probability of being exceeded. Thus, the tendency of having actual loads over time coming in both above and below the forecast is indicative of a "good" forecast. However, we have the safety of knowing that we have sufficient capacity to meet a 1 in 10 year peak demand. BWP has adequate resources in our portfolio to produce any energy required above the 50/50 forecast, too.

Figure 2 shows historical energy requirements for past fiscal and calendar years by the large triangles and squares, respectively. The latest forecast of annual Net Energy for Load ("NEL") requirements based on anticipated normal weather conditions are shown by the large circles. NEL is the amount of energy referenced to the interconnection point between the LADWP and Glendale electrical systems and the Burbank system that is required to meet Burbank's sale obligations to its customers.

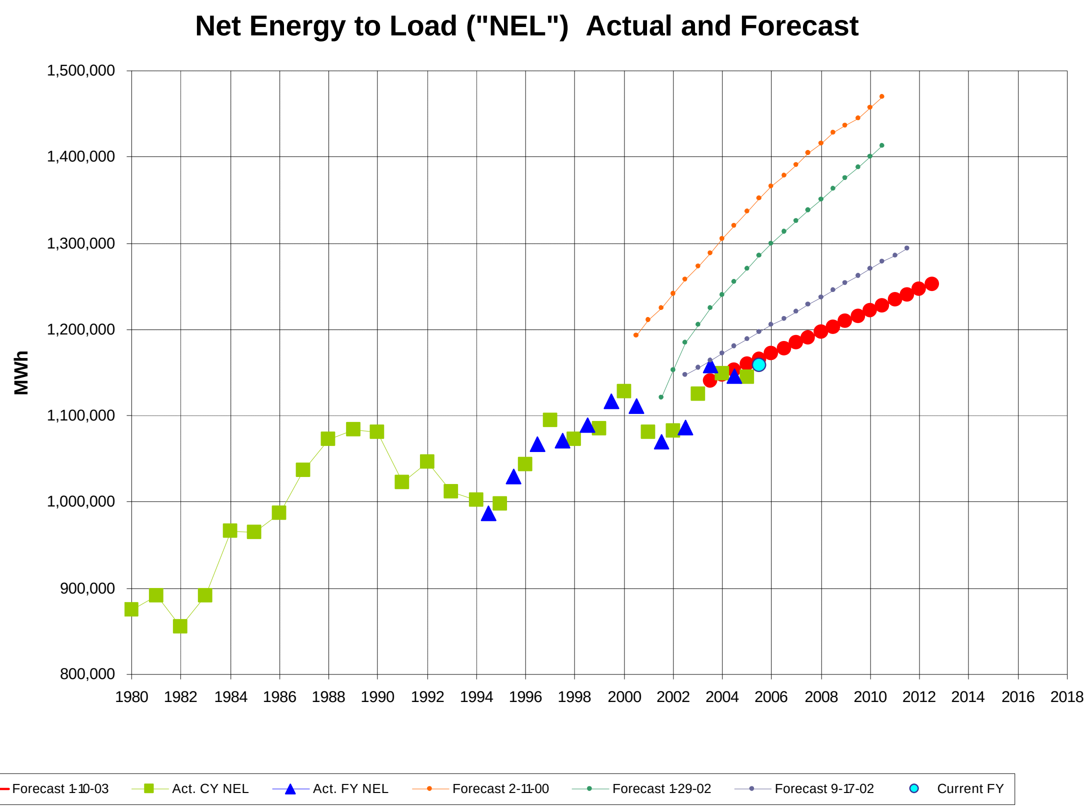


Figure 2

BWP applies tests to determine how good the current forecast is. One test is to plot historical weather normalized consumption to see how it compares to the current load forecast. Figure 3 shows such an analysis. The diamonds are historical data that has been weather normalized. The trend line shows the associated best fit regression. Since the extension of this line passes right through following year's projected forecast (the circle), the existing load forecast is still valid.

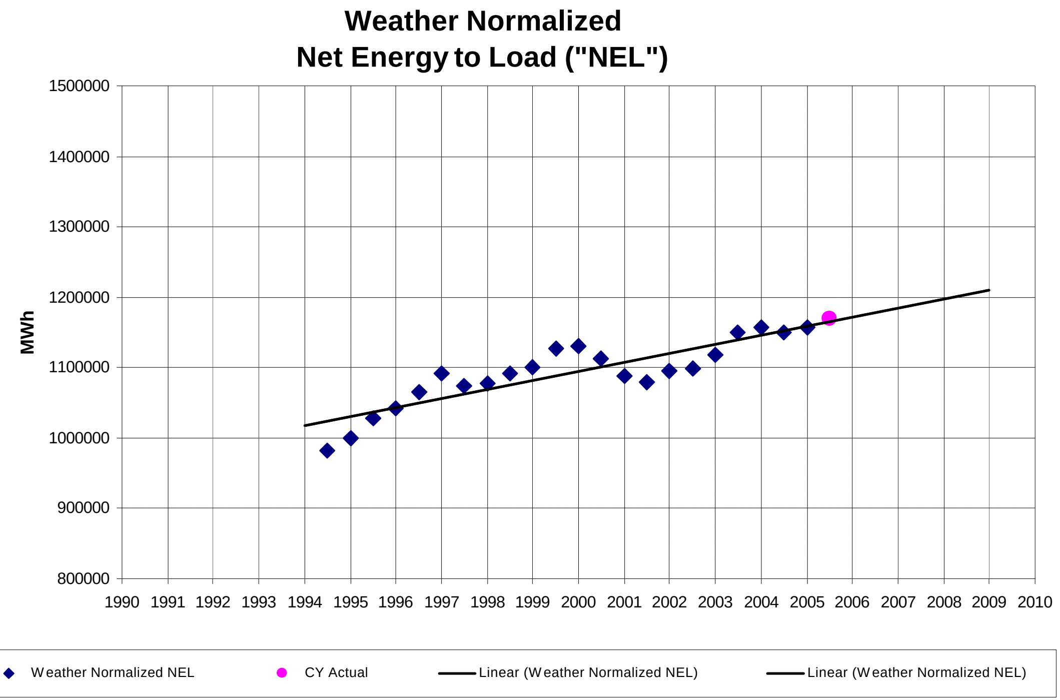


Figure 3

BWP spends considerable resources and time analyzing weather patterns (both actual and predicted) and our customers' energy needs, both current and future, to determine the best load forecast. We look at the peak demand or maximum rate that our customers use electricity and the total annual consumption of electric energy to determine the future energy requirements. We rely on a complicated and historical review to test if we are correct. Then, we make adjustments to our forecast as actual information becomes available. All this work is done to make sure that we are delivering cost-effective and resource-efficient energy to our customers.

4.4 Potential Additional Sources of Load Growth

The load forecast is based upon projected growth based on historical experience. There are two discrete possible sources of additional load growth that are not reflected in the load forecast.

The first of these is the potential for significant electric vehicle load. While BWP has offered an incentive bill credit for electric vehicles for many years, it is not currently producing a meaningful response. BWP has joined the Plug-In Hybrid Electric Vehicle (PHEV) Partnership. A PHEV is a hybrid gasoline/electric automobile which has storage batteries that are charged while the vehicle is stationary. The potential gasoline savings from widespread deployment of this technology are significant, and therefore the potential electric load impacts are also significant. We do not anticipate this to be realized in the near-term future, but a study element has been defined in the Action Plan to examine this potential.

The second are of potential significant load growth is the installation of electric heat pumps in place of natural gas heating systems. The Burbank-Glendale-Pasadena Airport

Authority is in the process of installing sound-deadening retrofits on 5,400 homes. Included in this is the installation of central air conditioning systems. Energy Star heat pumps could be substituted for the air conditioning systems, and would result in a reduction in natural gas consumption and an increase in winter electricity consumption for space heating purposes. BWP is fully resourced, and the incremental generating resource is expected to be the Magnolia Power Project during most winter hours. Given the 48% thermodynamic efficiency of MPP, plus the typical winter heating efficiency of Energy Star heat pumps of about 250%, the total amount of natural gas used for heating could be significantly reduced if heat pumps were installed on these homes. There would be commensurate environmental benefits. A study element has been included in the Action Plan to examine this potential.

5.0 EXISTING RESOURCES

Besides predicting how much energy our customers will need, BWP staff also must manage our existing supply resources to make sure that we balance risk and cost. This section presents summaries of Burbank's existing supply side resources located in Burbank and elsewhere and our transmission assets located throughout the Western U.S.

5.1 Natural Gas Fired Generation

Burbank has had local generation facilities for more than 50 years. For example, BWP's local generation is all natural gas fired generation, with generating units ranging in age from the early 1960s to the newest completed in 2005.

Existing Units

Table 2 shows the existing units, the type, ratings, and when they were built. It also describes the way in which the plant is used. There are four ways to operate a power plant: as a baseload, load following, peaking, and operating reserve plant. This is explained in greater detail in Section 15.2.

LOCAL GENERATING UNITS

Unit Name	Type	Nameplate MW	Continuous MW	Efficiency Btu/kWh	In-Service Date
Olive 1	Steam	44.0	40.0	11,500	1959
Olive 2	Steam	55.0	50.0	10,000	1964
Lake	Combustion Turbine	47.0	45.0	1,000	2002
Magnolia	Combined-cycle	310/96 *	244/75.6 *	7,000	2005
	TOTAL	242.0	231.0		

Notes: (*) BWP has a 30.992% interest in this SCPPA owned plant located in Burbank.

Table 2

5.1.1.1 Steam Turbines

The Olive 1 and 2 steam generating units comprised of a boiler, steam condenser, turbine-generator, and cooling tower are BWP's oldest existing units.

In recent years, Olive 1 and 2 have both been on-line running during the summer with one unit operating continually adjusting its output as load changes and the other unit kept at minimum load to provide operating reserve. During the winter, one of the Olive units is normally kept on-line at minimum load to provide operating reserves should they be needed while the other is kept on hot standby so it can be started within a few hours.

Considering their age, the Olive units are in fair condition. In 2003, they both underwent major refurbishment. They were recently retrofitted with new state-of-the-art selective catalytic systems (SCRs) to reduce nitrogen oxide (NO_x) emissions and new digital control systems which will enable us to control the units better, reduce air emissions, and operate at lower levels during off-peak periods conserving fuel. With these retrofits and upgrades, it is expected that these units will be available beyond the duration of the period covered by this IRP or roughly ten years.

These units represent about 20% of our peak generating capacity. However, because of the relatively low efficiency of these units (high fuel consumption) they have been primarily relegated to load following and providing operating reserve. (See Section 15.2 for a detailed discussion of baseload and load following operation of generation units.) Because of this, their annual output is normally limited and on a combined basis is expected to be less than 100,000 MWh per year, or only about 9% of our energy supply.

5.1.1.2 Combustion Turbine: The Lake Unit

On June 12, 2001, City Council authorized BWP to proceed with the emergency procurement and installation of a new 47MW General Electric LM-6000 simple cycle combustion turbine. The unit went into service in mid- 2002 and represents "best of class" combustion turbine technology.

It is used predominately in the summer for load following and in the winter for standby operating reserve. When not needed to serve local retail requirements, the unit is frequently used for wholesale transactions with other entities.

The expected annual output of this unit for retail load requirements is expected to range from 50,000 to 100,000 MWh per year.

5.1.1.3 Combined-cycle: The Magnolia Power Project

On January 11, 2002 Council authorized BWP to participate in a Southern California Public Power Authority (SCPPA) combined-cycle generating plant built in and operated by Burbank known as the

Magnolia Power Project. The unit went into service in September 2005 and represents "best of class" combined-cycle technology.

Magnolia is a General Electric 7FA combustion turbine. The exhaust is run through a heat recovery system to produce stream, which is then used to power a General Electric A14 steam turbine. The nominal output of the facility is 250 MW. For limited periods it can be augmented with duct firing and steam injection (conceptually similar to afterburners on a military aircraft) to produce up to 310 MW.

Burbank has an entitlement to 30.992% of the project's output, or around 75 MW. With duct firing and steam injection, available about 5% of the time, BWP's share can reach up to 95 MW. The combined heat rate (or overall efficiency) of the facility is very high so it is expected to operate at a high capacity factor. Based on the nominal rating of the plant, it is expected that 60%, or 400,000 MWh, of the plant's potential output will go to retail load. In addition, depending on market prices for power, additional power the unit can produce is expected to go to the wholesale market.

Section 6.1, 6.2, and 6.3 found later in this report present an extensive discussion of the Magnolia Power Project.

5.2 Gas Supply

The volume of gas required each month depends on weather, gas availability, the cost of power, and the cost of gas. Other considerations such as plant maintenance can also affect the level of generation and the need for natural gas.

Gas fueled generation facilities are dependent upon a stable and secure supply of natural gas. To accomplish this BWP imports natural gas from as far north as Canada and from Texas and New Mexico. We bring gas into the City, through firm gas pipeline contracts from Alberta, Canada to Malin on the California-Oregon border for delivery of up to 4,770 Dth per day. Additionally, the City has rights to ship on the El Paso Pipeline System of 4,858 Dth per day at the California-Arizona border. Our rights to El Paso Pipeline capacity expire in March of 2007. Natural gas is a major cost driver in our business and not having it means the lights won't stay on.

Burbank through SCPPA is in the process of acquiring ownership of natural gas reserves in the ground. Rights to approximately 1,000 Dth/day have been acquired and it's possible to expand the acquisition program up to 3,000 Dth/day through another acquisition in two years.

Burbank has developed a risk management policy and strategic hedging program for natural gas procurement. Section 13 of this report presents a detailed description of the hedging program.

5.3 Contractual Arrangements

BWP has electric capacity and energy available through long term contractual agreements for resources located outside California. These contractual arrangements are basically considered firm generation, which is jointly owned with other municipal partners. By leveraging these assets of our municipal partners we achieve the critical mass needed to build large projects/contracts. This strategic practice reduces construction, financing, and operating costs and lets us achieve economies of scale and obtain the most favorable financing rates.

BWP has acted in concert with other electric municipal power systems in Southern California to form a Joint Powers Authority for developing and participating in new generation and transmission projects called the Southern California Public Power Authority (SCPPA). SCPPA has been used by BWP to finance its participation in the Southern Transmission System (STS), Hoover Uprating, Palo Verde, and most recently the Magnolia Power Project. A similar agency, based in Utah, called the Intermountain Power Agency (IPA) was used to develop the Intermountain Power Project (IPP).

As an alternative, or compliment, it is possible to contract for power from various outside parties rather than generate it. There are however, certain risks associated with contracts that must be kept in mind when pursuing contracts as is evidenced by the recent bankruptcy of Enron Corp. The lessons are:

1. Know your business partner;
2. Maintain awareness of their financial condition;
3. And, limit your exposure with any one party.

Table 3 summarizes Burbank's long-term contractual arrangements associated with the power purchases of our generation portfolio. The table also lists the type of fuel associated with the generation, capacity (MW), and expected annual energy (MWh/Year) from each.

Purchased Power						
Type		Name	End Date		Capacity @ Source (MW)	Max Energy (MWh/yr)
Hydro	- Peaking	Hoover	Sep 2017		20.125	26,600
Nuclear	- Baseload	Palo Verde	Oct 2030		9.400	70,000
Coal	- Baseload	IPP	Jun 2027		75.000	576,000
Purchase	- Peaking	BPA - Sale	Apr 2008		40.000	145,512
				Total	144.525	818,112

Table 3

The resources represent the core of our portfolio ensuring a reliable and competitively priced source of energy to meet customer needs.

The following is a brief description of BWP's four contractual resources located outside the City:

5.3.1 Hoover

Location: Hoover Dam is located on the Colorado River along the Nevada-Arizona border.

Capacity: A total of 20.125 MW. This capacity consists of 5.125 MW renewal of Burbank's original Hoover "A" contract in addition to a 15 MW Hoover "B" upgrade portion.
Energy: The annual energy associated with these portions is 21,158 MWh and 5,442 MWh respectively, for a total of 26,600 MWh per year plus the potential for a portion of any additional Excess Energy that might be available from the plant due to unexpectedly high stream flows.
Operator: The plant is owned by the Federal government, operated by the Western Area Power Administration and energy is received via a contract with the SCPPA.
Term: This contract remains in effect until September 30, 2017.

5.3.2 Palo Verde

Location: The Palo Verde Nuclear Generating Station is located south of Phoenix, near Wintersburg, Arizona.
Capacity: Three 1,278 MW units. Burbank has rights to 4.4% of SCPPA's 216.48 MW interest in the plant, amounting to 9.525 MW.
Energy: The expected annual energy availability is 70,000 MWh per year, but the actual energy is dependent upon the performance of the units. Historically energy production from Palo Verde has been excellent.
Operator: It is operated by the Arizona Public Service Company and the agreement was entered into service in the early 1980s.
Term: This contract remains in effect until October 31, 2030.

5.3.3 Intermountain Power Project ("IPP")

Location: IPP is a two unit coal-fired thermal plant located near Delta, Utah.
Capacity: There are three cost-based long-term power sales contracts associated with the IPP resource that expire in 2027:
The Power Sales portion represents the piece acquired with the other California participants through the Southern California Public Power Authority.
The Layoff portion is comprised of the interest in the project held by Utah Power that has been sold to the California participants. Utah Power does not have the right to cancel this contract.
The Excess portion is comprised of the interests in the project held by Utah municipal utilities and Utah Electric Co-operatives that has been sold to the California participants. The Munis and Co-ops have the right to take back their portion at any time with 6 months notice.
Based on a plant rating of 1,800 MW, Burbank's present 4.16% entitlement in this plant totals approximately 75 MW. Power is received under three separate contracts as shown in Table 4.
Energy: It is estimated that the annual energy available to Burbank is 576,000 MWh, but year to year variations are inevitable due to occasional outages of the units.
Operator: IPP is operated by the Los Angeles Department of Water and Power ("LADWP").

IPP Capacities At Plant		
Contract	Percentage	Amount - (kW)
Power Sales	1.704%	30,670
Lay-off	1.667%	30,000
Excess	0.797%	14,350
	Total 4.168%	75,020

Table 4

At present the future of the Excess agreement for IPP is unknown. This is attributable to uncertainty over what the Utah municipals and Co-operatives are likely to do with the Excess agreement if IPP Unit 3 is built. (Section 7 presents a more detailed discussion of ongoing IPP related developments.) At this point in time, it is unknown what will happen but three potential outcomes and impacts are as follows:

1. The Cooperatives and Munis may cancel the Excess agreement. In this event, Burbank would lose approximately 14 MW of capacity and associated energy. While this might decrease our dependence on coal and reduce CO2 emissions, there are several potential negative impacts as follows:

    - First, there is a negative cost and reliability impact. IPP provides low cost base load capacity and energy in the mid $40/MWh range. Presently, there is no other potential replacement resource available at such an attractive price.

    - Second, is loss of the Northern Transmission System ("NTS") transmission rights that are associated with the Excess Contract. Losing rights to the NTS would materially affect BWP's ability to conduct wholesale power trading. Presently, energy is not actively traded at the IPP generating station, but rather at Mona and Gonder, two transaction points on the NTS. With the loss of the NTS, BWP would likely experience a significant loss of trading opportunities the magnitude of which is hard to quantify.

2. The Coo-ops and Munis may permanently assign the Excess agreement to us. In this event, BWP would continue to receive the power and have the benefit of an attractively

priced resource. As well, we would retain rights to the NTS transmission system.

3. Some combination of permanent assignment and reduction in the quantity under the Excess agreement. What form this option might take is speculative. But, to the extent we could keep low cost power would benefit us. Again, as previously mentioned any reduction in NTS rights as a consequence of reductions under the Excess agreement would be a negative.

5.3.4 Bonneville Power Authority ("BPA")

Location: Pacific Northwest
Operator: Bonneville Power Authority
Term: This contract ends on January 31, 2008.

In January 1988, the City of Burbank executed a twenty-year power sales/exchange agreement with BPA. The agreement has two modes of operation: sale and exchange. The sale mode occurs when the Pacific Northwest is in an energy surplus condition, and the exchange mode occurs when the Pacific Northwest is in an energy deficit condition. Both modes have an annual and a seasonal block.

During the sale mode, 20 MW at 60% load factor or 105,120 MWh is available from the annual block. A seasonal block contributes another 20 MW at 55% load factor or 40,392 MWh from May 15 through October 14, when BWP's energy needs are highest.

In the exchange mode, BPA provides 9 MW of capacity on an annual basis and another 9 MW seasonal block of capacity from May 15 through October 14. The capacity is used by Burbank to buy inexpensive off-peak power during the evening to bring down to Burbank during the higher priced on-peak daytime. In exchange for the annual block of capacity, Burbank is obligated to return to BPA 22,824 MWh of energy annually in equal weekly increments. Burbank also returns an additional 8,775 MWh of energy to BPA from November 16 through April 15 in exchange for the seasonal block of capacity received from BPA.

BPA placed the contract in the Exchange Mode for the 2001/02 fiscal year and it has remained there. It is expected that the agreement will remain in the exchange mode for the duration of the contract which expires in January 2008 but may have obligations lasting another three months until April.

5.4 Renewable Resources

During the past several years, BWP has undertaken several initiatives to bring environmentally preferable resources into its power supply portfolio. Although their percentage is not large compared to our traditional resources, renewable energy is nevertheless an important part of our resource portfolio. This section describes our renewable resources. Section 8 describes the planned increased role BWP has for renewable energy as it implements its Renewable Portfolio Standard.

5.4.1 Micro-hydro

In 2002, BWP installed a small micro-hydro system to take advantage of a required pressure reduction where the City's water facilities interface with the Metropolitan Water District of Southern California (MWD) at the Valley Pumping Plant. The peak output of the facility is approximately 400 kW in size. The micro-hydro system is used when BWP needs to bring water into its system.

5.4.2 Micro-turbines Using Landfill Gas

In July 2001, BWP began productively putting to use the naturally occurring landfill gases (methane) to make energy. Previously, this gas was flared. BWP recently expanded and upgraded the micro-turbine units at the City's landfill site. BWP is the world's first operator of a landfill power project using this technology.

The installation now comprises ten micro-turbines – 30 kW Capstone micro-turbines that produce a maximum output of approximately 300 kW and about 2,000 MWh per year and supply the energy needs for 500 homes.

In 2005, Burbank installed an additional 250 KW Ingersoll-Rand micro-turbine at its landfill which is the first commercial micro-turbine installation to run directly on landfill gas. It operates continuously and is designed for 90% availability. Annual energy production of up to 2,000 MWh per year is expected. This addition increases Burbank's landfill gas generation capacity to 550 kW.

5.4.3 Solar Demonstration

In May 1998, Burbank installed a 4 kW photo-voltaic solar demonstration project. This facility has been operating at about a 25 % capacity factor producing about 9 MWh per year.

5.4.4 Ameresco Landfill Generation Project

In 2004, Burbank City Council approved BWP's 4 MW participation in the Ameresco project. This project produces energy by using landfill gas (methane) from the Chiquita Canyon Landfill, which is located approximately five miles west of the City of Santa Clarita along State Highway 126.

The developer originally promised that the project would be in-service by mid- 2005, but that has not happened. The developer has run into difficulty firming up the gas rights for the plant and is having trouble securing the necessary permits from the South Coast Air Quality Management District (SCAQMD). The developer is working on a design that meets the SCAQMD's requirements for the poor quality of the gas from the landfill. Currently, the project is expected to go into service in 2006.

The facility is comprised of four internal combustion engines that use the landfill gas as a fuel source. It is expected that the facility will operate at a high capacity factor and produce approximately 16,000 MWh per year, which corresponds to about 1% of our annual requirements.

Although they represent a small portion of our resource mix at this time, as described later in this IRP, Burbank is committed to ensuring that over the next several years renewable energy represents an increasingly larger share of our energy portfolio.
Next, we'll take a look at BWP's transmission assets.

5.5 Transmission Resources

The City has ownership or entitlements to the transmission facilities shown on the figure in Appendix B. It is over transmission lines that electricity travels and BWP "transports" electricity generated outside the city into the city. BWP uses these lines to bring in both firm and economy power from remote generation resources.

BWPs transmission resources fall into three general categories:

Generation Integration lines that connect our remote generating facilities to the Southern California grid; local Transmission lines that connect the city limits of Burbank to the Southern California grid; And, lines acquired to have access to low-cost economy energy sometimes available in other regions, and to sell surplus power from BWP generation to other regions.

A detailed description of the various transmission facilities that BWP has rights to follows:

5.5.1 Pacific Northwest DC Intertie ("DC Intertie")

Description: This is a double pole +/- 500 kV DC transmission system and extends 850 miles.
Location: The lines originate in Celilo in Northern Oregon and extend to Sylmar, California.
Ownership: Burbank owns 115 MW of transmission capacity on this line at the Nevada/Oregon Border (NOB). However, in July 1990, BWP entered into a twenty-year agreement with five Edison Resale Cities to lay-off 30 MW of surplus transmission capacity in this line. With this lay-off agreement, BWP still has 85 MW of transmission capacity remaining for its own use.
Use: The DC Intertie is primarily used to bring power entitlements from the Pacific Northwest to Burbank under the BPA contract. It also allows Burbank to make spot market purchases of economy power from that region, or sales to that region.

5.5.2 Southern Transmission System ("STS")

Description: The STS is a 488 mile long, double pole +/- 500 kV DC transmission system.

Location: The STS originates at IPP, in Central Utah, and terminates at the Adelanto Switching Station in Southern California.
Ownership: BWP's STS share is 86 MW (4.498%) of capacity on the STS based upon a line rating of 1,920 MW.
Use: The line is primarily used to bring Burbank's power entitlements from IPP to the Los Angeles Basin and has secondary use in bringing economy power from Utah and Nevada to the L.A. basin.

5.5.3 Northern Transmission System ("NTS")

Description: The NTS consists of two, 50-mile long, 345 kV AC lines.
Location: The NTS originates at the Intermountain Power Project and connects to Mona Substation in Utah and to the Gonder Substation in Nevada.
Ownership: Burbank has rights to schedule up to 38 MW of firm capacity on the NTS.
Use: The line was built to move IPP power to Utah entities. However, when they signed the Excess Power Sales Agreement they had no use for a portion of the line so the California entities picked up the rights. Currently, these lines are primarily used for wholesale trading and buying short-term power from the market when it is attractively priced.

As discussed in the IPP section of the Existing Resources part of this report there is a chance that as a consequence of the third IPP unit being built that Burbank might lose its NTS transmission rights. This would occur if the Utah municipal utilities and Co-operatives cancelled or withdrew the Excess power agreement. This is likely to occur because the parties who plan to participate in IPP Unit 3 intend to use the NTS rather than build new transmission to accommodate unit 3. The loss of BWP's NTS rights would cause Burbank to forfeit current revenue that is being generated from using the NTS. In addition, it would leave us without a transmission path for IPP power during Southern Transmission System outage periods.

5.5.4 McCullough -VictorvilleLine 2

Description: This line is a 180-mile 500 kV AC transmission line
Location: Originates at the McCullough transmission hub near Las Vegas, and terminates at Victorville, north of Burbank.
Ownership: In 1980, Burbank acquired a 2.476% entitlement, which corresponds to 25 MW of capacity based on the line's current rating and continues until May 31, 2030.
Use: Burbank uses this line to make power transactions with entities in Nevada, New Mexico, and Arizona.

5.5.5 Hoover Transmission Service Agreement With LADWP

Description: Add in.
Location: Add in.
Ownership: January 1992, BWP entered into a firm transmission service contract with LADWP for the delivery of BWP's total Hoover entitlement of 20.125 MW to Receiving Station E ("RS-E").

Use: BWP brings Hoover power into the LA Control System through this service agreement. The contract expires on September 30, 2017, coincident with the expiration of Burbank's Hoover entitlement agreements. Should our Hoover entitlements be renewed beyond September 30, 2017, Burbank has the right to renew this Agreement for a similar term.

5.5.6 IPP Transmission Service Agreement With LADWP

Description: This is a contract with LADWP to provide 84 MW of firm transmission service
Location: Power is received at the 500 kV bus of Adelanto Switching Station and delivered to RS-E.
Ownership: This contract expires on June 15, 2027, coincident with Burbank's IPP entitlement contract expiration.
Use: This contract allows a path for BWP's IPP entitlement as well as some extra transmission for transactions with other utilities in Utah.

5.5.7 Victorville-Receiving Station E ("RS-E") Transmission Service Agreement With LADWP

Description: This contract with LADWP provides 25 MW of firm transmission service
Location: Power is received at the 500 kV bus of the Adelanto Switching Station or the 500 KV bus of the Victorville Switching Station and delivered to RS-E.
Ownership: This contract will expire on May 31, 2030, coincident with the expiration of Burbank's rights and entitlement in the McCullough-Victorville line 2.
Use: BWP uses this arrangement to match BWP's rights and entitlement in the McCullough-Victorville line 2.

5.5.8 Marketplace-Adelanto Transmission Service

Description: A 500 kV transmission line
Location: The Marketplace-Adelanto 500 kV transmission line runs from the new Marketplace Substation, approximately 17 miles southwest of Boulder City, Nevada, to the vicinity of Adelanto, California.
Ownership: The line is rated at 1,200 MW and BWP has an entitlement to 11.5337% of the 67.9167% interest held in the project by SCPPA, which results in approximately 94 MW of capacity for BWP.
Use: In addition to the entitlement, this transmission arrangement provides Burbank access to the McCoullough Substation, which is connected by a short tie-line to the Marketplace Substation. It provides for greater flexibility by allowing BWP to trade capacity on both lines.

5.5.9 Adelanto-Receiving Station E ("RS-E") Transmission Service Agreement With LADWP for Mead-Adelanto Project

Description: This Agreement provides up to 94 MW of transmission service over the Los Angeles system

Location: The RS-E Agreement provides an arrangement between Adelanto and Burbank for power transmitted over the Marketplace-Adelanto project.
Ownership: Under the Agreement, Burbank can adjust the amount of transmission capacity it receives up to a total of 94 MW. Presently, Burbank is requesting 25 MW's of service.
Use: This contract is open-ended and can continue at Burbank's discretion as long as the Marketplace-Adelanto transmission line remains in-service.

5.5.10 Marketplace-Mead 500/230kV-Westwing Transmission Service

Description: This agreement provides for transmission service between the Westwing Substation in Arizona near Phoenix, to the Mead Substation in Nevada near Las Vegas, to the Marketplace Substation which is also located in near Las Vegas.
Location: This transmission service is comprised of three different legs incorporating the Marketplace Substation, the Mead and McCoullough Substations, and the Westwing and Perkins Substations northwest of Phoenix, Arizona.
Ownership: In the Marketplace to Mead 500 kV leg, Burbank has rights to 70 MW, which corresponds to 16.8675% of SCPPA's 22.4082% interest in this section. In the Mead Substation component, Burbank has rights to 35 MW corresponding to 15.9091% of SCPPA's 17.7563% interest in this component. In the Mead to Westwing section, which goes through the newly constructed Perkins Substation, Burbank has the majority interest with 35 MW derived from a 14.7059% interest in SCPPA's 18.3077% ownership of this section.
Use: The line is used to bring our Palo Verde entitlements home and also for acquiring short-term market purchase from the region when they are economic.

5.5.11 Sylmar-Receiving Station E Transmission Service Agreement With LADWP For The Pacific Northwest DC Intertie

Description: This is transmission service on the LADWP Beltline transmission system between Sylmar and Burbank.
Use: Burbank uses it to bring up to 100 MW of transmission service associated with the DC Intertie from the Sylmar DC facilities to RS-E substation. As well, Burbank is in dispute with LADWP regarding scheduling rights at Sylmar that Burbank believes it has associated with this agreement.

The aforementioned transmission assets are adequate to service BWP's existing needs. They have also enabled BWP to participate very effectively in buying and selling wholesale power. However, as we add more renewable energy to our portfolio it may be necessary as discussed later in this report to acquire additional transmission service from other parties or participate in development of new transmission in order to get the renewable energy to Burbank.

6.0 NATURAL GAS FIRED GENERATION ISSUES

6.1 The Magnolia Power Project

As described earlier, the Magnolia Power Project (Magnolia) went into service in September 2005 and represents "best of class" combined-cycle technology. The project is owned by the Southern California Power Authority ("SCPPA"). Burbank has an entitlement to 30.992% of the project's output, or nominally 75 MW.

The project was comprised of a General Electric 7FA combustion turbine the exhaust of which is run through a heat recovery system to produce stream is used to power a General Electric A14 steam turbine. The technical output of the facility is 250 MW. For limited periods, Magnolia can be augmented, with duct firing and steam injection, to produce up to 310 MW.

6.2 Benefits of the Magnolia Power Project

Magnolia brings many benefits to BWP as described below:

- Load-centered generation: The project is located within the City of Burbank. This provides several benefits. No external transmission is necessary to bring the power to BWP customers; this lowers the cost of the resource. And, as an added benefit, there is increased reliability because getting the power to Burbank is not as subject to potential transmission outages.

- Very efficient: The unit is the most efficient gas fired unit currently in-service world-wide. The means that energy produced by the plant uses the least amount of fuel. Because less fuel is used in production, there are indirect environmental benefits associated with saving natural resources and lower levels of emissions per unit of energy produced.

- Low emissions: Apart from the lower production of emissions due to efficiency, the project uses the best emissions control technology available for natural gas fired units.

- Project is operated by Burbank: BWP is the operating agent for the project. This enables Burbank to have a central role in determining when and how the unit will be operated.

- Provides AGC: The AGC, or automated generation control, system of the project is state of the art allowing the project to be connected to BWP's energy management system, which can direct the unit to respond to changes in load.

- Reduced losses: Prior to Magnolia, there was a net inflow of power with the Los Angeles system at the RS-E interconnection creating substantial transmission system losses as the power flowed over BWP's 69kV network. Now with Magnolia operating, the flow reverses and there is a net outflow to the Los Angeles and Glendale systems associated with the power other participants are moving to their systems. The other Magnolia participants have agreed to reimburse BWP for the losses associated with moving their power to the RS-E interconnection. The net effect is that when Magnolia is operating during most typical system load levels, BWP has eliminated 0.5% of the losses, or about 3,750 MWh annually, it previously had on its 69kV transmission network.

- Reactive Power: Magnolia can provide a significant supply of reactive power, if needed, to maintain system voltage levels within Burbank and acceptable reactive power interchanges with the LADWP and Glendale systems.

  Additionally, there are loss savings to Burbank as a consequence of the transmission scheduling service we provide to several of the Magnolia participants. Energy moved on other participants behalf from BWP to the Marketplace Substation in Southern Nevada are generally counter-flowing to our normal schedules. These schedules can be netted against our own schedules thereby reducing transmission losses.

- Labor cost savings: Magnolia has enabled Burbank to achieve significant improvements in labor productivity associated with running its local generation facilities due to Magnolia.
- Other revenue: Magnolia provides several sources of revenue to BWP. These consist of water sales to the project, revenue from the site lease, wholesale opportunities from the sale of surplus power from the project to other parties, and transmission service revenue for providing transmission service to other participants getting their power from RS-E to their service territories.

The preceding section documents the many benefits that Magnolia brings to BWP, for a complete analysis we now look at new challenges that it presents.

6.3 Challenges Created by Magnolia

While the benefits of Magnolia far out weigh any negatives, adding this additional power resource has also presented several challenges as described below:

- Increased operating reserves: BWP's share of the 250 MW rating of the facility corresponds to approximately 75 MW. With duct firing and steam injection BWP's entitlement increases to 95 MW. As discussed later in the Reserves and Operating Issues section of this report, BWP needs to have sufficient operating reserves available to respond in the event of a loss of Magnolia. Without Magnolia, Burbank had a planning reserve of approximately 50 MW. Now with Magnolia we have nearly doubled the requirement and we need to investigate ways to minimize the cost of providing additional reserves.

- Fuel: Although Magnolia is a very efficient plant, it will still burn lots of fuel due to the fact that we expect to run it a lot. It is expected that nearly one-third of BWP's energy requirements will come from Magnolia. In order to maintain competitive and stable rates, BWP needs to manage its costs. To that end, BWP needs to ensure that the volatility of costs related to the natural gas burned by Magnolia is managed (i.e., the risk of price volatility is reduced.) How we propose to do that is discussed in further detail in the Hedging / Fuel Management section of this report.

- Capacity Factor: Production costing studies done by BWP staff indicate that BWP can currently use approximately 60% of the available output associated with its share of the plant for retail load because at night the output of its coal and nuclear resources (IPP and Palo Verde) are incrementally less expensive and sufficient to meet customer demand. In order to lower the average cost of the resource, it is desirable to run the plant closer to 100% of the time. Staff expects this will most likely be achieved through marketing the output of the unit in the wholesale market. Whenever the BWP does not need all of the output of Magnolia and the market price of power exceeds the incremental operating cost of the plant, the plant will normally be operated and the surplus power sold. Because of the high efficiency and low emissions of Magnolia, this will normally provide economic benefits to both BWP and the buyer, and will reduce the total amount of power plant emissions in Southern California.

- The matter of getting the most value from assets (realized cost savings) is discussed in greater detail later in this report in the Asset Management section.

The cost of fuel is our number one challenge with Magnolia. The price of natural gas has been climbing and Magnolia uses lots of fuel. Roughly, three-quarters of the magnolia operating budget is dedicated to fuel costs. Keeping this stable will prevent rate increases. Also, Magnolia has increased our operating reserve requirements. This is the amount of reserve energy that BWP needs to be ready have on hand in case something happens to take Magnolia out of service. While these are serious challenges, the tangible benefits that Magnolia brings to our system are significant.

6.4 Olive 3 and 4 Restoration/Retrofit

On May 11, 2001, the South Coast Air Quality Management District (SCAQMD) adopted new air quality rules that required the retrofitting of all combustion turbines to meet new emissions limits, or be shut-down by January 1, 2004. As a consequence of the SCAQMD rule change, staff analyzed the existing turbines and determined if it would not be prudent to invest in installing new emission controls. As a result of staff's investigation, Olive 3 and 4 were removed from service at the end of 2003.

While Olive 3 and 4 are still on site and presumably could still be operated with minor repairs, however, they are not permitted by the SCAQMD.

As discussed later in this report, due to the peaking nature of BWP's retail loads in response to extreme temperature, there are a limited numbers of hours each year where BWP could beneficially use the 40 MW that could come from these units. A potential solution is to look at retrofitting and licensing the Olive 3 and 4 combustion turbines. The two units sized at 17 and 24 MW respectively could combine to potentially provide in excess of 40 MW, and be a valuable source of reserves if the cost of the retrofit proves economic.

If Burbank could gain approval to operate the turbines for emergency use, they could serve as 40 MW of non-spinning reserve for all hours in the year. This amount is roughly half of BWP's contingency reserve obligation. Outside of an emergency, these units would never need to be fired. Their purpose would be to prevent blackouts and to allow for increased options in dispatching BWP's other generating assets. They could also provide a ready source of reactive power to the BWP system.

Because Olive 3 and 4 could be started quickly, they may be able to provide some reserves without having to actually be running. Conversely, because they take a long time to warm up, the Olive 1 and 2 units must be "hot" and burning fuel to be able to provide reserves. If the Olive 1 and 2 units can be left "cold" at times, it is possible that having Olive 3 and 4 available could reduce fuel consumption and air pollution.

If Burbank were able to re-license the Olive 3 and 4 turbines, the idea would be to operate them only for a limited time each year during peak load conditions. If for example, the units were put into service during those periods when the system load exceeded 250 MW, they would be capable of providing an additional 40 MW of capacity. The 40 MW could be used as non-spin reserve or the units could be turned on freeing up other resources. As discussed later in this report, the number of hours each year that Burbank's existing resources are expected to be inadequate to meet load are less than 250 hours per year. (Later sections of this report explore the nature of this resource deficiency in detail.) Because of the limited expected hours of operation, the relative in-efficiency of these units and the resultant poor operating economics should not be a significant detractor.

Potentially, the greatest challenge for an affordable Olive 3 and 4 retrofit stems from expired air permits. The permits for the two units expired on December 31, 2003. Current regulations require that the unit be re-permitted under Best Available Control Technology ("BACT") standards, which would require performance levels down to 3.5 parts per million (PPM) NOx. Such a low level may not be technically feasible with such old turbines or it may cost a substantial amount to achieve the Best Available Retrofit Control Technology ("BARCT") levels mentioned above.

BWP may be able to realize a substantial gain from modernizing/retrofitting Olive 3 and 4. This could cut our resource reserve requirements almost in half and provide the needed additional power for those few and limited hours each year when we need additional power. These units could also provide low cost reactive power as needed. For these reasons, staff proposes to further investigate the feasibility of retrofitting Olive 3 and 4 for the purpose of meeting peak load requirements, or reserve requirements.

7.0 INTERMOUNTAIN POWER PROJECT RELATED DEVELOPMENTS

7.1 IPP Unit 3

Currently, there are two coal-fired generating units operating at the Intermountain Power Project (IPP).

Over the past several years, there has been an effort underway to develop a third coal fired unit at this site. In light of our commitment to adding renewable energy resources to our portfolio, (discussed in the following section), BWP does not plan to add additional coal based energy in the foreseeable future. Consequently, BWP will not have any direct involvement in the proposed third unit.

As discussed earlier in Section 5.3.3 of this report, the IPP Excess Power Contract is comprised of power that certain Utah municipalities and co-operatives can recall at any time for their own use. This situation creates uncertainty over how long Burbank will have access to the 14 MW of IPP power associated with the Excess Contract. Thus, converting the Excess Contract to a fixed non-recallable contract would eliminate the existing uncertainty, and certainly benefit BWP.

Indirectly, there may be an impact with the development of the 3rd IPP unit. As a precondition for the third unit being developed, it may need to use the existing common facilities at the site. So, unit 1 and 2 participants who have Excess Power Contracts may be in a position to leverage their rights by having their Excess contracts "fixed." As a result, staff will continue to monitor developments related to the third unit at IPP with a goal of fixing the uncertainty associated with the Excess Power contract.

7.1 Southern Transmission System Upgrade

If the third unit is built at IPP, there is a need to build additional transmission to move the power to load. One transmission path that would require upgrading is the Southern Transmission System ("STS"), which is a DC power line that runs from the plant to Adelanto, in Southern California. Another project requiring upgrading is the Northern Transmission System ("NTS"), which is designed to move power north to Gonder and Mona in Utah.

BWP intends to keep abreast of developments related to IPP with a view to ensuring that our interests in the existing are protected and that we are positioned to participate in new developments if they should prove to be beneficial.

8.0 RENEWABLE RESOURCES

8.1 Legal Requirement

Senate Bill 1078 was signed into law in 2002 and requires that all utilities in California adopt Renewable Portfolio Standards (RPS). The intent of the RPS is for each utility to commit to increasing the renewable energy content of their resource portfolios. For investor owned utilities (IOU's) the legislation prescribed their renewable energy programs by defined and detailed requirements, procurement target, and annual compliance rates. The stated end goal being that all IOU's procure 20% of their energy requirements from renewable resources by the year 2017 subject to needing the power and not impacting rates. For municipal utilities the requirement was more general allowing each utility to adopt its own standard as long as:

(a) The governing body of the local publicly owned electric utility responsible for implementing and enforcing the RPS recognized the intent of the Legislature to encourage renewable resources, while taking into consideration the effect of the standard on rates, reliability, and financial resources and the goal of environmental improvement.

(b) As well, each local publicly owned electric utility was required to report, on an annual basis, to its customers, the following:

(1) The expenditures of public goods funds for renewable energy resource development including description of programs, expenditures, and expected or actual results.

(2) The resource mix used to serve its customers by fuel type showing the contribution of each type of renewable energy resource with separate categories for those fuels considered eligible renewable energy resources.

The Burbank City Council adopted its own RPS in the fall of 2003. It can be found in Appendix A. BWP's standard commits to a goal to supply 20% of its energy load though renewable resources by the year 2017. The standard does not establish interim procurement targets, but does acknowledge that future resource needs will be met through renewable resources.

BWP will consider the cost of renewable power against benchmarks set by the California Public Utilities Commission (CPUC) for the IOU's. BWP's procurement obligation is tempered by the funding levels of public benefit programs established after the passing of Assembly Bill 1890 (1996). Any subsidies required to support the expected above market cost of renewable energy may come from the Public Benefit Fund but will be managed so that no other programs are adversely affected.

Consistent with the portion of their Public Benefit Funds that the IOUs are spending to subsidize renewable energy purchases, Burbank adopted a spending cap on its Public Benefit Fund expenditures for renewable energy of 17% of the annual amount collected. This along with non-material rate increases is intended to cover the excess cost of developing renewable resources.

For a description of sources from which Burbank gets existing renewable resources the reader is referred to the section on Renewable Resources under Existing Resources.

8.2 Effect on Fully Resourced Utility

BWP has been pursuing the addition of renewable energy like wind, solar, green-waste, and geothermal to its resource portfolio.

From an energy perspective BWP is currently adequately resourced, so there is not a need to add significant quantities of additional resources. As well, the times that BWP does need more resources are during periods of high load. This favors adding additional resources that can be tailored to demand and need - - a feature that most renewable resources don't have. Examples of such resources include peaking generators like the Lake combustion turbine, demand-side management measures like interruptibility, and contracts with other utilities.

Despite these challenges, BWP intends to meet its commitment of supplying 20% of sales from renewable resources by 2017 without significantly impacting customer rates. We expect to do this by meeting future load growth (net of system efficiency and conservation) from renewable energy sources and by renewable power instead of operating natural gas generating facilities. Table 5 shows a tentative schedule of the minimum percentage of our sales that will come from renewable sources to achieve 20% by 2107.

Renewable Energy Targets	
Fiscal Year	Renewables As Percent Of Sales
2006/07	1%
2007/08	2%
2008/09	3%
2009/10	4%
2010/11	6%
2011/12	8%
2012/13	10%
2013/14	12%
2014/15	14%
2015/16	16%
2016/17	18%
2017/18	20%

Table 5

Future resource additions are expected to be lumpy, which means that sometimes we'd be ahead of the targets in the table and other times behind.

8.3 Availability of Renewable Energy

Unfortunately, renewable resources are not generally available at points which BWP's existing transmission resources can reach. Consequently, to bring renewable power home will require procuring additional transmission increasing the cost of the resource.

One way to get around this problem is to sell off the energy component at the source where it is located and take credit for the environmental attribute, which is commonly know as a Renewable Energy Credit ("REC"). Since this market approach necessitates selling the energy to a third party, consideration needs to be given whether or not the energy from the resource can be competitively priced on its own and be attractive to others, or if it would take a subsidy to make it attractive.

BWP has been involved with several solicitations for renewable energy through SCPPA. The responses have been comprised primarily of wind resources, geothermal, and with limited solar offerings. Wind tends to be the most economic, but has the downside of being erratic and has associated scheduling challenges. Geothermal is generally slightly more expensive than wind, but developers want to sell it as a "baseload" product, meaning that it has to be taken at a constant rate all the time. This is problematic for BWP because we don't need more energy at night and during the winter.

8.4 Wind Issues

Wind energy is currently the most promising renewable resource. Wind turbine technology is relatively mature compared to other renewable technologies and wind generation is competitive cost-wise compared to modern gas fired combined-cycle plants. From an operational viewpoint however, wind does have a few drawbacks that limit its usefulness.

By its very nature, wind is an intermittent and uncontrollable resource. Any utility seeking to add wind energy into its portfolio will have to deal with the fact that it is difficult to schedule wind. There is a loss of control with the resource as the energy must be taken when the wind blows and make-up must be procured when it is not blowing. This issue has lead to some debate within the power industry as to what capacity should be assigned to wind resources. This IRP assumes a capacity value for wind resources consistent with the capacity factor of the resource. For example, a 10 MW installation that had a 35% capacity would be credited with 3.5 MW of capacity. If a firm energy product is desired, a unit (likely a thermal peaker) will have to be dispatched to cover for fluctuations in the output. Another issue with wind is that it is usually found in remote areas where there is no transmission nearby. Generally, transmission needs to be built to the resource and the costs of doing so may be prohibitive. Likewise, utilizing other utilities transmission may also be too costly.

A way to increase the renewable energy content of our resource portfolio would be to back-off local generation and substitute renewable energy. This can be most readily achieved by using wind power. The idea is to schedule wind power to BWP and at the same time back off a like amount of natural gas generation from Magnolia. The economics are such that the market commands a premium for firm power and discounts the price of variable, or intermittent energy. Recent industry proposal solicitations suggest that a long-term firmed up wind product that is guaranteed to be available all the time can be acquired in the $60 to $70/MWh price range. Whereas, the price on an "as-the-wind-blows" basis is in the $60/MWh range. The difference between the firm product and as-the-wind-blows is the premium attributable to firming up the resource.

BWP has been evaluating the time of day and season of year for potential wind projects, with a preference for locations where wind projects will produce most of their power during the day and during the summer months, when it is most valuable to us. At those times, our less efficient generating units like Lake and Olive 1&2 are more likely to be operating, and curtailing these operations saves a large amount of fuel and money.

Because of its high efficiency, Magnolia is expected to be on-line running most of the time. But with current natural gas prices running in excess of $7/Dth, as-the-wind-blows energy may be competitive with the incremental cost of generation from Magnolia. Therefore, by backing down the unit to minimum load levels and substituting intermittent wind energy, it would possible to increase the portion of renewable energy in our portfolio by an additional amount.

8.5 Green Waste

Green Waste refers to tree trimming, grass clippings, and other vegetation that would otherwise go into landfills. By converting this to electricity, we can both reduce landfill requirements and reduce natural gas dependency. Green waste does not include burning of municipal solid waste (garbage) which has more significant environmental issues.

Waste-to-energy technologies are another source of potential renewable energy. They can be broadly categorized into two categories, incinerator technologies and anaerobic digestion technologies. Combustion, gasification, and pyrolysis are incinerator technologies, while tank and pond/lagoon digestion are classified under anaerobic digestion.

The development of waste-to-energy technologies has lagged in recent years. This is attributable to several reasons. The fuels involved generally have low Btu values compared to fossil fuels, resulting in high transportation costs, which to minimize cost require installation close to the fuel source. They also have high initial capital costs compared to traditional fossil fuel generation, and it has been difficult for developers to secure financing since developments have a low return on investment.

Further, there is a negative public sentiment (NIMBY – “Not in my backyard.”) towards waste-to-energy plants as the plants have to be built onsite at local land fills. As well, there is a public perception that the plants have dirty emissions. Indicative of these perceptions is that SB 1078, which required utilities to adopt Renewable Portfolio Standards specifically excluded incineration as a qualified resource except for the burning of “rice waste” in Northern California.

Off-setting such negative perceptions is the fact that in Southern California we are running out of landfill space. Converting some of the green waste that would normally be land-filled into energy would help alleviate the looming landfill capacity shortage.

SCPPA is considering the development of a green-waste to energy project in the region. Location, costs, potential technologies are not know at this time, but BWP intends to continue to monitor this development with a view toward participating.

8.6 Geothermal Energy

Producing energy from the heat stored in the earth's crust is also a potential source of renewable energy. There are several locations in or near California that have promising potential. The source nearest to Burbank and the one most likely to lead to a development of interest would be located in Imperial County in Southern California.

Although there is considerable geothermal energy potential in the area, there are several challenges that need to be overcome. First, is that rights to the resource are controlled principally by one entity. Thus, there isn't much competitive pressure to offer energy at attractive prices and there isn't much resource available for development by anyone else.

For example, recent indications are that developers want $80 to $90 per MWh for energy. This price is approximately $20 to $30 MWh higher than for wind power. Another issue is developer performance. It's our understanding that certain projects have been delayed for years and promised in-service dates have slipped.

Getting the project output to BWP is another consideration that needs to be addressed both in terms of lack of transmission out of the area and that the power would pass through several different systems each with its own costs, potentially making the cumulative cost prohibitively expensive. A final consideration is that geothermal projects generally are designed to run at constant output that means getting more energy during off-peak periods when we don't need it.

Burbank will continue to monitor the potential for adding energy derived from geothermal sources to its power resource portfolio and act to acquire some after satisfactorily addressing the aforementioned issues.

8.7 Renewable Energy Credits

Renewable Energy Credits (RECs) or "Green Tags" are certificates associated with renewable electricity generating resources that are traded in the marketplace. They allow a renewable energy developer to sell the electricity produced by their resources separately from the "attribute" of being a renewable resource. The power is traded just like power from coal, nuclear, natural gas, or other generating facilities, without any reference to its source. The RECs are traded separately to customers that associate value with the renewable energy.

A common reason for this is to permit the renewable energy attributes to be assigned to a purchaser without the need for physical transmission arrangements. The power can be sold to a nearby utility, which may not need (or value) the renewable nature of the power, while the attribute is sold to a customer (utility or end-use retail customer) that assigns a value to the renewable nature of the generation. In this manner, the purchaser of the REC can pay for a portion of the cost of the resource in order to "cause" the renewable resource to be developed, while the purchaser of the power pays only for the market price of the power itself, absent the renewable credit.

One way for BWP to meet its renewable energy obligation is to purchase RECs in the marketplace. It could then recognize these as renewable resources in its portfolio, satisfying the City's commitment to meet a specified percentage of load with renewable energy. BWP itself would not receive the power from the renewable resource, but would "cause" the development of renewable energy resources.

The major disadvantage of this approach is that BWP would not receive the independence from natural gas price volatility that purchase of ownership in an actual renewable generating facility would provide. Ownership or long-term contracts for actual renewable resources provides a physical "hedge" against higher fuel costs. It actually does not matter if these renewable resources are connected to the BWP system - - even if the renewable resources are in another utility's system, the power can be sold at market prices, and the revenue used to buy fuel for BWP's generating facilities.

RECs are not a preferred approach to meeting Burbank's renewable energy commitment.

8.8 Green Marketing

BWP offers a program – Clean Green Support – to its residential customers who choose to support renewable energy production. Customers choose to "upgrade" 50% or 100% of their household electric consumption to renewable energy by paying an additional $3 or $5 per month on their utility bill. BWP purchases Green Tickets with these funds.

To date, BWP has purchased $119,120 in Green Tickets representing 9,450,000 kilowatt-hours from developers of renewable energy resources in the state of California.   All of the Green Tickets purchased by BWP are Green-E certified. Green-E is the nation's leading independent certification and verification program for renewable energy products. Green-E tracks all Green Tickets to verify that each is sold once and only once.

BWP is reviewing options for a green energy support program for Burbank businesses and anticipates offering such a program in 2006.

A major seller of Green Tags is the Bonneville Environmental Foundation (BEF) (www.greentagsusa.org). The funds collected by BEF through sales of green tags go to pay a portion of the cost of constructing new wind and solar generating resources. Each green tag represents 1,000 kilowatt-hours of electricity and costs $20, or $.02/kWh.

To date, BWP has been able to purchase Green Tags at an average cost significantly lower than this. While this price of $20/MWh may be viewed as an upper limit on the economic value of "green-ness" to BWP, it does NOT represent the entire value of renewable energy. Actual ownership of a renewable energy resource provides cost stability for BWP consumers, particularly given the volatility of natural gas and electric energy wholesale market prices.

As BWP acquires more renewable resources, we will no longer need to purchase Green Tags to support our green marketing program. Instead, we will be supporting a green energy program.

8.9 Cost-effectiveness

A major consideration concerning renewable resources is cost. Generally, green power producers demand a price premium for their product. During the last several years this has been as high as 20 to 30 % over the price of comparable traditional sources. More recently, as natural gas prices have escalated, renewable energy has become competitive with conventional resources. Over time, these inter-relationships change but it is estimated that having 20 % of our resource portfolio comprised of green power would affect rates from 4 to 8 % over what it would take to supply the same energy from other sources.

Another way to minimize the rate impacts of renewables is to ask customers to subsidize the purchase of renewable energy. We have already been using this strategy in our Clean Green Support program. It might be possible to increase the number of customers signing up for the Clean Green Support program.

As discussed previously, this is a residential program where customers voluntarily agree to have $3 or $5 per month added to their utility bills which BWP uses to purchase renewable energy credits (green tickets) to “green-up” the energy they use to either the 50% or 100% level, respectively. Increased penetration of this program for residential customers, or expanding the program to other customer classes like commercial would provide additional funding to purchase more green tickets. This would increase the renewable content of our resource portfolio.

8.10 Recent Renewable Energy Procurement Efforts

Because of the benefits of joint projects, it is expected that BWP will work in conjunction with other Southern California municipal utilities through the Southern California Public Power Authority (SCPPA) when acquiring renewable resources. To that end Burbank participated in an RPF for renewable energy in the fall of 2005 through SCPPA. Responses were received from 12 different respondents. A number of the proponents submitted proposals for more than one project so in total there were 26. Most of the offers were for contracts although several offered the option of ownership. In general, the wind projects were the most economic ranging in price from the mid $50/MWh to high $70/MWh, followed by several small landfill projects in the mid $60s, geothermal projects from the mid $60/Mwh to mid $70/MWh, with solar being the most expensive ranging in excess of $90/MWh. Transmission losses associated with bring the power to Burbank are estimated to run around 5% which has the added effect of increasing costs by 5%. As well, it will be necessary to secure transmission from other parties in order to access some of the resources. It is estimated that these transmission costs could add another 10% to the cost. The stage of development of the various projects ranges from those currently built, some have been permitted or are in the process of being permitted, and others are in the planning stage and are not expected to come on-line for four or five years at the earliest. Some are dependent on transmission developments which must to be developed in parallel with the generation projects.

Burbank has expressed an interest and is actively pursuing the following:

1. Several different wind projects. The resources are located in the Pacific Northwest, Wyoming, Utah, and three locations in Southern California. Wind resources are typically available only 35% of the time so a 5 MW project is expected to produce enough energy to provide 1.25% of Burbank's annual requirements. If all the proposed developments come to fruition the energy output would correspond to 16.25% of Burbank's annual energy requirements. Burbank has transmission access to about one-half of the proposed developments so it is conceivable BWP could be in a position to receive about 8% of renewable wind energy from this RFP in 3 years.

2. Geothermal located in the Imperial Valley. Geothermal facilities run at extremely high load factors. The project development status is very tentative and transmission would need to be built. As well, to get the power home we would likely have to arrange for transmission through several other utility's service territories which has the unfortunate effect of increasing the cost of the resource.

3. Solar located in Southern California. The proposed solar facility is a peaking resource with maximum output during the afternoon hours of the summer months. The estimates are it will produce power about 35% of the time. To get the power home we would need to work out transmission arrangements with LADWP for transmission service.

There have been several meetings held with project developers to review their proposals. Negotiations have begum with several to define and clarify the terms and conditions of service.

If all the aforementioned resources are added in the next five years, BWP will achieve the renewable energy targets committed to in Burbank's RPS.

As discussed in Section 16, adding more renewable energy may have rate impacts. BWP will be undertaking some economic analysis on the proposals to determine the potential impact on electric rates of adding renewable resources. Because of high natural gas prices in the near term it is expected that adding renewable energy when gas prices are over $8.50/Dth may lead to the situation where renewable energy is attractively priced in the initial years but over time, especially if natural gas prices fall, become less attractive and increase the overall cost of BWP's energy portfolio. Increased quantities of renewable energy in our resource mix will likely necessitate taking less energy from Magnolia for native load. This means that we'll need to either back down production out of Magnolia or sell the surplus. Because of the intermittent nature of wind-based energy production, the output of wind resources will likely need to be firmed up using Magnolia or another firm resource or possibly paying the supplier to do so. Thus, the fiscal and operational impacts of adding renewables needs to be thoroughly examined and understood as final commitments are being made.

9.0 ENERGY EFFICIENCY AND CONSERVATION

9.1 Historical Conservation Expenditures and Savings

BWP has supported a variety of energy efficiency programs since 1998. Most of these have been multi-year efforts to achieve retrofit efficiencies, to encourage the purchase of energy-efficient products, and to transform markets so that consumers recognize and prefer efficient technologies.

During the 2000-2001 power crisis, BWP went a step further, providing direct delivery of energy efficiency products and information to all residential consumers, in order to achieve a higher rate of savings in the short-run. The distribution of compact fluorescent lamps in this period is the principal reason for the “bulge” in conservation performance in that year.

Table 6 below shows estimated energy and peak capacity savings for BWP programs implemented since 1998:

Estimated Energy and Peak Capacity Savings
From Consumer-Level Programs Implemented Since 1998

Year	Annual Energy Savings (MWh)	Annual Capacity Savings (MW)
Prior to 2001	8,743	2.2
2001-02	8,970	2.2
2002-03	4,229	1.1
2003-04	4,037	1.4
2004-05	5,557	1.2
2005-06	5,218	1.2
Cumulative Total to Date	36,753	9.3
Projected Future - Base Case	6,760	1.7
Projected Future - Aggressive Case	13,520	3.4

Table 6

9.2 Existing Conservation Programs

Since 1998, BWP has invested in energy efficiency programs through its operation of “public benefits” programs. BWP’s current conservation programs are shown in Table 7 and include:

Existing Energy Efficiency and Conservation Programms	
Program Name	Brief Description
Made in the Shade	Residential and business shade trees
Commercial Corridor Tree Program	Installation of shade trees on major roads
Torchiere Exchange Program	Free fluorescent torchiere lamps in exchange for halogen or incandescent units
Energy Solutions	Business rebate program
Home Rewards	Residential rebates for energy-efficient appliances and equipment
Home Energy Analyzer	On-line energy audit service for residential customers
Ice Bear	Ice storage cooling systems
Resource Conservation Manager	Professional energy and resouce manager for Burbank Unified School District

Table 7

The BWP budget includes expenditure of a total of 2.85% of electric rate revenue on public benefits programs, of which about 1.8% is designated for energy efficiency programs. The current conservation budget is $2.85 million for fiscal year 2005-06. Because most programs pay only a portion of the cost of measures installed by customers, BWP's budget leverages 2 – 5 times this investment in energy efficiency measures (although a significant portion of the consumer investment is typically for amenities, like through-the-door ice and water, in addition to the efficiency benefits of newer refrigerators). The current annual rate of investment is projected to save 1.7 megawatts of capacity per year and 6.8 million kilowatt-hours per year, a figure that is cumulative from year to year. This is based on an average of the cost and performance of BWP conservation investment for the three budget years, 2003-04 through 2005-06.

9.3 Resource Conservation Manager (RCM)

In 2005, BWP funded the Burbank Unified School District (BUSD) to employ a full-time Resource Conservation Manager (RCM) position. This employee is charged with achieving savings in electricity, natural gas, water, sewer, solid waste, and other resource consumption by the BUSD. Experience with this type of program in other areas, particularly the federal institutional sector and the Pacific

Northwest, indicates that this type of program can produce lasting and cost-effective savings for the customer.

BWP is providing the salary for this position for the first two years, and guaranteeing that salary (net of 50% of the achieved savings) for the next three years. At the end of that period, we expect that this position will become a permanent part of the BUSD staff on a self-supporting basis, and that further support from BWP will become unnecessary.

This program in part replaced a rate discount granted by BWP to the BUSD. The idea was to help the BUSD achieve long-term savings in their energy costs through efficiency, rather than short-term savings from a preferential rate. Evaluation of the RCM performance will occur in 2006, after a full year of experience has been gained.

The energy savings from the RCM will be documented as part of the contract between BWP and BUSD, and the separate contract between BUSD and Tetratech, the company providing and training the person assigned to this position. Based on previous experience in other regions with the RCM approach, expected savings of 10% - 20% can be anticipated over the next 2-3 years. Given current energy consumption of about 11 million kilowatt-hours per year, we believe that savings of 1-2 million kilowatt-hours per year, and up to 1 megawatt of capacity savings will be achieved. The annual value of these savings is on the order of $100,000 - $200,000 per year. In addition, the RCM is responsible for pursuing savings in natural gas consumption, water use, sewerage requirements, and solid waste reduction for BUSD. We anticipate this proving to be a highly cost-effective investment for BWP and BUSD.

9.4 Comparison of BWP Efficiency Programs to Southern California Edison

Southern California Edison (SCE) is a large investor-owned utility with a service territory that encompasses many communities near Burbank. In recent months, SCE has announced significant augmentation of its conservation programs to include additional measures, additional funding, and extensive cost-effectiveness evaluation. It is not practical for a small utility like BWP to engage in the type of analysis prepared by SCE, but it is extremely useful for BWP to take advantage of the work done by SCE, and to compare our programs and program results to those of SCE.

Table 8 below compares BWP conservation program funding to that of SCE as a percentage of revenues.

Comparison of 2005-06 Funding Levels For Southern California Edison and Burbank Water and Power		
	Southern California Edison	Burbank Water & Power
Conservation Funding	$242,940,000	$2,846,607
Annual Retail Revenues	$8,448,000,000	$136,789,000
2003-04	2.9%	2.1%

Table 8

As is evident, the recent increases in conservation funding from SCE has resulted in a higher percentage of its revenue being invested in efficiency than is currently the case at BWP. In addition to our expenditures on customer energy efficiency, BWP devotes a portion of our Public Benefits funds to renewable resources (as discussed in Section 8) and to low income energy assistance. The total, including all three components, is 2.85% of annual system revenue. This IRP explores the impact of increasing BWP efficiency funding.

Another useful comparison is the level of conservation achieved and anticipated by SCE, and that is planned by BWP. Table 9 below compares the projected energy efficiency program savings for SCE and BWP for 2006. The BWP figures represent only specific adopted programs with estimated savings; a portion of the 2005-06 funding is designated for potential program investigation and implementation, and will tend to increase these estimated savings. In addition, savings from the BUSD Resource Conservation Manager are not reflected, but as discussed above, are expected to be significant.

2005-06 Conservation Projected Savings For Southern California Edison and Burbank Water & Power		
	Southern California Edison	Burbank Water & Power
Conservation Savings (kW)	230,200	1,170
System Load (kW)	21,934,000	284,000
Conservation Savings as % of Load	1.0%	0.4%
Conservation Savings (MWh)	1,156,667	5,218
System Load (MWh)	85,000,000	1,902,000
Conservation Savings as % of Load	1.4%	0.5%
Note: BWP Savings do not yet reflect savings from BUSD Resource Conservation Manager		

Table 9

This table indicates that the level of conservation achievement for BWP is lower than that being achieved by SCE. This is consistent with the lower funding levels for BWP, and the recent increased emphasis on conservation resource acquisitions for SCE as directed by the California PUC. One option identified in this IRP is a possible doubling of BWP conservation funding, with an analysis below in Section 9.6 of the impacts that would have on other resource acquisition needs and in Section 16 of the potential impact on system electric rates.

This IRP does not contain a Burbank-specific assessment of efficiency potential. Such analyses are expensive, time consuming, and duplicative of work done by others, particularly Southern California Edison (Southern California Edison: 2006-2008 Energy Efficiency Program Plans, June 1, 2005). Instead, we have assumed that BWP could increase its efficiency investment and achieve the same rate of efficiency achievement as SCE has initiated with its 2005-06 program augmentations. Basically, achievement of savings from programmatic conservation equal system load growth is assumed possible, and it would require approximately a doubling of current funding (or alternative procurement methods) to achieve.

Table 10 below shows the estimated annual additional energy and capacity savings that BWP can achieve with these levels of energy efficiency funding:

Additional Savings For Burbank From Increased Funding Levels For Conservation Programs		
	Base Case Current Budget	Agressive Case Doubled Budget
Annual Peak Savings	1.7 MW	3.4 MW
Annual Energy Savings	6,760 MWh	13,520 MWh

Table 10

The "aggressive" case assumes that a doubling of BWP conservation investment would result in a doubling of conservation achievement. BWP is currently acquiring the most cost-effective resources available to it, given the limitations of its staffing and funding. Implicit in the assumed doubling is an assumption that while the average cost of acquired resources might be higher (i.e., BWP is already pursuing the most cost-effective options), lower average administrative costs would offset this. Basically, BWP is approximately where SCE was prior to its 2005-06 augmentation effort. One important difference, however, is that SCE has a supply deficiency, and BWP is fully resourced to meet current and projected demand, except for the extreme peak periods. A doubling of BWP conservation investment and achievement would bring the utility up to the newly-enhanced level being pursued by SCE, and would basically meet all system projected load growth with conservation. A principal concern with this is the interplay of such a decision with the commitment to pursue renewable generating resources. This is discussed above in Sections 4, 6, and 8 of this IRP, and below in Sections 12, 15, and 16. Both renewable resources programs and energy efficiency programs compete for a limited pool of public benefits funding at BWP and or have rate impacts to BWP customers.

In addition to these customer programs, BWP has substantial expenditures for energy efficiency measures on the utility's side of the meter. Expenditures by BWP on system efficiency improvements, including voltage upgrades, line reconductoring, power factor correction, and substation replacement are discussed separately in this IRP in Section 11.

9.5 Additional Possible Programs

BWP is examining a wide range of potential additional conservation programs to offer to its customers. The analysis done by SCE is one of the tools being used to identify potential programs that can be effectively implemented by a small utility. BWP staff is also garnering efficiency and cost-effectiveness data from other local municipal utilities. Examples of these are shown in Table 11.

Additional Possible Conservation Programs			
Program	**Currently Offered By**	**Potential Savings**	**Expected Cost-Effectiveness**
Low-Income Refrigerator Exchange	Los Angeles Dept of Water & Power	High	Excellent
Compact Fluorescent Light Distribution	BWP has conducted program in the past	High	High
Livingwise Education	Glendale Water and Power, others	Moderate	Moderate
LED Night Lights	Azusa Water and Light	Moderate	Moderate
Air Duct Efficiency	Glendale Water and Power	Moderate	Moderate
Solar Photovoltaic Carport Installation	Riverside; Anaheim Public Utilities	Moderate	Low

Table 11

Decisions about which additional programs to implement would be based primarily on cost-effectiveness, customer interest, and available funding. There are adverse rate impacts (and under some market conditions, adverse total bill impacts) of a more aggressive conservation commitment, as discussed in Section 16. A decision of whether to add to BWP programs is a policy decision for the BWP Board and Council, informed by this IRP.

9.6 Discussion of the Cost-effectiveness of BWP Conservation Programs

The average cost of BWP's programs in recent years has been slightly lower than the cost of power supply to the BWP system, even considering the portion of costs paid by consumers. At current high fuel costs, the savings are well above the cost of supply-side alternatives, but the availability of more cost-effective renewable resources in the future is projected to be competitive with the cost of energy efficiency.

Conservation programs provide both energy and capacity. Unlike generating facilities, there is no simple way to separate the "cost" of these two separate elements provided by conservation. For convenience, this IRP has assigned the cost of conservation programs 75% to energy and 25% to capacity. Table 12 below shows this result in both energy savings and capacity savings that are below the cost of new power supply resources that would otherwise be required to meet these needs.

Estimated Economics of BWP Conservation Programs 3-Years 2003-2005	
Factor	Dollars (Except As Indicated)
Estimates by BWP	$ 6,251,696
Assumed Match from Consumers	$ 6,251,696
Total Conservation Programs	$ 12,503,392
Estimated kW Savings	3,800 KW
Estimated Annual kWh Savings	14,812,114 kWh
Overall Cost of Conservation (Assuming 15-year Average Measure Life)	$ 0.056
Cost of Capacity @ 25%	3,125,848
Cost of Energy @75%	9,377,544
Peaking Capacity Cost/kW	$ 823
Energy Cost/kWh (Assuming 15-year measure life)	$ 0.042

Table 12

By comparison, the Lake generating facility provides peaking capacity to BWP at an investment of about $800 per kilowatt, plus a maintenance cost of about $2.5/MWh. The Magnolia project has similar capacity costs to Lake, and has significantly higher annual maintenance costs. Offset by lower fuel costs due to its high efficiency. The fuel costs for Magnolia, at current market prices for natural gas, are about $0.065/kWh, and are expected to decline to about $0.05/kWh over the next few years. Both Magnolia and Lake are somewhat more expensive than the cost of BWP's energy efficiency programs.

9.7 Effect of Efficiency Programs on Peak and Energy

Energy efficiency programs provide savings in energy consumption. Depending on when those savings occur, generally energy efficiency programs also provide capacity savings at the time of the system peak demand. For a utility with a sharp summer peak demand, like BWP, savings at the time of the system peak are particularly valuable. These savings help the utility avoid investment in generating capacity, transmission facilities, distribution capacity, and also reduce the requirement for reserve capacity to maintain reliable service.

Table 13 below hypothetically compares two types of conservation measures with identical annual energy savings in terms of the contribution to peak demand savings, and carries this through to the economic value of each type of measure based on example values for peaking capacity and energy.

Illustrative Exhibit Comparing
Value of Peaking vs. Baseload Savings
Values shown are hypothetical, not analytical

Savings	Peak-Oriented (Shade Trees)	Baseload-Oriented (Refrigerator Efficiency)
Annual kWh Savings	100,000	100,000
Load Factor	20%	80%
Peak Capacity Savings	60 kW	15 kW
Losses on peak	10%	10%
Avoided Capacity	66 kW	16.5 kW
Avoided Capacity with Reserves @ 7%	70 kW	17 kW
Value of Energy Savings @ $0.06/kWh	$6,000	$6,000
Value of Capacity Savings @ $100/kW/Year	$7,000	$1,700
Total Value of Measures	$13,000	$7,600
Average Value per kWh	$0.13	$0.076

Table 13

The impact on reserves shown above is dependent upon decisions made by BWP with respect to membership in the ISO or other reserve-pooling arrangements, as discussed in Section 12 of this IRP. Under current circumstances, BWP must carry reserves equal to the contribution of its largest single contingency. Under these circumstances, energy efficiency programs do not contribute to a lower reserve requirement. If BWP were to join the ISO, however, the reserve requirement would change to a percentage of the load actually being served. In that case, the performance or value of energy efficiency programs would have an additional benefit in the form of reduced reserve requirements.

It is obviously more cost-effective to concentrate conservation efforts on measures which provide load relief during peak periods. These type of resources will not only avoid the need for peaking resources, but also for the fuel used for those resources and, potentially, for the additional reserve requirements needed during peak periods.

9.8 Power Factor

A form of energy conservation not always recognized in resource planning studies is the capacity, energy, and facility savings that can be achieved by improving customer and system power factor.

Electric power is composed of two types: real and reactive power. Reactive power is necessary to supply the magnetic fields required to produce real (usable) power in generators or to produce output power in motors. It is also necessary to maintain system voltage in a power system. Reactive power is also consumed in lines and transformers. It is supplied by both generators and shunt capacitors.

Power factor is a measure of how efficiently electric power is being used. It is expressed as the ratio of kilowatts (kW) to kilo-Volt-Amperes (kVA) . The ideal would be to have a power factor of 1.0 or 100%. This means only real power (kW) is being required from the utility and reactive power (kVAR) is either zero or is being supplied from other sources.

While not a precise analogy, power system capacity can be thought of as a glass being filled with root beer. The glass must be large enough for both the liquid and the foam. If the foam can be kept down, a smaller glass will hold the entire bottle of root beer. A "100% power factor" is conceptually similar to a "zero foam" glass of root beer – all of the capacity is doing useful work, and none is wasted or underutilized.

Why is this important?
If all of the capacity of the system is performing useful work, the same amount of generating, transmission, and distribution capacity can provide more energy service to consumers than if some is underutilized or wasted. Therefore improving power factor provides capacity savings for the system, allowing additional customers to be served without the need for new generation, transmission, or distribution facilities.

When the power factor on portions of the system are low, the amperage increases to achieve the same amount of useful work. Higher amperage means higher energy losses, with losses increasing with the square of the amperage. Energy losses on the utility system are made up by burning more fuel in its power plants. Burning this additional fuel also increases air pollution and produces more carbon dioxide (CO_2) than necessary. The cost of this additional fuel is paid for by all BWP customers through increased rates. Power factor improvement by any customer or BWP will lower BWP's overall fuel cost, which directly benefits all its customers in lower electric rates.

From a utility perspective, if all BWP customers improved/maintained their power factor as close to 100% as possible, it would minimize the generating capacity and fuel needed to supply energy losses. Not only would BWP and its customers save significant sums of money, but this would directly benefit air quality and reduce CO_2 production as well.

Improving power factor also results in a better system voltage profile and minimizes the need to produce expensive reactive power from its generating units. During peak load conditions this can become a critical operating constraint that could, in the worst of circumstances, lead to loss of generating units and voltage collapse.

All this has significant implications when taken on a state or national level. Improved power factor on the part of utilities and their customers would significantly slow the need to build new generating capacity and transmission lines. It also would also add years to the availability of fossil fuels and the health benefits of reduced air pollution and CO_2 production would be substantial as well.

Improving our Customers' Power Factor
Correcting power factor will help our customers and BWP save energy and money. BWP has had a power factor penalty and reward provision as part of its electric rates for large commercial and industrial customers since 1982. To help our customers, BWP created this power factor penalty/reward provision in our rates. This provision can provide a customer with a significant reduction in demand charges if power factor can be improved to at least 98%.

For example, a customer with a monthly demand of 1,000 kilowatts (kW) at a power factor of 80%, under the "P" electric rate schedule will pay a monthly demand charge plus an additional power factor penalty of up to 50%. If this customer corrects and maintains its power factor at 98%, their monthly demand charge is reduced by applying a credit for power factor above 90% Depending upon the level of power factor correction achieved, this could save a typical large customer thousands of dollars a year. Simple payback for installing power factor correction capacitors can often be two years or less for those customers with power factor below 90%.

Improving power factor from 80% to 98% will reduce load current by 25%, and losses by 56%. This will allow more load to be served and extend the useful life of equipment by preventing its premature replacement. This decreases capital cost for both the customer and BWP. For example, power factor correction from 80% to 98% could extend the use of the BWP's/or the customer's existing transformer and distribution system capacity for up to seven years depending upon the customer's load growth. All motors will also run cooler due to reduced current and the resulting lower resistance losses, thus extending their life. Since less heat is produced, this will also reduce building air conditioning energy requirements.

Many large customers have taken steps to correct their power factor to at least 90% or more to avoid the penalty for low power factor. Since 1982, power factor correction by large customers plus the application of capacitors on the distribution system has been a key contributor in raising BWP's system power factor from approximately 90% to 98%. The cumulative savings in capacity requirements to date from power factor improvement on the BWP system is about 22 megawatts – 8% of our peak demand. This has been achieved through a combination of customer-implemented improvements on their side of the meter, plus installation of capacitor banks at substations and at other points along the distribution system. This is the single largest and most cost-effective conservation program operated by BWP.

Most such customers can install capacitors and improve their power factors quite inexpensively. If they do so, they avoid the surcharge, perhaps enjoy the rate credit, and BWP avoids the need to provide them with reactive capacity, which does not actually produce useful work for the customers.

From a system wide perspective, BWP has increased the power factor overall to the 98% level; this was accomplished in part by customers responding to the rate incentive, and in part by BWP installing capacitors at strategic points on the distribution system. The advantage of achieving this correction at the customer level is that the savings are experienced throughout the distribution system and into the customer premises. Correction on the system reduces the generating capacity required to meet load, certainly a desirable outcome.

As indicated, efforts to date have reduced BWP's generation needs by about 22 MW. But correction of power factor at the substation or generator level does not address the line losses that occur on local distribution systems or the wasted energy in the form of heat at the customer premises. As discussed in Section 11, BWP will be installing additional capacitors at a few distribution stations to further improve the system power factor, but will also do more to encourage improvement at the customer level.

The existing power factor clause provides for a power factor penalty for power factors below 90% and provides for up to an 8% demand charge reduction credit for power factor correction to a maximum of 98%. As part of this IRP process, it is recommended that BWP should increase the penalty level from 90% to 95% in its large commercial/industrial electric rate as soon as practical. Alternatively, for large customers, modifying demand charge to $/kVA will accurately reflect capacity costs incurred to provide service at any power factor. This should provide additional rate incentive, especially for new BWP large customers to correct their power factor. In surveying, many utilities today have power factor surcharges in their rate structure to provide incentive for their customers to correct their power factor to 95%.

10.0 DEMAND SIDE MANAGEMENT

10.1 Introduction

This section discusses a number of options potentially available to BWP to reduce customer demands under extraordinary peak demand circumstances. Some of these can be implemented with economic incentives to customers that may be attractive, while others may be installed by BWP as system contingency resources to be used as a last resort before being forced to involuntarily curtail customers. This means outages for our customers and that is something that we want to avoid.

One way for BWP to meet its peak demand and prevent customer outages is to take steps to reduce customer usage at the time of extreme weather events or when failures at our generating or transmission facilities. While BWP plans to develop sufficient resources to meet customer needs, there may be times when multiple unit failures create situations where available supply does not meet our customer's demand. This is when we would like to be able to contact our customers to reduce load and prevent outages by a mutually beneficial arrangement. Currently BWP requests voluntary curtailment via media appeals under extreme conditions. While our customers have responded, the amount of response is not known in advance. A formal demand-side management program could add certainty to this potential, and allow a portion of it to be planned to meet our reserve capacity requirements.

We roughly estimate that BWP could obtain about 10 megawatts of capacity for a few hours at a time during extreme conditions from either interruption or critical peak pricing of its largest customers, and perhaps another 5 megawatts of capacity from the medium to large general service customers. However, the extent to which this is duplicative of savings we are already able to achieve during extreme peak events through voluntary curtailment of customers is not known with certainty, and the incremental benefits may be relatively modest.

10.2 Load Control for Large Customers

In the event of a transmission interruption to BWP or a failure of one of the generating facilities that normally provides service, it could be desirable to curtail large customer HVAC systems until a replacement resource could be brought into service.

What does load control involve?

Primarily, BWP is interested in being able to reduce our largest customers load at critical times to prevent system-wide outages. For instance, BWP has a number of large commercial customers with large heating, ventilating, and air conditioning (HVAC) plants. Installing equipment on these HVAC systems to permit BWP to remotely curtail their operation for a few minutes at a time may provide the utility with the ability to ensure more reliable service during the short period between failure of a generation or transmission resource and the startup of a substitute resource.

In many cases, the customer may not even know they have been curtailed if replacement resources are quickly available. Just to be clear, if the customer agrees with this load reduction tactic, it actually occurs when BWP remotely shuts down the customers' air conditioning or heating system (or other large loads) and it could be voluntary or involuntary on their part within agreed limits.

Why would a customer agree to this load reduction?

A customer might agree to this load control program for a number of reasons. First, BWP has the ability to bring on additional resources quickly, within a matter of minutes. The inconvenience to the customer is likely to be small and short-lived. Doing so could prevent a major outage with absolutely no electric service for much longer periods, a much greater inconvenience to the customer. The cost of the control equipment is not great, and the customer would normally receive a financial incentive to participate. For these reasons, it would be of interest for both BWP and our customers. BWP is looking at possibly providing an incentive to our qualifying customers as a study item resulting from this IRP.

As discussed in Section 15.2, BWP has two resources that can be brought up to full power in ten minutes or less. These are the Lake power plant (47 megawatts) and the duct firing portion of the Magnolia Power Plant (60 megawatts, of which BWP is entitled to 19). The latter would, of course, only be available if Magnolia is already on-line. Both of these are "peaking" resources that would not normally be used to meet peak demand.

Control systems to reduce load can be implemented through radio, ripple, or cellular systems. They can also be set to automatically trip off loads under pre-specified operating conditions. With modern electronics and communications, the cost of installing such systems can be quite modest.

Ways to implement

A strategy to entice customers would be to offer an incentive for customers to participate in such a program. A typical compensation would involve a payment every year whether or not the right to interrupt service was used (a "reservation" fee), plus a payment each time the right to curtail is exercised (a "utilization" fee). If the combination of incentive payments was significantly less expensive than purchasing an equal amount of reserve capacity in the marketplace, BWP may be able to meet its reliability requirements at lower cost than would otherwise be the case.

Another way to go about this would be to use a mandatory approach. This would involve amending the BWP rules and regulations to require that large HVAC systems be subject to interruption for system stability purposes up to a defined period of time. Many utilities, particularly in the state of Florida and on island utility systems, have such provisions. The rates of general application to large customers would then be reduced slightly to reflect this change in the planned reliability of service.

In either case, the interruptions would need to be limited in frequency and duration, so that workspaces do not become so uncomfortable that workers cannot perform their usual responsibilities. Most large commercial customers would prefer their HVAC systems be shut down for a few minutes as an alternative to a general outage that would impact their entire operation.

In general, public benefits funds would not be applicable to a strictly load management program.

How much would this save?

The exact amount of savings produced from customer load control is not known by BWP. We roughly estimate that our largest customers have a total demand at the time of the system peak of 100 megawatts, of which up to half may be air conditioning load. On an instantaneous basis, all of this could be curtailed for system stability purposes. Over a period of more than a few minutes, however, service would need to be restored and only about 10% of the load could be curtailed on average over a period of an hour or two.

This IRP proposes as a study item to inventory large HVAC systems served by BWP. We will survey our large customer-owners to determine their willingness to participate in an interruptible service program. A decision would need to follow on whether or not to implement a program on a voluntary basis (where customers sign up for a rate credit) or to make a program of general applicability to the class of eligible customers, and reflect the credit in the rate design.

10.3 Load Control for Small Customers

While large customers have larger loads to reduce, smaller customer's HVAC systems are also a potential source of load curtailment for short durations. Many utilities, including Southern California Edison, have offered curtailable rate credits for residential and commercial air conditioning systems for years.

However, compared to large customers the installation of curtailment equipment on existing smaller air conditioners could be a significant expense. With modern electronics, the incremental cost of providing for interruptibility of new small HVAC systems could potentially provide a low-cost peaking reserve resource for BWP.

The benefit of curtailing smaller customers' load is not known by BWP. This IRP proposes as a study item to examine the rate of installation of new small HVAC systems on the BWP system, the cost of installing curtailment controllers, and the incentives that would be necessary to make these options acceptable to consumers. Depending on the outcome of this study, the launching of a small customer load control program could be implemented in the future.

An option would be to make installation of such control equipment a requirement for new construction, and for upgrades of equipment in existing homes and businesses. The study identified for this item will evaluate the potential for such savings, the cost of such equipment, and the consumer acceptability of such a program.

A study will provide a better estimate of the potential, but we have roughly estimated the magnitude of this potential resource. A decision to move forward with this analysis will be made only after the feasibility and acceptability of a large-customer program is examined, because the economics are certain to be less favorable for a large number of smaller customers.

As with the large customers, we estimate that our smaller customers contribute about 100 megawatts to our peak demand. However, smaller customers have more diverse loads than typical large office buildings, with less of the load being associated with air conditioning. Therefore, we assume that only about 25% of this load could be subject to interruption. Therefore about 25 megawatts could be available on an instantaneous basis for system stability purposes, and about 5 megawatts could be available for a few hours to relieve system stress.

10.4 Time of Use Pricing

BWP has applied time of use (TOU) pricing to our largest customers for several years now. The rate for Warner Bros., NBC, and Providence St. Joseph Medical Center are all characterized by on-peak energy charges that are approximately twice as high as the off-peak energy charges. In the utility industry, these are considered very "aggressive" TOU differentials.

BWP has installed TOU-capable meters on all larger general service customers for many years. A conversion to TOU rate design could be implemented at a modest cost. However, the principal obstacle is customer acceptance and the lack of evidence that such rates have a significant impact or changed our customers' behavior.

BWP has examined the effect that these TOU prices and meters have had since they went into effect. Figure 4 below shows the before and after share of load within each rate period for our three TOU customers. The loads were consolidated in order to show an overall effect and to mask any customer-specific data that might be disclosed.

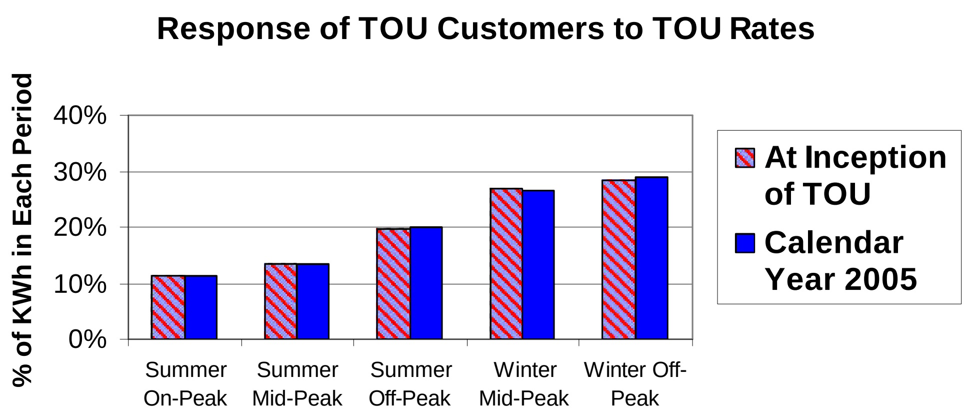


Figure 4

Overall, the TOU pricing does not appear to have influenced our customers in any statistically significant way. While the observed changes are in the desired direction (away from the summer peak), they are well within the normal year-to-year variation due to weather. In discussions with these customers, it appears that energy costs are simply not a large enough part of the cost of doing business to justify either the significant investment or a change of management or operating practices to take advantage of the TOU price.

However, this does not mean that TOU pricing is ineffective for BWP. Customers using a higher-than-average share of their power during peak periods cost BWP more to serve. It would be appropriate that they pay accordingly. Otherwise, the rest of the customers will be subsidizing the higher-than-average during peak periods. Our investigation shows that TOU pricing appears to be a cost-recovery mechanism, not a load-management mechanism with predictable peak capacity savings.

One large customer now considering an expansion of its load is interested in installing a thermal storage system as a part of the new building project. The TOU rate may be providing a significant stimulus for this investment, demonstrating that the time to influence customer behavior is at the time of construction or major refurbishment. The estimated savings from this system, if installed, would be in the 200 KW to 500 KW range.

A shift of load from on-peak to off-peak would provide measurable economic and environmental savings. During on-peak hours, BWP is likely to call on its less-efficient generating units, like Lake and Olive, to supply power. During off-peak periods it is more likely that the Magnolia unit would provide incremental power needs. Since Magnolia is about 30% more efficient than the peaking units, the total fuel consumed would be lower, and the total emissions (including CO_2) would be lower to serve an off-peak load. In addition, because outdoor temperatures are lower, the heat rejection of the chillers for a thermal storage system would be more efficient at night, meaning that fewer total kilowatt-hours would be needed to produce the same amount of cooling.

10.5 Critical Period Pricing

Critical Period Pricing (CPP) is an alternative to traditional TOU pricing that focuses on the specific hours when the utility system is facing constraints, rather than on certain periods of every day. The advantage of CPP is that it asks customers to modify their behavior only when the benefit to the utility system is particularly high.

Under a CPP rate, customers know the rate design in advance and know that when a critical peak event is declared, they will pay the designated rate. They do not know in advance when the critical peak periods will occur – that is dependent upon weather, wholesale power and fuel prices, and utility system conditions. When a critical period is declared (typically announced 24 hours in advance) the higher rates take effect on an announced or publicized schedule.

Table 13 below compares a traditional TOU rate to a CPP rate. The key difference is that a CPP rate applies a much higher price to a much smaller number of hours per year.

Comparison Of
Time of Use Rate vs. Critical Period Pricing Rate

Rate Element	Flat Rate	Time of Use Rate	Critical Period Pricing Rate
Off-peak	$0.12	$0.08	$0.08
On-peak 8 A.M. - 6 P.M. Monday to Friday	$0.12	$0.15	$0.11
Critical Peak Hours, not to exceed 200 per year	N/A	N/A	$0.32

Table 13

In this type of rate design, the "general" on-peak rate is designed to recover the higher fuel and purchased power costs that normally occur during the on-peak period. The critical period rate is designed to recover the costs of additional capacity and incremental fuel costs associated with the highest-cost periods. The CPP rate is limited to a defined number of hours in a day, and a limited number of total hours per year.

The California investor-owned utilities (IOUs) have been experimenting with CPP for over a year, and the preliminary results of these investigations are quite promising. While BWP's experience with TOU pricing has shown less than a 1%

load reduction during the priority-peak period, the California Statewide Pilot Project (SPP) showed reductions during peak periods of up to 14% in the residential sector and 10% in the general service sector from the CPP rates.

Implementing a CPP rate requires advanced metering so that interval data is collected from customers. BWP already has interval meters installed at our largest customers, those with typical monthly peak demands in excess of 750 kilowatts. These customers collectively account for about 20% of BWP total sales.

Based on the SPP, Table 14 shows the estimates of possible costs and benefits from implementation of CPP.

Possible Costs and Benefits
From Implementing Critical Period Pricing

Factor	Residential / Small Commercial	Large Commercial 50 kW - 750 kW	XL General Service 750 kW plus
Cost of metering	$1000/Customer	$1000/Customer	None; installed
Operating costs	$100/Customer/Year	$100/Customer/Year	None; already measured by remote
Critical peak demand per customer	5 kW	50 kW +	750 kW +
Potential savings per customer	0.7 kW	5 kW +	75 kW +
Cost-effectiveness	Poor	Fair	Good
Recommendations	Do not Pursue	Study	Consider with Next Rate Change

Table 14

Since there is no incremental cost for new metering, naturally the biggest potential benefit comes from the extra-large general service customers. With peak demand for the large and extra-large general service customers totaling some 100 megawatts for the BWP system (about a third of the system total), the potential peak load reduction from CPP for this class is on the order of 10 megawatts. About half of this potential lies with the largest customers, those with demands over 750 kilowatts.

The remaining large demand-metered general service class (250 – 750 kW demand) could probably provide approximately another10 megawatts, depending on the outcome of studies of the cost, cost-effectiveness, and customer acceptance.

10.6 How Much Load Relief from TOU and CPP is Truly "Incremental?"

Not all of the potential load relief from interruptibility, time-of-use rates, or critical peak pricing is necessarily "new" demand response. BWP has used media appeals and direct contacts to customers to achieve voluntary load reductions during extreme conditions for many years. The response of our customers has been excellent.

During the height of the energy crisis in 2000-2001, many Stage 2 and 3 alerts were issued. BWP also called on our customers to reduce their electricity usage. Our customers responded and BWP experienced loads that were about 4% (12 megawatts) lower than would have been expected without the appeals. Our rough estimate of the amount of load relief achievable with interruptibility is about 15

MW. With the addition of CPP to all demand-metered rate schedules, we would expect something in the range of 15 – 20 megawatts, reducing loads by another 2-3%.

This IRP proposes two study items relating to critical period pricing. First, discussions with the largest customers are proposed to explore converting their existing TOU rate schedules into CPP rates. The three existing contract customers are subject to contract renewal or amendment in 2007 and 2008.

The second study item is to explore the costs and benefits of CPP for the remaining large demand-metered industrial customers, representing about another 20% of BWP's total sales.

In these discussions with customers, we expect to learn information that will provide guidance as to how much incremental load relief can be anticipated from the implementation of demand-response programs.

11.0 TRANSMISSION AND DISTRIBUTION IMPROVEMENTS

The BWP distribution system is one of the five largest users of electricity in the City, ranking with the studios and hospital in terms of contribution to peak demand and energy consumption due to station, line, and transformer losses. Improving the energy efficiency of the power distribution system ranks in importance with improving the energy efficiency of end-use devices and systems:

- For BWP, an absolute reduction of even 0.25% in annual distribution energy losses (e.g., from 5.25% to 5%) can save 3,000 MWh per year, for an energy savings of $210,000 per year. (3,000 MWh times an average energy cost of $70 per MWh).

- For BWP, 0.25% reduction in annual losses translates to a reduction in peak losses that is nearly four times higher, or 1%. Most distribution losses are a function of the square of the line current, and the current at BWP's peak is about twice the average current, making the losses "two squared", or four times higher. Taking into account that transformer core losses do not vary with current, we adjust the 1.0% figure downward to 0.85%. For a system peak of 285 MW, a 0.85% reduction in peak losses is 2.42 MW.

Table 15 offers a specific example of how recent improvements in BWP's distribution system efficiency and its customers' end use efficiency can combine to dramatically slow the growth in system peak demand.

Comparison Of 2005 and 1998 Peak System Demands	
Element	MW
System Peak in 1998	284.0
Increase in Cutomer Peak Demand	23.0
System peak in 2005 if there were no peak demand reductions from efficiency	307.0
Distribution system efficiency gains	(7.5)
End use efficiency gains	
- From conservation programs	(9.8)
- From codes, standards, equipment efficiencies	(5.7)
System peak in 2005	284.0

Table 15

BWP's system peak demand in 2005 (284 MW) was the same as that in 1998 (284 MW), despite a 7.0% increase in kWh sales since 1998. Without peak reductions from system and end use efficiency gains since 1998, BWP would have very likely increased its system peak by 23 MW to 307 MW.

As with achieving gains in customer end-use efficiency programs, achieving gains in distribution system efficiency has the same effect on the system as acquiring additional resources. But, unlike the gains in end-use efficiency, the gains in distribution system efficiency do not reduce retail revenue. Instead, these gains have a beneficial impact on rates as well as the environment: saving fuel costs, stretching the life of transmission and generating facilities, as well as reducing air pollution and CO2.

11.1 Overview of Distribution System

Power comes to the BWP system from two principal sources: deliveries at Receiving Station E (RSE) from the LADWP 230 kV transmission system, and generation from local resources, including the new, SCPPA-owned Magnolia Power Project (Magnolia). (Two 69kV tie lines also interconnect BWP to the Glendale system but in almost all cases, these lines are delivering power from BWP to Glendale.)

Bulk power flows through BWP's 69kV network to four Switching Stations, which transform the bulk power down to a 34.5 kV network, which distributes the power to large neighborhood and industrial stations. These stations transform the power down to radial 4 kV and 12 kV circuits, which fan out to serve individual customers.

Table 16 shows how the major elements within a typical distribution system contribute to distribution losses:

Loss Contribution of Various System Elements

Element	Percentage Contribution
Primary lines	45%
Substation transformers	11%
Distribution transformers, core losses	23%
Secondaries and services	17%
Distribution transfomers, copper losses	4%
	100%

Table 16

Although Burbank is only 17 square miles, the distribution system serving it has hundreds of miles of primary and secondary lines, dozens of substation transformers and thousands of distribution transformers, all representing significant sources of energy and power loss.

11.2 BWP Distribution System Loss Reductions

Beginning around 1980, BWP took significant steps to reduce losses among all its major distribution system elements, and has succeeded in reducing annual losses by about 0.07% per year (using linear regression). Besides 1980, Table 17 shows losses in 1999, just before another round of system improvements began; 2005, the last complete calendar year; and 2015 a target roughly ten years in the future.

Reductions in Annual and Peak Losses Since 1980				
Calendar Year	1980	1999	2005	2015 Goal
Annual Losses Peak Losses	6.25% 21.25%	4.92% 16.73%	4.50% 15.30%	3.37% 11.46%

Table 17

If BWP continues its loss reduction programs, it will have cut its annual and peak losses by nearly one-half the 1980 levels by 2015. Of particular interest to this IRP is the reduction in peak MW owing to peak loss reduction programs, as Table 18 shows:

System Efficiency Improvements
Burbank Water and Power
1980 - 2011

Values in MW

	Achieved 1980-1998	Achieved 1999-2005	Planned 2006-2015	Total
Power Factor Correction	21.0	1.0	4.0	26.0
Subtransmission	-	4.8	-	4.8
Station Improvements	-	0.5	1.5	2.0
Voltage Upgrades	-	0.7	5.0	5.7
Customer Transformers	-	0.5	1.0	1.5
Total Peak Demand Savings	21.0	7.5	11.5	40.0

Table 18

Without the peak loss reduction efforts that have occurred since 1980, the 2005 summer peak would have been 28.5 MW higher: 313.5 MW instead of the actual 285 MW. Referring back to Table 15, end-use efficiency gains avoided an additional 15.5 MW of peak demand growth; taking this into account, the 2005 summer peak would have been 329 MW.

The planned reduction of 11.5 MW in peak demand represents about one-third of the projected system demand growth through 2015. Additional peak load reductions from end-use efficiency should result in relatively modest load growth measured at the generation level.

11.2.1 Power Factor Correction

Between 1980 and 1998 (prior to the 1999 "base year" used in most of the IRP analysis), the reduction in peak losses was almost exclusively due to improving the system power factor from 90% to 98%. The resulting reduction in total load current is the basis for the significant reduction in peak losses (21MW). From 1999 to 2005, BWP continued to improve power factor at several stations and distribution circuits, reducing peak losses by a further 1.0 MW.

In the 2006-to-2015 period, BWP plans to correct the power factor at its three remaining low-power factor (91% or 92%) stations:

- BWP will relocate a 6 MVAR capacitor bank from an abandoned station and re-install it at the Golden State Station, which will correct the station peak power factor from 91% to 99%.
- BWP will install a new 18 MVAR capacitor bank (to be initially equipped with 9 MVAR of capacitors) at Keystone Station, which will correct the station peak power factor from 92% to just under100%.
- BWP will install a 2.4 MVAR capacitor bank at NBC Station, which will correct the station peak power factor from 91% to just under 100%.

Summary of Station Power Factor Improvements

Substation	Current Power Factor (at time of system peak demand 7/22/05)	With Effect of Planned Changes To Improve PF	Capacity Savings After Planned Changes (Basesd upon 2005 Peak Day)
Golden State	91.1%	99.0%	1.4
Keystone	92.0%	100.0%	1.5
NBC	91.3%	100.0%	0.5
Total Capacity Savings (MW):			3.4

Table 19

11.2.2 Subtransmission

Since 1999, BWP has significantly reduced the peak losses in its subtransmission networks (34.5kV and 69kV) through significant capital additions:

- building a fourth Switching Station
- using larger conductor sizes
- more 34.5 kV and 69 kV paths for power to flow

Table 19 shows that the peak loss reductions will vary somewhat by whether BWP is importing or generating from Magnolia:

Peak System Losses			
Condition	Maximum Import	MPP W/O Tie	MPP With Tie
1998 2005	3.14% 1.44%	3.24% 1.28%	3.14% 1.78%

Table 20

Until September 2005, when MPP began commercial operation, BWP was often operating close to "Maximum Import" mode, which has an associated peak system loss reduction of 1.7 % (3.44% minus 1.44%). This translates to a peak load reduction of 4.8 MW (1.7% times the 2005 system peak of 285 MW).

In future years, BWP will usually be operating in the "MPP with closed Glendale tie" mode, which has an associated peak loss reduction of 1.36%; however, BWP expects that future line additions and other subtransmission improvements will enable BWP to regain its 1.7% loss reduction well before 2015.

11.2.3 Station Improvements

Upgrading the remaining 4 kV stations to 12 kV will generate significant loss savings. For each distribution station that is scheduled for replacement or upgrading to 12 kV by 2015, Table 21 presents the estimated peak load relief from the upgrade.

Future Station Upgrades And Expected Capacity Benefits		
Station	Year Upgraded (Actual or planned)	Expected Capacity Benefit of Upgrade
Alameda	2008	53 kW
Burbank	2008	22 kW
Clybourn	Post 2010	10 kW
flower	Post 2010	39 kW
McCambridge	2010	70 kW
Naomi	Post 2010	63 kW
Pacific	2008	5 kW
Town	Post 2010	57 kW
Victory	Post 2010	89 kW
Winona	Post 2010	50 kW
Total		458 kW

Table 21

11.2.4 Voltage Upgrades

As stations upgrade to 12kV, the distribution circuits they serve will also upgrade to 12 kV, resulting in peak line loss reductions of up to 5.0 MW.

11.2.4 Customer transformers

BWP has a total of approximately 6,000 distribution transformers on its system, ranging from small, 25 KVA pole top transformers to large, 2,500 kVA padmounted transformers. Attention to the efficiency of distribution transformers can provide significant loss reductions. Since 1980, BWP has used lifecycle cost evaluation of transformer bids, which has tended to make transformer losses lower than otherwise.

Another important consideration is transformer sizing. If transformers are larger than they need to be to meet customer needs, the amount of electricity lost is greater than necessary.

Some BWP customers are served by transformers that are far larger than the current requirements of customers. For example, a large industrial manufacturer moved and a warehouse operation took over the facilities, using only a fraction of the electrical power as before. BWP reduced the capacity of the transformer bank serving the customer by a factor of two, avoiding unnecessary transformer losses. In general, if the transformer is far larger than is needed by the current customer or must be replaced anyway, then BWP will probably find the transformer downsizing to be economical.

BWP will adopt a program of methodically comparing distribution transformer capacity to current and expected customer demands.

- For all transformers with capacity in excess of 250 KVA, compare the transformer size to historical peak demands of the connected customers. Determine if a change in transformer size would produce significant energy and/or capacity savings.

- In all cases where a transformer is proposed to be installed or changed, review data to determine the minimum size transformer that will reliably meet customer demands;

- Develop a transformer load management program within the Customer Information System that allows engineering staff to draw on customer load data when a transformer must be replaced under outage conditions, so that a resizing can occur at the time of replacement without any delay. This transformer load management program could eventually be implemented together with the BWP GIS system to identify geographically where transformer overloads are occurring.

11.3 Study plan for future IRP

Given the substantial impact of distribution loss reduction on energy and capacity savings, future IRPs will also include:

- Making more precise estimates of loss reductions in future years, along with associated average and peak energy and capacity savings

- For several substations, exploring whether to operate fewer substation transformer banks during low-load periods, in order to optimize losses. (The reduction in no-load losses is likely to more than offset the increase in copper losses.) A transformer bank could be switched off at most 4 – 34.5 kV stations year round and meet reliability standards. This would save 98.7 kW on-peak and 176.1 kW off-peak based upon 2005 loads.

- Reviewing BWP’s policy on conservation voltage regulation.

12.0 OPERATING RESERVES AND OPERATIONAL ISSUES

12.1 WECC Operating Reserve Requirements

One of the responsibilities of belonging to an interconnected grid is that control areas need to provide for backup power when unplanned outages occur. In the west, the Western Electric Coordinating Council ("WECC") is the organization that sets technical and operating standards for the interconnected electrical grid. The WECC reserve criteria applies to all control areas within their jurisdiction and is comprised of the sum of the following items:

1) **Regulating Reserve –** This is unloaded capacity that must be immediately available and responsive to automatic generation control ("AGC") so as to provide enough regulating margin to allow the control area to meet NERC's Control Performance Criteria.

2) **Contingency Reserve -** An amount of spinning and non-spinning reserve which can be made available within 10 minutes of an outage to replace that resource. The amount of contingency reserve that must be provided is the greater of the following two:

    a) Single Largest Contingency: reserves sufficient to replace the largest contingency as a result of a forced outage from generation or transmission equipment. Half of this requirement must be met by spinning reserves. Normally, this would be 75 MW for Magnolia.

    b) The sum of five percent of the load responsibility served by hydro generation and seven percent of the load responsibility served by thermal generation. Half of this requirement must be met by spinning reserves. For a peak load of 270 MW this would correspond to 2% of 20 MW for the hydro related to Hoover and 7% of 250 MW for remaining thermal based generation for a total of 18 MW.

3) **Additional Reserve for interruptible imports.** An amount of reserves to replace an interrupted import. These reserves must be available within 10 minutes.

4) **Additional Reserve for on-demand obligations.** An amount of reserves equal to on-demand obligations to other entities or control areas. These reserves must be available within 10 minutes.

For Burbank, under WECC the Contingency Reserve requirement applies as set out in (2-a) . Burbank must provide Contingency Reserves for its single largest contingency, which currently is 75 MW from its share of the Magnolia Plant. Since Magnolia can produce nearly 100 MW with duct firing and steam injection on, Burbank would have to provide for 100 MW of reserves when Magnolia is operating at this level. Burbank is not a control area and we are part of the LADWP control area.

As indicated above, the Contingency Reserve can be split into two components. At least one-half must come from partially unloaded units that are on-line and immediately capable of assuming load. The other one-half, the non-spinning portion, of Contingency Reserve can be met though the following methods:

1) Interruptible load – load that can be interrupted within 10 minutes of notification.

2) Interruptible Exports – Energy than can be called back within 10 minutes of notification.

3) On demand rights purchased from other control areas.

4) Off-line generation capable of being brought on-line and meeting its share of the reserve requirement within 10 minutes of notification.

12.2 Burbank's Situation

As discussed in the previous section, Burbank is located in the Los Angeles basin and is a member of the LADWP control area. BWP is contractually obligated to provide Contingency Reserves associated with our single largest contingency in operation.

Historically, this has been done using local generating facilities. Normally, a combustion turbine that can be started in a matter of minutes was used to meet the non-spin half of the requirement. And, the other half would come from a partially unloaded steam unit. Although BWP has an automatic generation control unit to regulate its electric system, Burbank does not have a contractual obligation with LADWP to provide for regulating reserve. LADWP presently regulates for Burbank as part of its control area function.

While BWP is not obligated to provide LADWP with Contingency Reserves, however we have responsibly been operating to provide adequate reserves for the region. However, it is not apparent that doing so provides any real benefits to the LADWP control area. This is because the single largest contingency in the control area governs the amount of Contingency Reserves that LADWP must carry. WECC requires LADWP to have a significantly larger Contingency Reserve obligation corresponding to the Intermountain Power Project. Consequently, BWP's Contingency Resource obligations associated with Magnolia, which are less than 100 MW, are subsumed within LA's obligation resulting in us being "covered" in the same way as LA's other units within their control area that are smaller than the single largest contingency are covered.

In light of this, BWP is currently negotiating with LADWP for a new arrangement that is equitable for both parties. We envision such an arrangement would likely involve BWP continuing to pay an annual fee to LA, or making a certain amount of BWP capacity available to LA during peak load periods.

12.3 Use of Demand Side Spinning Reserves

Section 10.2 of this IRP identifies the possible installation of automatic load shedding equipment on the large HVAC systems of the utility's largest customers.

If implemented, this would give the utility the ability to automatically decrease customer loads at times of system instability. A decision of whether to move forward with this will depend on customer response to the proposal, as well as response to the critical period pricing approach discussed in Section 10.5.

These are separate, and probably partially redundant approaches to reducing customer load at times of extreme system demand. Critical period pricing is expected to reduce load for a few hours at a time, while direct load control would completely curtail some loads for a few minutes at a time.

If customer load can be remotely controlled by the utility, the Western Energy Coordinating Council allows the utility to count some of this as a spinning reserve. This has significant value to the utility. Conversely, if critical period pricing is used instead of direct load control, the amount of load will be expected to be lower (and therefore our reserve requirement, if computed on a percentage basis, will be lower), but because the utility does not have the ability to directly control the load, it cannot be counted as a spinning reserve.

A rough estimate is that the utility has approximately 30 – 50 megawatts of large HVAC systems operating at the time of an extreme peak event on our system. This is the outside limit of what might be achievable as a very short-term interruption, only allowing time to get a standby generating unit started and synchronized before restoring service would be necessary. The potential load control is much greater than that estimated for critical period pricing, but it is important to recognize that the duration of the load reduction is quite different.

BWP will initially pursue critical period pricing, while discussing with our large customers the alternative of direct load control as a study item. The projected peak demand savings from critical period pricing will be incorporated into the load forecast after 2008; any savings from direct load control would need to net out that projected customer response to avoid double-counting.

12.4 Swapping to Reduce Contingency Reserves

Another method of reducing BWP's Contingency Reserve obligation is to reduce the size of the contingency. One way this could be accomplished is to trade, or exchange resources with another party. For example, assume BWP's largest contingency is 75 MW; we could trade 25 MW of that resource in exchange for 25 MW of another party's resource in which we had no existing rights. After the trade, our largest contingency would be reduced to 50 MW because the other party would have rights to the other 25 MW. BWP would gain rights to 25 MW of resource from the other party and we would still have a total of 75 MW, but now split between two different units.

At the time of this writing, BWP has a short-term swap arrangement in place with LADWP whereby we can exchange up to 40 MW of Magnolia's capacity for a similar amount on one of LADWP's Haynes units. This arrangement seems to be working well for both parties and we will explore the opportunity of making it longer-term.

12.5 Purchase of Reserves

Rather than providing reserves from our generating facilities, it is possible to purchase reserves. Normally, this would be done when it is less expensive to do so. Purchases could be made from those located within LADWP's control area or that have access to the LA control area.

Over the years, Burbank, Glendale, and LA have purchased reserves from each other on a short-term basis. For longer-term arrangements, the parties have found that it is more affordable to self-provide reserves than buy from each other. Thus, it doesn't make economic sense to purchase reserves on a long-term basis for BWP's Contingency Reserve requirements.

Theoretically, it should be possible to buy reserves from the California Independent System Operator,which connects to the LA control area. However, as a policy the ISO does not sell reserves to other control areas. Consequently, there is no opportunity to purchase reserves from the ISO with regard to operating reserves without being a member of the ISO.

12.6 Reserve Sharing

Another option to reduce reserve obligations is to pool reserve requirements with other utilities that have different resources. Preliminary investigations into joining a reserve sharing pool like the Southwest Reserve Sharing Pool suggest that BWP could lower its Contingency Reserve requirement. As an example, rather than having 75 MW of generating capacity available to pick up load, we would be obligated to supply approximately 25 MW. These reserves would be available with on-line generation and the remaining 50 MW via transmission interconnections with other pool members.

A reserve sharing pool arrangement would free up 50 MW of generation that could then be sold as surplus on the market. In order to pursue this option, BWP needs to determine whether or not it is beneficial for BWP to leave 50 MW of generation unloaded or 50 MW of transmission unloaded.

Staff will investigate reserve sharing and will implement it if the analysis shows that it is economic and the necessary logistical arrangements can be worked out with LADWP.

12.7 Efficiency Program and Demand Side Management Impact on Reserves

Depending on how BWP provides for reserves, energy efficiency programs may help reduce the reserve requirement. Under current circumstances, with a reserve requirement dictated by the size of our largest generating unit, changes to BWP loads will not affect the reserve requirement. However, if we became a member of a reserve sharing pool, such as the California ISO, our reserve requirements would become a percentage of our load. Under these conditions, any activity that reduces loads also reduces reserve requirements.

Energy efficiency programs reduce loads. Under current circumstances, a 1 megawatt reduction in load reduces our need for generating capacity by about 1.10 megawatts – the amount of load reduction plus the associated line losses at the time of the system peak demand. If we participated in a reserve-sharing program, however, this would increase to approximate 1.17 megawatts, because the reduced load would also have the effect of reducing the required reserves. As shown in Table 22, the net system capacity savings would therefore consists of:

MW Savings for Conservation	
Element	MW
Basic Load Reduction	1.00
Avoided Distribution Losses at Peak	0.01
Avoided Reserve Requirements	0.07
TOTAL	1.17

Table 22

The savings on reserves associated with energy efficiency programs are entirely dependent upon a change to how BWP provides for reserves. Unless and until a reserve sharing arrangement is implemented, BWP's reserve requirement will be dictated by the size of our largest single generating contingency, currently Magnolia.

13.0 HEDGING / FUEL MANAGEMENT

13.1 Description of issue

The greatest potential risk associated with BWP's power supply portfolio is the cost of natural gas fuel for future electric production not yet purchased. Depending on the time-frame and the future cost of natural gas, the potential exposure is $25 to $35 million annually, which represents 30 – 40% of the cost of power.

BWP recognized this risk several years ago and developed BWP's ENERGY RISK MANAGEMENT POLICY AND PROCEDURES. This policy includes a strategy called Planning-Driven executions, which sets out the hedging strategy for the natural gas requirements for retail load.

Historically, natural gas prices tend to trade toward an average price. This is called the "mean reversion" characteristic of natural gas prices. The Planning-Driven executions rely on buying natural gas using a mean pricing approach. This strategy calls for BWP to hedge when natural gas prices fall below the mean price of the preceding four years.

Over the last several years, as prices have climbed it has not been possible to build up a natural gas portfolio using this strategy because natural gas prices have constantly been going up and not reverting back to the mean as has historically been the case. Accordingly, BWP is in the process of updating the hedging policy to achieve a reliable and stable natural gas fuel portfolio with prices as low as possible.

With hindsight, it now appears that there is a fundamental shift underway in the natural gas market with prices increasing due to decreasing North American gas production. Production in Canada and the lower 48 states appears to have peaked so the additional supply is likely to come from increased importation of LNG and gas from Alaska.

Evidence that the market is anticipating increased gas supply in the future is exhibited by gas prices several years out being lower than the near years. A market with near term prices higher than those further out is called “backwardated.” An illustrative example of such market conditions is shown in Figure 3 which follows. Over the last several years the shape of this curve has moved steadily higher and to the right, or out, with time as indicated by the red arrow.

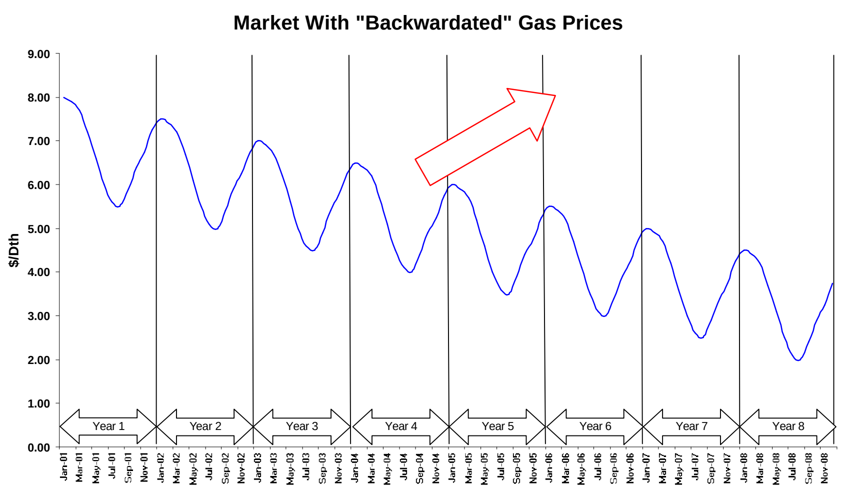


Figure 3

13.2 Proposed Hedging Strategy

Taking this into consideration, BWP proposes to institute a hedging strategy during “backwardated” market conditions that calls for annual programmatic buying of strips of natural gas of up to five years in duration supplemented by opportunistic buying when prices drop to attractive levels.

Programmatic Buying

The idea behind the programmatic buying is that after an initial catch-up phase to institute annual buying for about 20% of future load. Because of the current high cost of natural gas in the short-term the first phase, called “catch-up” consists of buying a large quantity over several years to average down the cost of gas in the near term years. This is followed by the actual programmatic buying where strips comprised of 5 year terms are bought each year to create a ladder. This is shown conceptually in Figure 4.

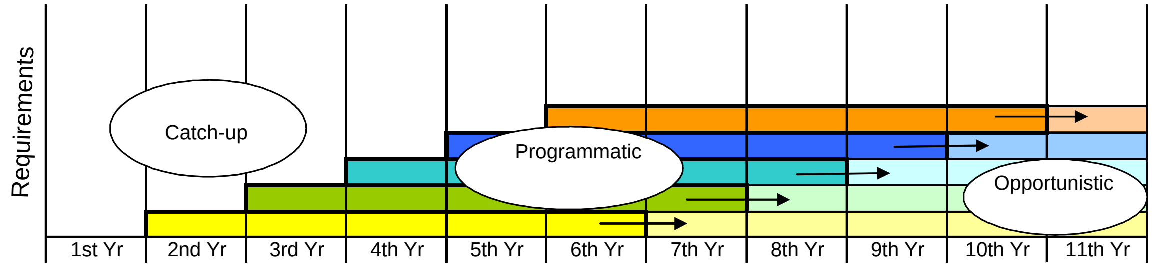


Figure 4

Then as each of the "initial" programmatic strips expires, it is replaced by another strip having a 5 year term. After 5 years the process would result in a portfolio being populated with 5 strips – each with 5 year term as shown in Figure 4. As long as the market remained backwarded the process would repeat itself with the "yellow" strip being replaced with another 5 year strip, etc.

The strips purchased in this manner would result in dollar cost averaging of price over the term of each strip, which in a backwardated market would have the effect of lowering prices in the near term. Rolling over strips corresponding to 20% of our annual natural gas requirements each year results in 100% of portfolio needs being met over 5 years and mathematically gives each strip the same weighting in the ladder, increasing the stability of BWP's gas portfolio with regard to price and its effects on retail rates.

Natural gas prices have historically been lower in the spring, summer, and fall months than during the winter when natural gas demand throughout the country is highest. When appropriate, the programmatic hedging will take advantage of this phenomenon by filling storage during the low price periods for use during the winter.

Opportunistic Buying

Opportunistic buying means purchasing natural gas when it is cheap. If, over time, gas prices decline and it becomes attractive to buy "cheap" gas out in the future, beyond 5 years out, or fill in some of the gas that has not been purchased within 5 years, such purchases will be considered.

Because gas prices are generally lower in the summer, additionally seasonal purchases will be made during April to October to fill storage for burning during the following winter months of November through February. BWP currently holds rights to 400,000 Dth of storage through March 2009. It is recommended as long as the market remains backwardated, BWP should, if economically justifiable, continue to acquire additional storage in the future for up to 5 years out.

Strategy for Market in Contango

Historically, the normal situation for future's markets is called "contango." This is where prices further out are higher than those near term as shown in Figure 5.

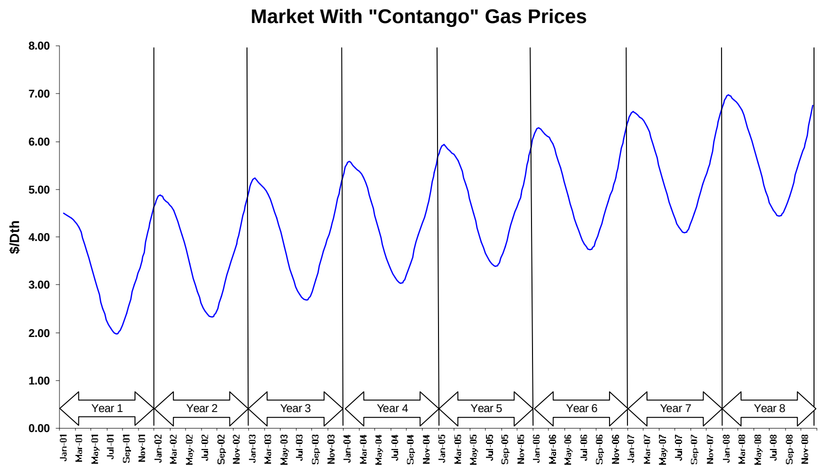


Figure 5

During such a scenario, we would still want to have adequate gas in our portfolio for reliability and price stability. But, to minimize future costs, we should avoid paying the higher prices further out. This can be accomplished by shortening the term of the annual strips when they are rolled-over from 5 to 3 years. Also, we would shorten the term that any seasonal purchases are made for future years.

13.3 Use of options and Financial Instruments

It is also possible to achieve the benefits of hedging through the use of various financial instruments. One of these mechanisms is to use options. By paying a premium, BWP could purchase the right to buy natural gas at a predetermined price, protecting itself against an upward move in prices. In the event prices fell, BWP could choose to not exercise the option and purchase at the lower market prices. However, the cost of options can be pricey and they fluctuate with market volatility. When making forward purchases, BWP will undertake an analysis to ascertain whether or not it is cost effective to purchase options rather than buying the physical product.

It is not prudent to rely on one supplier for all of BWP's natural gas requirements. For example, if we lock in gas at an attractive price with a supplier and that supplier goes out of business we would need to replace the gas. So, if in the interim the market price increases we would be faced with the situation of having to replace the "lost" gas at higher prices, thus losing the benefit of the hedge. To avoid the credit risk associated with relying on only one supplier, it is desirable to contract with multiple sources provided they have good credit consistent with Standard and Poor's AA rating.

It is also possible to make financial arrangements called "swaps" with financial institutions who have good credit. These arrangements can be used to "cap" the price of gas by having the financial institution pledge to pay for costs above some pre-agreed upon price level. Conversely, if market prices fell we would be obligated to pay for the gas at the agreed upon price.

14.0 SHOULD BWP JOIN THE INDEPENDENT SYSTEM OPERATOR (ISO)

In 2004, BWP had Energy Management Services ("EMS") undertake an extensive evaluation to determine the advantages and disadvantages of BWP joining the ISO. The primary focus of the study was to quantify the economic and qualitative differences between Burbank joining the ISO as a Participating Transmission Owner ("PTO") and forming a Metered Subsystem ("MSS"), as opposed to remaining in the LADWP control area. The primary benefits to joining the ISO were:

1. An identified benefit is the $7.3 million per year reduction in annual transmission costs. The reduction is attributable to the averaging in of Burbank's costs with that of the other utilities in Southern California, who are already members of the California ISO.

   The $7.3 million figure ignores the potential impact of having to "give back" revenues from the sale of transmission service to other parties. Any revenue associated with our transmission needs to be subtracted off the annual transmission costs to get a "net" figure.

   Currently, we receive about $1.3 million per year from Anaheim, Riverside, and Azusa, Banning, and Colton for transmission service we provide them on the Pacific Northwest DC Intertie. The Magnolia participants' scheduled transmission service is expected to produce another $2.2 million in revenue. When these revenues of about $3.5 million are subtracted from the transmission benefit of $7.3 million identified above, the net annual benefit in reduced transmission costs is $3.8 million per year.

2. Another identified benefit is the reductions in annual operating reserve costs. Getting a handle on what these costs are is difficult. The ISO costs are highly variable so estimates are prone to fluctuate. Work done in conjunction with R.W. Beck indicates that providing spinning for our local generating facilities costs in the range $1.5 to $3.0 million annually, depending on the cost of fuel with a mid-value of $2 million annually.

   EMS looked at the 2003 data and estimated that the ISO costs for operating reserves would have been about $0.5 million annually. Based on more recent ISO cost data, this estimate seems low. In summary, it is likely that Burbank would see a reduction of operating reserve costs of about $0.5 to $1 million per year by joining the ISO. (This would be partially offset by the cost of regulation, which is discussed below.)

The major disadvantages of joining the ISO are identified as:

1. A disadvantage identified is the increase in the cost of meeting load as it changes throughout the day. This is called regulation. Current contractual arrangements with LADWP do not require Burbank to provide regulation for its retail load requirements. (BWP does have AGC capability which could be used for regulating purposes.) Based on 2003 ISO costs, EMS estimated there would be a direct cost to BWP for regulation (the ability to adjust generation to load) of $1.2

million per year based on an average requirement of 3% of load as Regulation-Up and 2% of load as Regulation-Down.

2. A major disadvantage is that BWP would have to pay ISO costs know as Grid Management Charges ("GMC") of approximately $1.0 million per year. EMS used the then current filed ISO GMC charge and noted that the ISO had proposed unbundling from three parts to five parts with 7 billing determinants.

   Also, BWP would pay a FERC fee of $0.021/MWh based on load to fund FERC, which the ISO treats as a pass through charge to each entity. The fees are lower than some might expect, not because of the rates, but because of the volumes. Since MPP is sited in BWP's service territory, the exports to other owners can be netted against imports from other BWP resources, leading to a smaller net load on the ISO system and associated lower cost.

3. Finally, another drawback is the increased cost of staffing, consulting and infrastructure needed to support ISO involvement. These costs are expected to be approximately $ 1 million per year.

The following table summarizes the costs and benefits and shows that we could expect a cost reduction of approximately $1.6 million annually if BWP joined the ISO.

Reduction in Cost	
Transmission	$ 3.8 million
Operating Reserves	$ 1.0 million
Increase in Cost	
Regulation	$ 1.2 million
ISO charges	$ 1.0 million
Staff & Consulting	$ 1.0 million

Joining the ISO may produce short-term benefits, but there is a great deal of uncertainty about how durable the savings are. The uncertainty centers around four main areas: transmission costs eroding, uncertainty over the future rate treatment of 50% of BWP's transmission, and whether or not we would be able to come back to the LA Control Area if we join the ISO and change our minds, and forced outages.

- One, is the risk that the annual transmission cost savings will be eroded if additional transmission is built to serve the ISO Control Area. EMS results indicate that it would take approximately $1.5 billion in transmission infrastructure to reduce the annual transmission cost savings by $1 million per year.

  In late 2003, the CPUC issued a report stating that approximately $1.9 billion in transmission infrastructure would be necessary just to meet the transmission needs for the legislatively mandated renewable portfolio standards. IOUs like Southern California Edison have also indicated that they have plans to spend $11 billion on transmission infrastructure improvements over the next decade.

- The second area of uncertainty is over the future rate treatment for certain transmission lines that comprise nearly 50% of BWP's revenue requirements.

For example, some parties are arguing before FERC that the STS (BWP owns 4.5 %) should be treated as a generation tie-line. As well, recent developments in the City of Vernon's FERC rate case raise concerns about the value of the Mead-Adelanto and Mead-Phoenix transmission and the value this transmission provides to the ISO. If this transmission is disqualified, then rolled-in rate treatment would severely negate the anticipated cost benefits of joining the ISO.

- The third area of uncertainty is if BWP left the LADWP control area, there is no assurance that we could be back into their control area if in the future we decided that we wanted to leave the ISO.

- The final area of uncertainty is the loss of control over our own system. Although, BWP would be a metered sub-system within the ISO control area and as such is supposed to be isolated from mandated statewide blackouts, there is no guarantee that during future statewide power shortages we would not be forced to share in outages.

To summarize the primary benefit of joining the ISO is the benefit of combining our transmission costs with lower cost ISO transmission. Since this benefit is not durable and the downsides of loss of control and increased complexity are to be avoided, the bottom line is that a decision to join the ISO comes down to whether or not BWP wants to put the effort forward and assume intangible uncertainty and risks for a projected $1 million in annual savings.

15.0 RESOURCE ANALYSIS

15.1 Planning Issues

How to best plan for BWP's energy future is influenced by many factors. This section discusses the political, regulatory, and operational issues that staff considers as it develops its resource plan and presents recommendations regarding how BWP should provide for future unmet resource requirements.

15.1.1 Legislative Considerations

Federal and state policy affects the objectives in resource planning and influences the structure of resources. Federal and state legislation, regulations, and policy initiatives for energy resources should be reflected in electric resource planning processes.

Energy Bill

In 2005, the comprehensive Energy Policy Act was signed into law and sets the stage for the nation's energy policy. Over the next year, the Federal Energy Regulatory Commission (FERC) will implement some of the most important requirements of the Act.

The energy bill includes provisions addressing price transparency in electric and natural gas markets, and significantly revises FERC's enforcement and civil penalties authorities. Conceivably, this increased authority should be a significant deterrent to any repeat of the sort of unscrupulous behavior that occurred during the Western energy crisis in 2000 and 2001. The new statute also affirms the FERC's exclusive authority under the Natural Gas Act to authorize new import terminals for liquefied natural gas (LNG). Bringing new sources of supply and competition to the marketplace should drive fuel and energy prices down.

Of potential interest for resource planning is the newly created two-year, $800 million Clean Renewable Energy Bond that was passed as part of the energy bill. The Bond provides $500 million for consumer-owned utilities that want to build wind, open and closed-loop biomass including agriculture (livestock waste), geothermal, small irrigation, and incremental hydropower. This new Bond is an opportunity that BWP could use to build a wind renewable energy project.

Regulatory Trends – Tighter all Around

Currently, BWP's generation units must comply with the federal Clean Air Act (CAA), which is implemented by the state subject to U.S. Environmental Protection Agency (EPA). The CAA directs EPA to establish air quality standards to protect public health and the environment. BWP's plants must comply with air permit requirements designed to ensure attainment standards.

Within the current federal political environment there exists a debate over revising the CAA in order to reduce overall emissions from the combustion of fossil fuels. Currently, the debate focuses on the emission standards and compliance measure for sulfur dioxide (SO_2), nitrogen oxides (NO_x), mercury (Hg), particulate matter (PM), and the regulation of carbon dioxide emissions. A number of alternative proposals for federal multi-pollutant legislation would require significant reductions in emissions of SO_2, and NO_x, and establish new definitive standards for mercury.

The U.S. Environmental Protection Agency (EPA) has two major regulatory rules for controlling NO_x, SO_2, PM, and mercury, which clearly establishes a direction for addressing multi-pollutant emissions. The environmental community continues to pressure regulators and legislators to more stringently regulate toxic air pollutants.

While the utility industry is currently only regulated for mercury from coal and oil emissions, 34 other hazardous air pollutants (HAPs) identified in the CAA are regulated in one form or another across several different industries. If Congress re-opens the CAA, then the utility industry would likely be facing the possibility of being regulated for more HAPs, which could impact BWP's resource planning operations.

The EPA has set the following timeframes to revise regulations:

Clean Air Act: tighter ozone and particulate matter (PM) standards in 2008 that will even be tighter than California's Clean Air Act standards and Clean Water Act.

Clean Water Act: tighter water effluent guidelines for the utility sector in 2009 timeframe (new technologies requiring more capital investments)

Overall, regulatory trends in the next five years will likely mean tighter environmental standards and protections for air and water. California leads the nation in air quality regulations, and federal changes are not as likely to significantly impact our resource planning. However, if Congress re-opens the CAA, then it could mean major adjustments in resource planning for the national as a whole.

Climate Change

Climate change is an issue that requires the attention of the energy sector. As a large emitter of greenhouse gases, BWP needs to consider the potential for government imposed environmental costs associated with climate change policy as well as voluntary measures to reduce our greenhouse gases.

Carbon and greenhouse gas reduction is likely to be another hot state and national issue over the next five years. At the national level, the President has a program for addressing climate change, including the goal to reduce emissions intensity of the U.S. by 18 percent by 2012 through the Climate VISION program and the efforts to improve the voluntary greenhouse gas registry and guidelines.

The Governor announced his goal for the state to meet certain greenhouse gas reduction targets in 2010 and 2020. Towards that goal, a number of California EPA interagency task forces are evaluating different sectors of the economy. The utility sector is considered a large producer of greenhouse gases. For the moment, reduction efforts for greenhouse gas reduction are voluntary, but that is likely to change.

In 2004, BWP voluntarily joined the California Climate Action Registry. The Registry requires the reporting of CO_2 emissions for the first three years of participation, although participants are encouraged to report the remaining five GHGs covered in the Kyoto protocol (CH_4, N_2O, HFCs, PFCs, and SF_6). The reporting of all six gases is required after three years of Registry participation. BWP recognizes the need to consider the financial risks of greenhouse gases in resource and business planning decisions.

As of this writing, it is unclear what the actual effect will be to electric generators as the Committee must evaluate a wide range of technologies; however it is reasonable to assume some additional costs as federal mandates to reduce greenhouse gas emissions come into play. These costs will likely be in the form of a carbon tax, an adder that each generator must pay.

As an example, if an adder of $8/ton of CO_2 were put into play, a 10,000 heat rate coal plant would see a variable cost increase of about $8.16 / MWh, a 10,000 heat rate natural gas plant would see a variable cost increase of $5.20 / MWh, and a 7,000 Btu/kWh gas plant would see a $3.64/MWh variable cost increase. If an $8/ton adder were adopted, BWP would face an increase in power supply expenditures of $7 million per year using our current resource mix.

BWP's technical staff has evaluated our carbon dioxide (CO_2) emissions based on our generation sources. This research shows a declining trend in CO_2 emissions system-wide. For instance, BWP is below our 1990 levels by 11 percent and has entered into other voluntary measures. BWP has already made great strides in reducing CO_2 and we feel confident that we will be able to comply with any federal and state reduction measures that are adopted.

Renewable Energy

In 2003, the City of Burbank passed a Renewable Portfolio Standard (RPS) with the goal of 20% renewable energy by 2017. The Governor's Administration and some of the investor owned utilities expect to reach or exceed this goal by 2010. As such, there will continue to be pressure from the environmental community to move the timeframe up and to increase the amount of renewable energy that comprises the municipal utilities' portfolio.

During the debate on the energy bill, Senate Bingaman's (D-AL) renewable portfolio standard (RPS) amendment passed by a vote of 52-48. While the RPS was not included in the final energy bill there is a sense that Congress should enact a mandatory measure to address climate change.

Planning Reserves and Resource Adequacy

In 2005, California Assembly Bill 380 became law. It establishes resource adequacy requirements for all load-serving entities in the State. Municipal utilities are required to maintain physical generating capacity adequate to meet their peak demand requirements consistent with the most recent minimum planning reserve and reliability criteria approved by the Board of Trustees of the Western Systems Coordinating Council ("WSCC") or the Western Electricity Coordinating Council ("WECC").

Since WECC is currently working on developing a new standard, the requirement for BWP is the WSCC criteria. The WSCC minimum planning reserve and reliability criteria requires that we plan to meet or exceed at least one of the following criteria:

1. Cover our largest risk plus 5 percent of the load responsibility of the control area. Since Burbank's load responsibility within the LADWP control area is to provide for our own load, the criteria corresponds to our largest risk, which is our share of Magnolia plus 5% of our load.

2. An annual reliability criterion based on a 90% probability of meeting all loads in a year.

Unfortunately, determining how to apply these criteria for planning purposes is not straight forward. The problem with (1) above is that it is not clear what load level to plan for. For example, should utilities plan for a weather normalized peak load which has a 50 percent probability of occurring or a higher standard like (2) of meeting peaking load 90% of the time?

For planning, Burbank uses a performance criterion of meeting load 90% of the time (1 in 10 probability of exceeding), plus providing reserves at least as great as its single largest risk.

15.1.2 BWP Is A Fully Resourced Utility

As discussed later in this section, with the exception of a few hours each year, Burbank is currently adequately resourced to meet its native load requirements. We expect potential shortages of up to 66 MW and associated energy are anticipated for less than 250 MW hours per year. We do not need to add significant new resources over the next five years or resources that are available for the entire year.

The IRP looks at ways of dealing with the identified shortfall through conservation, demand side management, and procuring additional power during the summer period when the shortage is most likely to occur.

From an energy perspective, Burbank has the ability to run its local generation facilities (Magnolia, Lake, and the Olive units) longer to meet anticipated load growth. This means that existing facilities could likely meet most of the expected energy growth. However, our Renewable Portfolio Standard ("RPS") goal calls for Burbank to add additional quantities of renewable energy each year. So, a challenge BWP faces is to economically add additional renewable energy to its portfolio.

15.1.3 City Goals and Policies

BWP is committed to proactively engage on GHG and RPS policy issues through a strategy that includes the following elements:

- Policy: BWP supports legislation and regulations that enable win-win solutions for GHG reductions. BWP has committed to a 20% renewable energy portfolio by 2017 and has voluntarily joined the California Climate Action Registry. BWP will continue to work with regulators and legislators to identify alternatives to reduce GHG emissions.

- Planning: While no mandatory GHG reduction policies exist today, BWP is already 11% below our 1990 GHG emission levels and by 2010 will be 14% below. Despite the fact that we have fully planned for our customers utility needs, we expect to be able to add 20% renewable energy by 2017 without significant rate impacts to our customers. In the IRP, BWP has looked at various scenarios dealing with the cost of CO2.

- Procurement: BWP recognizes the cost and risks associated with CO_2 and does not plan on any net additions of coal based resources.

- Accounting: BWP has adopted transparent accounting of GHG emissions by joining the California Climate Action Registry.

15.2 Daily Resource Requirements

To meet customer demand, which is generally called *load*, a utility must constantly adjust its resources so output (supply) and load (demand) are in equilibrium.

Figure 6 illustrates the daily operating challenges faced by a utility. It shows the daily load changes that BWP must serve during a typical summer week. From the figure, it can be seen that there are wide demand swings from lows in the early morning hours to peaks in the mid-afternoon. It is simply not possible to schedule all resources at maximum output all the time due to the varying load. Instead, resource output has to be constantly adjusted to meet load demand as it changes.

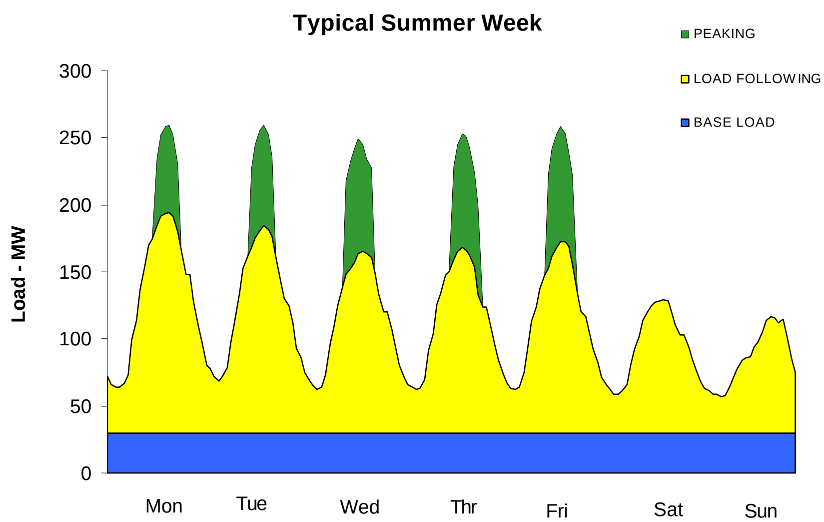


Figure 6

In order to minimize cost, a utility must constantly manage its resources so that the most economically efficient mix of generation is achieved. To do this, some units are run at a constant output - generally at full output where they operate most efficiently. These are referred to as base loaded units. The rectangular region at the bottom portion of the graph shown in Figure 6 corresponds to a base loaded unit.

Another type of operation is load following. In this mode, a unit is kept at minimum output during low demand periods, and its output is increased as the system demand rises. This type of operation is shown in the region above the rectangle in the graph.

A third type of unit operation is peaking in which a unit is kept off-line until its output is needed. After a peaking unit is brought on-line, its output is adjusted to match the system demand not supplied by the base loaded and load following units.

This type of operation is identified by the resources at the top of the peaks because they are only on-line during this period.

BWP normally schedules coal and nuclear as baseload resources (IPP and Palo Verde). When one of our local steam units Olive 1 or 2 is on line for operating reserves, its minimum load component is considered as baseload. Magnolia is expected to be used mostly in the load following mode. And, the Lake combustion turbine is expected to be used as a peaking unit. As well, the duct firing portion of the Magnolia Power Plant of which BWP is entitled to 9 MW can be brought on-line in ten minutes or less making it a useful peaking resource.

15.3 Annual Resource Requirements

If one were to graph all the hourly energy requirements required to meet load over the course of a year and arrange them from the highest to lowest requirement, the result would be what resource planners call a Load Duration Curve ("LDC"). The LDC shows the percent of time retail load is at or above a certain level. A load duration cure for BWP's retail load requirements is shown in the following Figure 7.

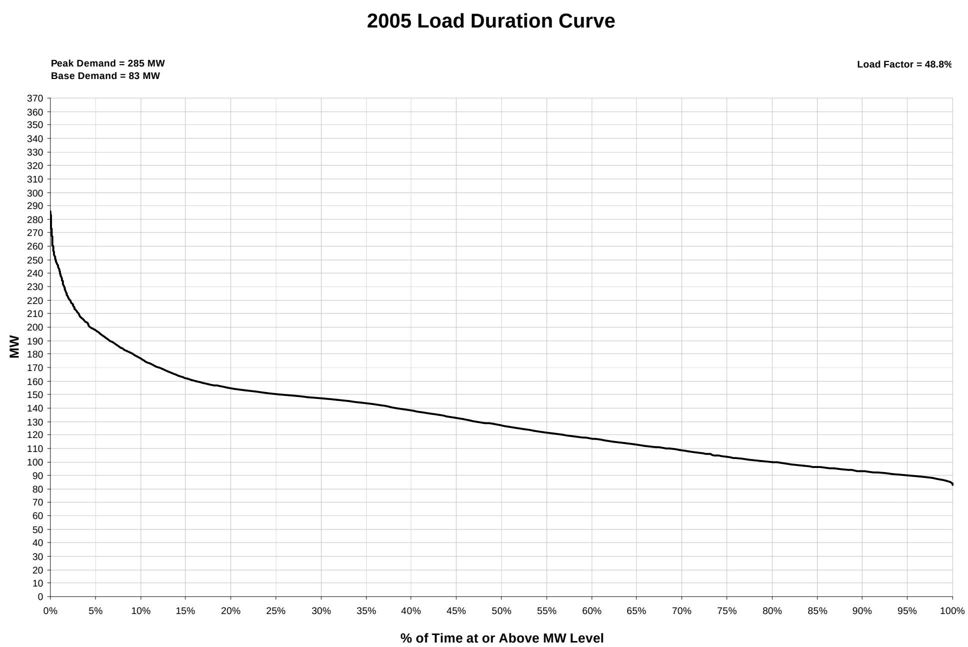


Figure 7

From the graph we can see that 100% of the time BWP experienced a load greater than 83 MW, the average load was 135 MW, and for one hour the maximum load was 285 MW. As a utility's energy requirement grows the load duration curve slowly shifts up and to the right.

As indicated above, in order to meet load, a utility must provide resources. When resources are superimposed on the load duration curve, it is possible to show graphically how resources are allocated to meet load. Figure 8 shows the result with the vertical axis of the graph corresponding to capacity associated with each of the resources and the horizontal axis showing the percentage of time the resource is available.

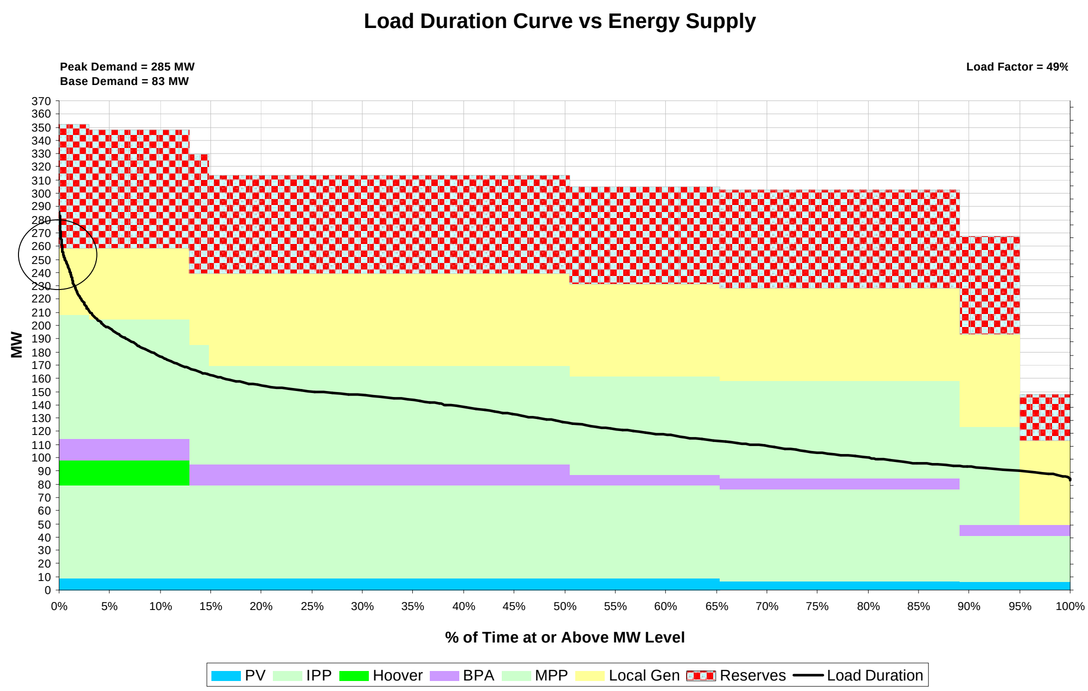


Figure 8

This graphic for 2005 shows the various resources used to meet load as solid colors. The resources used for contingency reserve requirements are shown by the cross-hatched area. From the figure, it is possible to infer the following:

- From the area under the load duration curve, it can be seen that load is met from Palo Verde, the Intermountain Power Project, Hoover, BPA, and Magnolia.
- From the shaded area above the load duration curve, it is possible to see how much additional energy can be generated from existing resources to meet future load growth. For BWP's rate of load growth the annual shift upward averages 1 to 2 MW along the whole curve.
- From the cross-hatched area above the load duration curve, it is evident that there are adequate planning reserves as discussed earlier in Section 15.1.1 of this report. (Remember reserves are unloaded generation that Burbank needs to have available to meet load should a resource fail.)

15.4 Determination of Unmet Resource Requirements

The maximum resource deficiency we expect to experience over the next 5 years without adding any new resources is expected to be less than 2 to 3% of the time. This equates to about 250 hours per year and could range up to 66 MW in magnitude towards the end of the period.

The area highlighted by the circle on the graph in Figure 8 is of particular interest. Figure 9 shows this section of the curve enlarged.

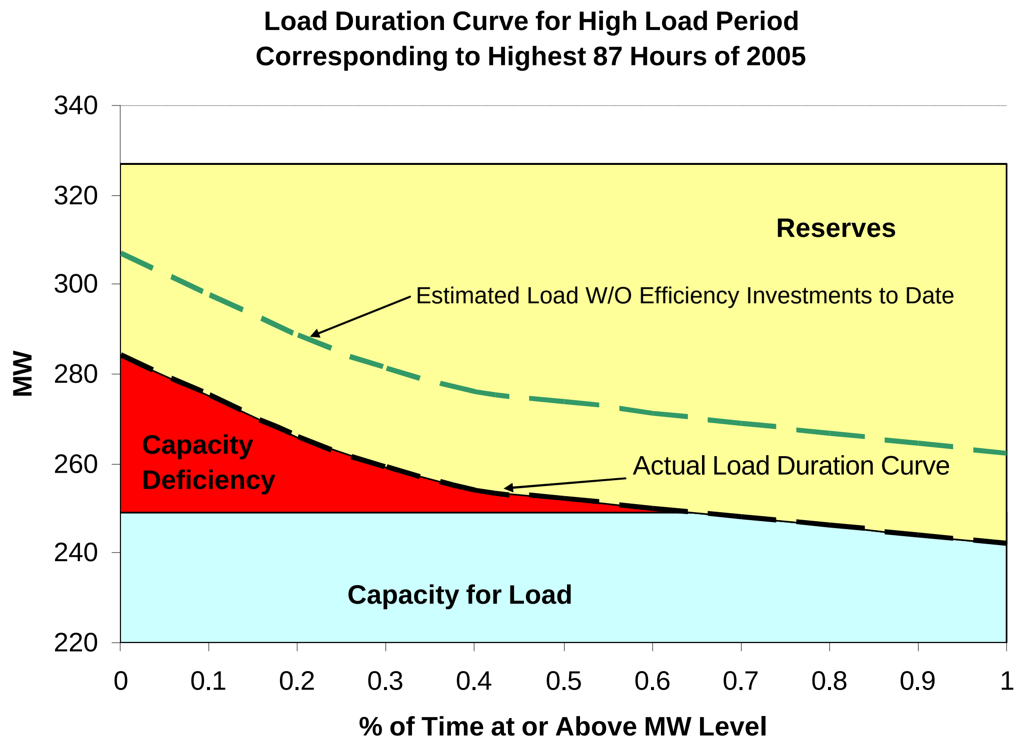


Figure 9

In total BWP has approximately 325 MW of capacity available. As indicated in Figure 9, 250 MW is available to meet load and 75 MW is needed to provide reserves. This leaves an area under the load duration curve labeled "Capacity Deficiency" which corresponds to resources that have been set aside to meet contingency reserves so is not available for meeting load. Consequently, this triangular shaped region above 250 MW but below the Load Duration Curve labeled "Capacity Deficiency" represents a capacity shortfall. From the figure, it can be seen that this shortage amounts to a maximum amount of approximately 35 MW and is expected less than approximately 0.5% of the time.

When the BPA contract expires in 2008, our ability to serve load from the existing portfolio would drop to around 234 MW. With our existing resource portfolio, it is expected that during the term of this IRP BWP's system load will exceed 250 MW more than 250 hours a year on average. Table 23 summarizes the expected capacity shortages over the next five years.

EXPECTED CAPACITY DEFFICIENCES

FOR FISCAL YEARS 2006/07 to 2010/11

Values in MW

	Net Rating At RSE	2006/07	2007/08	2008/09	2009/10	2010/11
PROJECTED PEAK LOAD Without PAST PROGRAMS		**310.1**	**312.1**	**314.1**	**316.1**	**318.1**
Less cummulative effect of previous programs						
- Conservation		10.4	10.4	10.4	10.4	10.4
- Distribution System Improvements		1.7	1.7	1.7	1.7	1.7
- Code Improvements		5.0	5.0	5.0	5.0	5.0
- Power Factor Corrections		1.0	1.0	1.0	1.0	1.0
- Other		-	-	-	-	-
PROJECTED PEAK LOAD AT RSE		**292.0**	**294.0**	**296.0**	**298.0**	**300.0**
EXISTING OUTSIDE CONTRACTS						
Hoover	20.4	20.4	20.4	20.4	20.4	20.4
IPP (2)	70.0	70.0	70.0	70.0	70.0	70.0
Palo Verde	9.3	9.3	9.3	9.3	9.3	9.3
BPA (3)	16.7	16.7	16.7	-	-	-
Other Firm Purchases	-	-	-	-	-	-
Market Purchases	-	-	-	-	-	-
Total Existing Outside Contracts	116.4	116.4	116.4	99.7	99.7	99.7
LOCAL GENERATION						
Steam Turbines						
Olive 2	50.0	50.0	50.0	50.0	50.0	50.0
Olive 1	40.0	40.0	40.0	40.0	40.0	40.0
Combined Cycle						
Magnolia Power Project	75.0	75.0	75.0	75.0	75.0	75.0
Combustion Turbines						
Lake	44.0	44.0	44.0	44.0	44.0	44.0
Total Local Generation	209.0	209.0	209.0	209.0	209.0	209.0
RENEWABLES						
Micro Hydro (Valley Pumping Plant)	0.5	0.5	0.5	0.5	0.5	0.5
Micro Turbines (Burbank Landfill Gas)	0.5	0.5	0.5	0.5	0.5	0.5
	1.0	1.0	1.0	1.0	1.0	1.0
TOTAL AVAILABLE CAPACITY	326.4	326.4	326.4	309.7	309.7	309.7
PLANNED RESERVES (1)		75.0	75.0	75.0	75.0	75.0
CAPACITY AVAILABLE FOR LOAD		251.4	251.4	234.7	234.7	234.7
UNMET CAPACITY REQUIREMENTS		40.6	42.6	61.3	63.3	65.3

FOOTNOTES:

(1) Corresponds to single largest contingency.
(2) Assumes full amount of Excess Power Sales Agreement is availabe to Burbank.
(3) Assumes BPA contract is in Sale Mode for the duration of the contract starting in FY 2002/03.
(4) Assumes capacity credit of 35% of contract capacity of 30 MW.

Table 23

15.5 Options For Meeting Unmet Resource Requirements

The purpose of this section is to identify the options that are available to meet the resource deficiencies expected to occur between the 2006/07 and 2010/11 fiscal years. BWP wants to ensure that the expected capacity and energy deficiencies are met in order to ensure that its customers have a reliable source of electric power.

There are several options to explore either individually or collectively that will be considered. These are:

- Increased energy efficiency and demand side management to reduce the peak requirement as discussed in Section 9. In Section 9.4, it is estimated that based on current expenditure levels additional peak reductions of 1.7 MW and energy savings of 6, 760 MWh could be achieved from conservation programs and aggressive program doubling expenditures could achieve 3.4 MW and 13, 520 MWh respectively. Section 10 discusses the potential for increasing demand side management efforts. The exact amount of peak reduction that may be economically achieved is not known. This IRP proposes that a study be undertaken to inventory large HVAC systems served by Burbank and a voluntary program implemented for those willing to participate in an interruptible service program

- Section 11 discusses additional savings that can be realized from continued improvements on BWP's distribution system. Table 16 in Section 11.2 summarizes the peak system loss reductions that are achievable from upgrading substations to 12 kV (0.5 MW), reconductoring distribution circuits and energizing them at 12 kV (0.7 MW), and replacing distribution transformers and service drops (0.5 MW) for a total of 1.7 MW.

- Power Factor improvements on Burbank's transmission and distribution system and at customers premises also represent potential savings. It is estimated as shown on Table 19 in Section 11.4.2 that additional power factor corrections could achieve 50 kW of demand reduction and about 100 MWh per year of energy savings.

- Power up or buy more from the market. BWP could procure additional supply side resources such as putting Olive 3 and 4 back into service or buy some additional power during the summer high load period.

- Increased levels of renewable energy will also result in increased capacity benefits. It is conservatively estimated that up to 24 MW of capacity can be added over the next five years and approximately 150,000 MW of energy.

- Maintaining the shaft-swap agreement with LADWP or new arrangements with LADWP could result in the "freeing-up" of 40 MW of capacity over the term of this IRP.

Based on the resource assumptions in this IRP, BWP will meet all of its load growth, and displace a significant amount of generation from natural gas by investing in energy efficiency and renewable resources over the period 2006 – 2011. A total of about 22% of the BWP peak electric demand is projected to be met with these environmentally preferable resources. Appendix C presents a table showing how the capacity deficiencies identified in Table 23 will be met over the next five years by the aforementioned options. The shaded areas represent initiatives that are comprised of new conservation and efficiency programs, the addition of renewables, and measures to reduce reserves. Figure 10 which follows shows the capacity balance for the system. By 2011, it consists of 44 megawatts of capacity provided by efficiency measures installed prior to 2006, 20 megawatts of capacity provided by new efficiency measures, and 24 megawatts provided by renewable resources.

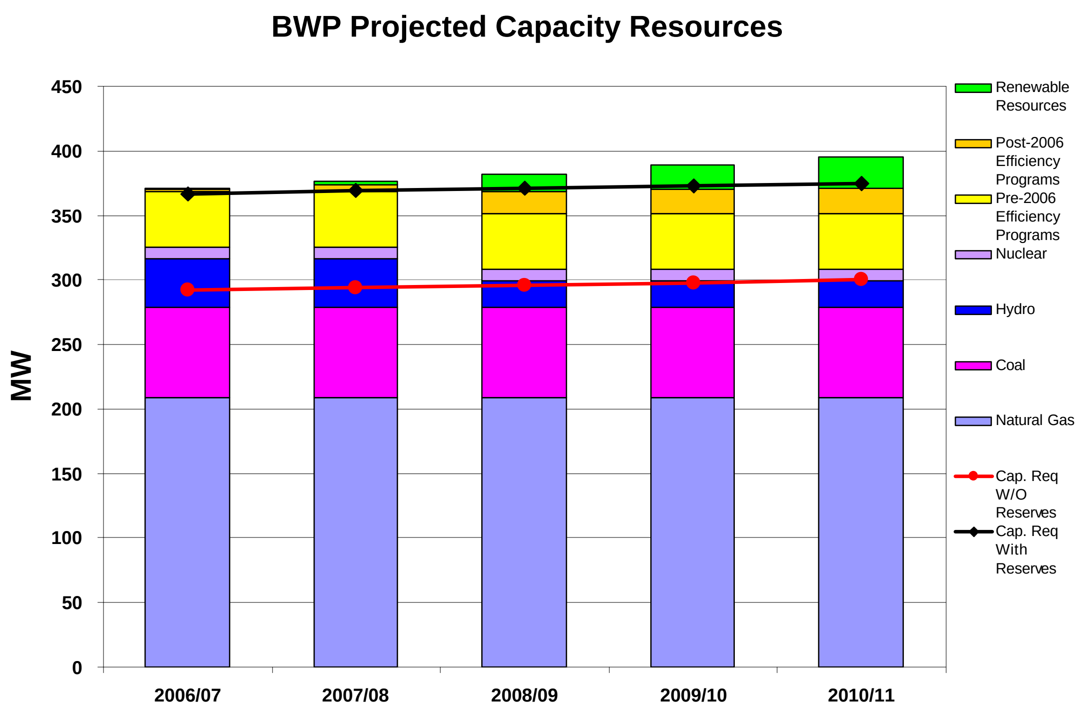


Figure 10

Appendix D shows how BWP will meet its energy requirements over the next five years assuming the energy savings and addition of renewable resources discussed above are implemented.

Similarly, the focus on efficiency and renewable resources will reduce the BWP reliance on fossil fuels to meet our energy requirements. A total of 21% of our system electricity requirements in 2011 will be met with environmentally preferable resources. Appendix D presents a table showing the energy balance for the system over the next five years according to the base scenario of this IRP and is graphically summarized in Figure 11 which follows. This is projected to include 78,000 megawatt-hours of efficiency acquired prior to 2006, 47,000 megawatt-hours of efficiency acquired over the next five years, and 151,000 megawatt-hours of renewable resources. By 2011, our conventional resources will be supplying a smaller absolute and percentage share of our customer's energy requirements than is the case today.

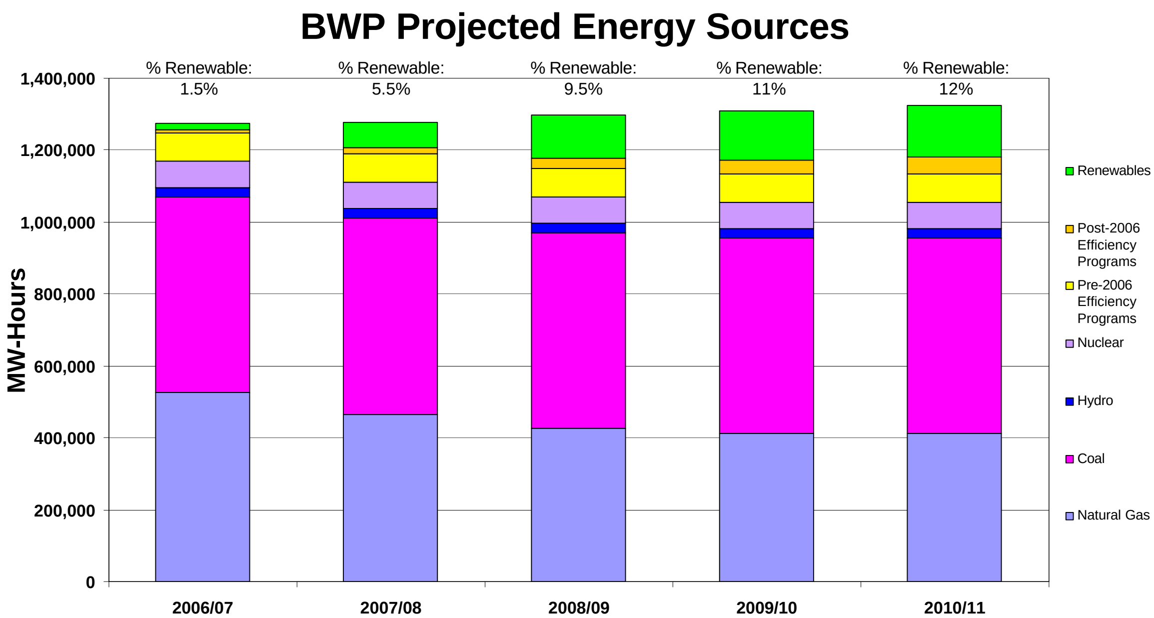


Figure 11

16.0 RATE AND BILL IMPACT CONSIDERATIONS

Any alternative resource acquisition that BWP pursues will have an impact on the rates and bills of its customers. In general, if BWP can find resources that are cheaper than the cost of running our existing power plants, rates and bills will decline compared with not acquiring those resources. However, BWP also has the ability to bring new resources into its system and then sell the output of its generating facilities to other utilities. In these situations, it may be desirable to acquire new resources even if the cost exceeds the operating costs of BWP generation.

Conservation is somewhat different. While BWP's conservation acquisitions to date have been quite cost-effective, the impact on rates and bills is different from a generating facility. Conservation investments increase the utility's costs (revenue requirement) while reducing the utility's sales revenues. As a result, conservation puts upward pressure on electric rates to a much greater degree than generating resource acquisition. However, if customers pay higher rates for fewer kilowatt-hours, they may pay lower bills for getting the same amount of useful energy service.

For this reason, we have modeled the probable impact of alternative resource acquisition strategies on both our electric rates and the total bills of our customers.

There are many variables which interact in determining customer rates and bills, and not all of these have been modeled. The most important determinants, however, are:

- The cost of natural gas to fuel our generating units and the price we can get for surplus power. These are closely related, since the cost of gas dictates the market price for power in Southern

California.

- The amount of conservation we fund, and the cost we incur to fund it.

- The amount of renewable energy we purchase, and the cost we incur to fund it.

Given these major determinants of how rates would change in response to different resource acquisition scenarios, we have made the following assumptions, and estimated the rate and bill impacts that result:

The market price for power will fall in a range of $25 to $75 per megawatt-hour; the low end of this range is approximately the cost of operating a coal plant, and we do not expect prices to fall below this level; it is possible that prices will exceed $75 if loads increase sharply and/or natural gas prices return to levels experienced in 2000 and 2005.

The average cost to the utility of funding conservation is $40 per megawatt-hour; it is assumed that customers will also make a contribution to the cost of conservation measures, typically as much as the utility grant or more.

It is estimated that the cost to the utility of acquiring renewable resources will be $70 per megawatt-hour with the average cost of the resource being in the mid-$60/MWh range with another $5 to 7/MWh for losses and transmission. This is consistent with costs that appear to be adequate to attract renewable energy developers to offer their products to BWP.

Table 22 below shows the estimated impact on rates and bills for four different scenarios, given these basic assumptions. The scenarios are:

- <u>Base Scenario:</u> The policies in effect prior to 2005 governing conservation and renewable resource investment continues. By 2011, BWP meets an additional 2.5% of its load with utility-funded conservation measures, plus an additional 5% of its load with renewable generating resources.

- <u>Aggressive Conservation:</u> by 2011, BWP meets an additional 5% of its load with utility-funded conservation measures, plus an additional 5% of its load with renewable generating resources.

- <u>Aggressive Renewables:</u> by 2011, BWP meets an additional 2.5% of its load with utility-funded conservation measures, plus an additional 12% of its load with renewable generating resources.

- <u>Aggressive Conservation and Renewables:</u> by 2011, BWP meets 5% of its load with utility-funded conservation measures, plus an additional 12% of its load with renewable generating resources.

Table 24 summarized the results of the analysis. In every scenario, we assume that existing conservation and renewable resources continue to provide service to customers. In addition, in every scenario, we assume that the very aggressive system efficiency improvements that BWP has planned are implemented.

Rate and Bill Impacts of Scenarios					
All Scenarios include existing resources, planned system efficiency improvements, and conservation measures funded funded to date. Conservation shown is above those base levels					
	Renewable % of Load by 2011	Conservation % of Load by 2011	Market Price Cases		
			Low $35/MWh	Mid $50/MWh	High $65/MWh
Base Case					
Rates	5.0%	2.5%	4.4%	2.9%	1.4%
Bills			1.8%	-0.3%	-1.2%
Aggressive Conservation Acquistion					
Rates	5.0%	5.0%	6.4%	5.1%	3.9%
Bills			1.1%	-0.1%	-1.3%
Aggressive Renewable Acquistion					
Rates	12.0%	2.5%	5.8%	4.0%	2.2%
Bills			3.1%	1.4%	-0.4%
Aggressive Conservation and Renewable Acquistion					
Rates	12.0%	5.0%	8.4%	6.2%	4.1%
Bills			3.0%	0.9%	-1.1%

Table 24

It is important to note that the cost modeling does not indicate the absolute level of rates that BWP customers will face. That is dependent on many variables, including inflation rates, interest rates, the share of BWP's capital investments that are funded from rates and from bond issues, the cost of natural gas, state and federal legislation that affects BWP, and the rate of growth in our service territory, among others. The purpose of the cost modeling is to show the rate and bill impact of discrete decisions BWP has before it on increasing conservation and renewable resource development, not a full forecast of possible rates and bills under all possible economic and political conditions.

17.0 ASSET MANAGEMENT

Asset management consists of utilizing existing facilities more fully and efficiently by marketing, or selling, to others when not needed for internal purposes.

17.1 Wholesale Transactions

The benefits of good asset management can be tremendous. In an active wholesale market, BWP has used trading margin profits to avoid or moderate rate increases to customers. The profits come from the sale of power during periods of temporary surpluses and providing transmission service to others, BWP will continue to be active in the wholesale market by taking advantage of profitable (cost saving) trading opportunities when they arise. Ongoing and potential new sources of revenue (cost saving) are discussed below.

17.1.1 Transmission Sales

BWP has several ongoing transmission sales to other parties. These are:

1. Pacific Northwest DC Interties – 30 MW sale. In July 1990, BWP entered into a 20-year agreement with Anaheim, Riverside, Azusa, Colton, and Banning to layoff (or not take) 30 MW of surplus transmission capacity on the DC Intertie. Cash flow from the lease agreement enables BWP to recoup a portion of the expenditures it made on the DC Intertie Uprating Project several years ago. The agreement will expire after July 2010, at which time use of the entitlement will revert back to BWP and we will determine how best to put this asset to work.

2. Scheduling Service Agreements with Cerritos and Anaheim for them to get their IPP power from RS-E to delivery points on the interface of the LADWP and Cal ISO control areas. The agreements have an initial one year term and renew automatically for an additional 12 month term until terminated.

17.1.2 Long-Term Sales

With Magnolia, BWP may find itself in the situation of having “surplus” capability to produce power for extended periods of time. This would normally occur during times of the year when BWP’s system demands are low – fall, winter and spring. During these periods, it may potentially be profitable to “lay-off” a portion of Magnolia over a period of months.

However, power sales made to non-tax-exempt buyers need to be less than three years in duration in order to ensure that Magnolia’s tax-exempt financing regulations are not violated. A major concern is what to do if Magnolia is forced out of service for mechanical reasons. To eliminate this likely or unlikely risk, it is possible to make such a sale contingent on, but that comes with the cost of a lower price for the product.

17.1.3 Spot Market Opportunities

A successful strategy that BWP has used in the past is to market or sell power for short periods of time, generally less than a month. Sales for a couple of days or hours in duration are also common. The primary advantage of these types of transactions is that the shorter the term the lower the associated risk. If there is a delivery problem another resource can usually be substituted for a little extra cost.

17.1.4 Seasonal Exchanges

BWP currently has an ongoing exchange agreement with BPA, which expires in early 2008. We intend to re-negotiate a new arrangement that would take effect once this agreement expires. The logical party to do this with is BPA. However, this will be challenging as we are involved in ongoing litigation against BPA.

18.0 ACTION PLANS

This IRP sets forth both a two-year and 5-year action plan to guide the utility in making resource decisions for the future. In addition, it identifies a number of study items to be initiated during the first two years, for possible implementation in the last three years of the plan.

18.1 Two Year Plan

In order to preserve all possible options for the future, Burbank needs to focus its short-term planning efforts during the next two years on the following:

Action Items for Two-Year Plan:

- Plan and budget for the replacement of the Burbank substation with more efficient equipment.
- Secure contracts for initial acquisition of at least 10 megawatts of new renewable resources and associated transmission as needed.
- Implement the 5-year hedging strategy for natural gas discussed in section 13 of this IRP.
- Resolve issues surrounding the provision of reserves. This can be addressed by negotiating a reserve-sharing agreement with one or more utilities, by implementing interruptibility options, or through other means.
- Complete the installation of power factor correction equipment on the remaining stations to secure approximately 4 megawatts of capacity.
- Implement TOU and/or Critical Peak Pricing for the largest customers, generally those with existing interval metering.
- Modify power factor design to improve incentives to customers.
- Resolve planning issues relating to the Intermountain Power Project.
- Consider implementing the Ice Bear thermal storage programs within the BWP conservation offerings.
- Determine if Olive 3 and 4 can be returned to service; if economic, proceed with retrofits.
- Increase the power factor threshold in current rates from 90% to 95%.

- Complete analysis of seasonal management of station transformer banks, and implement program to de-energize one bank of transformers at three-bank stations during all months when it is possible to provide reliable service with one transformer out of service.

Study Agenda for Two-Year Plan:

- Evaluate the amount of incremental load control, over and above that achieved through customer appeals, can be expected from TOU and/or direct load control programs.

- Meet with BWP largest customers to discuss attractiveness of interruptibility options and critical period pricing options.

- Determine if further augmentation of BWP energy efficiency programs should be pursued, given commitments to renewable energy development and other financial and operational constraints on BWP.

- Evaluate transmission options for bringing additional renewable resources to the BWP service territory.

- Inventory large HVAC systems in Burbank to be able to quantify the amount of potential load control.

- Evaluate the potential for load control involving small HVAC systems, including review of studies and programs from other utilities.

- Evaluate and prioritize renewable resource options for acquisition in the remaining three years of the Plan.

- Evaluate and prioritize station and circuit voltage upgrade options, and quantify the capacity and energy savings they will provide.

- If Olive 3 and 4 cannot be returned to service, prioritize alternatives for providing needle-peaking capacity, including generation, interruption, and pricing alternatives.

- Evaluate all energy efficiency programs being offered by SCE and other Southern California utilities to determine which should be added to BWP program offerings.

- Review the sizing of transformers for all customers with transformers in excess of 250 kva to determine if right-sizing is economic.

- In conjunction with the Burbank Unified School District, evaluate the results of the Resource Conservation Manager, and determine if this concept is applicable to other large customers, including the City of Burbank.

- Evaluate the practicality and cost-effectiveness of participating in a green waste project in Southern California.
- Evaluate the potential load impacts, environmental impacts and cost-effectiveness of Plug-In Hybrid Electric Vehicles. Examine the option of a time-of-use residential rate option for PHEV owners, to enable them to use lower-cost off-peak power for vehicle charging, and avoid the potential of such charging taking place during critical peak periods.
- Evaluation the potential to encourage the installation of Energy Start electric heat pumps in applications where central air conditioning is being used, including the Burbank-Glendale-Pasadena Airport Authority noise program. Examine the potential additional summer savings from higher efficiency units, additional winter load, and associated environmental benefits from more efficient use of natural gas. Consider the possibility of eliminating the third rate block during the winter months to avoid inappropriate bill impacts on customers using heat pumps.

18.2 Five Year Plan

In addition to completion of elements begun in the first two years following adoption of this IRP, over the longer term, the following need attention:

- Acquire renewable resources to meet the first five-year target set by this Plan.

- Restore Olive 3 and 4 to service if economic, implement either interruptibility or critical period pricing, or secure other needle-peaking resource options as determined most appropriate in the two-year study plan if Olive 3 and 4 cannot be returned to service.

- Complete voltage upgrades to BWP stations and circuits as determined cost-effective in the two-year study.

- Implement a transformer tracking system within the customer information system so that when transformers fail, right-sizing is implemented at the time of replacement.

APPENDIX A

Burbank Water & Power

Renewables Portfolio Standard

Adopted October 2003

Purpose: This standard represents Burbank's commitment to renewable resource procurement consistent with the provisions of SB 1078.

Goal: BWP will increase procurement of electricity from eligible renewable resources until a target portfolio level of 20% is reached by 2017, measured by the amount of energy required in making retail sales of electricity.

Qualifying Resources:

Electricity produced from the following technologies constitute "eligible" resources: biomass, solar thermal, photovoltaic, wind, geothermal, fuel cells using renewable fuels, low impact hydroelectric generation, digester gas, municipal solid waste, landfill gas, ocean wave, ocean thermal, tidal current, renewable components of sales from other parties (green tickets), or renewable distributed generation on the customer side of the meter. Facilities can be located anywhere in the interconnected transmission system located in the interconnected WECC electrical grid.

Timing of Long-Term Resource Additions:

Renewable resources will be procured to the extent they fulfill unmet needs identified in BWP's long-term resource procurement plan. BWP will not uneconomically terminate, abrogate, or otherwise end any existing long-term contract in order to meet the renewable target portion of its energy portfolio.

Price Benchmarking:

In considering the appropriate reasonable prices to be paid for renewable resources, Burbank will consider but not be limited to the price benchmarks set by the CPUC for the State's investor owned utilities and shall include the costs associated with transmission.

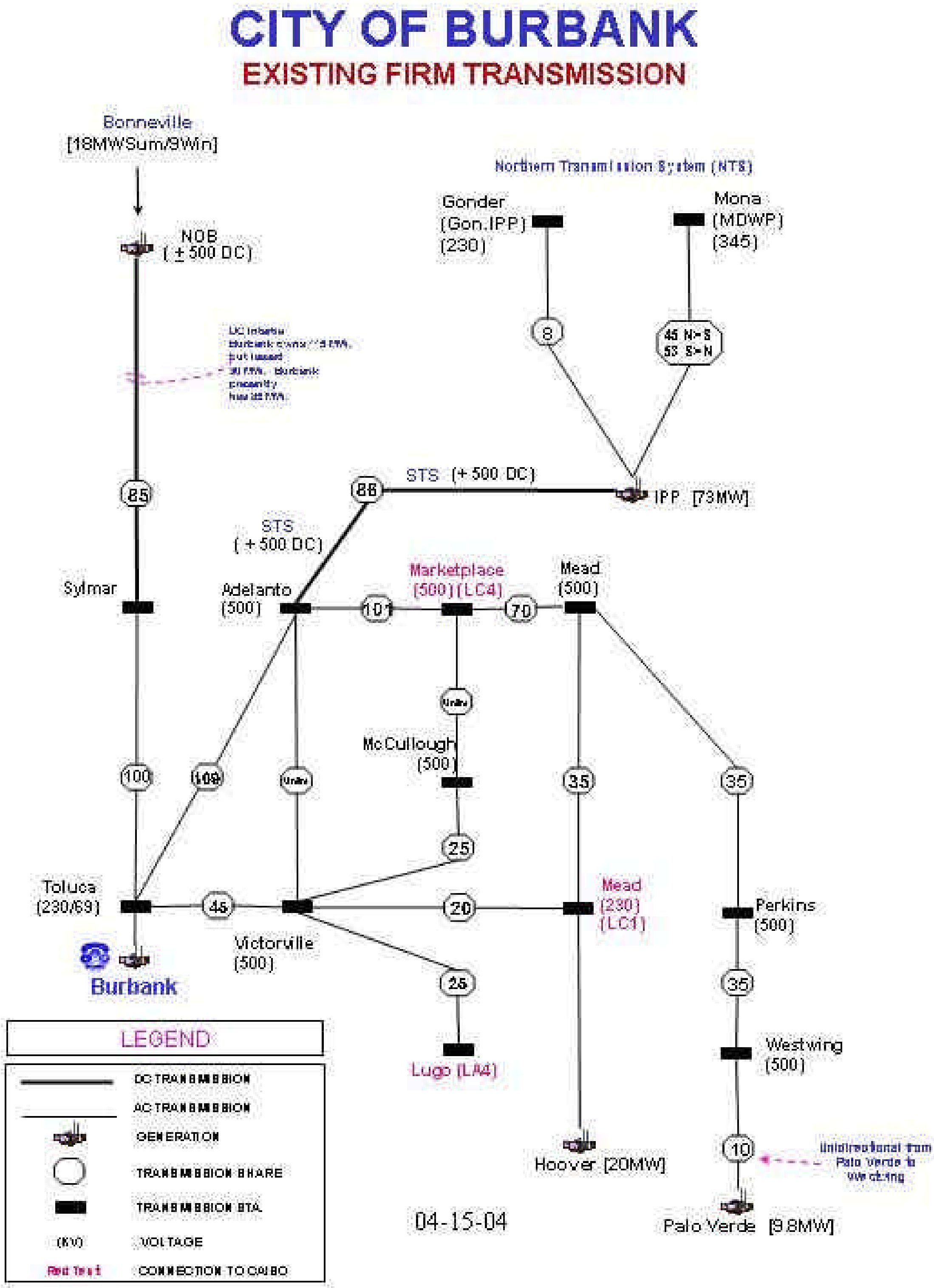
Limit on Subsidies:

The procurement obligation is contingent upon BWP having sufficient funds available to make "supplemental energy payments" to subsidize the above-market costs of renewable energy. Any subsidy will come from public benefit expenditures that BWP is required to make pursuant to the provisions of AB 1890. Renewable energy subsidies from Public Benefits Funds will not come at the expense of conservation programs. The availability of sufficient Public Benefits Funds will be a de facto limit on the annual renewable purchase obligation and compliance with this Standard will be deemed achieved where noncompliance is caused by the unavailability of PBC expenditures in an amount not to exceed 17% annually.

Rate Impact:

The addition of renewable energy resources should not materially increase system wide rates.

APPENDIX B


CITY OF BURBANK
EXISTING FIRM TRANSMISSION
Bonneville
[18MWSum/9Win]
NOB
(± 500 DC)
Northern Transmission System (NTS)
Gonder
(Gon.IPP)
(230)
Mona
(MDWP)
(345)
8
45 N>S
53 S>N
IPP [73MW]
STS (+ 500 DC)
88
85
STS
(+ 500 DC)
Sylmar
Adelanto
(500)
101
Marketplace
(500) (LC4)
70
Mead
(500)
Univ
McCullough
(500)
100
108
Univ
35
35
25
Toluca
(230/69)
45
Victorville
(500)
20
Mead
(230)
(LC1)
Perkins
(500)
Burbank
25
35
Lugo (LA4)
Westwing
(500)
Hoover [20MW]
10
Palo Verde [9.8MW]
04-15-04
LEGEND
DC TRANSMISSION
AC TRANSMISSION
GENERATION
TRANSMISSION SHARE
TRANSMISSION STA.
(KV)
VOLTAGE
Red Text
CONNECTION TO CAISO

APPENDIX C

DEMAND REQUIREMENTS (MW) AND CAPACITY RESOUCES

FOR FISCAL YEARS 2006/07 to 2010/11

Values in MW

	Net Rating At RSE	2006/07	2007/08	2008/09	2009/10	2010/11
PROJECTED PEAK LOAD Without PAST PROGRAMS		**334.8**	**336.8**	**338.8**	**340.8**	**342.8**
Less cummulative effect of previous programs						
- Conservation		9.3	9.3	9.3	9.3	9.3
- Distribution System Improvements		6.5	6.5	6.5	6.5	6.5
- Code Improvements		5.0	5.0	5.0	5.0	5.0
- Power Factor Corrections		22.0	22.0	22.0	22.0	22.0
- Other		-	-	-	-	-
Subtotal: Pre-2006 Efficiency Programs		42.8	42.8	42.8	42.8	42.8
PROJECTED PEAK LOAD AT RSE (before new programs)		**292.0**	**294.0**	**296.0**	**298.0**	**300.0**
EXISTING OUTSIDE CONTRACTS						
Hoover	20.4	20.4	20.4	20.4	20.4	20.4
IPP (2)	70.0	70.0	70.0	70.0	70.0	70.0
Palo Verde	9.3	9.3	9.3	9.3	9.3	9.3
BPA (3)	16.7	16.7	16.7	-	-	-
Other Firm Purchases	-	-	-	-	-	-
Market Purchases	-	-	-	-	-	-
Total Existing Outside Contracts	116.4	116.4	116.4	99.7	99.7	99.7
LOCAL GENERATION						
Steam Turbines						
Olive 2	50.0	50.0	50.0	50.0	50.0	50.0
Olive 1	40.0	40.0	40.0	40.0	40.0	40.0
Combined Cycle						
Magnolia Power Project	75.0	75.0	75.0	75.0	75.0	75.0
Combustion Turbines						
Lake	44.0	44.0	44.0	44.0	44.0	44.0
Total Local Generation	209.0	209.0	209.0	209.0	209.0	209.0
NEW CONSERVATION & EFFICIENCY						
New Conservation Programs (Table 10)		1.7	3.4	5.1	6.8	8.5
Customer transformers and service drops (Table 16)		-	-	1.0	1.0	1.0
Upgrade Substations to 12 kV (Table 16)		-	-	1.5	1.5	1.5
Reconductor Distribution / Energize at 12 kV (Table 16)		-	-	5.0	5.0	5.0
Power Factor Correction (Table 19)		-	2.0	4.0	4.0	4.0
Other		-	-	-	-	-
Total New Conservation and Efficiency		1.7	5.4	16.6	18.3	20.0
RENEWABLES						
Micro Hydro (Valley Pumping Plant)	0.5	0.5	0.5	0.5	0.5	0.5
Micro Turbines (Burbank Landfill Gas)	0.5	0.5	0.5	0.5	0.5	0.5
Ameresco	2.0	-	2.0	2.0	2.0	2.0
Wind (4)	11.0	-	-	11.0	11.0	11.0
Other	-	-	-	-	5.0	10.0
Total Renewables	14.0	1.0	3.0	14.0	19.0	24.0
TOTAL AVAILABLE CAPACITY	339.4	328.1	333.8	339.3	346.0	352.7
RESERVES - Single Largest Contingency (1)		75.0	75.0	75.0	75.0	75.0
Reserve Reductions		40.0	40.0	40.0	40.0	40.0
NET RESERVE REQUIREMENTS		35.0	35.0	35.0	35.0	35.0
CAPACITY AVAILABLE FOR LOAD		293.1	298.8	304.3	311.0	317.7
UNMET CAPACITY REQUIREMENTS (- "surplus" / + "deficiency")		-1.1	-4.8	-8.3	-13.0	-17.7

FOOTNOTES:

(1) Corresponds to single largest contingency.
(2) Assumes full amount of Excess Power Sales Agreement is availabe to Burbank.
(3) Assumes BPA contract is in Sale Mode for the duration of the contract which ends April 2008.
(4) Assumes capacity credit of 35% of contract capacity of 30 MW of wind.

APPENDIX D

ENERGY REQUIREMENTS (MWh) AND ENERGY SUPPLIED

FOR FISCAL YEARS 2006/07 TO 2010/11

Values in MWh

	2006/07	2007/08	2008/09	2009/10	20010/11
ENERGY REQ. W/O PAST PROGRAMS	1,254,074	1,266,293	1,278,512	1,290,731	1,302,950
Less cumulative effect of previous programs					
- Retail Conservation	36,750	36,750	36,750	36,750	36,750
- Distribution System Improvements	20,000	20,000	20,000	20,000	20,000
- Code Improvements	21,900	21,900	21,900	21,900	21,900
- Other	-	-	-	-	-
Subtotal, Pre-2006 Programs	78,650	78,650	78,650	78,650	78,650
NEL Energy Requirements	**1,175,424**	**1,187,643**	**1,199,862**	**1,212,081**	**1,224,300**
Distribution Losses	60,000	61,000	62,000	63,000	64,000
SYSTEM ENERGY REQUIREMENTS	1,235,424	1,248,643	1,261,862	1,275,081	1,288,300
EXISTING OUTSIDE CONTRACTS					
Hoover	26,600	26,600	26,600	26,600	26,600
IPP (1)	544,000	544,000	544,000	544,000	544,000
Palo Verde	73,710	73,710	73,710	73,710	73,710
BPA (2)	(36,500)	(15,800)	-	-	-
Other Firm Purchases	-	-	-	-	-
Total Existing Outside Contracts	607,810	628,511	644,310	644,310	644,310
LOCAL GENERATION					
Steam Turbines					
Olive 1	-	-	-	-	-
Olive 2	50,000	50,000	30,000	15,000	15,000
	50,000	50,000	30,000	15,000	15,000
Combined Cycle					
Magnolia Power Project	400,000	340,000	320,000	320,000	320,000
Combustion Turbines					
Lake	76,000	76,000	76,000	76,000	76,000
Total Local Generation	526,000	466,000	426,000	411,000	411,000
NEW CONSERVATION & EFFICIENCY					
New Conservation Programs (Table 6)	6,760	13,520	20,280	27,040	33,800
Distribution System Improvements (1% over 5 years)	2,449	4,897	7,346	9,794	12,243
Seasonal Management of Station Transformers	-	600	600	600	600
Total Renewables	9,209	19,017	28,226	37,434	46,643
RENEWABLES					
Micro Hydro (Valley Pumping Plant)	800	800	800	800	800
Micro Turbines (Burbank Landfill Gas)	2,000	2,000	2,000	2,000	2,000
Ameresco	-	16,500	16,500	16,500	16,500
Wind	13,500	50,000	100,000	100,000	100,000
Other	-	-	-	20,000	25,000
Total Renewables	16,300	69,300	119,300	139,300	144,300
ECONOMY ENERGY PURCHASES	76,105	65,815	44,026	43,037	42,047
TOTAL ENERGY SUPPLIED	1,235,424	1,248,643	1,261,862	1,275,081	1,288,300

FOOTNOTES:

(1) Assumes full amount of Excess Power Sales Agreement is availabe to Burbank.

(2) Assumes BPA Contract is in Sale Mode until it expires in 2008.