

FC 1025 (08/17/11)

Meeting Date: ~~11/15/11~~ 12/05/11
Agenda Item: 4.1
Unclassified Manager: F. Maitski
Extension: 2284
Director(s): All

BOARD AGENDA MEMO

SUBJECT: Work Study Session on Energy Management

RECOMMENDATION:

That the Board receive and discuss information related to energy management at the District.

SUMMARY:

This workshop is designed to provide the Board a general overview of energy management activities at the District. It also provides the Board additional information on the California Renewables Portfolio Standard (RPS) requirements in response to the Informal Board Member Request (IBMR) I-11-0016. The workshop will follow the outline in the attached presentation and will include:

- Relevant Board policies.
- Electrical energy consumption and cost.
- The District's partnership in the Power & Water Resources Pooling Authority (PWRPA).
- District Energy Management Practices.

Relevant Board Policies

Staff follows Board policy in managing the District's energy program. The following policies are the most relevant.

- Ends 2.1—Current and future water supply for municipalities, industries, agriculture and the environment is reliable.
- Ends 2.2.1—Manage, operate and maintain raw water transmission and distribution assets to maximize reliability, to minimize life-cycle costs and to minimize impacts to the environment.
- Ends 2.3.2—Manage, operate, and maintain the water treatment plant and treated water pipeline assets to maximize reliability, to minimize life-cycle costs and to minimize impacts to the environment.
- Ends 4.3.2—Reduce greenhouse gas emissions when reasonable and appropriate.
- EL 5.4—The CEO shall not spend extravagantly, inefficiently, or in ways more costly than necessary.
- EL 9.3—The CEO shall not fail to inform the Board of the intent to approve a collaborative agreement, and keep the Board informed on an ongoing basis.

(Continued From November 15, 2011)

In implementing Board policy, the primary goal in managing District water supply facilities is to provide a reliable water supply. Ensuring a reliable supply of electric power to District facilities is necessary to meet this goal.

Electrical Energy Consumption and Cost

District energy consumption includes: imported water pumping; water treatment processes; raw and treated water remote facilities; and heating, ventilation and air conditioning (HVAC), lighting, server and computer loads in offices and plants.

The District consumed 172,785 megawatt-hours (MWh) of electricity in fiscal year (FY) 2009 at an overall cost of \$5.7 million. The total operating budget for FY09 was \$178 million; therefore, electricity costs account for approximately 4.1 percent of the annual operating budget. The 2009 data is the latest available data from the California Department of Water Resources (DWR) and the U.S. Bureau of Reclamation (USBR).

Most of the District's energy consumption is for pumping imported water into the county. Of the District's total energy consumption, pumping from the South Bay Aqueduct (SBA) portion of the State Water Project (SWP) and San Felipe Division (SFD) of the federal Central Valley Project (CVP) accounts for about 40 percent and 50 percent of the total, respectively. The cost of this energy is included as an operational expense in the water costs paid to DWR for SBA deliveries and the U.S. Department of Interior, Bureau of Reclamation (USBR) and the San Luis & Delta Mendota Water Authority for deliveries via the SFD. The 2009 total energy usage and cost at all District facilities is shown on Table 1.

TABLE 1: DISTRICT ENERGY USAGE AND COST					
FACILITIES	ENERGY USAGE		ENERGY COST		UNIT COST
	<i>(MWh)</i>	<i>(Percent)</i>	<i>(\$)</i>	<i>(Percent)</i>	<i>(\$/MWh)</i>
Imported Water Pumping		90.38%		69.1%	
CVP – San Felipe Division ^{1,7}	85,827		\$1,643,800		\$19
SWP - South Bay Aqueduct ⁷	69,145		\$2,128,000		\$31
Coyote Pumping Plant ^{2,3,5,7}	1,031		\$116,139		\$113
Vasona Pumping Plant ^{2,3,7}	163		\$27,729		\$170
SUB TOTAL	156,166		\$3,915,668		\$25
Water Treatment		6.10%		18.2%	
Rinconada Water Treatment Plant ^{3,4,7}	6,678		\$639,755		\$96
Santa Teresa Water Treatment Plant ^{3,4,7}	2,052		\$205,003		\$100
Penitencia Water Treatment Plant ^{3,4,7}	1,806		\$187,224		\$104
SUB TOTAL	10,536		\$1,031,982		\$98
Office & Warehouse		2.99%		9.8%	
Offices & Warehouse Buildings ^{3,7}	5,160		\$553,038		\$107
Miscellaneous (118 Accounts)		0.53%		3.0%	
Raw and Treated Water T&D ^{6,7}	923		\$169,916		\$184
GRAND TOTAL	172,785	100%	\$5,670,604	100%	\$33

Table Notes:

1. CVP includes portions of energy and cost for pumping water at Delta Division and San Luis Unit pumping costs.
2. CVP Project power is used for both Pacheco and Coyote pumping plants for project water pumping.
3. Power and Resource Pooling Authority (PWRPA) energy costs consist of fixed customer and meter charges, variable demand (kW), energy (kWh) and Public Purpose Program (P3) funding charges. Therefore, PWRPA unit

cost (\$/MWh) varies for each district treatment plant, pumping plant and office building based on individual facility power demand and energy consumption.

4. *Rinconada Water Treatment plant uses significantly more energy compared to Santa Teresa and Penitencia Water Treatment plants to pump treated water into the Rinconada plant reservoir.*
5. *Coyote uses PWRPA power for pumping water to and from Anderson reservoir.*
6. *There are approximately 118 small PG&E accounts serving electrical load for raw and treated water turn outs, cathodic protection at district remote locations.*
7. *Energy costs for pumping CVP and SWP project water are included in water rates and paid as a part of water charges. Energy costs for Rinconada, Santa Teresa, and Penitencia water treatment plants; Vasona and Coyote (only partially) pumping plants; and Office buildings are paid to PWRPA. Energy charges for small accounts are paid to PG&E.*
8. *CVP and SWP data are taken from various publications by other agencies.*

District critical facilities are equipped with emergency and standby engine-generator units. The primary purpose of these generators is to ensure continual operation of critical Water Utility facilities by providing an alternative power source during utility power outages. District records show that run time for such generators is about 20 hours per year. Therefore, the cost to operate and maintain these generators is outside the scope of this work study session.

Although energy consumption for imported water pumping is about 90 percent of the total energy consumption, the cost of that energy is about 69 percent of the total energy cost. This is because both the SWP and CVP generate relatively inexpensive hydroelectricity that is then applied to the operations costs of the respective projects.

The SWP was constructed with hydro-generation capacity that exceeds most of its on-peak pumping loads. The excess power generated is sold into the open market during on-peak time. Conversely, less expensive off-peak energy is then purchased from the electrical power market to supply its off-peak pumping loads. Thus, the cost/MWh for transporting imported water is less than other sources of energy.

In regards to CVP pumping, the District has a contract with the USBR to operate and maintain the SFD facilities; therefore, the District has some flexibility to influence energy consumption of Pacheco and Coyote Pumping Plants through operational measures.

Prior to 1992, Pacific Gas and Electric Company (PG&E) served all district electrical loads at three treatment plants, Vasona pumping plant, commercial power at Coyote pumping plant, raw and treated water remote facilities, and office and warehouse buildings. The district executed an electric service contract with Western Area Power Administration (WAPA) to deliver power to Rinconada water treatment plant in October 1992; with supplementary power being served by PG&E. In December 2004, the district terminated electric service contracts with PG&E and WAPA for eight major facilities (three treatment plants, two pumping plants, Almaden campus buildings, Blossom Hill Annex and Winfield Warehouse) and transitioned to PWRPA as described below.

Power and Water Resources Pooling Authority

Since January 2005, the District has acquired its electric power from the Power & Water Resources Pooling Authority (PWRPA) to serve its three water treatment plants, two water pumping plants, and office buildings, which is about 9.8 percent of the district's total energy usage (excluding imported water pumping). PWRPA is a Joint Powers Authority comprised of

14 public water purveyors¹ that organized in 2004 under California State law to collectively manage individual power assets and loads. PWRPA provides power to convey, treat, and recycle water for growers and consumers.

The District's participation in PWRPA significantly reduces its cost of power (compared to Pacific Gas & Electric [PG&E]), saving from \$0.5 million to \$1.15 million per year, based on hydrology, by pooling allocations of inexpensive hydroelectric power and purchasing supplemental power in the open market. Additional information on PWRPA is included in Attachment 1.

There are four specific regulatory requirements in the State of California that affect any public electric utility including PWRPA operations. They include (1) Resource Adequacy (RA) mandated by the California Independent System Operator (ISO); (2) Public Purpose Program (P3) funds mandated by the State of California; (3) California Renewables Portfolio Standard (RPS) mandated by Senate Bill X1-2; and (4) Green House Gas (GHG) regulations mandated by AB 32, the Global Warming Solutions Act of 2006.

Resource adequacy is a State of California mandated planning and procurement process to ensure adequate electrical resources are available to serve all customers in real time. It requires PWRPA to prudently plan for and procure resources that are adequate to meet its peak demand and a 15 percent planning reserve margin. Ideally, PWRPA would have ownership or control of actual facilities to meet these requirements. Although it has ownership of some facilities, PWRPA relies on firm, physical contracts with about ten power producers (Shell Energy, City of Roseville, Power-Ex, Iberdrola Renewable, Sonoma County Landfill, Morgan Stanley, BP Energy, Sempra Energy, Eagle Energy, EDF Trading, Barclay Bank, etc.) to partially meet this requirement. PWRPA has plans to acquire facilities over time, such as the Lodi Energy Center project, to meet the requirement.

AB 995, approved by Governor Gray Davis on September 30th, 2000, also requires PWRPA to set aside a fixed percentage of its retail service revenue into a Public Purpose Program fund (P3 fund). P3 money is to be used to fund any or all of the following public purpose programs: (1) cost-effective demand-side management services to promote energy efficiency and energy conservation; (2) new investment in renewable energy resources and technologies; and (3) research, development, and demonstration programs for the public interest. Each Participant is granted a three-year period to exclusively direct their contributions from the P3 fund to any qualifying projects or programs they choose. The District was awarded all of its P3 contributions in the amount of \$158,458 for installing a district wide power monitoring system; and replacement of motor and adjustable speed drive for the Penitencia backwash pump replacement project.

SB1x 2 requires PWRPA to implement and enforce a new renewable energy portfolio standard including a requirement to implement minimum procurement targets for procuring eligible renewable resources. The procurement targets for renewable resources expressed as a percentage of total power portfolios are:

- January 1, 2011—December 31, 2013: Average of 20 percent.

¹¹ Banta-Carbona Irrigation District (ID), Glenn-Colusa ID, James ID, Lower Tully River ID, Princeton-Cordora-Glenn ID/Provident ID, West Side ID, West Stanislaus ID, Arvin-Edison Water Storage District, Cawelo Water District, Reclamation District 108, Santa Clara Valley Water District, Sonoma County Water Agency, and Westlands Water District

- January 1, 2014—December 31, 2016: Average of 25 percent.
- January 1, 2017—December 31, 2020: Average of 33 percent.

A considerable portion of PWRPA's power, from 29 to 84 percent, is hydroelectric power produced by the USBR Central Valley Project and distributed and marketed by Western Area Power Administration (WAPA)—Attachment 2; however, this source of power is not an "eligible renewable" source under SB1x 2. It is unclear if PWRPA must meet this obligation for its total load, or just for the amount of power greater than its WAPA allotment. The California Energy Commission will make a determination on this issue in 2012. Initially, PWRPA is on target to meet the 20 percent renewable portfolio standard (RPS) goal for its total load by utilizing the power output from Sonoma County's small, 1.5 MW, Hydro facility, and numerous small solar and landfill gas projects. Each of these resources qualifies as an eligible renewable resource. The District's Almaden campus solar project is counted as one of the eligible renewable sources.

The California Air Resources Board (CARB) is finalizing regulations to implement AB 32—the Green House Gas (GHG) legislation. The AB 32 draft identifies a cap-and-trade program as one of the GHG emission reduction strategies for California. Under cap-and-trade, an overall limit (the Cap) on GHG emissions is established for all capped sectors. Facilities subject to the cap can reduce GHGs, receive permits (allowances) for their reductions, and then trade them on the open market. Power generation is a capped sector subject to this program, and the regulation will apply to PWRPA. Specific impacts to PWRPA will be presented to the District Board during the presentation of this item.

District Energy Management Practices

Staff performs a number of energy management activities to ensure power reliability, minimize energy costs, and reduce the District's carbon footprint. These include: (1) scheduling, tracking and reporting energy usage and cost; (2) managing raw and treated water operations to minimize energy use; (3) installing energy efficient systems and devices; (4) constructing and operating renewable energy projects; and (5) reporting greenhouse gas emissions and methods of reduction. Each of these is discussed in more detail below.

1. *Scheduling, Tracking, and Reporting Energy Usage and Cost*

Managing and scheduling energy is key to reducing risk and maintaining a reliable and reasonable cost energy supply. Staff develops annual plans by forecasting its energy load using weather forecasts, historical data, and future process/operations changes. Energy load schedules are prepared monthly and then updated daily to reflect energy demand trends and weather patterns. The District uses the Scheduling and Metering Billing Application (SAMBA) provided by PWRPA that enables treated and raw water plant operators to enter daily treated water production and raw water demand which is then translated into hourly electric load schedules. The SAMBA daily load forecast is used to produce a balanced hourly schedule of loads that are submitted to the California Independent System Operator (CAISO). Staff also utilizes SAMBA to create custom reports for billing verification and operational analysis.

2. *Water Operations Management*

Water supply operations are managed to minimize the energy use needed for in-county pumping, while meeting other operational objectives and constraints. Pumping at

Vasona or Coyote (preference power) Pumping Plants is necessary when flow requirements from the State Water Project (SWP) or Central Valley Project (CVP) exceed certain thresholds. Staff continuously updates water supply operation plans to coordinate schedules of importation and distribution of water supplies from the SWP, the CVP, and from local reservoirs. Water supply schedules are developed to ensure reliable supplies to water treatment plants, streams and other recharge facilities and to manage reserves for reliability. Planning models are used to minimize in county pumping, by adjusting schedules whenever possible to maintain flows below the pumping thresholds.

With diligent system management, in-county pumping is typically not required except in some higher demand months from July through October. Exceptions can also occur in dry years when either local water supplies are limited, a source of supply is restricted or offline, or when other overriding considerations such as San Luis Reservoir low point avoidance dictate operational strategies to meet water demand. Annual pumping days per year at the Coyote Pump Plant have ranged from 0 to 223. Annual pumping days per year at the Vasona Pump Plant have ranged from 0 to 161. The wider operating range of these pump stations are largely due to changes in the hydrologic cycle.

3. Energy Efficiency

The District implements energy efficiency improvement projects at various District owned facilities. This typically occurs when energy consuming facilities are replaced or rehabilitated. Staff specifies energy efficient devices, equipment, and systems for new projects whenever possible. Premium efficiency motors and adjustable speed drives are specified to reduce pumping related energy consumption.

In 2005, Emcor Energy and Technologies and District staff conducted an energy efficiency site survey (energy audit) at various district facilities and prepared a summary of recommendations for potential energy savings at the Almaden campus, Rinconada Water Treatment Plant, and the Vasona Pumping Station. Staff executed one third of the recommendation. The deviation was caused by both change in operational needs and operating scenarios. For example, More Ave Pump retrofit was scheduled to be included in the RWTP Advanced Treatment Process project and the referenced project is still in planning phase. Staff also replaced motor starters with lower-cost soft starters instead of the recommended variable frequency drives based on the lower operating hours at Vasona Pumping Plant. The following audit recommendations were implemented by the District:

- Replaced existing less efficient fluorescent lighting fixtures with high efficiency fluorescent lighting fixtures at the Rinconada Water Treatment Plant. (\$25K installation cost with 67,934 kWh/year energy reduction).
- Installed occupancy sensors at Rinconada Water Treatment Plant. (\$3k installation cost with 14,914 kWh/year energy saving).
- Replaced existing outdoor lighting fixtures with more efficient outdoor lighting fixtures at the Almaden campus. (\$31K installation cost with 31,812 kWh/year energy reduction).

In addition to implementing the report recommendations, staff implemented the following improvement projects:

- Replaced booster pump drive with a high efficiency adjustable speed drive at the Rinconada Water Treatment Plant. (\$180K construction cost with 12,945 kWh/year energy reduction).
- Retrofitted lighting and Heating Ventilation and Air Condition system (HVAC) at the Administration Building. HVAC ductwork has been replaced with insulated ductwork. The HVAC system control was also improved with better zone management and improved air delivery. (\$40K construction cost with 31,957 kWh/year energy reduction, natural gas saving is not included).
- Retrofitted exterior light fixture improvements at the Coyote Pumping Station with energy efficient lighting. (\$20K construction cost with 1,830 kWh/year energy reduction).

4. Renewable Energy

The District operates two major sources of renewable energy: the Anderson Hydroelectric Facility, and the Almaden Campus Solar Project. Annually, these projects provide for approximately 4.9 percent of the District's energy load.

- The Anderson Hydroelectric Facility is a 940 kilowatt (kW) facility built in 1988. The facility has produced a cumulative 29,820 megawatt-hour (MWh) of energy and a cumulative revenue of \$2,607,213 since 1988. The District has a 30-year power purchase agreement with PG&E. The rate structure was front-loaded in the 30-year contract to facilitate faster capital investment payback in the first 10 years. The rate started from \$0.068/kWh in 1988 and reached \$0.130/kWh in 1997. From 1997 to 2011 the energy rate followed a fluctuating, diminishing trend, and is currently \$0.043/kWh.
- The Almaden Campus Solar Project is a 205 kilowatt (kW) facility producing about 332,000 kilowatt hours (kWh) of electricity each year. The project was implemented in response to the California energy crisis that occurred earlier 2001 resulting in rolling power blackouts and rising electricity costs. In December 2001, Staff presented the Board with several potential solar projects. The Board directed staff to pursue the Almaden campus project in May 2002, and it was put into operation in April 2004.
- Large scale renewable energy projects are challenging due to their high cost per kW to construct, operate, and maintain, especially when compared to PWRPA rates. Cost issues can be the determining factor when considering renewable energy projects; however, PWRPA will most likely be required to implement a new renewable portfolio standard (RPS) that will require more use of renewable energy sources by PWRPA and its participants. Recently, PWRPA evaluated a number of California Land Fill gas projects, two large scale Solar projects—one in Kings County near Fresno and another in the Mojave Desert, wind power from the Pacific Northwest re-marketed by Shell Energy North America, and a Bio Mass project in Oregon marketed by Iberdrola. Each of these projects had project costs in excess of \$100/MWh in a market environment that would only support \$50/MWh. Therefore, these projects did not come to fruition.

- District also utilizes small solar and battery backup systems at various district remote facilities for Automated Local Evaluation in Real Time (ALERT) system and Dam safety Automated Data Acquisition System (ADAS) system.

Additionally, staff continuously looks for opportunities to develop additional renewable energy projects as discussed under Next Steps.

5. Greenhouse Gas (GHG) Emission and Reductions

In 2009, the District was recognized as a Climate Action Leader by the US Environmental Protection Agency for having verified its GHG emission inventories. In March 2011, the District was presented the California Sustainability Showcase award for establishing the Greenhouse Emission Reduction program, updating knowledge management portal, and integrating climate change into planning and operations.

In 2006, the District started an inventory of its GHG emissions from fleet diesel and gasoline fuel use, natural gas use, and electricity from PG&E and PWRPA. The inventory to date did not include emissions for conveying imported water, as this was not required by the reporting protocol.

Data from 2006 to 2008 were verified under the California Climate Action Registry. The District's annual carbon footprint ranged widely from 2,300 to 7,400 metric tons/year. The carbon footprint is greatly affected by the amount of hydroelectric energy available from PWRPA, which is controlled by hydrologic events. Emissions factors for PG&E and PWRPA are about one third to one half of the national average, and well below the California average. During 2006, a very wet year, all PWRPA energy was from renewable sources, with zero emissions.

While energy regulations are evolving, so are the methods for accounting for emissions. This year, the District is transitioning into the Climate Registry, with an updated reporting protocol and increased sophistication. For example, the Climate Registry added reporting for other gases such as methane (CH₄) or nitrous oxide (N₂O). The online tool also requires more detailed source data input by car models and associated fuel use. The reporting protocol prescribes specific processes for establishing emission factors (lbs/kWh) which need to be reviewed and accepted by the Climate Registry. In addition to changes in the reporting protocol, future District energy demand increases (e.g., Advanced Recycled Water Treatment Facility) would affect GHG emissions.

Next Steps:

Staff plans for Energy Management include the following steps:

1. Continue with power and water scheduling, tracking, reporting energy usage and cost, and long term load forecasting.
2. Continue to optimize planning model to minimize in-county pumping.
3. Conduct an energy audit in fiscal year 2013 and develop future project plans for improving energy efficiency under operational and capital improvement projects.
4. Continue to achieve energy saving through the water-use efficiency program.

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5. Continue to utilize available PWRPA P3 funds to execute energy efficiency projects.
6. Continue with green house gas emission inventory reporting and green business program.
7. Implement recommendations in Process Control Systems Master Plan for better management of pumping schedules and production rates in order to achieve the targeted energy savings.
8. Install PWRPA electric service at South Bay Advance Recycle Project that would provide annual cost saving of \$0.5 million compared to PG&E electric service.
9. Consider and develop in-conduit hydroelectric turbines on the distribution system where pressure reduction is needed. These systems would replace pressure reducing valves with small turbines to produce power. Both the District and individual retailers are interested in this technology and staff is working with them on how best to coordinate these efforts. This includes a proposal to perform a feasibility study of our water distribution system in fiscal year 2013. Feasibility study will provide type, number, size, installation cost, and estimated power output.

FINANCIAL IMPACT:

There is no financial impact with this item. The District spends approximately \$5.671 million to acquire electrical power and \$283,000 to manage the electric power program. These activities include most of the staff work described in the District Energy Management Practices, starting on page 4 of this memo.

CEQA:

The recommended action does not constitute a project under CEQA because it does not have a potential for resulting in direct or reasonably foreseeable indirect physical change in the environment.

ATTACHMENTS:

- Attachment 1: PWRPA Background Information
- Attachment 2: CVP Hydro Power Information
- Attachment 3: Glossary of Terms
- Attachment 4: Power Point Presentation

ATTACHMENT 1

PWRPA BACKGROUND INFORMATION

INTRODUCTION

The Power and Water Resources Pooling Authority (PWRPA) is a California Joint Powers Authority (JPA) whose members are Irrigation Districts. California Irrigation Districts possess statutory authority to provide electric service at retail in California. Through an Aggregated Services Agreement and a Cost Sharing Agreement, PWRPA members have joined together with other public water purveyors, known as Stakeholders, to provide electric service at retail to its members and stakeholders, otherwise known as Project Participants. SCVWD is a PWRPA Project Participant and PWRPA has been its retail electric service provider since January 2005. The Aggregations Services Agreement provides that PWRPA operations are governed by a Board of Directors comprised of a representative from each Project Participant. Frank Maitski represents the SCVWD as a PWRPA Director.

Each Project Participant has a seat on the PWRPA Board and has a proportionate vote that it may cast on any matter requiring Board approval. Each Project Participant's vote is based on a bicameral formula where 50% of the voting share is based on one vote per entity and 50% is based on energy use over a 5 year period. Project Participant voting shares are recalculated on an annual basis to account for an additional year's energy use in the bicameral formula. The SCVWD's current voting share is 5.55%. The SCVWD Board of Directors approved the SCVWD's participation in PWRPA on January 20, 2004. Prior to January 2005, all SCVWD facilities received power from PG&E at average rates in excess of 12 cents (current rates are in excess 16 cents) with an exception of power received from Western Area Power Administration at Rinconada, Coyote, and Pacheco. In 2004, the SCVWD Board also delegated authority to the CEO to execute future aggregation service, operations, power purchase, transmission and distribution facility, and general development agreements that benefit the SCVWD with secured, reliable, and cost-effective power. The CEO has been managing the SCVWD's participation in PWRPA under this authority.

HYDROELECTRIC POWER

The common link between the 14 water purveyors in PWRPA is that they are all water contractors of the federal Central Valley Project (CVP) and receive an allotment of low cost hydroelectric power from the Western Area Power Administration (WAPA). Hydroelectric power is a byproduct of CVP operations. The first priority for use of this power is for Project Use—operations within the CVP including operation of the Pacheco and Coyote Pumping Plants. The cost for this power is approximately \$20/MWh (or 2 cents/kilowatt-hour). Project Use power cannot be applied to the Coyote Pump Station when it is used to pump the SCVWD's local water from Anderson Reservoir.

Additional power not used within the CVP is then made available to First Preference customers and then to Base Resource Customers. SCVWD, along with other PWRPA districts, has a Base Resource Contract. In order for PWRPA to serve its Project Participants at retail, each Project Participant, including SCVWD, has assigned its Base Resource Power allocation to PWRPA. PWRPA then uses the pool of Base Resource Power to serve each of its Project Participants guaranteeing that SCVWD receives no less than its original allocation and often much more than it would receive if it were independent. The SCVWD's power allocation has

been between 935 MWh to 1764 MWh which is about 6% to 10% of total SCVWD load per year, at a cost of approximately \$40/MWh. Periodically, some agricultural districts in PWRPA have difficulty using their full allotment of base resource due to low loads in the winter, and during wet conditions. If a PWRPA district cannot use its full allocation of base resource power, the power is made available to other PWRPA Participants like SCVWD at a cost significantly less, about 25%, than the cost of power on the open market. A reconciliation report on the use and cost of power for each agency is produced by PWRPA, annually.

SUPPLEMENTAL POWER

The total amount of base resource available to PWRPA is dependent on hydrologic conditions. During the first six years of PWRPA operations, base resource (hydro power allocation) accounted for 29% to 84% of PWRPA's annual load. As an independent electric utility, PWRPA must reliably provide sufficient power to meet the loads of all PWRPA agencies. To make up for the difference between load and base resource, the PWRPA General Manager must also acquire supplemental power on the open market. The PWRPA Board adopted a Risk Management Policy that includes a hedge policy that is employed by its General Manager to reduce volatility of the cost of delivered power to PWRPA Participants. This policy directs the Authorities supplemental power purchase program. Forward purchases are used to reduce the risk of very high price spikes in the open market.

The PWRPA Supplemental Power Purchase program is more complex than most programs due to the huge swings PWRPA experiences in both load and power supply caused by unpredictable annual hydrologic conditions. Power contracts are purchased up to three years in the future to hedge against high spot prices of electricity like those experienced in the Energy Crisis of 2000 and 2001.

Power consumption is then estimated on a daily and hourly basis in the short term. PWRPA schedules this power with the California Independent System Operator (ISO) and makes purchases on the open market to meet final metered demands, or sells excess power back to the open market. Accounts are then settled for each agency based on their actual use on an hourly basis.

To minimize reliance on market priced power, PWRPA Participants also make capital investments in new power producing facilities. As discussed in the CEO Bulletin of January 15-21, 2010, the CEO executed a rate agreement with PWRPA for 384 kilowatts of capacity from the Lodi Energy Center (LEC) project. The LEC project is being developed by the Northern California Power Agency which includes BART, the City of Santa Clara and the California Department of Water Resources. LEC is a 280 megawatt (MW) natural gas fired combined cycle gas turbine facility with state of the art, efficient technology. PWRPA's share of the capacity is approximately 7.6 MW with potential expansion to 8.0 MW with certain transmission fixes. The cost of the power is dependent on natural gas prices but is expected to be approximately \$68 per MWh and will meet approximately 5% of the SCVWD's energy load. The LEC project is scheduled to come on line in July, 2012.

CURRENT COST SHARING DISCUSSION AND NEGOTIATIONS

PWRPA has been operating for approximately six and one half years and experienced the full range of hydrologic conditions during this time. This diverse load and supply experience has allowed the organization to exercise all aspects of its joint powers and cost sharing agreements. Based on this experience, PWRPA members are now reexamining the cost allocation formulas

agreed to in 2004. The main principle in the discussion is to fairly pass through costs, as much as possible, directly to the agency that incurs them. There are three categories of costs to operate the organization. The cost formula for each is listed below.

- Administration—50% for each agency, 50% based on energy consumption
- Scheduling—50% for each agency, 50% by meter
- Metering—Percent of total number of meters
- Power costs including supplemental purchases

The most significant issue for the SCVWD is allocation of supplemental power. The PWRPA general manager enters into contracts for power up to three years in advance based on the total need for PWRPA. Supplemental power is then allocated to each agency for the calendar year based on load estimates. The allocation calculation is made in October of the previous year and assumes average conditions. When hydrologic conditions change from average, especially in a drought, the allocation formula allocates SCVWD more supplemental power than it needs and it must sell this excess, at either a profit or a loss, depending on the market price at the time of the sale. The situation is mostly caused by large swings in power demand for several of the large power consuming agencies. PWRPA members agree this method needs to be modified and the PWRPA general manager has developed a recommendation for the PWRPA Board to consider that will more closely track SCVWD power demand.

The current cost methodology for energy scheduling places an unfair burden on one agency that has hundreds of meters, but only one load like the rest of the Districts. SCVWD has a total of eight (8) meters. The PWRPA general manager has recommended that the 50% cost allocation based on meters instead be allocated on total energy. This recommended is acceptable to all agencies. This change would cause SCVWD a small scheduling cost increase of about \$11,000; annually.

In the PWRPA cost allocation formulas, 50% of the costs of Administration and Scheduling are allocated to each district on an equal basis. This allocation method results in a fairly large fixed cost burden for small districts when compared to the larger districts. The PWRPA general manager has developed a recommendation to reduce the fixed cost burdens on smaller PWRPA districts. There is not, however, general agreement on this recommendation. Regarding energy consumption, SCVWD is a small agency in PWRPA.

The PWRPA Board has been discussing cost allocation issues for over six months and has agreed to make all changes in cost allocation as a single package since costs saved by one participant are cost increases to other participants. The package requires a 75% favorable vote, based on voting share, of all PWRPA Participants. During the August Board meeting, a motion to adopt a complete package failed to receive a 75% yes margin. The PWRPA general manager was asked to clarify some aspects of the package and bring back the recommendations at the September Board meeting where adoption of a package is likely.

RECLAMATION

Managing Water in the West

Mid-Pacific Region

Central Valley Project Hydropower Production

Introduction

Reclamation's Mid-Pacific Region has eleven hydroelectric powerplants in the Central Valley Project (CVP) with a maximum operation capability of 2,100 megawatts (MW) when all reservoirs are at their fullest. The power generated from these plants helps California meet its energy needs and assists the economy.

CVP Powerplants and Capacities:

Northern California Area Office (NCAO)

Shasta Dam	710 MW
Trinity Dam	140 MW
Judge Francis Carr	154 MW
Spring Creek	180 MW
Keswick Dam	105 MW
Lewiston Dam	350 kilowatts (KW)

Central California Area Office (CCAO)

Folsom Dam	207 MW
Nimbus Dam	17 MW
New Melones Dam	383 MW

South-Central California Area Office (SCCAO)

O'Neill	14.4 MW
San Luis	202 MW

What's a kilowatt?

When you use electricity to cook a pot of rice for 1 hour, you use 1,000 watt-hours of electricity! 1,000 watt-hours equals 1 kilowatt-hour, 1 kWh. Your utility bill usually shows what you are charged for the kilowatt-hours you use. The average residential rate is 8.3 cents per kWh. A typical U.S household consumes about 11,000 kWh per year, costing an average of \$900 annually.

Source: Consumer Guide to Home Energy Savings, 8th Edition. 2003. Washington, D.C.: ACEEE; www.aceee.org.

A megawatt (MW) is 1,000 kilowatts

What Reclamation is Doing

The CVP had a memorable power generation year in 2006, producing 7,301,045 megawatt hours (MWh). Typically, the CVP generators produce about 4,500,000 MWh in an average water year. In FY2010, CVP power generation was 4,222,000 MWh. Because of the wet winter conditions and expected high runoffs and high reservoir levels, by the end of fiscal year 2011, the CVP is forecasted to produce 5,730,000 MWh.

What it Takes to Get the Job Done

CVP powerplants are operated 24 hours a day, 365 days a year. Facilities staff implements a comprehensive preventative maintenance program to ensure everything remains running, coordinating outage scheduling for optimization of water and power, and accomplishing facility and equipment improvements. In addition, each generator is taken out of service in the fall or early winter for approximately 2-3 weeks for extended maintenance, repairs, and minor improvements.

At NCAO facilities, many upgrades and improvements have recently taken place. In June 2008, rewinding and runner replacement for the last unit at Shasta was completed. The five original units



U.S. Department of the Interior
Bureau of Reclamation

each rated at 75 MW now each produce 142 MW. At CCAO, both Folsom and Nimbus powerplants are due for major overhauls with Unit 2 contract awarded for this work and expected to be completed August 2011. Work is being performed during the October-June outage periods which began in 2009 and ends in 2014. With this strategic blend of preventative maintenance and facility enhancements, hydropower production and reliability is increased, but remains very economical.

NCAO has 75 craftsmen, as well as managers, engineers, and other support staff who together keep the power flowing. CCAO has a centralized Operations and Maintenance (O&M) staff consisting of about 30 craftsmen and 6 engineers.

Reclamation Partners

From a power perspective, Reclamation's customers are both water and power users; both value the products produced by the CVP. To ensure reliability and dependability of the energy generated by CVP powerplants, Reclamation's power customers began advance financing of the power O&M portion of the CVP budget in 1998. The Western Area Power Administration (WAPA), markets and transmits the energy the CVP produces. WAPA follows a formal procedure for allocating CVP energy to "preference" customers. Those customers have 20-year contracts (that expire in 2024) for their share of the CVP energy that is in excess of Reclamation's water pumping needs.

How CVP Hydropower Contributes to the Economy

CVP energy is sold "at cost" to our customers. This cost is approximately \$30 per MWh to CVP preference customers and is based on specific capital costs due to construction of the CVP plus annual O&M costs allocated to power. On top of the price paid for the CVP energy, the preference customers also pay approximately \$15 per MWh for their contribution to the CVP restoration fund.

CVP Hydropower Makes a Difference During Heat Waves

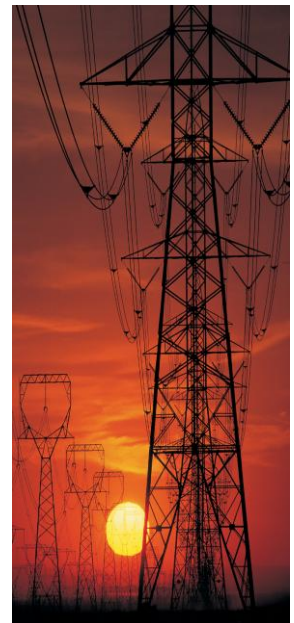
CVP power generation is "shaped" so that maximum production is predominantly available during the peak hours of noon to 6 p.m. Releases from Reclamation's regulating reservoirs – Natomas, Keswick, and Lewiston – are held constant during a 24-hour period so they are at their lowest levels by early morning as upstream generators do not generate during that time (off-peak periods). Then, these same upstream generators can be loaded heavily during higher peak demand times, thus filling the regulating reservoirs by early evening. On August 25, 2010, CVP hydroelectric powerplants produced about 1,200 MW of the 47,350 MW Californians needed at the peak of electrical usage.

For More Information:

MP Region Public Affairs

916-978-5100

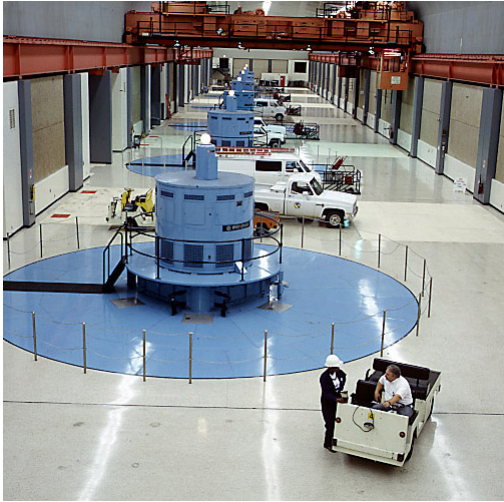
www.usbr.gov/mp



SWP HYDRO GENERATION

California Hydroelectric Statistics & Data

In 2007, hydro-produced electricity used by California totaled nearly 43,625 giga-watt-hours (GWh) or 14.5 percent of the state's total system power. In-state production accounted for 69.5% of all hydroelectricity, while imports from other states totaled 30.5%.



A total of 343 hydroelectric facilities are in California with an installed capacity of 13,057 megawatts (MW). Hydro facilities are broken down into two categories: larger than 30 MW capacity are called "large hydro"; smaller than 30 MW capacity is considered "small hydro" and are totaled into the renewable energy portfolio standards. The amount of hydroelectricity produced varies each year. It is largely dependent on rainfall.

One of those hydro facilities is the Edward Hyatt Power Plant on Oroville Dam, pictured on the right. According to the [Calif. Dept. of Water Resources](#), the "Hyatt Power Plant was constructed in the bedrock below Lake Oroville. A cavern the size of two football fields was dug out to house the facility." Of the six units, three generate power, while the other three can either pump water for pumped water storage or generate power."

The Hyatt Power Plant is part of California's [State Water Project](#), which is the largest state-built water and power development and conveyance system in the United States. It is the largest single power consumer in the state and the fourth largest energy producer. It makes a significant contribution to the state's electrical grid because the hydro power offers a flexible resource with rapid response to help stabilize the power grid.

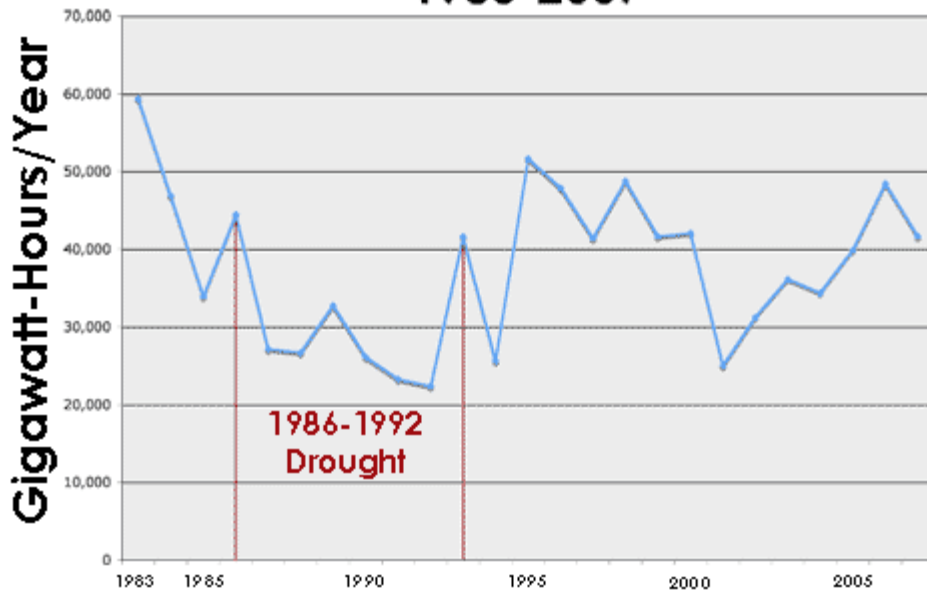
California 2007 Total System Power from Hydro in Giga-watt Hours					
Fuel Type	In-State Generation	Northwest Imports	Southwest Imports	Total System Power	Percent of Total System Power
Large Hydro	23,283	9,263	2,686	35,232	11.7%
Small Hydro	3,675	4,700	18	8,393	2.8%
Total Generation	209,856	24,669	67,547	302,072	100.0%

Source: [Total System Power](#)

**Total Hydroelectricity Production
(In Giga-watt-Hours; Includes Imports)**

				1983	1984	1985	1986	1987	1988	1989
Hydroelectric				59,351	46,880	33,898	44,478	27,140	26,692	32,742
Total Generation				199,609	211,900	210,172	211,028	220,371	232,926	238,567
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Hydroelectric	26,092	23,244	22,373	41,595	25,626	51,665	47,883	41,400	48,757	41,627
Total Generation	252,355	242,343	245,535	242,026	256,719	256,367	253,621	255,080	276,412	275,803
	2000	2001	2002	2003	2004	2005	2006	2007		
Hydroelectric	42,053	25,005	31,221	36,140	34,372	39,891	48,431	43,625		
Total Generation	280,496	265,059	272,509	276,969	289,359	287,977	295,268	302,072		

**Hydroelectric Production
1983-2007**



ATTACHMENT 3 - GLOSSARY OF TERMS

A - Ampere	The unit of measure of electric current
Control Area	A large geographic area within which a utility (or group of utilities) regulates electric power generation in order to maintain scheduled interchanges of power with other control area and to maintain the required system frequency.
Demand	The amount of a commodity or service requested at a specified time. The demand on utility system is the amount of energy drawn by customers at a specific time. Demand may also be referred to as load.
Demand - Off peak	Specific time of use for electricity demand from utility companies. Refer to following table.
Demand - On Peak	Specific time of use for electricity demand from utility companies. Refer to following table.
Demand - Partial Peak	Specific time of use for electricity demand from utility companies. Refer to following table.
Demand - Super Peak	Specific time of use for electricity demand from utility companies. Refer to following table.
GWh – Giga-watt-hour	1,000 million watts
Hydroelectric Energy	Energy that is produced from gravitation forces on the water or movement of water
KVA	Thousand volt-ampere
kW - Kilowatt	Thousand watts
Landfill Gas	Gas produced when organic matter decomposes in solid waste disposal sites, or landfills. Landfill gas can be flared, used on-site to fuel electric generators, or processed to meet natural gas pipelines - quality standards and then distributed.
Large Hydropower	Hydroelectric systems larger than 30 MW
MW - Megawatt	Million watts
MWh – Mega-watt-hour	Unit of energy that is 1,000,000 watts consumed in one (1) hour
Public Utility	An entity that supplies the general public with an essential commodity or service, such as electricity, natural gas, water, or telephone service.
Renewable Energy	Energy that is naturally replenished which comes from sources such as geothermal, rain, sunlight, tides, water and wind. Examples include solar, hydro electricity, biomass, landfill, and micro turbines
Small Hydropower	Hydroelectric systems smaller than 30 MW
Tariff	Public schedules detailing utility rates, rules, service territory, and terms of service that are filed for official approval with a regulatory agency
TOU	Time of use
V - Volt	The unit of measure of electric potential
VA - Volt-ampere	The basic unit of measure of apparent power in an electric circuit
VAR - Reactive volt ampere	The portion of the apparent power that does no work in an alternating current circuit, but that must be available to operate certain type of electrical equipment.
W - Watt	The basic unit of measure of real electric power, or rate of doing.

ATTACHMENT 3 - GLOSSARY OF TERMS

SPECIFIC TIME OF USE (TOU) TO DETERMINE POWER DEMANDS:

Pacific Gas and Electric (PG&E)

Demand Type	Months	Time	Days
Peak	May 1st-October 31th (First Half)	12:00 PM-6:00 PM	Monday-Friday (Except holidays)
Partial		8:30 AM-12:00 PM	Monday-Friday (Except holidays)
		6:00 PM-9:30 PM	Monday-Friday (Except holidays)
Off		9:30 PM-8:30 AM	Monday-Friday (Except holidays)
	All Day	Saturday, Sunday, and holidays	
Partial	November 1st-April 30th (Second Half)	8:30 AM-9:30 PM	Monday-Friday (Except holidays)
Off		9:30 PM-8:30 AM	Monday-Friday (Except holidays)
		All Day	Saturday, Sunday, and holidays

Power and Water Resource Pooling Authority (PWRPA)

Demand Type	Months	Times	Days
Super	January 1st-June 30th (First Half)	1:00 PM-8:00 PM	Monday-Saturday
On		7:00 AM-12:00 PM	Monday-Saturday
		9:00 PM-10:00 PM	
Off		11:00 PM-6:00 AM	Monday-Saturday
	All Day	Sundays & holidays	
Super	July 1st - December 31st (Second Half)	1:00 PM-8:00 PM	Monday-Saturday (Except holidays)
On		7:00 AM-12:00 PM	Monday-Saturday
		9:00 PM-10:00 PM	
Off		11:00 PM-6:00 AM	Monday-Saturday
	All Day	Sundays & holidays	

Board Work Study Session on Energy Management

Presented by:

Frank Maitiski, PE
Deputy Operating Officer
Water Utility Technical Support Division



Outline

BOARD WORK STUDY SESSION ON ENERGY MANAGEMENT

- Relevant Board Policies
- Energy Consumption and Cost
- The District Partnership in Power Water Resource Pooling Authority (PWRPA)
- District Energy Management Practices
 - Scheduling, Tracking and Reporting
 - Water Operations Management
 - Energy Efficiency
 - Renewable Energy
 - Greenhouse Gases Emission
- Next Step
- Questions and Answers



2 |

Relevant Board Policies

BOARD WORK STUDY SESSION ON ENERGY MANAGEMENT

- Ends 2.1. Current and future water supply for municipalities, industries, agriculture and the environment is reliable.

- Ends 2.2.1. Manage, operate and maintain raw water transmission and distribution assets to maximize reliability, to minimize life-cycle costs and to minimize impacts to the environment.

- Ends 2.3.2. Manage, operate, and maintain the water treatment plant and treated water pipeline assets to maximize reliability, to minimize life-cycle costs and to minimize impacts to the environment.



3 |

Relevant Board Policies (continued)

BOARD WORK STUDY SESSION ON ENERGY MANAGEMENT

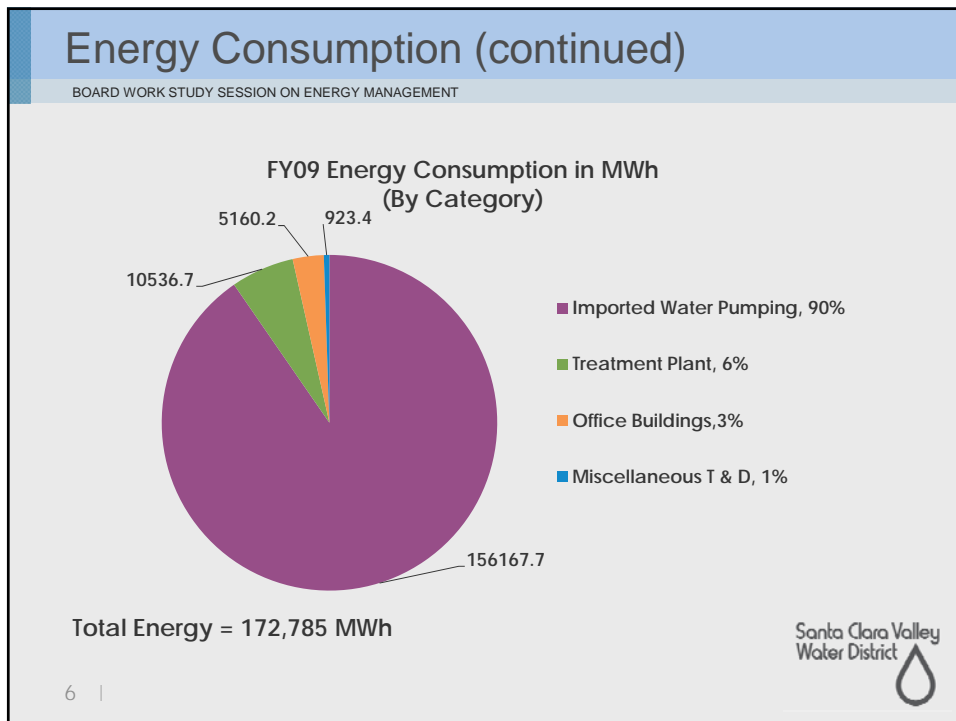
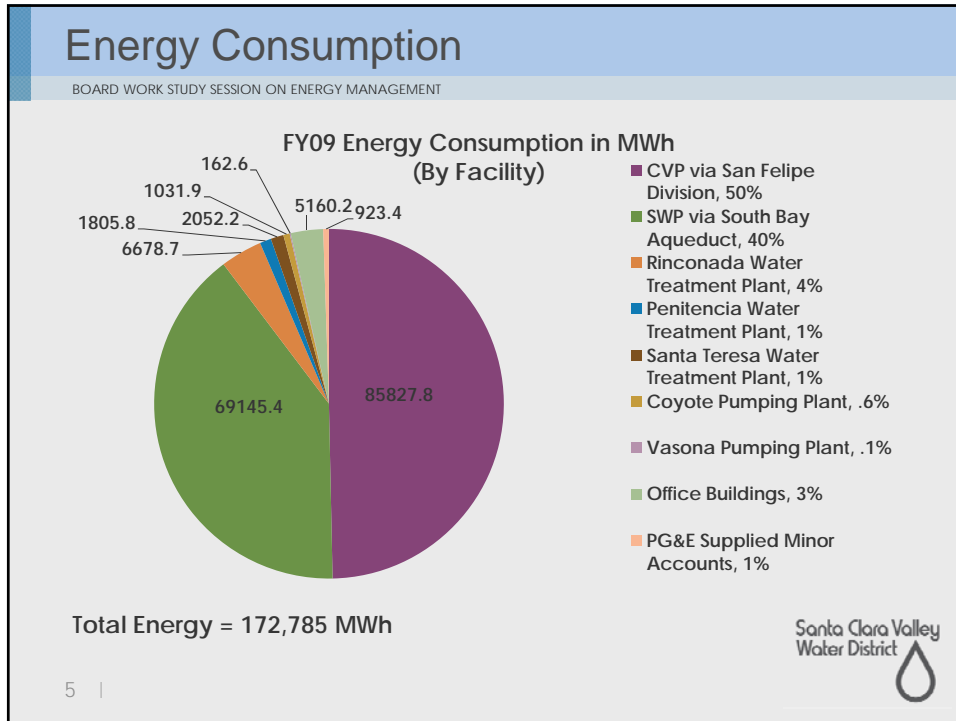
- Ends 4.3.2. Reduce greenhouse gas emissions when reasonable and appropriate.

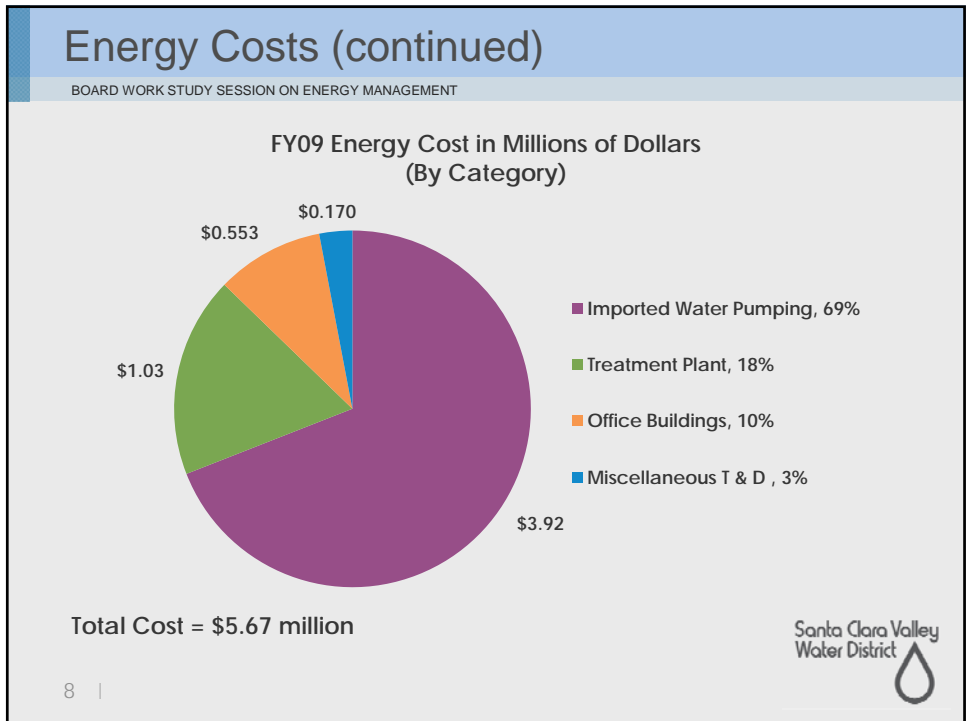
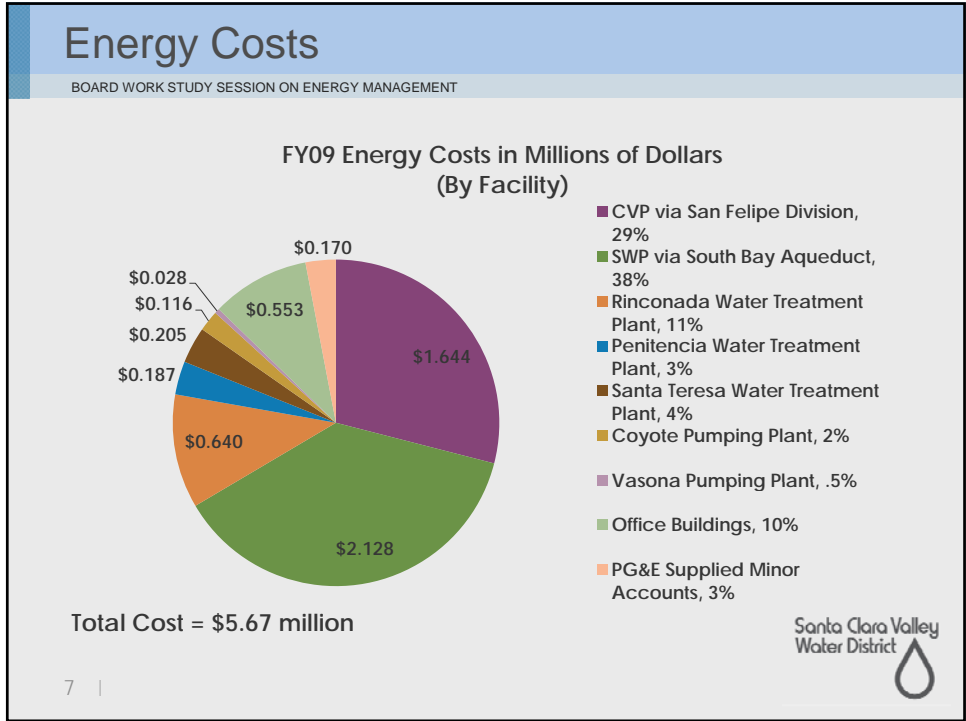
- EL 5.4. The CEO shall not spend extravagantly, inefficiently, or in ways more costly than necessary.

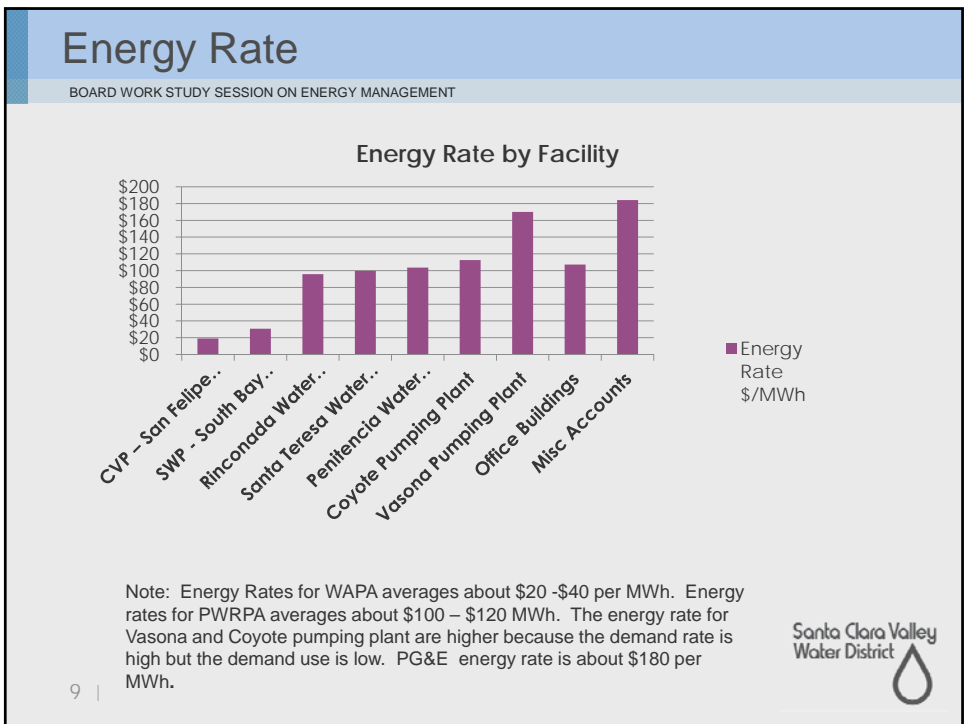
- EL 9.3. The CEO shall not fail to inform the Board of the intent to approve a collaborative agreement, and keep the Board informed on an ongoing basis.




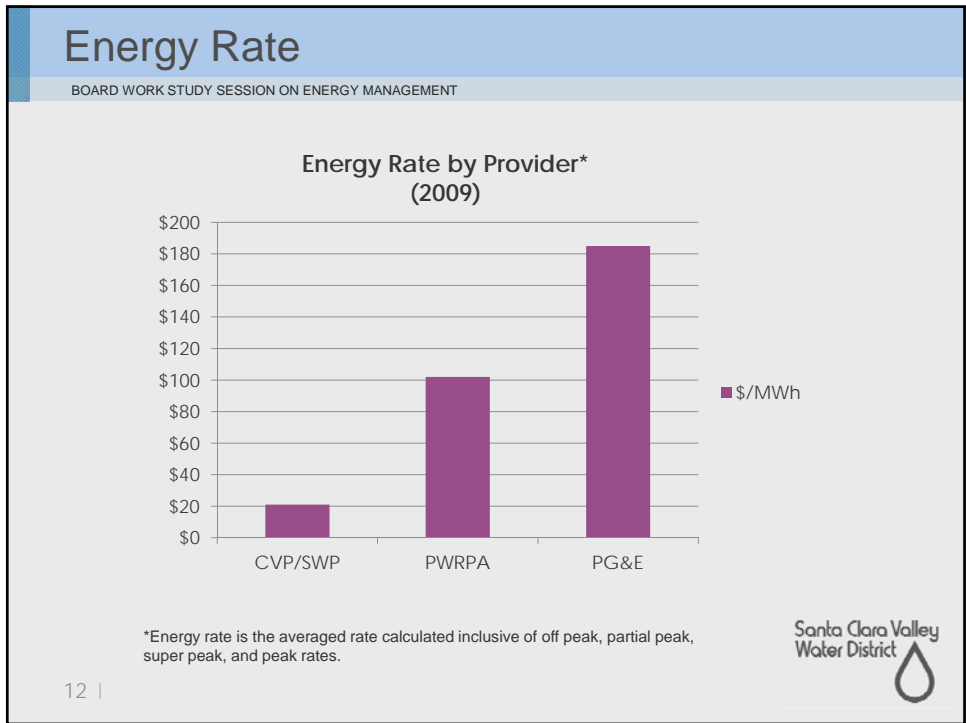
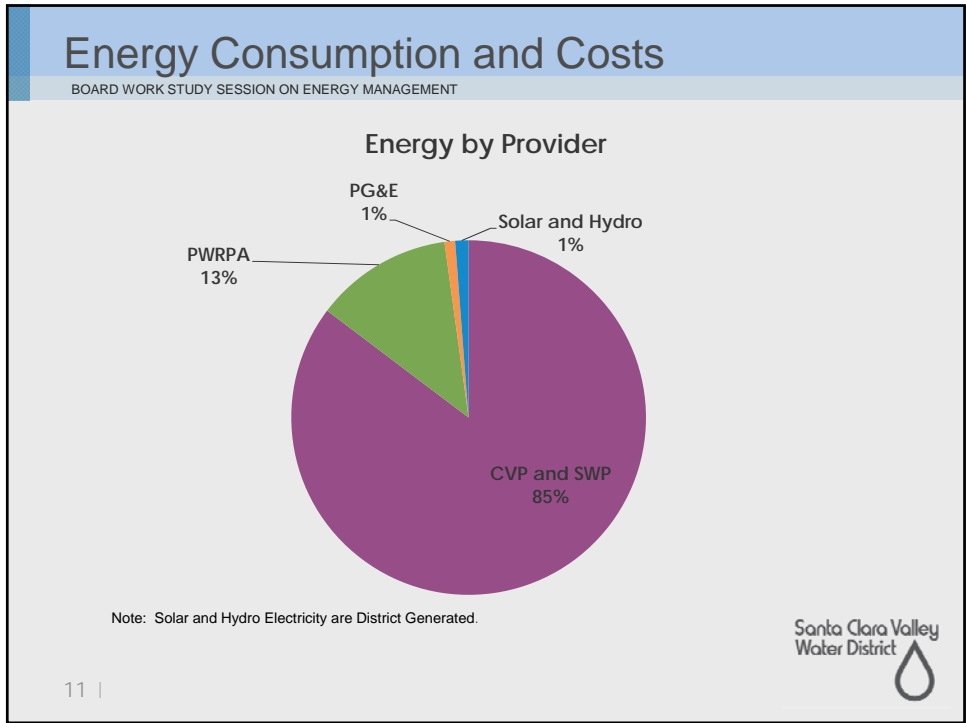
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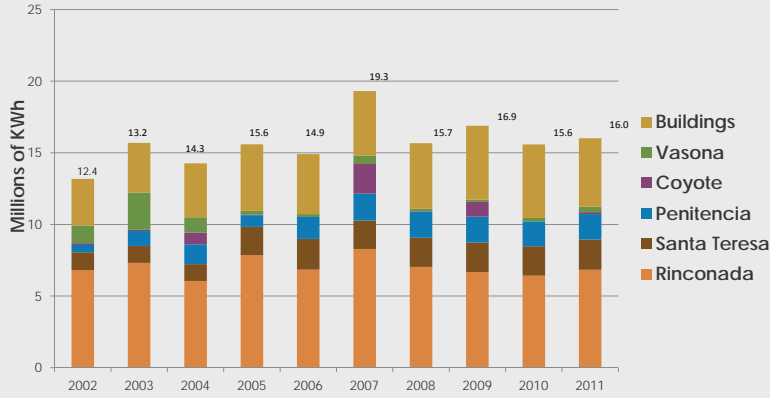
- ## Energy Consumption and Cost (continued)
- BOARD WORK STUDY SESSION ON ENERGY MANAGEMENT
- ### Energy Providers
- Central Valley Project (CVP) and State Water Project (SWP) ~85% Power Supply
 - San Felipe Division, Pacheco, Coyote Project Power, O'Neill and Jones Pumping Plant
 - Power Water Resources Pooling Authority (PWRPA), ~13% Power Supply
 - Rinconada, Santa Teresa, Penitencia, Coyote Commercial Power, Vasona, Almaden Campus
 - Pacific Gas and Electric, ~ 1 % of Power Supply
 - Miscellaneous Minor Accounts
 - Solar and Hydroelectricity, ~1% of Power Supply
- Santa Clara Valley Water District 
- 10 |



Energy Consumption

BOARD WORK STUDY SESSION ON ENERGY MANAGEMENT

Ten Year Annual Energy Usage



Note: This chart shows 10-year energy usage for the district managed account and excludes CVP and SWP usage.

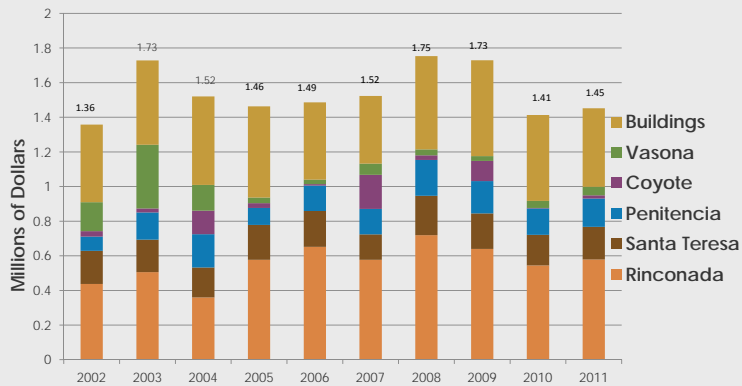


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Energy Costs

BOARD WORK STUDY SESSION ON ENERGY MANAGEMENT

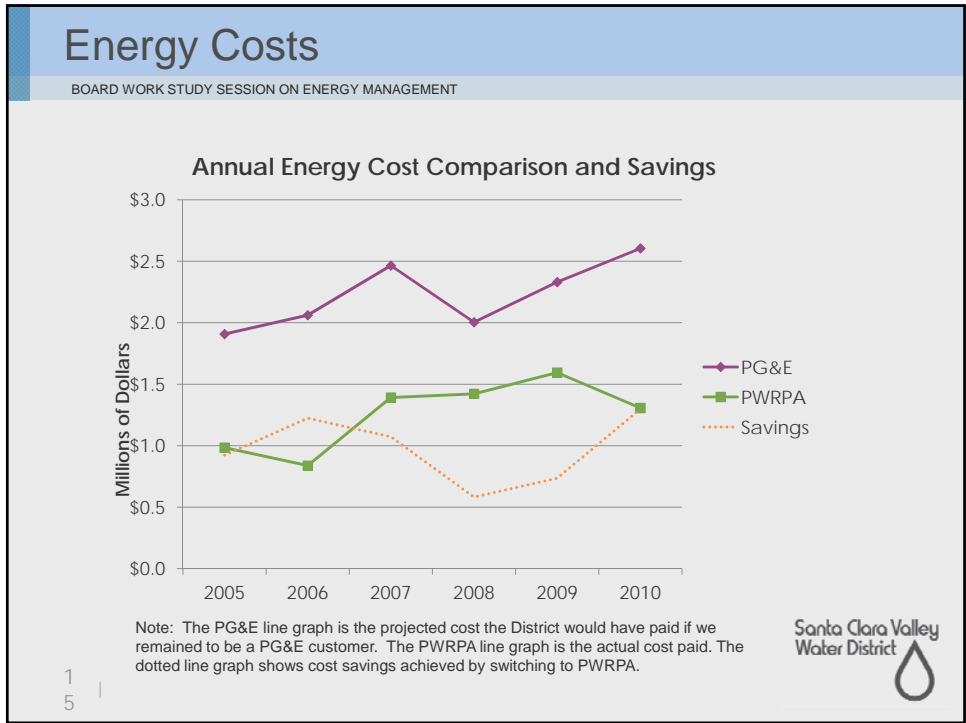
Annual Energy Costs



Note: This chart shows 10-year energy cost for the district managed account and excludes CVP and SWP usage.



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The District Partnership in PWRPA

BOARD WORK STUDY SESSION ON ENERGY MANAGEMENT

Electric Utility Organization

- Organized in 2004
- 14 water purveyors and irrigation districts

Mission

- Collectively manage individual power assets and loads by pooling and allocating resources

Santa Clara Valley Water District

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The District Partnership in PWRPA (continued)

BOARD WORK STUDY SESSION ON ENERGY MANAGEMENT

Participants

Irrigation Districts (Parties)

- Banta-Carbona Irrigation District (ID), Glenn-Colusa ID, James ID, Lower Tully River ID, Princeton-Cordora-Glenn ID/Provident ID, the West Side ID, West Stanislaus ID

Water Districts (Stakeholders)

- Arvin-Edison Water Storage District, Cawelo Water District, Reclamation District 108, Santa Clara Valley Water District, Sonoma County Water Agency, and Westlands Water District

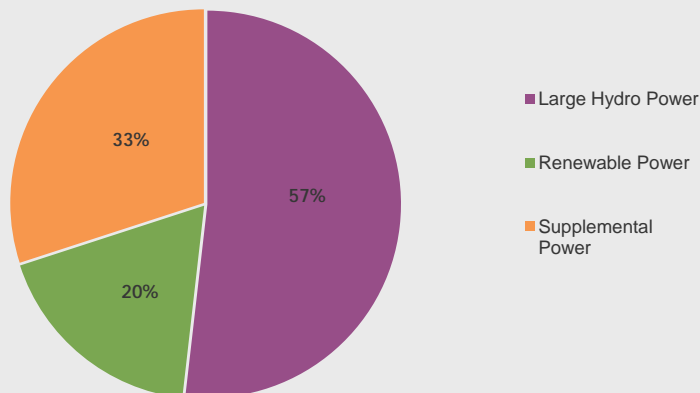


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The District Partnership in PWRPA (continued)

BOARD WORK STUDY SESSION ON ENERGY MANAGEMENT

PWRPA Portfolio on an Average Year



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The District Partnership in PWRPA (continued)

BOARD WORK STUDY SESSION ON ENERGY MANAGEMENT

PWRPA (Utilities) Responsibility

1. Resource Adequacy
 - *Plan and procure adequate electrical resources that are available to serve all members in real time*
2. Public Purpose Program (P3)
 - *Cost effective demand side management services to promote energy efficiency, investment in renewable energy resources and technologies, and research, development and demonstration programs for the public interests*
3. Renewable Energy
 - *Development of renewable resources in portfolio while considering standard rate, reliability, financial resources, and the environment*
4. AB 32 – The Green House Gas Legislation
 - *The auction proceeds available to PWRPA will be used to offset the higher cost of fossil fuel generation that must purchase Allowances to meet their GHG targets. This Cap and Trade program should begin in January 2013.*



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The District Partnership in PWRPA (continued)

BOARD WORK STUDY SESSION ON ENERGY MANAGEMENT

SB1x2 requires publicly owned utilities to implement and enforce a new renewable energy portfolio standard.

- Average 20% Renewable by December 31, 2013
- Average 25% Renewable by December 31, 2016
- Average 33% Renewable by December 31, 2020



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District Energy Management Practices

BOARD WORK STUDY SESSION ON ENERGY MANAGEMENT

- Scheduling, tracking, and reporting
- Water operation management
- Energy Efficiency
- Renewable Projects
- Greenhouse Gas Reduction



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District Energy Management Practices (continued)

BOARD WORK STUDY SESSION ON ENERGY MANAGEMENT

- SAMBA – Scheduling and Metering Billing Application

	Thursday 8/25/11	Friday 8/26/11	Saturday 8/27/11	Sunday 8/28/11	Monday 8/29/11	Tuesday 8/30/11	Wednesday 8/31/11
RWTP (MG/D)	50.00	50.00	50.00	50.00	50.00	50.00	50.00
Hourly Demand							
CONFIRMED:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

* The submission deadline for a given trade date is 4:00 AM of the previous day
 * The late submission deadline for a given trade date is 8:00 PM of the previous day



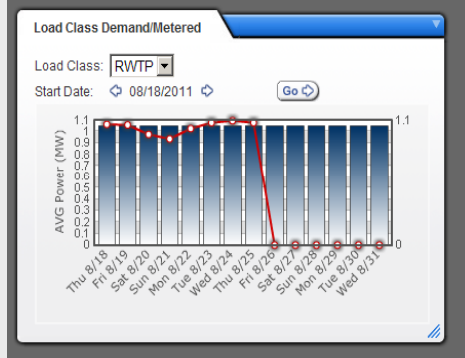
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District Energy Management Practices (continued)

BOARD WORK STUDY SESSION ON ENERGY MANAGEMENT

Tracking

- Actual and forecasts are graphed to display historical usage for planning, day ahead scheduling requirements, and purchases of supplemental power



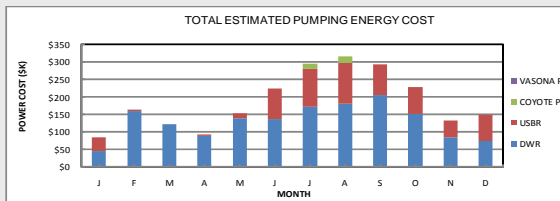
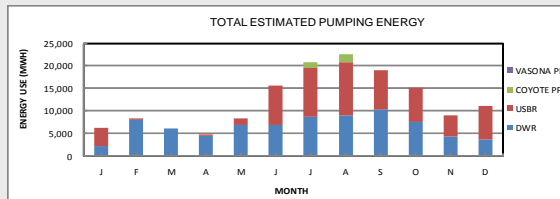
23 |

District Energy Management Practices (continued)

BOARD WORK STUDY SESSION ON ENERGY MANAGEMENT

Water Supply Operations Planning Models are used to Minimize In-County Pumping for Water supply

2011 Water Supply Operations Plan Energy Forecast



QP119016 2011 WATER OPS PLAN - AUG - 90% EXC.

TOTAL ENERGY REQUIRED: 147 GWH
 TOTAL ESTIMATED PUMPING COST: \$2.3 MILLION
 TOTAL VOLUME DISTRIBUTED RWDS: 152520 AF



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District Energy Management Practices (continued)

BOARD WORK STUDY SESSION ON ENERGY MANAGEMENT

In County Pumping is Avoided if Practical

OPERATIONS
Santa Clara Valley
Water District

Coyote Pump Plant Annual & Monthly Power & Cost

Document No.	OP02761007.3.10.2b
Revision	1
Effective Date:	4/25/33
Process Owner:	CP&U Unit Mgr

Page 1 of 1

Document No. OP02761007.3.10.2b
Revision 1
Effective Date: 4/25/33
Process Owner: CP&U Unit Mgr

Coyote Pump Plant Annual Power

Coyote PP Power Cost (\$)

Power Use (KWH)

Power Cost

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District Energy Management Practices (continued)

BOARD WORK STUDY SESSION ON ENERGY MANAGEMENT

Energy Efficient Drives

- Replacement of Adjustable Speed Drive at Rinconada Water Treatment Plant, Construction Cost \$180K, Energy Saving 12,945 kWh/Year

Before

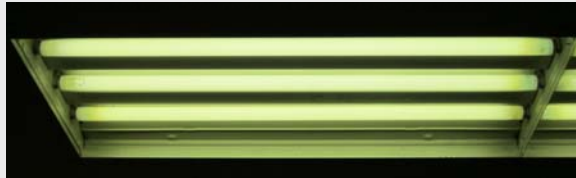
After

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District Energy Management Practices (continued)

BOARD WORK STUDY SESSION ON ENERGY MANAGEMENT

- Energy Efficient Lighting Upgrades
 - Energy saving of 133,533 kWh/ year, Construction Cost \$116 K



Before



After



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District Energy Management Practices (continued)

BOARD WORK STUDY SESSION ON ENERGY MANAGEMENT

- HVAC Duct Replacement



Before



After



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District Energy Management Practices (continued)

BOARD WORK STUDY SESSION ON ENERGY MANAGEMENT

Public Purpose Program (P3)

Incentive 1 (June 2009)

- Power monitoring equipment, District wide
 - ✓ Cost \$ 34,702, Qualified Amount 100%

Incentive 2 (May 2011)

- Adjustable speed drives for Backwash Project at Penitencia Water Treatment Plant
 - ✓ Cost \$334,000.00, Qualified amount for funding \$124, 255



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District Energy Management Practices (continued)

BOARD WORK STUDY SESSION ON ENERGY MANAGEMENT

Anderson Dam Hydroelectric System

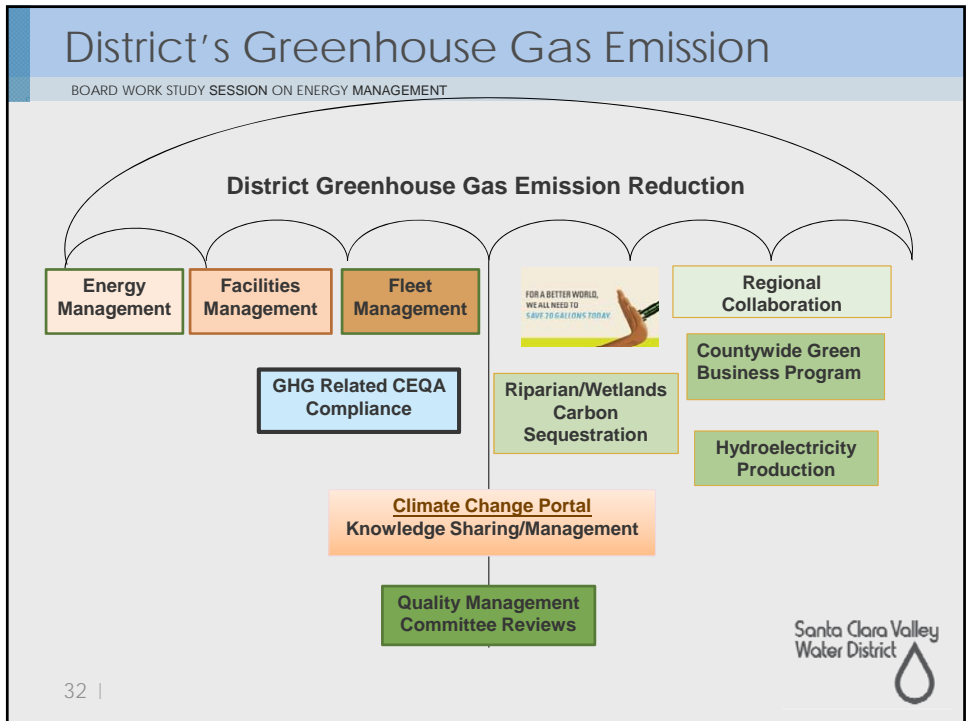
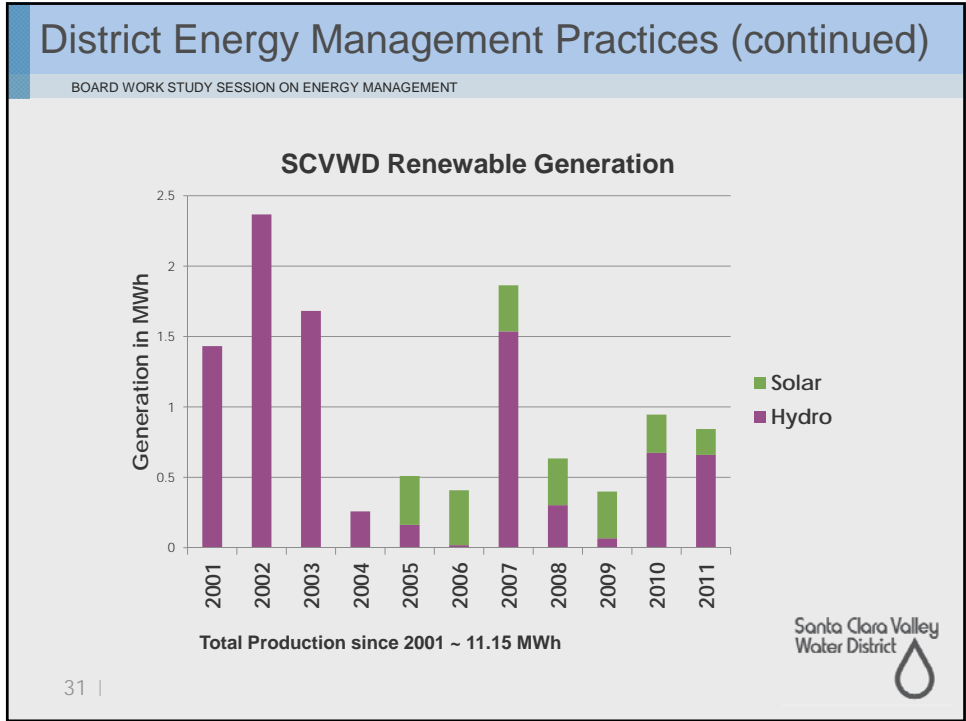
Almaden Photovoltaic System

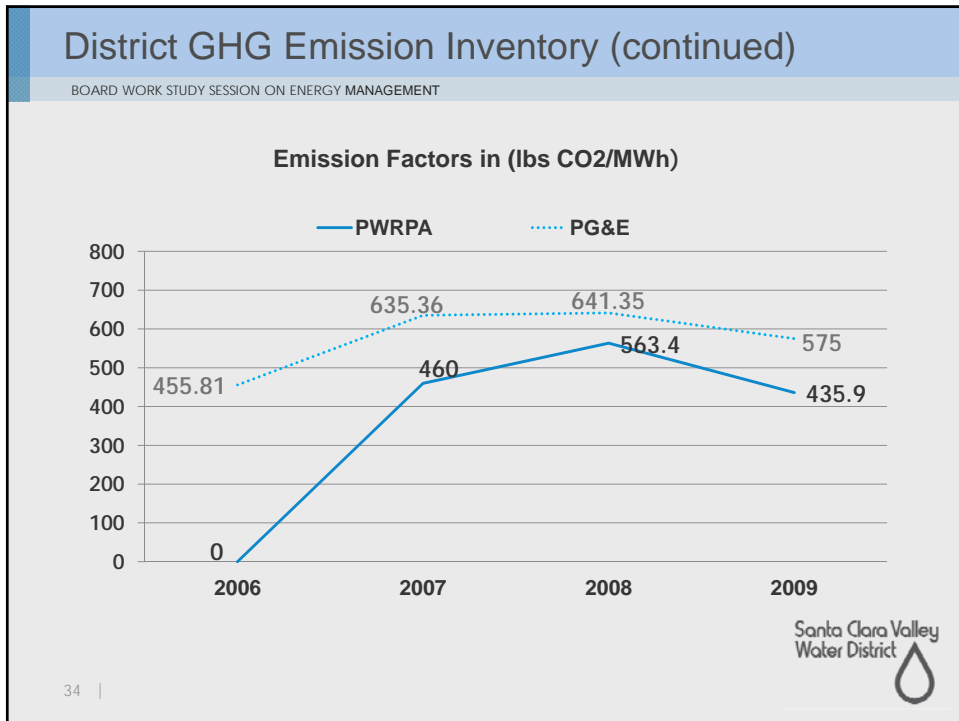
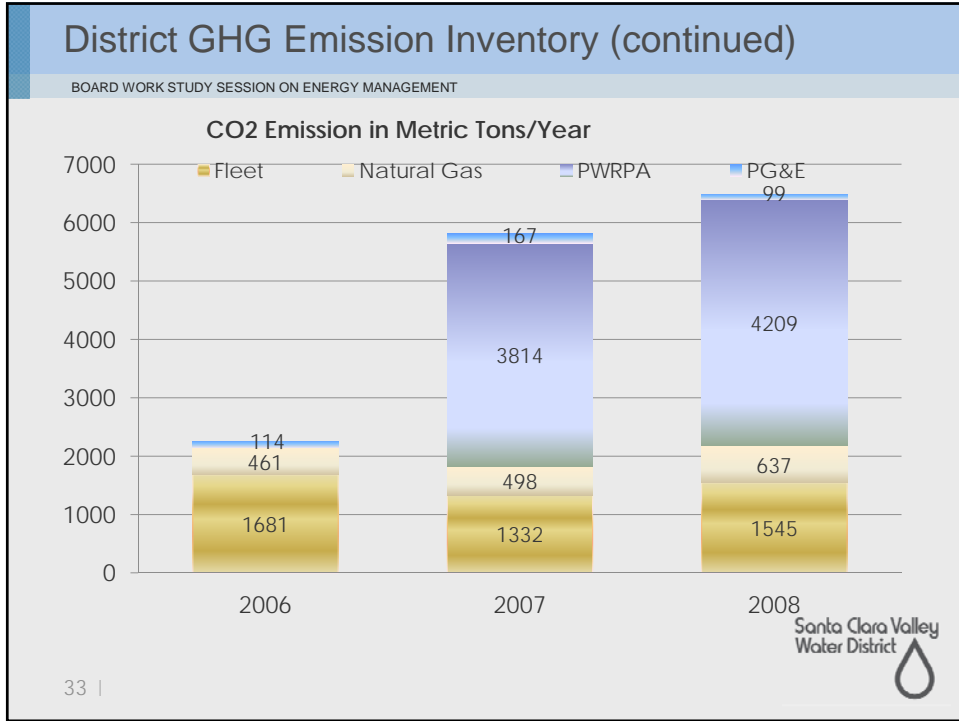
PWRPA Shared Renewable Systems

Future Renewable Opportunities



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GHG Emission Increases/Reductions (continued)

BOARD WORK STUDY SESSION ON ENERGY MANAGEMENT

Efficiency Measures	Reductions
<ul style="list-style-type: none"> kWh/MG water treated kWh/ sq. ft building space CO₂ in lbs / kWh 	<ul style="list-style-type: none"> Energy efficient technologies/BMPs Renewable in Energy Supply Portfolio Water Conservation Anderson Hydro Wetlands Riparian Habitats Green Business Business Related Travel Alternative Work Schedule


Santa Clara Valley Water District

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Greenhouse Gas Reduction (continued)

BOARD WORK STUDY SESSION ON ENERGY MANAGEMENT


Recognition



2004



2009-10



2010-11

Santa Clara Valley Water District

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Next Steps

BOARD WORK STUDY SESSION ON ENERGY MANAGEMENT

- ❑ Continue with power and water scheduling, tracking, reporting energy usage and cost, and long term load forecasting.
- ❑ Continue to optimize planning model to minimize in-county pumping.
- ❑ Conduct an energy audit in fiscal year 2013 and develop future project plans for improving energy efficiency under operational and capital improvement projects.
- ❑ Continue to achieve energy saving through the water use efficiency program.
- ❑ Continue to utilize available PWRPA P3 funds to execute energy efficiency projects.



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Next Steps (continued)

BOARD WORK STUDY SESSION ON ENERGY MANAGEMENT

- ❑ Continue with green house gas emission inventory reporting and green business program.
- ❑ Implement recommendations in Process Control Systems Master Plan for better management of pumping schedules and production rates in order to achieve the targeted energy savings.
- ❑ Install PWRPA electric service at South Bay Advance Recycle Project that would provide annual cost saving of \$0.5 million compared to PG&E electric service.
- ❑ Consider and develop In-conduit hydroelectric turbines on the distribution system where pressure reduction is needed. These systems would replace pressure reducing valves with small turbines to produce power.




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Question & Answer

BOARD WORK STUDY SESSION ON ENERGY MANAGEMENT

Q&A?

Santa Clara Valley
Water District 

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