



Santa Clara Valley Water District

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BOARD AGENDA MEMORANDUM

SUBJECT:

Climate Change Mitigation- Update on Progress Towards Carbon Neutrality by 2020.

RECOMMENDATION:

Receive and discuss information on progress towards carbon neutrality by 2020.

SUMMARY:

This is the annual update of staff efforts to achieve carbon neutrality for the District by 2020. Using the methodology adopted by the Board in 2013, staff estimates that the District can offset 22,160 of its 22,700 metric tons of CO₂e emissions. Staff will continue to refine this estimate on an annual basis, and will also continue to explore opportunities to reduce its carbon footprint over the next five years to meet this goal.

Background

The District's efforts on climate change include two parts, adaptation and mitigation. Adaptation refers to District activities to address the impact of climate change on the District's mission, including promoting and supporting resilient and adaptable water supply, reducing flood risks and flood damages, enhancing ecosystem resiliency, and improving understanding through training and communication. Climate change mitigation refers to District activities to reduce greenhouse gas emissions, improve energy efficiency, and work towards achieving carbon neutrality. In the future, staff will provide one update for adaptation efforts in the spring; and one update for mitigation efforts in the fall of each year. This agenda item provides an update on progress towards achieving carbon neutrality since the last report on October 28, 2014.

As the primary water resources agency for Santa Clara County, the District manages an integrated water resources system that includes the supply of clean, safe water, natural flood protection, and stewardship of streams on behalf of Santa Clara County's 1.9 million residents

The District's ability to provide those services is challenged by the potential of warmer temperatures, changing precipitation and runoff patterns, reduced snow pack, and rising sea levels. Managing climate change related uncertainties, vulnerabilities, and risks to local water resource management is critical to fulfill the District's mission.

The Board recognized that climate change not only affects the District's mission, but also that District operations generate, avoid, reduce and sequester Greenhouse Gases (GHG). Therefore, the Board established Board's Policy No. E-4.3.1: "Reduce greenhouse gas emissions to achieve carbon neutrality by 2020", which directs the District's efforts in reducing green house gas emissions.

At the March 26, 2013 Board meeting, staff presented a District-wide internal framework for achieving carbon neutrality by 2020. The Board adopted a methodology for calculation of the

District's carbon footprint and offsets from District activities such as its water conservation program. As shown in Table

1, staff's latest projection of the District's carbon footprint is 22,700 metric tons (MT) of CO₂e and the total offsets are 22,160 MT of CO₂e per year. This estimate projects the District can offset most of its emissions by 2020.

Updated Carbon Emission and Reduction Calculations

Table 1 is a summary of carbon emissions and offsets for District operations for 2010 to 2014, with an estimate of the same information for 2020. The major source of emissions is importing water from the State Water Project, and the major source of reductions is savings from the District's water conservation program. As shown on Table 1, achieving carbon neutrality is well within reach.

Table 1. Summary of Estimated and Projected Carbon Footprint and Offset in MT CO₂e /Year

Calendar Year		2010	2011	2012	2013	2014	2020
Emissions		22,100	21,800	29,800	29,700	22,000	22,700
1	Direct Emissions from District Operations	2,200	2,300	2,500 ¹	2,800 ¹	3,000 ¹	2,200
2	Indirect Emissions from Purchased Electricity	2,200	500	3,400 ¹	4,000 ¹	6,000 ¹	4,400
3	Other Emissions	17,700	19,000	23,900	22,900	13,000	16,100
	a. Import from State Water Project	14,800	16,100	21,100 ²	20,000 ²	10,100 ²	13,200 ³
	b. Employee and Business Travel	2,900	2,900	2,900	2,900	2,900	2,900
Reduction/Sequestration		22,400	23,100	24,200	23,000	23,500	22,160
1	Water Conservation Program (WCP)	17,100	17,800	18,400	16,700 ⁴	17,000 ⁴	14,800 ⁵
2	Recycled water	2,500	2,500	3,000	3,500	3,700	3,700
3	Carbon sequestration	500	500	500	500	500	500
4	Green Business Program	2,200	2,200	2,200	2,200	2,200	2,200
5	Energy optimization measures	100	100	100	100	100	960
Difference		300	1,300	-5,600	-6,700	1,500	-540

Notes to the Table: 1 These are estimates and verifications will be completed in June 2016; 2 District specific emission factor based on EF for CY 2013 the State Water Project; 3 Projection based on DWR's projected emission reduction for CY 2020; 4 Adjusted based on changes in PG&E's emission factors as compared to the 3-year averages of CY 2005 to 2007; 5 Projection based on a 45% reduction in PG&E's CY 2020 EF compared to the 3-year average of CY 2005 to 2007.

It is important to recognize that there are uncertainties associated with estimating emissions from the State Water Project, employee and business travels, and reductions from water conservation, water recycling, habitat restoration, and the green business program. The methodologies to calculate emissions and reductions will continue to evolve over time.

A significant change is the calculation of carbon emissions from the State Water Project. The State refined its estimates and clarified its reduction target through the recently completed Greenhouse Gas Emission Reduction Plan. Working with the Department of Water Resources (DWR), staff updated the calculations as follows:

Customized emission factor for District's imported water: Since March 2013, the State revised its estimates, and provided energy use data, to provide the basis for calculating the emission factor for importing from the State Water Project to the District. Instead of using a statewide data, the District now has a customized estimate. This customization is based on the energy intensity of water delivered

directly to the District.

Projected GHG emission based on DWR's Emission reduction target: DWR provided baseline emission data for the State Water Project for 1990 and its target for reduction. By 2020, DWR is targeting a 50% reduction from its 1990 baseline. Staff used this information in its updated estimate for Year 2020 GHG emission for the State Water Project.

Projected carbon offset adjusted: PG&E provided an informal estimate for Calendar Year (CY) 2020 emission factor, reflecting a 45% reduction from the baseline data staff used for estimating the carbon offset for water conservation. The baseline data was based on the average of CY 2005 to 2007 emission factor. Staff plans to further refine the estimates for water recycling, and from the green business program in future updates.

Projected future electricity needs for expanded water treatment facilities: Staff incorporated the future electricity needed for the Silicon Valley Advanced Water Purification Center (SVAWPC) and for the addition of ozone treatment at Rinconada Water Treatment plant.

At this time, staff has not incorporated impacts of the expedited purified water program including the energy demand for operating the expanded treatment facility, nor related carbon offset from the increased use of purified water. The District's expanded purified water facilities are expected to begin operating after 2020.

Energy Optimization Plan

This section outlines the status of the energy optimization effort, which includes the development of renewable energy projects, Power and Water Resources Pooling Authority (PWRPA)'s renewable energy projects, energy efficiency and conservation and other efforts.

Development of Renewable Energy Projects

Staff is pursuing both photovoltaic (PV) solar generation and in-conduit hydro-electric energy recovery projects. The District, as a member of PWRPA, continues to work with a PV Solar developer to implement PV solar systems at Santa Teresa and Penitencia water treatment plants (WTPs). The solar project will be funded through a power purchase agreement (PPA), which will allow the District to purchase solar power at a fixed rate over the 20-year project duration.

Staff is also researching potential in-conduit projects to recover energy dissipated during water distribution. During FY15, staff worked with NLine Energy, Inc. (NLine) to further analyze the Anderson Hydroelectric facility to expand on an initial feasibility study completed in 2014. During the initial feasibility study, many raw and treated water turnouts were deemed to be not economically feasible. Staff continues to monitor alternative hydroelectric designs that may be suitable for energy generation.

The status of these projects is shown below.

Photovoltaic Solar Projects

The PV systems at Santa Teresa and Penitencia WTPs are expected to provide 560 kW of power and generate approximately 850 megawatt-hours (MWh) of energy annually over the 20-year term of the power purchase agreements (PPAs) between PWRPA and the Green Light.

As reported during the October 2014 Climate Change Mitigation update, the District was unable to reach an agreement

with the original solar developer for the project, SolarCity Corporation (SolarCity), due to financial and risk management disparities. Staff subsequently began negotiations with the next highest-ranked bidder, Green Light Energy Corporation (Green Light), in November 2014.

The unique, three-party partnership between public and private agencies complicated project development. Since the PV systems are expected to be installed at continuously operating water treatment facilities, negotiating terms to ensure reliable treatment plant operations required extensive review by District legal and project staff. Terms related to suspension of the solar panel system during extended plant shutdowns, obligation to deliver and receive energy, and conditions for early termination and associated fees prolonged negotiations with Green Light.

Working with PWRPA, staff successfully finalized a PPA and site license for each project site in May 2015. During the June 2015 PWRPA Board meeting, the PWRPA Board approved the two PPAs between PWRPA and Green Light, and a rate agreement between PWRPA and the District. Together, the agreements allow the District to purchase, through PWRPA, the solar energy generated from the project for direct use at the water treatment facilities. Approval of the site license for each project site is pending a California Environmental Quality Act (CEQA) review by Green Light; the CEQA work is currently in progress at the two treatment plants and expected to be complete by November 2015.

Complications during negotiations and project delays during CEQA review have lengthened the project timeline. Construction is currently scheduled to begin in December 2015, and both sites are expected to be operational by summer 2016.

In-Conduit Hydroelectric Projects

The existing PPA agreement with PG&E to export energy generated by the Anderson hydroelectric facility expires in 2018. The recent NLine analysis presents multiple options for transitioning the facility as the existing the PPA agreement expires. The recommended options include (1) retiring one of the two existing generating turbines and switching to a more profitable feed-in tariff with PG&E, or (2) replacing one of the turbines with a smaller unit to capture baseload flows that currently bypass the existing turbines. Staff will continue to work with NLine to decide which option is most suitable for future operation of the facility.

To recover energy from District pipeline and turnouts, staff continues to monitor prospective in-conduit technology. In February 2015, staff attended an informational meeting with Lucid Energy, Inc. (Lucid), the manufacturer of a unique vertical-axis turbine design, to review alternative methods for in-conduit energy generation. The vertical-axis turbine design has less impact to pipeline flow and water distribution operations than other turbine designs. Staff pre-screened potential treated water turnouts but Lucid determined the flows and pressures at the sites would not meet the minimum requirement for sufficient energy generation.

PWRPA Renewable Projects

PWRPA is subject to the State of California "Renewable Portfolio Standard" (RPS) mandate, whereby electric utilities must serve an RPS percentage of retail sales with renewable resources within a given Compliance Period. The RPS percentage increases from 21% in 2014, the beginning of Compliance Period 2, to 33% by 2020, the end of Compliance Period 3. PWRPA plans to meet its RPS mandate with a combination of renewable resources including an existing landfill gas and small hydro projects, as well as interests in new solar projects and short-term contracts with wind energy providers. The local renewable energy projects being pursued by the District will be used by PWRPA in meeting the RPS mandate.

Through PWRPA, the District was able to secure a 750 kilowatt (KW) allocation in the Whitney Point Solar Project

(Whitney Point), a 20 megawatt (MW) utility-scale solar project in Fresno County. Staff initially reported a 500KW participation in Whitney Point before PWRPA negotiated an allocation increase of 250KW for the District. This project is expected to become operational in 2017.

In 2014, PWRPA procured for the District a 400 KW share in the 75 MW utility-scale Astoria 2 Solar project located in Kern County, California. This project is also expected to be operational in 2017.

Participation in the above two utility-scale projects will increase the proportion of renewable energy in the District's annual purchased electricity portfolio.

Energy Efficiency and Conservation

Staff continues to implement recommendations from its recent energy audit. Out of 49 recommended energy conservation measures (ECMs), staff has completed 20. In FY15, staff completed five ECMs and currently has 19 ECMs in progress. These include a pump selection tool to display the efficiency of operating pumps at Pacheco Pumping Plant (PPP) and recommend the most efficient combination of pumps using real-time operating conditions. Staff also completed lighting upgrades at PPP, heating, ventilation, and air conditioning improvements for the Almaden Campus; and updated District specifications to replace older motors with high-efficiency motors at the WTPs.

Implementation of the Plan continues to depend on competing priorities in other District projects and programs, and project validation and prioritization.

Carbon Neutrality by 2020

Carbon neutrality can be achieved through advancing the following measures, which are already a part of the District's strategies:

Diversified water supply portfolio: About two thirds of imported water comes from zero-emission sources; the federal water project and the gravity-fed Hetchy Hetchy system. In 2010, about three fifths of the energy for the State Water Project was zero-emission hydroelectricity. Local supplies including natural surface water, groundwater, and recycled water continue to provide low-emission water supply.

Diversified energy sources: PWRPA provides 95% of the District's purchased energy and strives to optimize the purchase of renewable energy. PG&E is also one of the cleaner energy providers in the state. Additionally, the District continues to expand its renewable energy generation including photovoltaic solar and Anderson hydro production.

Conservation/Efficiency Program: Over two thirds of the carbon offsets come from the District's water conservation program. Energy efficiency and conservation continues to be the most cost effective way for emission reduction. The water conservation program, along with the energy optimization plan, will continue to play an important role.

Water Recycling: Increasing production of purified water will increase energy consumption at the Silicon Valley Advanced Water Purification Center, potentially increasing the energy related emissions. However, accelerated purified water production also provides carbon offsets. Any changes to the projections of purified water production will need to be incorporated in future plans.

Other efforts: Water recycling, the green business program, and habitat enhancements and restoration

continue to provide the co-benefits of contributing to the District's work toward carbon neutrality.

Next Steps for Climate Change Mitigation

Staff continues to implement the Energy Optimization Plan (see Attachment 2) described above and implement renewable energy projects, energy efficiency and conservation programs to offset the carbon footprint resulting from purchased electricity. PV solar projects at Santa Teresa and Penitencia WTPs are expected to be operational by summer 2016, while in-conduit hydroelectric projects will continue to be evaluated in FY2016. Staff will also continue to seek other opportunities for the District to reduce its carbon footprint. This includes working with the DWR to determine the feasibility of DWR purchasing renewable energy on the District's behalf for imported water from the State Water Project.

FINANCIAL IMPACT:

There is no direct fiscal impact with this item. Each project has its own fiscal consideration. Implementation of the Energy Optimization Plan over the planned five-year implementation period will be budgeted in future fiscal years.

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: PowerPoint

Attachment 2: Status of Energy Optimization Plan

UNCLASSIFIED MANAGER

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