



PASADENA WATER AND POWER
MEMORANDUM

February 17, 2009

TO: ENVIRONMENTAL ADVISORY COMMISSION

FROM: PHYLLIS E. CURRIE, GENERAL MANAGER

SUBJECT: RECOMMEND TO THE CITY COUNCIL TO APPROVE THE PASADENA WATER AND POWER DEPARTMENT'S 2009 INTEGRATED RESOURCE PLAN PREPARED BY PACE GLOBAL ENERGY SERVICES AND REVISED RENEWABLE PORTFOLIO STANDARD

RECOMMENDATION:

It is recommended that the Environmental Advisory Commission ("EAC") recommend that the City Council to approve:

1. The 2009 Integrated Resource Plan ("IRP") for Pasadena's power supply resources prepared by Pace Global Energy Services, LLC ("Pace"); and,
2. The revised Renewable Portfolio Standard, included as Exhibit 1, to replace the current RPS adopted on October 13, 2003.

APPLICABLE URBAN ACCORDS GOALS:

Implementation of the 2009 IRP and proposed RPS revisions would help the City meet, or exceed, the following United Nations Urban Environmental Accords ("Urban Accords") goals:

- (1) Action 1- Renewable Energy: Adopt and implement a policy to increase the use of renewable energy to meet 10% of the city's peak load by 2012;
- (2) Action 2- Energy Efficiency: Adopt and implement a policy to reduce the city's peak load by 10% by 2012 through energy efficiency, shifting the timing of energy demands, and conservation measures; and,
- (3) Action 3- Climate Change: Adopt a citywide greenhouse gas reduction plan that reduces the jurisdiction's emissions by 25% by 2030.

BACKGROUND:

The Pasadena Water and Power Department (“PWP”) 2009 IRP is a 20-year strategic power resource plan that establishes broad objectives and an overall direction for future policy, program, and procurement decisions with respect to PWP’s power supply resource portfolio. The recommended portfolio of resources provides a sustainable balance between environmental benefits, reliability, and low cost of electricity to PWP’s electric rate payers.

The IRP was prepared by Pace through an extensive analytic and stakeholder input process. In the process, Pace evaluated many different options for meeting the City of Pasadena’s (“City”) future electricity demands and the resulting IRP recommends a preferred mix of resources that meet multiple objectives in a reliable, cost competitive, flexible, and environmentally responsible manner under a wide variety of market, regulatory, and economic conditions. As one of the first IRP implementation items, PWP proposes to revise the current Renewable Portfolio Standard (“RPS”) to reflect the 2009 IRP recommendations.

Introduction

PWP prepares an IRP approximately every five years with on-going mid-term review every two to three years. While the IRP provides definitive direction for the short term, it provides a long term vision by retaining flexibility in implementation as regulatory, market or economic conditions; or community’s objectives change.

On July 23, 2007, as recommended by the Environmental Advisory Commission and endorsed by Staff, City Council deferred consideration of the Pasadena Water and Power (“PWP”) Draft 2007 IRP that had been developed between late 2005 and 2006. The Council further directed PWP to work with the EAC and stakeholders to develop a new comprehensive 20-year IRP.

Following the Council’s deferral, the EAC and the Electric and Water Committee (“EWC”), a subcommittee of the EAC, held two public meetings through which stakeholders and the EAC sought input to assist PWP in developing the scope and evaluation criteria for a Request For Proposal (“RFP”) seeking an independent consultant for energy policy and developing the IRP.

An RFP for an IRP was issued on December 05, 2007, and proposals were evaluated by City staff and Dr. Carol Carmichael of the EAC and EWC. Pace was determined to best meet the City’s needs. On May 20, 2008 the EAC supported PWP’s recommendation to select Pace and on June 9, 2008, the City Council approved signing a contract with Pace to develop a comprehensive 20-year IRP.

Public Process

On July 16, 2008, Pace made its first introductory public presentation at a meeting of the Municipal Services Committee (“MSC”). Given the complexity of preparing an IRP and its impact on all segments of rate payers, MSC approved

the formation of an IRP Advisory Group consisting of ten members representing residents, business, non-profit organizations, environmental interests, EAC, MSC, and City government. The Advisory Group was formed on August 12, 2008 including five members appointed by the Mayor. Subsequently, Pace made one presentation to EAC, held four public meetings and six Advisory Group meetings between August 12, 2008 and January 24, 2009. Dr. Carol Carmichael, a member of Advisory Group and Dr. Marc Baum regularly updated the EAC, and PWP periodically updated the EWC and MSC about the IRP's progress and sought comments.

PWP gratefully acknowledges the contribution of the members of the Advisory Group to the IRP process. Their expertise and knowledge, insightful feedback and input, and many hours of participation in the numerous meetings helped PWP and Pace immensely with the development of final 2009 IRP.

PWP kept the community informed and sought input through various channels such as Council Members' town hall meetings, large customers associations, and the Chamber of Commerce and other community organizations. To make information further readily accessible and keep the IRP process transparent, Pace presentations to the EAC, MSC, Advisory Group, and the public meetings, reports, modeling assumptions, forecasts for energy use, fuels, and carbon credits, and Pasadena's electricity demand, and videos of public meetings were posted on PWP's website <http://www.pwpweb.com/irp>. Public meetings were aired on KPAS. PWP used several means to seek the community's input on priorities and willingness to pay more for environmental stewardship beyond regulatory requirements. PWP obtained input through various means such as a phone survey by RKS Research and Consulting (105 residential and 101 businesses), walk-in surveys at grocery stores/farmers' markets (303), and the PWP web site (14). To keep stakeholders informed and involved, IRP-related articles were published regularly in City publications such as In-Focus, Conduit, and Currents. PWP also submitted editorials and purchased advertising space in the local press and newsletters such as the Pasadena Star News, Pasadena Journal, Pasadena Weekly, Neighborhood Connection Newsletter, Lake Avenue Business Association Newsletter, and Chamber of Commerce Newsletter.

In the early meetings, Pace collected input for setting objectives, priorities, parameters and concerns from past IRPs. Pace also described the analytical approach to evaluate different objectives in terms of GHG emission reduction, cost, price risk, market risks, percentage of renewables, and reliability.

Summary of 2009 IRP Recommendations:

The key recommendations of the 2009 are summarized below.

- **Coal Power Displacement:** By 2016, reduce purchases of power from the Intermountain Power Project (IPP) coal plant by at least 35 MW;
- **New Local Gas-Fired Generation:** By 2014, retire the existing 65 MW Broadway 3 power plant and replace it with a comparably sized new combined cycle plant at the same site;
- **Upgrades of Existing Generation:** Continue to maintain and upgrade the existing Glenarm 1 & 2 generating units in order to extend their operating lives for next 20 years
- **Energy Efficiency and Load Management:** Implement programs to achieve significant reductions in electricity consumption in accordance with PWP's current energy conservation and demand reduction goals to the following timeline:
 - **Energy Savings:** Reduce energy sales by 13.3% below expected levels by 2016;
 - **Peak Load Savings:** Reduce peak load by 10% below expected levels by 2012;
 - **Additional Demand Response:** Reduce peak load by an additional 5 MW by 2012 through programs that provide customers with information and economic incentives to reduce their consumption during peak load periods;
- **Renewable Energy:** By 2020, increase the percentage of PWP's energy mix provided by renewable energy sources to 40% according to the following timeline: 15% by 2010; 33% by 2015; and, 40% by 2020;
- **Solar Photovoltaic:** Extend Pasadena's current goal to install 14 MW of customer-owned solar photovoltaic installations in Pasadena by 2017 to achieve 15 MW by 2020 and a total of 19 MW by 2024;
- **Feed-In Tariff:** Establish a feed-in tariff program with the goal of procuring 8 MW of qualifying renewable resources located inside Pasadena by 2020 and a total of 10 MW by 2023 at an average price of up to 15 ¢/kWh;
- **GHG Emissions Reductions:** By 2020, achieve CO₂ emission reductions of at least 40% according to the following timeline: 5% by 2010; 25% by 2015; and, 40% by 2020.

Alternative Views:

Some stakeholders have questioned the recommendations of Preferred Resource Plan and expressed alternative views. Major comments are listed below.

1. Why invest in a new electric generating unit in Pasadena rather than improving the intra-city sub transmission system so that all required electricity, preferably renewable energy, can be imported? This will reduce overall cost and air emissions within Pasadena and regionally.

Response: Economic analysis by Pace, based on certain well-researched industry assumptions, indicate that adding new local gas-fired generation under the Preferred Resource Plan is the lower cost option compared to portfolios that consider new transmission upgrades. The annualized cost of installing a new generating unit is only marginally higher than maintaining the existing 43 year old B3 unit for 20 more years, if possible. Additionally, Pace concluded qualitatively that portfolios that add new gas-fired local generation were superior from a reliability perspective because they directly addressed PWP's reliability concerns by reducing its dependence on the aging units as well as a single point of entry for importing energy into Pasadena. According to Pace, the current transmission interconnection facilities with their 215 MW import limits at Goodrich permit PWP to meet approximately 90% of its annual energy requirements from remote resources including renewable resources. Therefore, the Preferred Resource Plan is superior from reliability, economic, and risk management perspectives. PWP believes that overdependence on a single point of energy import into the City jeopardizes the reliability of electricity in the City. Therefore, the current arrangement of local power plant capacity of about 200 MW and an import capability provides an acceptable balance of reliability.

2. Why is PWP not considering increasing import capability through more than one existing import interconnections?

Response: PWP is currently studying increasing its import capability by participating in transmission projects, analyzing the intra-city sub transmission system, and increasing interconnection capacity at the existing import location. However, due to the local physical design and layout of the electrical system and geography, there is no feasible import interconnection option. PWP will continue to evaluate long-term solutions to both reliability and resource access needs that can ensure continued reliability of service.

3. Isn't it true that the new efficient combined cycle electric generating unit would be operating much more than the existing old B3 unit? If so, it would generate cumulatively higher emissions in Pasadena.

Response: It is true that Pace's analysis indicates that the new unit is expected to operate more hours, generating fewer emissions on a per MWhr basis but more emissions in aggregate than the status quo. However, the Preferred Resource Plan specifies displacing 35MW of coal-fired generation from IPP with cleaner resources having lower GHG emissions. The new unit would provide power within minutes when needed with lower emissions. This approach results in an overall reduction of Pasadena's GHG emissions and improved reliability.

4. By installing a new natural gas fired combined cycle electric generating unit, isn't PWP discouraging development of renewable energy projects?

Response: The short answer is "No". To the contrary, a new energy efficient, state of the art combined cycle unit would most likely help expand the development of certain renewable energy resources. New gas-fired generating units are capable of, and necessary for, providing balancing energy into California and regional transmission grid in real time to compensate for the fluctuating and/or intermittent nature of renewable energy resources such as wind and solar generation.

5. Why doesn't the 2009 IRP include a long term decision to sell off PWP's IPP ownership share or commit to allow the contract to lapse upon expiration in 2027?

Response: Given the fact that nearly 50% of electricity in the country is generated by coal, there is a strong possibility that commercially viable carbon capture and sequestration type GHG reduction technology will be developed in the next 8 to 12 years. The IPP plant retrofitted with such GHG reducing technology would become a valuable low cost, clean, energy asset for PWP once the debt is retired. Many alternatives are being studied at IPP to evaluate GHG reduction measures. IPP is owned by numerous utilities from Sothern California and Utah. It is extremely difficult, logistically and legally, to modify the long term contracts to relieve PWP of its interest in the plant. Further, even if PWP were to successfully sell its interest in the plant, it is almost assured that the buyer would continue to draw its portion of energy. Thus, the sale of the IPP contract would not result in reduced emissions. By committing to sell energy equivalent to 35 MW of PWP share and not use that energy to serve City's load, the same objective is achieved.

Uncertainties/Risks:

It is important to recognize that the Preferred Resource Plan is based on certain assumptions and forecasts which are likely to change in future. However, the extent of the changes is unknown and the uncertainty increases with time. The following main uncertainties are expected to significantly impact PWP's ability to achieve recommended goals and maintain rate changes to rate payers.

- Legislative and Regulatory (California, Western States and Federal):
 - Environmental: Climate change regulations, carbon credit cost, RPS, CEQA, air permitting and other environmental restrictions.
 - Electric Utility: Resource Adequacy, California Independent System operator's nodal market, transmission rights and other regulations.
- Availability and connectivity of renewable resources:
 - Unavailability of currently operating renewable resources
 - Sellers under contract defaulting on commissioning dates or unable to complete projects
 - Inordinate delays in projects under development due to lack of financing, permitting, inexperienced developers, cost overruns.
 - Inadequate transmission//complexity of transmission contracts
- Economic:
 - Continually increasing cost of renewable energy
 - Future market prices of electricity and fuels
 - Credit crunch and lack of private investor equity
 - Local and regional economic conditions
 - Inability of municipal utilities like PWP to take advantage of tax breaks available to private entities
 - Load shrinkage
 - Evolving technology (most contracts are for 20 to 30 years)
- Operational:
 - Customer usage patterns (smart grid, plug-in hybrid vehicles)
 - Inadequate transmission
- Community Perspective
 - Priorities for PWP
 - Level of willingness to pay for environmental stewardness

Challenges:

While PWP supports adoption of the 2009 IRP, PWP would also point out that the recommended goals are quite high and pose considerable challenges, many beyond control of PWP. Implementation of most of the goals will take months, if not years, and those commitments have long term impacts financially and operationally. Therefore, it is prudent to undertake short to mid term goals and have a long term vision with periodic review and necessary flexibility. In short term PWP anticipate the following main challenges.

- City's budget and financial priorities
- Reliable delivery schedule of contracted renewable resources under development (most projects are located outside California)
- Rate impact due to increasing cost of renewable energy
- Rate impact due to climate change legislations/regulations.
- Rate impact due to market sale of 35 MW of IPP power
- Ageing workforce, and hard to find and retain skilled employees

- Legal and contractual constraints related to IPP and associated transmission systems

IRP Implementation Plan:

PWP plans to prepare and present a broad plan to implement recommendations of the 2009 IRP before May 31, 2009. The implementation will include elements such as:

- Formally adopting a revised RPS, as described below
- Continued procurement of renewable resources through city- and SCPA-issued RFP's;
- Continued development and implementation of customer programs to incentivize solar, energy efficiency and demand reduction;
- Perform study to evaluate the cost-effective energy efficiency potential. Council adoption of updated energy efficiency and demand reduction goals is required within 12 months consistent with AB-2021 (2006);
- Development of proposed feed-in-tariff over next 12-14 months;
- Establishing a Smart Grid vision, roadmap, and business case for Pasadena within 12 months;
- Prepare approach, schedule, identify major issues, resources and budget for replacement of B3 with a new 65 MW combined cycle unit and life extension of GT1 and GT2 gas turbines;
- Perform legal and financial feasibility studies related to IPP coal displacement alternatives;
- Continue reporting and monitoring of PWP's GHG emissions using the Climate Action Registry or similar accepted methodology.

Details of these implementation activities are still under development, and staff anticipates additional details will be provided in the April-May 2009 timeframe.

PWP also proposes to update EAC and MSC biannually about its progress in achieving recommended targets.

Proposed Renewable Portfolio Standard:

The City Council adopted the current RPS on October 13, 2003 in order to reflect the goals established in the 2001 Strategic Power Resource Plan and comply with Senate Bill 1078 ("SB1078"). SB1078, which became law January 1, 2003, requires local publicly owned utilities to establish and implement a renewable portfolio standard that "recognizes the intent of the Legislature to encourage renewable resources, while taking into consideration the effect on rates, reliability, financial resources, and the goal of environmental improvement." While the law did not require local publicly owned utilities to adopt a specific target or qualifications, state policy clearly indicated a preference to meet a 20% RPS by 2017, or sooner. Additional laws have been subsequently passed that accelerate the RPS goals for investor owned utilities. Laws have also been proposed to

increase the targets for local publicly owned utilities to 20% by 2010 and 33% by 2020. As a result of the IRP process, it has been determined that a new RPS, more aggressive than the current RPS and proposed legislation, should be adopted by the City Council to clearly signal Pasadena's commitment to the environment and meet the resource portfolio mix recommended by this IRP.

The revised RPS policy (attached as Exhibit 1) incorporates the following IRP recommendations and other changes:

- Consistent with the IRP recommendations, establish new RPS targets at 15% by 2010, 33% by 2015, and 40% by 2020;
- Clarify that the targets represent the percentage of energy used to meet PWP's retail electric sales plus distribution losses (to be consistent with Power Content Label accounting methods);
- Consistent with statewide policy, eliminate the inclusion of energy from Pasadena's existing large hydroelectric plant, Hoover Dam;
- Further clarify the eligibility of tradable renewable energy credits (formerly referred to as "Green Tickets") to meet RPS goals;
- Clearly indicate that RPS objectives include reducing greenhouse gas emissions, meeting or exceeding state mandates, and encouraging local renewable resources; and
- Eliminate the "Background" Section of the RPS Policy statement.

FINANCIAL IMPACTS OF IRP:

Due to a variety of commodity and environmental cost pressures, PWP's power costs are going up. This is true regardless of whether PWP implements the IRP recommendations, does nothing, or something else. Pace estimates that implementation of the Preferred Resource Plan, when measured over the entire 20 year planning horizon covered by the 2009 IRP, would lead to a 34% increase in PWP's average levelized energy procurement cost versus 2008 procurement costs. Pace further estimates this increase would be approximately 28% if PWP made no incremental changes to its existing portfolio. Therefore, the estimated cost impact of Preferred Resource Plan is approximately 6% above "status quo" operations. These projected cost increases for the Preferred Resource Plan and the Status Quo portfolio are expressed in real, 2008 dollars that are not adjusted for future inflation. After adjusting for inflation at an assumed rate of 2.5% per year, the Preferred Resource Plan is projected to lead to approximately a 9% increase in PWP's costs and rates over the status quo when measured over the 20 year planning horizon.

The energy costs and resulting rate impacts of implementing the Preferred Resource Plan are difficult to quantify with certainty at this time. There are numerous variables, including cost and availability of renewable resources, the price of natural gas to fuel City's gas fired power plants, the premium and limitations associated with reducing dependence on IPP and the cost of capital to

invest in renewable projects and local generation. Equal uncertainty prevails regarding the future costs associated with a “carbon tax” if Pasadena continues its current level of reliance on energy generated at IPP.

The actual impact on rates may vary considerably.

Pasadena Water and Power Renewable Portfolio Standard
(Revised March 2, 2009)

Objectives

PWP's Renewable Portfolio Standard (RPS) objectives are to reliably meet Pasadena's electric energy needs at stable and reasonable rates in an environmentally responsible manner. This policy is effectuated through an integrated resource plan that incorporates thermal resources, contracts, short-term purchases, and demand-side management programs in addition to renewable resources.

Specific RPS objectives include:

- Reduce the greenhouse gas emissions associated with PWP's portfolio of energy supply resources used to meet the electric demand of its retail customers;
- Meet or exceed the state mandate to encourage renewable resources;
- Obtain a diverse portfolio of cost-effective renewable resources;
- Encourage the development of local renewable resources; and,
- Minimize adverse impact of acquiring new renewable energy resources on customer electric rates.

Qualified Renewable Resources

- Renewable resources are defined as non-fossil fueled electric generating resources, including: biomass, solar thermal, photovoltaic, wind, geothermal, fuel cells using renewable fuels, hydroelectric generation, digester gas, municipal solid waste, landfill gas, ocean wave, ocean thermal, tidal current, or renewable distributed generation on the customer side of the meter;
- Renewable components of system sales from other parties shall qualify to the extent they can be verified;
- Pasadena's existing Azusa hydroelectric entitlements shall qualify;
- Energy purchased by PWP from customer-owned cogeneration facilities using renewable fuels shall qualify;
- New hydroelectric projects must be less than 30 MW to qualify; and,
- Renewable resources may be located within the Western Electricity Coordinating Council region, and PWP may procure tradable renewable energy certificates associated with qualifying resources with or without the associated energy.

Pasadena Water and Power Renewable Portfolio Standard
(Revised March 2, 2009)

RPS Target

Renewable resources used to meet PWP's retail electric energy sales, including distribution losses, shall reach a minimum of 15% by year 2010; 33% by 2015, and 40% by 2020.

Strategies for Meeting PWP's RPS Objectives

- Procure new renewable resources through a combination of cost-effective long-term contracts, short-term purchases, and tradable renewable energy certificates;
- Seek resources which are cost effective and which will have minimal impact on customer energy costs;
- Mitigate rate impact of renewable resource premiums by utilizing funds from Green Rate programs and a portion of Public Benefits Charges as available;
- Renewable resources will be procured to the extent they fulfill unmet needs identified in PWP's Strategic Resource Plan and supplemental short-term resource needs. PWP will not terminate, abrogate, or otherwise end any existing long-term contract in order to meet the renewable target portion of its energy portfolio;
- Replacing part of existing base-loaded resources for limited periods with renewable resources will be considered if such sales or exchanges meet resource portfolio economic, risk, and reliability objectives;
- The Pasadena City Council shall consider rate impacts, including the cost of associated transmission to deliver the energy to PWP's service territory, when approving contracts for additional renewable resources.

Reporting RPS Performance

Beginning with energy sold in Pasadena for the period from July 1, 2003 to June 30, 2004, PWP will report the following information to its customers annually:

- PWP's resource mix used for retail electric sales, by fuel type, including each type of renewable resource in a form that is consistent with the Power Content Label;
- PWP's revenues from "Green Rates" and the use of these revenues for renewable energy resource purchase and development; and,
- PWP's expenditure of public benefits funds used for renewable energy and renewable resource development.