Santa Clara Valley Water District

File No.: 16-0589

Agenda Date: 6/13/2017
Item No.: 5.1.

BOARD AGENDA MEMORANDUM

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

RECOMMENDATION:
Receive and discuss information on the District's progress towards carbon neutrality by 2020.

SUMMARY:
This is the update of District 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 22,360 of its 23,000 metric tons of CO2e emissions in 2020. 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

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.

Greenhouse Gas (GHG) emission mitigation or reduction refers to District activities that reduce greenhouse gas emissions generated by District activities towards achieving carbon neutrality. District's strategies towards carbon neutrality include:

1. Establishing a District-wide internal carbon offset methodology to facilitate emission reduction including properly crediting emission reductions from water conservation programs, habitat restoration or enhancements or renewable energy production and contributions to countywide emission reduction efforts;
2. Increasing fleet fuel use efficiency;
3. Maintaining a portfolio of alternative renewable energy supplies;

4. Increasing energy use efficiency;
5. Identifying and developing opportunities to employ sources of alternative energy that reduce greenhouse gas emissions;
6. Conducting periodic greenhouse gas emission inventories;
7. Reviewing energy usage and options for reducing greenhouse gas emissions for District facilities; and
8. Funding management of the County Green Business Program.

This agenda item describes GHG reduction efforts, and progress towards achieving carbon neutrality since the last report on October 27, 2015. It is divided into 4 sections: 1) Methodology for Calculating GHG Emissions and Reduction; 2) Updated Carbon Emission and Reduction Calculations; 3) Energy Optimization Plan; 4) Continuing Efforts towards Carbon Neutrality by 2020.

1. Methodology for Calculating GHG Emissions and Reduction

While District operations generate GHG emissions, it also provides opportunities to avoid, reduce and sequester GHG. Therefore, the Board established Policy No. E- 4.3.1: "Reduce greenhouse gas emissions to achieve carbon neutrality by 2020", which directs the District's efforts in reducing GHG emissions.

On March 26, 2013, the Board adopted a methodology for calculating the District's GHG emission or carbon footprint and offsets. Attachment 2 provides details on this methodology. The District's carbon footprint includes emissions from fleet, from onsite energy uses, and from emission related to imported water. District's carbon offsets come from conservation and green practices or activities, such as its water conservation, water recycling, green business programs, and carbon sequestration from wetland and riparian restoration.

When calculating the carbon offsets for water conservation activities, the Board directed staff to account for carbon offsets from water savings that are directly attributable to District programs. It does not include savings from building codes and/or new water use efficiency standards.

2. Updated Carbon Emission and Reduction Calculations

Table 1 provides estimates of projected carbon footprint and offsets for the years 2010 thru 2015 and an estimate for Year 2020. The Year 2020 estimated emissions are 23,000 metric tons (MT) and the total offsets are 22,360 MT.

Table 1. Summary of Estimated and Projected Carbon Footprint and Offset in MT Co2e/Year

Calendar Year	2010	2011	2012	2013	2014	2015	2020
Emissions	22,100	21,800	29,800	29,700	18,500	22,200	23,000
1. Direct Emissions from District Operations	2,200[1]	2,300[1]	2,500	2,800	3,000	2,100	2,200
2. Emissions from Purchased Electricity	2,200[1]	500[1]	3,400	4,000	6,000	6,300	4,400
3. Other Emissions	17,700	19,000	23,900	22,900	9,500	13,800	16,400

a. State Water Project	14,800	16,100	21,000	20,000	6,600[2]	10,900[2]	13,500[3]
b. Central Valley Project	0	0	0	0	0	0	0
c. Import from SFPUC	0	0	0	0	0	0	0
d. Employee Commute	1,500	1,500	1,500	1,500	1,500	1,500	1,500
e. Business Travel	1,400	1,400	1,400	1,400	1,400	1,400	1,400
Reduction/Sequestration	22,370	23,060	24,400	23,110	24,080	24235	22,480
1. Water Conservation Program (WCP)	17,100	17,800	18,400[4]	16,700[4]	17,600[4]	17,800[4]	14,800[5]
2. Recycled water	2,500	2,500	3,000	3,500	3,700	3,400	3,900
3. Carbon sequestration	500	500	500	500	500	500	500
4. Green Business Program	2,200	2,200	2,200	2,200	2,200	2,200	2,200
5. Energy Optimization Measures (EOMs)	70[6]	60[6]	300[6]	210[6]	80[6]	335[7]	1,080[8]
C. Difference	270	1,260	-5,400	-6,590	5,580	2035	-520

Notes to Table 1: [1] Verification completed; [2] District specific emission factor (EF) based on reported EF for CY 2014 and 2015 for the State Water Project; [3] Projection based on DWR's projected emission reduction of 33% by CY 2020 and updated water supply projection for 2020; [4] Adjusted based on decreases in Pacific Gas and Electric's (PG&E) 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. [6] This has been updated using reported energy productions and emission factors for each corresponding year. [7] The update includes energy conservation measure completed in FY 2015 in addition to zero-emission energy production through on campus solar and Anderson Hydro. [8] The update used an estimated emission factor for CY 2020 provided by PWRPA. This offset assumes that all measures are fully operational in CY 2020.

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. Examples of uncertainties include: hydrological conditions which could affect the emission factors from the Power and Water Resources Pooling Authority (PWRPA); resulting fluctuations in carbon footprint from direct energy purchases; and allocation of imported water from the State Water Project.

The State refined its estimates and clarified its reduction target through the recently completed GHG Emission Reduction Plan (Attachment 3). Staff also adjusted GHG reduction benefit from Water Conservation by taking into consideration the decreases in emission factors as compared to 2005-2007 average. Staff's assumptions and updates are outlined below:

a. Customized emission factor for District's past imported State Water Project water: Since March 2013, the State has provided a customized emission factor for State Water Project water imported by the District. This customization is based on the energy intensity of water delivered directly to the District. The customized emission factor is used to calculate past years' data (see note 2 in Table 1).

b. Projected carbon offset adjusted: PG&E provided an informal estimate for calendar year 2020 emission factor, reflecting a 45% reduction from the baseline data staff used for estimating the carbon offset for water conservation.

In February 2017, staff completed a Green Business Recertification. The process involved staff from fleet, energy, facilities management, procurement, office supply management, and watershed stewardship programs. Since 2000, the District has contributed between $67k to $100K annually or between 30% to 50% annual administration cost to the countywide green business program, and accounted for the associated GHG reduction benefits in the methodology.

3. Emission Reduction through Energy Management

This section outlines the status of the energy optimization effort, which includes the development of renewable energy projects, PWRPA renewable energy projects, and energy efficiency and conservation efforts.

Since the October 2015 update, staff provided the Board with updates regarding the status of the energy related projects:

- CEO Bulletin, 6/16/16 - Water Treatment Plant Solar Project Construction Update - to notify the board of construction status and anticipated completion;
- Board Member Request, 6/16/16 - Feasibility of Energy Recapture on Santa Clara Conduit (In-conduit) - to describe limiting factors for development of in-conduit energy recovery on district pipelines;
- Non-Agenda Memo, 12/23/16 - Completion of Water Treatment Plant Solar Projects - to provide history of project and notify of project completion; and
- Non-Agenda Memo, 1/23/17 - Completion of Utility-Scale Astoria II Solar Project - to notify of project completion and benefit to the District.
- Non-Agenda Memo, 5/5/17 - Completion of Utility-Scale Whitney Point Solar Project - to notify of project completion and benefit to the District.
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<u>Overview of Renewable Energy Projects</u>

The District is a member of PWRPA, a joint powers authority (JPA) to collectively manage electrical loads and generation assets. PWRPA is subject to the State of California “Renewable Portfolio Standard” (RPS) mandate, whereby electric utilities must serve a RPS percentage of retail sales with renewable resources within a given Compliance Period. In addition to supporting the board governance policy to achieve carbon neutrality, the local renewable energy projects being pursued by the District will also contribute to PWRPA’s requirement to meet the RPS mandate. The status of these efforts is described below.

A. <u>Local Renewable Projects - Water Treatment Plant Solar Projects</u>
The solar developer, GL Renewables, LLC (Green Light), completed construction of the 260 kilowatt (KW) and 248 KW PV solar installations at Santa Teresa and Penitencia water treatment plants, respectively, in October 2016. The projects will combine to generate approximately 850 megawatt-hours (MWh) of energy annually over the 20-year duration of the

project.

The projects are structured as power purchase agreements (PPAs), where Green Light owns, operates, and maintains the two systems on District property. In return the energy generated by the systems is sold for direct use at the associated treatment plant to offset utility power. The power generated is sold to PWRPA as the JPA, but the District ultimately pays for the power through a rate agreement with PWRPA.

The energy generated from the systems is intended for direct use at the water treatment plants and will offset utility power and contribute to the district goal to achieve carbon neutrality. Since the District is a non-tax paying entity, it is not directly eligible for investment tax credits. The arrangement allows Green Light, as a third-party owner of the systems, to receive the tax incentives for constructing and owning the systems, which also translates to a competitive energy rate for the District. In addition, PWRPA receives renewable energy credits (RECs) that can be used to meet RPS requirements.

In January 2016, staff worked with Green Light to evaluate additional District locations for potential solar development, including a rooftop solar installation at the Silicon Valley Advanced Water Purification Center (SVAWPC) and a combination of rooftop installation and carport structure at the Water Quality Lab. Given the proposed pricing options, the projects were not financially feasible using the power purchase structure.

B. Utility-Scale Renewable Projects through PWRPA

In 2014, PWRPA procured for the District a 400 KW share of the 75 megawatt (MW) utility-scale Astoria 2 Solar project located in Kern County, California. This project became commercially operational in December 2016.

Through PWRPA, the District also secured a 750 KW allocation in the Whitney Point Solar Project (Whitney Point), which is a 20 MW utility-scale solar project in Fresno County. The project commercial operation date (COD) was May 1, 2017.

Participation in utility-scale solar projects through PWPRA increases the renewable energy in the District's electricity portfolio and provides renewable energy to the District with the same environmental benefits as the solar projects located at the District's water treatment plants, and at a lower cost. Solicitations by solar developers of new utility-scale solar projects available through PWRPA indicate energy rates of approximately $60-70 per megawatt-hour (MWh) delivered to the district compared to the $108.25 per MWh generated by the solar installations at Santa Teresa and Penitencia water treatment plants.

Staff continues to evaluate upcoming utility-scale renewable projects through PWRPA to reduce the carbon intensity of the energy the District purchases from PWRPA.

C. In-Conduit Hydroelectric Projects

The existing PPA agreement with PG&E to export energy generated by the Anderson

hydroelectric facility expires in 2018. A recent study by NLine Energy, Inc. (NLine) presented multiple options with various alternative equipment configurations for transitioning the facility after the existing PPA agreement expires. Due to projected work on Anderson Dam and related factors that could alter the operation of the facility, staff plans to continue to support the existing equipment configuration and switch to a more profitable feed-in tariff with PG&E when the contract expires in 2018.

Currently, no additional sites are feasible for in-conduit hydro-electric energy development, but staff continues to monitor opportunities for in-conduit projects. In January 2016, staff worked with NLine to conduct a preliminary analysis of a potential energy recovery site during the design phase of the Main Avenue and Madrone Pipeline Restoration Project. The variation in expected flow and head (pressure) conditions at the site made it difficult to size a turbine to generate enough revenue to be economical. Space limitations and unknown challenges of leasing the head (pressure) from Central Valley Project water deliveries made the site not feasible for development.

Staff will continue to evaluate energy recovery and other emerging energy-efficient technologies that may be compatible with District conditions.

D. Silicon Valley Clean Energy

The District has approximately 140 minor facilities and remote turnouts that have PG&E electric services. PG&E recently partnered with Silicon Valley Clean Energy (SVCE), which is a new public, locally controlled electric generation service provider that offers high-percentage carbon-free electricity at a competitive price. SVCE is a local community choice aggregation program that provides residents and businesses with a choice of electric providers and sources of electricity. SVCE offers two options for carbon-free power: a 100% carbon-free (50% renewable) energy option for approximately 1% less than average PG&E costs; and a 100% renewable energy option for approximately 3% more than average PG&E costs.

The initial enrollment started in April 2017 and is available in twelve Silicon Valley communities, including Campbell, Cupertino, Gilroy, Los Altos, Los Altos Hills, Los Gatos, Monte Sereno, Morgan Hill, Mountain View, Saratoga, Sunnyvale, and unincorporated County of Santa Clara. Starting in April 2017, 76 of the District's 140 minor PG&E electric services enrolled in SVCE to increase the percentage of carbon-free electricity in the District's portfolio.

E. Energy Optimization Plan

Staff continues to implement the energy optimization measures (EOMs) recommended by the Energy Optimization Plan, a comprehensive energy audit conducted by Black & Veatch in 2013. Of the original 49 EOMs recommended by the Energy Optimization Plan, staff has completed 35 EOMs as shown in Attachment 4. In FY16, staff completed 15 EOMs, including investigation of the following measures: treatment plant ozone generator maintenance and efficiency testing, treatment plant backwash efficiency settings, lighting upgrades and HVAC settings at various facilities. There are currently eight (8) EOMs in progress and six (6) EOMs

were deferred until after the Rinconada Water Treatment Plant (RWTP) seismic retrofit and Reliability Improvement Project (RIP). Implementation of the Energy Optimization Plan continues to depend on competing priorities in other District projects and programs, and project validation and prioritization.

Effective energy management and efforts from the Energy Optimization Plan help lower the District's direct and indirect emissions presented in Table 1. Increasing the percentage of renewable resources in the District's energy portfolio through local and utility-scale solar projects helps to lower the emission factor of PWRPA which results in lower indirect emissions from purchased energy. Enrolling qualifying PG&E sites in Silicon Valley Clean Energy can further reduce indirect emissions by converting small remote sites to 100% carbon-free energy. Efforts from the Energy Optimization Plan help increase energy efficiency at district facilities to reduce emissions from District operations as shown in Table 1.

4. Continuing Efforts towards Carbon Neutrality by 2020

District's GHG emission reduction framework provides an effective mechanism towards achieving carbon neutrality. District's GHG reduction strategies support key drivers for achieving carbon neutrality as outlined below:

1. Diversified water supply portfolio: About two thirds of imported water comes from zero-emission sources; the federal Central Valley Project and the gravity-fed Hetch Hetchy system. In 2010, about three-fifths of the energy for the State Water Project was zero-emission hydroelectricity.

2. Continue to support statewide GHG emission reduction initiatives: The District continues to support DWR's target for emission reduction. Staff also initiated discussion on the feasibility of DWR purchasing renewable energy on the District's behalf for imported water the District receives from the State Water Project. According to DWR, as of 2015, energy sources used by the State Water Project is 65% carbon free, a 5% rise in carbon free energy compared to CY 2010. DWR is accelerating its path towards achieving a 33% total GHG emission reduction in 2020, by participating in an 85-MW and other utility-scale solar energy project in 2016. Staff anticipates further reduction in GHG emission related to Importing water from DWR's State Water Project.

3. Cost effective and renewable energy sources: With the addition of the newly completed 400 kW utility-scale Astoria II solar project in Kern County reaching its Commercial Operation Date on December 9, 2016 and the 750 kW solar allocation from the utility-scale Whitney Point solar project in Fresno County which became operational in April 2017, the District energy portfolio includes 2,263 kW of solar generation. Staff continues to evaluate additional utility-scale renewable projects through PWRPA to increase the District's renewable energy portfolio.

4. 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 of achieving emission reduction. The water conservation program,

along with the energy optimization plan, will continue to play an important role in future GHG emission reduction.

5. 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 updates.

6. Other efforts: Staff continues to implement energy conservation measures identified in the Energy Optimization Plan and green business practices throughout District facilities. Staff supports the District's Green Team Employee Resources Group to promote green practices through the way we work and live.

FINANCIAL IMPACT:
There is no direct fiscal impact from the recommended action to receive information on the District's progress towards achieving carbon neutrality by 2020. Implementation of unfunded elements of the Energy Optimization Plan may be presented to the Board for funding 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: Methodology
Attachment 3: DWR Green House Gas Reduction Goals
Attachment 4: Status of Energy Optimization Plan

UNCLASSIFIED MANAGER:
Jim Fiedler, 408-630-2736