

In 2004, a survey of United States Real Time Pricing (RTP) programs that reviewed 43 utilities with voluntary RTP programs was performed by Berkeley National Laboratory. The survey indicated that despite the theoretical benefits of improved price signals to retail customers, participation in most programs is declining. It showed that the customers that were able to be most responsive to price changes were those that had on-site generation. It also concluded that while the goal to improve economic efficiency is likely to be achieved by reducing the disconnection between wholesale prices and retail prices, it also transfers the risks to customers. Unfortunately, it was found that the customers had difficulty managing exposure to such price risks. Of the 43 utilities and their associated programs surveyed, only one program resulted in a system peak reduction of 1 percent.

Summary and Conclusions

EPAct 2005 requires regulatory entities to conduct an investigation and issue a decision on whether or not utilities should offer a time-based rate schedule for all customers. PWP currently offers TOU rates to all residential, commercial and industrial customers based on the availability of advanced meters, however, PWP needs to consider other time-based rate options, such as CPP and RTP.

The objective of the time-based rate consideration requirement is for regulating entities to determine, taking into account special circumstances in their area, if additional time based rate structures should be offered to customers, in order to promote conservation, encourage efficiency of resources and implements equitable rates.

This section summarized a framework for analysis that could be used by PWP to further evaluate time based rates. Based on the experience by PWP and other California utilities, time-based rates may provide additional incentive for conservation and efficient use of resources for some large customer. However, most customers are not interested nor experience sufficient savings such that these programs are successful.

Before PWP determines to proceed with the cost-benefit analysis of additional time-based rates options, the following items need to be considered:

- PWP currently offers a TOU rate, which is not selected by most customers. PWP should consider the potential impacts on customer participation and response in the event that TOU rates are modified as a result of an updated cost of service study.
- Are there any significant delays in generation, transmission or distribution infrastructure that can be realized if demand is shifted off-peak?
- If the CIS system needs to be upgraded, this cost often outweighs any benefits obtained by a changing rate structure.
- The experience with CPP and RTP programs demonstrate very limited response, except for large sophisticated customers.

Smart Metering

PWP currently offers a TOU-capable meter to customers who request the TOU rate and can meet this portion of the EAct. However, PWP is required to investigate whether or not it is appropriate to install time-based meters for all customers. More details of the requirements and issues related to smart metering are discussed in this section.

EPACT 2005 Requirements

The EAct 2005 requires that the utility consider offering time-based rates to all customers, as discussed in the previous section. Then if a customer selects the time-base rate, the utility must provide the customer with a time-based meter. The actual language from Section 1252 reads as follows:

“(c) Each electric utility subject to subparagraph (A) shall provide each customer requesting a time-based meter capable of enabling the utility and customer to offer and receive such rate, respectively.”

The Act also specifies that the investigation of time-based meters must consider the impact of providing them to all customers:

“Each State regulatory authority shall conduct an investigation and issue a decision whether or not it is appropriate for electric utilities to provide and install time-based meters and communication devices for each of their customers...”

Many of the issues related to smart meters are intertwined with the time-base rate schedules covered in the previous section. However, this section covers items specifically related to the meters.

PWP Current Status

PWP currently does meet the specific requirement by offering a Time-of-Use Rate (Schedule R-1, Section D-3.2 Option B). However, the rate schedule includes a footnote that indicates “This option is subject to meter availability”. This limitation may need to be revised or removed in order to comply with the “...shall provide” clause.

PWP Current Meter Status

PWP currently has 53,980 residential, and 8,255 commercial and industrial customers (total of 62,235 in 2006). PWP is currently in the process of replacing older residential meters with AMR-capable meters. This process is approximately 2/3 complete. The new meters, while capable of AMR, do not have time-of-use capability. The commercial and industrial customers

have meters with the ability for time-of-use rates. PWP currently offers the following meter types:

- Centron – new AMR meters for residential and small commercial, no TOU
- Sentinel – all sectors, AMR and TOU capability
- ABB – commercial and industrial, AMR and TOU capability

The Centron meter is the one currently being installed in all residential applications. If a TOU rate is requested, then a Sentinel meter would be installed.

Issues and Considerations related to Smart Meters

What is a Smart Meter?

Traditional electrical meters only measure total consumption and do not provide information regarding when the energy was consumed. Smart meters provide an economical way of measuring this information, enabling the utility to price electricity based on the cost of generating the electricity at the time it was purchased. The basic definition of a smart meter, in the context of the EPAct is a meter that is capable of measuring consumption during the time it took place, and thus can facilitate time-based rates.

Many common definitions of smart meters include the communication aspect. By this definition, a smart meter identifies consumption in more detail than a conventional meter, and communicates that information via some network back to the local utility for monitoring and billing purposes. Smart meters usually involve a different technology mix such as real-time or near real-time reads, power outage notification, and power quality monitoring. These added features provide more capability than simple AMR (automated meter reading).

In order to implement a two-period TOU rate, a CPP or an RTP program, special electronic meters are required to collect, store, and communicate the data to a utility's CIS system. These meters are designed in a modular fashion to (1) allow for recording consumption assuming differing levels of complexity in the TOU rates structure and (2) accommodate a variety of communications technologies for data collection.

Major manufacturers of metering equipment provide both single phase and three phase meters capable of supporting TOU rates. In order to collect the data from the meters, these meters are designed to work with either a specific communications technology such as Power Line Carrier or to allow the purchaser to select the type of preferred communications technology (cell phone, radio frequency, fiber optics) and select a communications module that can be added to the meter.

In addition to the meter itself, an advanced metering installation requires communication networks and data management systems. These additional components are referred to as the advanced metering infrastructure (AMI).

Smart Meter Implementation Cost

The cost for smart metering infrastructure is becoming more consistent and better understood due to the significant number of large-scale installations. The cost components of smart meters include:

- Advanced metering infrastructure system hardware and software
- New meters and related equipment and labor
- Installation
- IT integration
- Other utility internal costs

Meter Costs

PWP is currently in the process of installing new Centron meters throughout the city (AMR, but no TOU). The cost for each meter is approximately \$70. For customers that request a TOU meter, the Sentinel type would be provided at a cost of just under \$500.

For comparison, based on discussions with other utilities and meter manufacturing companies, costs for single-phase meters range from approximately \$190 to \$500 per meter depending on the communications module and the module required to accommodate the Two-Period TOU rate program. Generally, costs for three phase meters range from approximately \$300 to \$800 per meter depending on the communications module and the module required to accommodate the TOU rate program. Costs for multi-phase meters designed for large loads range from approximately \$400 to \$1,500 per meter depending on the communications module and the module required to accommodate the TOU rate program.

Advanced Metering Infrastructure Costs

The costs for smart meter communications components are illustrated in Table 2.

Table 2 Smart Meter Infrastructure Component Cost	
Communication System Type	Installed Cost (\$/meter)
Walk/Drive-By Radio	\$50 - \$90
Radio Fixed Network	\$100 - \$160
Power Line Fixed Network	\$110 - \$175

Source: EEL, "Deciding on "Smart" Meters: The Technology Implications of Section 1252 of the Energy Policy Act of 2005", September 2006

Another report by FERC¹ indicates that the per-meter hardware costs for AMI range between \$68 and \$100, and the total installed capital cost ranges between \$135 and \$214 per meter.

¹ US Federal Energy Regulatory Commission, *Assessment of Demand Response & Advanced Metering*. Staff Report, August 2006.

However, the prices have been dropping in recent years and case studies since 2004 have revealed ranges of \$68 - \$86 for hardware costs, and \$135 - \$150 for installed capital cost. A typical breakdown of these installed capital costs is shown in Table 3 below:

Table 3 Breakdown of Installed Capital Costs	
Cost Component	Percent
Endpoint Hardware	45%
Network Hardware	20%
Installation	15%
Project Management	11%
IT	9%

CIS and IT Costs

In addition to the meter hardware and installation cost, and the AMI hardware and installation cost, is the cost for IT and data management. A full AMR with real time pricing capability would require a significant overhaul of the PWP data management system. PWP estimates the cost to replace the current billing system between \$2 and \$5 million, depending on the type of system.

Total Costs

A more comprehensive evaluation would be needed to obtain the overall cost for implementing smart meters on a system-wide basis. However, based on the values indicated above, a 'ball-park' high-end estimate can be made:

Meter cost (\$450) + Infrastructure Cost (\$100) = \$550 per customer
 Number of Customers = 62,235
 Total meter Implementation Cost = 62,235 x \$550 = \$34,229,250
 CIS Replacement = \$5,000,000
Total = \$39,229,250

Benefits of Smart Meters

Organizations seeking to install smart meters in their territories or jurisdictions ultimately conduct a detailed cost/benefit study. These studies result in net present values or benefit cost ratios. The benefits of smart meters are more difficult to determine and are not as well known as the meter costs. However, in a variety of case studies, most have shown the benefits outweigh the costs. For example, PG&E has derived a B/C ratio of 1.01 and SDG&E found a ratio of 1.08². In both of these cases, since the ratios are near 1.0, the costs are nearly equal the benefits.

² Australia Ministerial Council on Energy, *Information Paper on the Development of and Implementation Plan for the Roll-out of Smart Meters*, January 2007.

On the other hand, Southern California Edison initially found the cost in excess of the benefits (BC ratio 0.59).

The benefits of smart meters can include:

- Peak reduction – local distribution
- Peak reduction – generation
- Billing and collection
- Meter reading
- Trading risk management
- Network management
- Metering savings
- Customer service

In all cases the majority of the benefits come from the peak reductions and savings in meter reading. According to EEI, the single greatest benefit is the reduction or elimination of manual meter reading, accounting for between one and two thirds of the total benefit.

For PWP, the current plan for installing AMR-capable meters for all customers will capture a significant portion of this benefit. It may also be possible by upgrading to a fixed communication network, that the Centron meters could provide the data necessary to support TOU rates.

Summary and Considerations

PWP offers time-of-use rates and can provide a TOU meter for any customer. PWP has not yet evaluated the impact of providing TOU rates and meters to all customers.

Some considerations include:

- Determine the costs and benefits of installing smart meters for all customers.
- Evaluate the costs and benefits of the different smart metering types.
- Compare the costs and benefits of smart meters for different customer classes.
- Understand and evaluate the impact of TOU rates on IT and database systems.
- Evaluate the impacts of networking and communications systems (e.g., if a fixed network is used, the basic Centinel meter can transmit every 5 minutes and would be able to support various TOU rates).

Detailed cost-benefit studies can be conducted. However, experience has shown that for utilities like PWP, the cost for full TOU and Smart Meter implementation far exceeds the benefit.

Exceptions are when significant new resource development is needed and there is a significant gap between base load and peak. For PWP, the desired effect for peak shaving and demand response can likely be achieved through offering a program to selected large commercial and industrial customers at relatively low cost.

Fuel Diversity and Generation Efficiency Standards

While PWP has not recently published a separate fuel sources plan, the 2007 Draft IRP does address both fuel diversity and the efficiency of current fossil fuel generation.

EPACT 2005 Requirements

The EPAct 2005 requires each electric utility to develop a plan to minimize dependence on a single fuel source and to ensure it uses a diverse range of fuels and technologies to generate electricity. The Act states:

“Each electric utility shall develop a plan to minimize dependence on one fuel source and to ensure that the electric energy it sells to consumers is generated using a diverse range of fuels and technologies, including renewable technologies.”

A fuel sources plan would analyze the fuel mix in PWP’s current resource portfolio, and address how PWP will plan resources in the future while attempting to minimize the dependence on a single fuel source.

Diversified portfolios mitigate exposure to both operational and financial risks associated with over-reliance on a single fuel source. Fuel diversity can produce a variety of potential benefits, including:

- Reduction of price volatility
- Mitigating regulatory risk associated with individual fuels
- Environmental benefits
- Improved system reliability
- Improved operational flexibility

In addition, EPAct 2005 requires each utility to develop and implement a 10-year plan to increase the efficiency of its fossil fuel generation.

PWP Current Status

Senate Bill 1305 (SB 1305) requires “every retail supplier that makes an offering to sell electricity that is consumed in California shall disclose its electricity sources.” The California Energy Commission developed a standard reporting format called the Power Content Label. The resulting fuel resource mix for PWP is located in Table 4. In addition, the fuel resource mix for the state is included for comparison. According to this information, PWP is primarily dependent on coal for 67 percent of the total energy supply.

Table 4 PWP Power Content Label Second Quarter 2007		
Energy Resources	2007 PWP Power Mix³	2006 CA Power Mix⁴
Eligible Renewable	9%	5%
<i>Biomass and Waste</i>	7%	<1%
<i>Geothermal</i>	1%	4%
<i>Small Hydroelectric (≤ 30 MW)</i>	<1%	<1%
<i>Solar</i>	<1%	<1%
<i>Wind</i>	<1%	<1%
Coal	67%	29%
Large Hydroelectric (> 30 MW)	5%	31%
Natural Gas	11%	35%
Nuclear	7%	<1%
Other	<1%	-
TOTAL	100%	100%

Pasadena Water and Power published a draft Integrated Resource Plan (IRP) January 31, 2007. Within the document, PWP included the following passage regarding the utility's reliance on coal:

"Throughout the public process of presenting this draft plan, it was clear that the citizens of Pasadena have a strong desire to reduce the consumption of coal as power generation fuel. PWP shares this strong desire. State legislation has reinforced this concept, and federal legislation over the next several years will likely impose a national standard. PWP recognizes that too much coal is burned to meet the needs of the city.

The current 65 percent reliance does not reflect fuel diversity, increases greenhouse gases over a more balanced portfolio, and is at risk of increasing costs through further carbon restrictions or carbon taxes. For all of these reasons, the goal of this plan is to reduce this reliance on coal in a prudent manner through the years.

³ http://www.ci.pasadena.ca.us/waterandpower/power_contentlabel%201stQtr2007.asp

⁴ Letter from California Energy Commission, April 16, 2007.

PWP is working with the other IPP⁵ participants to investigate solutions to the CO₂ emissions. There should be no expectation that technology can solve this problem and other options will be investigated such as partial divestiture or renewable energy blending. All of these options will have a consequent cost that PWP will present as an addendum to this report. The costs may include the loss of the associated transmission line (the Southern Transmission System).

If a reduction in output from IPP is pursued, additional studies will be required to determine replacement power. One possibility is an increase in local generation. This option will require a further investigation of transmission and distribution impacts associated with increased generation in Pasadena as well as the feasibility of increasing the licensed capacity of local generation⁶.”

In addition, EPAAct 2005 requires each utility to develop and implement a 10-year plan to increase the efficiency of its fossil fuel generation. PWP’s IRP addresses this issue as well. It is recommended that PWP re-power approximately 110 MW of local generation to replace aging, inefficient units with natural gas combined cycle technology.

Summary and Considerations

While PWP has not published a separate fuel sources plan, the IRP does consider this issue and the concluding recommendations account for shifting energy supply away from coal to other resources, including a high renewable resource target.

PWP could easily create a separate Fuel Diversity Plan report with very little, if any, new analysis. Alternately, PWP could issue a declaration that the fuel diversity and generation efficiency issues were covered in the 2007 Integrated Resources Plan.

⁵ Intermountain Power Project (IPP)

⁶ Pasadena Water and Power, *Integrated Resource Plan*, Draft, January 31, 2007.

Procedural Considerations

The general process for a municipal or public utility board to consider and determine whether or not to implement a particular standard is specified by PURPA. The primary requirements are to hold a public hearing, and then make a consideration and determination of appropriateness of each federal standard. For reference, this section includes first some process information based on PURPA specification, next examples of what other utilities are doing or have done related to this standard is provided, and finally recommendations based on PURPA specifications and the utility interpretations of the specification are provided.

EPAct 2005 Requirement

Based on the PURPA specifications, the basic procedural requirements for consideration of the standards are:

1. Public notice of hearing – invite comments
2. Hold public hearing – present data and hear public comment
3. Consideration of standard
4. Make determination
 - in writing
 - based upon findings and evidence presented in the hearing
 - in relation to the three purposes of PURPA⁷ and state laws
5. Determination made available to the public

While the process appears fairly simple, it has been interpreted many different ways by utilities.

Processes Established by Other Utilities

EESC conducted research regarding the processes established by other utilities around the country for comparison. This section includes brief summaries of selected utilities and their process and timelines for conducting the public process.

City Public Service (San Antonio, Texas)

CPS has outlined their process as follows:

- Publication of CPS Energy staff's preliminary recommendations on the company's Web site, cpsenergy.com - April 6, 2007

⁷ Three Purposes of PURPA:

- Encourage conservation of energy supplied by electric utilities
- Encourage optimal efficiency of electric utility facilities and resources
- Encourage equitable rates for electric consumers.

- Written comments due - April 20, 2007
- CPS Energy staff's responses to written comments published - May 11, 2007
- Public hearing - May 17, 2007

CPS also provides a web site where all the documents can be downloaded, as well as a public document room where customers can go to review information. They request that written comments be submitted by mail or e-mail.

Poudre Valley Rural Electric Association (Fort Collins, Colorado)

PVREA has announced its public process similar to other utilities by announcing the date of the hearing (June 1, 2007), soliciting public input (either written or verbal), and associated dates.

They then indicate that the board will reconvene on June 8, 2007, to “deliberate the testimony and to conclude the proceedings. Additional testimony will not be allowed. However, the board, on its own volition, may request clarifying information from its staff.”

Randolph Electric Membership Corporation (Asheboro, North Carolina)

The North Carolina Association of Electric Cooperatives (“NCAEC”) produced a notice and provided language to its member utilities for conducting the process for holding the EAct 2005 hearings. Their schedule is:

- Initial Comments: to be submitted on or before April 6, 2007
- Reply Comments: to be submitted on or before May 11, 2007
- Request to Participate in Public Hearing: to be submitted on or before May 11, 2007
- Public Hearing: to be held on May 23, 2007, commencing at 9:00 a.m. at the North Raleigh Hilton, 3415 Wake Forest Road, Raleigh, North Carolina 27609-7330
- Determination: to be rendered on or before August 7, 2007

New York Power Authority (White Plains, New York)

The New York Power Authority provided a very simple press release announcing a hearing, but provided few details of the contents or their plans for meeting the Act:

WHITE PLAINS—The New York Power Authority (NYPA) will hold a public hearing on January 10, 2007, on a new ratemaking standard for retail customers, as it is required to consider by the Energy Policy Act (EPA) of 2005.

The Demand Response and Smart Metering Standard centers on application of time-of-use rate schedules and metering equipment, reflecting any variance during different time periods in cost of generating and purchasing electricity at the wholesale level.

EPACT, which modified the Public Utility Regulatory Policies Act of 1978, provided for public comment as part of the consideration of the appropriateness of the new standard for various customer categories.

NYPA will conduct the Jan. 10 hearing at 10:30 a.m. at its administrative office building in White Plains, at 123 Main St., in the Jaguar room. The Power Authority trustees Tuesday authorized the hearing.

It appears that this type of announcement and process also meets the minimum requirement of the Act. Note they did not solicit input nor declare the agenda for the meeting.

Talquin Electric Cooperative, Inc. (Quincy, Florida)

Talquin Electric Cooperative, Inc. (Cooperative) announced their intent to hold a public hearing on the EPAct requirements. In the announcement they also indicated that they are a “full power requirements from Seminole Electric Cooperative, Inc.” so the Cooperative would not be able to effect certain of the PURPA standards, including Standards 2 (Fuel Sources) and 3 (Fossil Fuel Generation Efficiency). They then established a schedule:

- Notice Posted on Website - December 8, 2006
- Notice Mailed to Members – via cycle billing to be completed by January 8, 2007
- Initial Comments – to be submitted on February 16, 2007
- Reply Comments – to be submitted on March 23, 2007
- Notice of Intent to Participate in Public Hearing – to be submitted on or before April 20, 2007
- Public Hearing – to be held on May 22, 2007, commencing at 9:00 a.m. at Quincy Hampton Inn, 165 Spooner Road, Quincy, FL 32351
- Determination – to be rendered on or before July 31, 2007

Processes Recommendations

PWP has established a web site for information, given notice of the public hearing, and indicated how and when to submit comments. One of the key questions relates to the agenda and content of the public hearing. Some interpret the public hearing as the process to obtain public comments on the EPAct before the utility’s review. Other interpretations include the presentation of the utility’s review and recommendations along with the public comments.

At the public hearing, it is recommended that PWP prepare and present a summary of each EPAct requirement, brief status of PWP’s status related to the requirement, and issues that will be considered in making the final determination. In addition, it is important that the three purposes of PURPA and state laws are taken into consideration. While it is not necessary for PWP to make the determination at this meeting, once the determination is made, it must be in writing and made available to the public.

Summary and Conclusions

The Energy Policy Act of 2005 sections 1251, 1252, and 1254 require that utilities investigate areas of interconnection, net metering, time-based rates, fuel diversity, and fossil fuel generation efficiency. In most of these areas, PWP already has in place provisions that meet or exceed the standard. The primary action items for PWP are:

- Interconnection – PWP offers interconnection service and no further effort is required.
- Net Metering – PWP offers net metering for all customers with self-generation. As such no further effort is required.
- Time-Based Rates and Smart Meters – PWP does offer a TOU rate and corresponding meter to all customers. However, PWP needs to consider and determine whether or not it is appropriate to increase the number of time based rates offered and to install time-base meters and communication devices for all customers.
- Fuel Sources Plan and Generation Efficiency – PWP has considered these issues in its 2007 IRP. However, it may be appropriate to issue a separate Fuel Sources Plan and the 10-year Generation Efficiency plan.

The next steps needed to be taken by PWP are the following:

- Interconnection
 - Based on the conclusion that the current interconnection policy and agreements are written to meet or exceed IEEE 1547 standard:
 - Determination by City Council of whether or not to adopt the EAct 2005 requirement and issue a statement declaring that the current PWP policy (Regulation 23) is in compliance.
 - If the City Council determines that it will not adopt EAct 2005 requirement, the City Council must document its findings and make this document available upon request.
- Net Metering
 - Based on the conclusion that the net metering policy meets the requirements of EAct 2005:
 - ✓ Determination by City Council of whether or not to adopt the EAct 2005 requirement for net metering by stating that PWP is already meeting this requirement.

- ✓ If the City Council determines that it will not adopt EAct 2005 requirement for net metering, the City Council must document its findings and make this document available upon request.

■ Time Based Rates

- Based on the conclusion that PWP already offers a time based rate schedule to all customers, which is only used by less than 1% of all customers:
 - ✓ Determination by City Council of whether or not to adopt the EAct 2005 requirement for consideration of additional time based rates.
 - ✓ If the City Council determines that it will not adopt EAct 2005 requirement for additional time-based rates, the City Council must document its findings and make this document available upon request.
 - ✓ If the City Council determines that it will adopt EAct 2005 requirement for considering additional time-based rates, a detailed study analyzing CPP and RTP structures for all customer classes must be performed. Finally, after consideration and analysis is performed, the City Council must document its findings regarding whether or not PWP should offer additional time based rates. This document should be made available upon request.

■ Smart Meters

- Based on the conclusion that smart meters are already offered upon request at the customer's expense and that installation of smart meters for all customers will cost in the order of \$30 – \$40 million:
 - ✓ Determination by City Council of whether or not to adopt the EAct 2005 requirement for smart metering.
 - ✓ If the City Council determines that it will not adopt EAct 2005 requirement for smart metering, the City Council must document its findings and make this document available upon request.

■ Fuel Diversity and Generation Efficiency

- Based on the conclusion that PWP standard planning practices already incorporates consideration of fuel diversity and generation efficiency:
 - ✓ Determination by City Council of whether or not to adopt the EAct 2005 requirement for Fuel Diversity and Generation Efficiency thereby requiring additional reports filed to City Council.

- ✓ If the City Council determines that it will not adopt EPAct 2005 requirement for Fuel Diversity and Generation Efficiency, the City Council must document its findings and make this document available upon request.

Bibliography

Australia Ministerial Council on Energy, *Information Paper on the Development of and Implementation Plan for the Roll-out of Smart Meters*, January 2007.

Cap Gemini, *Smart Metering: The Holy Grail of Demand-Side Energy Management*, 2005.

Edison Electric Institute, *Deciding on Smart Meters: The Technology Implication so Section 1252 of the Energy Policy Act of 2005*, September 2006.

Edison Electric Institute, *Responding to EPAcT 2005: Looking at Smart Meters for Electricity, Time-Based Rate Structures, and Net Metering*, May 2006.

National Regulatory Research Institute, *Implication of EPAcT 2005 for State Commissions*, October 2005.

Southern California Edison, *Advanced Metering Infrastructure – Conceptual Feasibility Report*, August 2006.

US Federal Energy Regulatory Commission, *Assessment of Demand Response and Advanced Metering*, Staff Report, August 2006.

City of Pasadena Department of Water and Power, *Pasadena Power System Load and Resource Summary 2001*, October 2001.

City of Pasadena Department of Water and Power, *Pasadena Power System 2001 Strategic Resource Plan*, October 2001.

City of Pasadena Department of Water and Power, *Strategic Resource Plan Update*, Presentation to the Municipal Services Committee Utility Advisory Commission, December 8, 2004.

City of Pasadena Department of Water and Power, *Interconnection and Metering Agreement*, August 12, 2003.

City of Pasadena Department of Water and Power, *Light and Power Rate Ordinance*, Pasadena Municipal Code, Chapter 13.04, July 1, 2006.

City of Pasadena Department of Water and Power, *Distributed Generation Interconnection Requirements: Regulation 23*, October 13, 2003.

Urban Environmental Accords, June 5, 2005.

109th Congress, *Energy Policy Act of 2005*, January 4, 2005.