

CITY OF
HAYWARD
HEART OF THE BAY

Water Pollution Control Facility's Clean and Renewable Energy

Suzan England, *Senior Utilities Engineer*
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Water Pollution Control Facility
Utilities and Environmental Services



Water Pollution Control Facility's Clean and Renewable Energy

Engine Generator



HAYWARD

Commissioned in 2014



Water Pollution Control Facility's Clean and Renewable Energy

Combined Heat and Power



HAYWARD

4.1 Million BTUs per Hour



Water Pollution Control Facility's Clean and Renewable Energy

Fuel Conditioning



HAYWARD

Commissioned in 2014



Water Pollution Control Facility's Clean and Renewable Energy

Fuel Storage



HAYWARD

Able to hold 4 Hours worth of Bio Fuel



Water Pollution Control Facility's Clean and Renewable Energy

FOG Station



HAYWARD

Commissioned in 2013



Water Pollution Control Facility's Clean and Renewable Energy

One Megawatt Photovoltaic Array



HAYWARD

Commissioned in 2010



Water Pollution Control Facility's Clean and Renewable Energy

Recycled Water to Calpine



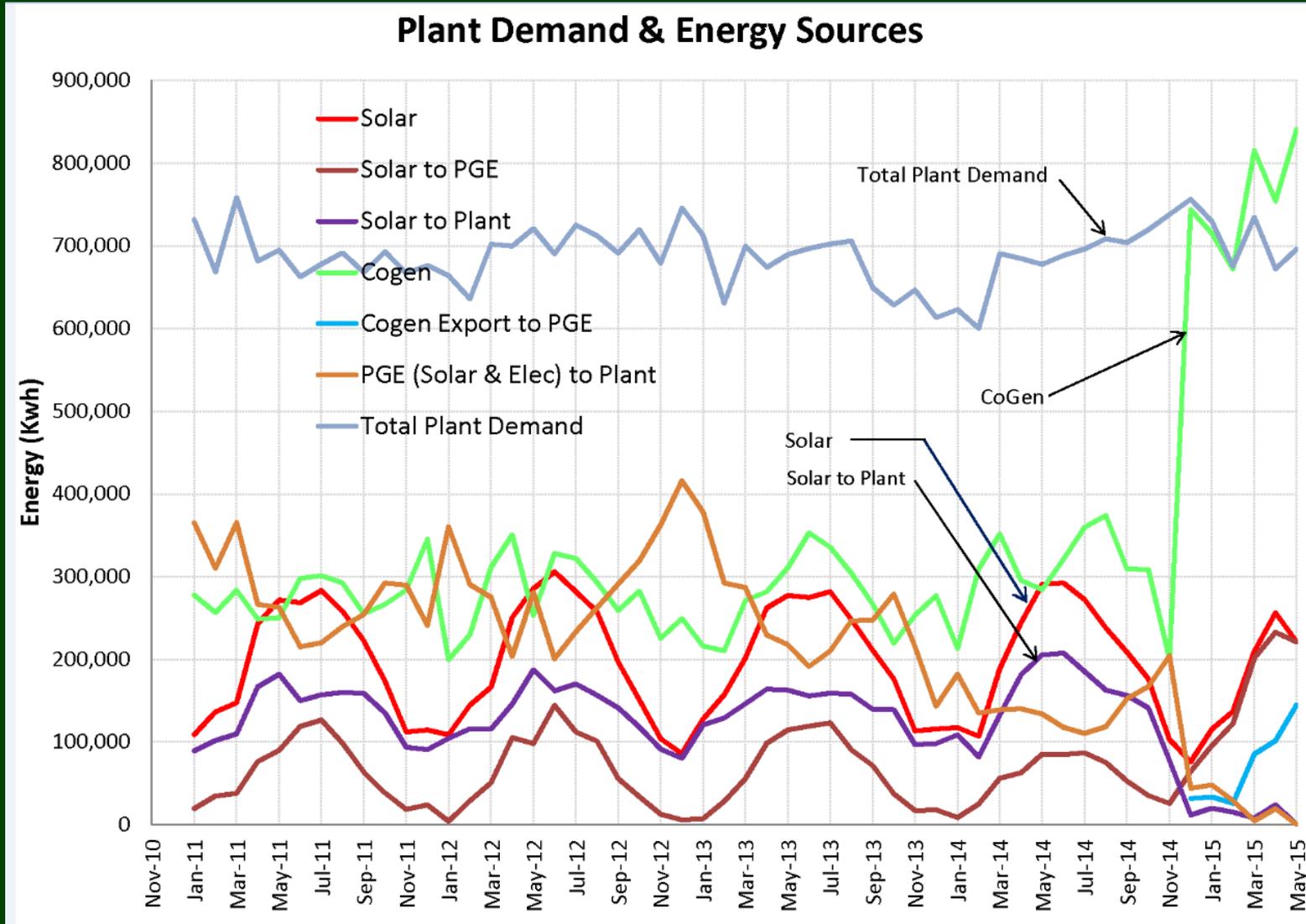
HAYWARD

Reducing the City's Effluent Pumping Cost by 20%



Water Pollution Control Facility's Clean and Renewable Energy

Power Production and Export



Water Pollution Control Facility's Clean and Renewable Energy

RES-BCT

WE MAKE POWER FROM RENEWABLE SOURCES:

SOLAR AND DIGESTER GAS

WE SWITCHED FROM NET METERING TO RES-BCT

WPCF IS THE GENERATING ACCOUNT

FIVE BENEFITTING ACCOUNTS

- LIMITED TO 5 MEGAWATT EXPORT
- WE ARE PG&E'S LARGEST GENERATING ACCOUNT
- HAYWARD IS THE FIRST CITY IN THE PROGRAM
- ONLY WASTEWATER TREATMENT PLANT



Water Pollution Control Facility's Clean and Renewable Energy

Clean and Renewable Power

- ENOUGH HEAT FOR ALL OF OUR PROCESS NEEDS, OR ENOUGH BTUS TO HEAT AND COOL 400 HOMES.
- 1.1 MEGAWATTS FROM COGENERATION (900 HOMES).
- 1.0 MEGAWATTS OF PHOTOVOLTAIC POWER (220 HOMES).
- UP TO 2,900 MEGAWATT HOURS PER YEAR OF GREEN ENERGY AVAILABLE FOR EXPORT TO 5 BENEFITTING ACCOUNTS IN THE CITY (260 HOMES).
- 2.5 – 4.0 MGD OF RECYCLED WATER TO COOL THE 619 MEGAWATT CAL PINE POWER PLANT, OR ENOUGH POTABLE WATER SAVED TO SUPPLY 13,000-21,000 HOMES FOR 1 YEAR.



Water Pollution Control Facility's Clean and Renewable Energy

Future Opportunities



PLEASE POST



SAN FRANCISCO BAY SECTION
California Water Environment Association

PLEASE POST

PLEASE POST



PLANT OPERATIONS & MAINTENANCE (O&M) COMMITTEE

Presents a Tour of the

City of Hayward Water Pollution Control Facility

**Earn up to
1 Contact Hour!**

Wednesday, April 15th, 2015
10:00 am to 1:00 pm

**Door Prizes!
Lunch Provided**

Tour cost is
\$20 (CWEA members) & \$30 (non-members)
Cash or Check (made payable to "CWEA-SFBS") only
Attendance is limited to 50. Please make your reservation early by email to:
abhagwat@carollo.com

Please provide CWEA membership status. For questions, email Anir.

Note: If you are unable to attend, please cancel by April 13th, or send a substitute. Failure to attend results in a financial burden, which may necessitate increasing the cost of future, tours.

For safety, participants to wear proper footwear that covers whole foot, toes, and heels. Sandals and high heels not recommended.

Overview: The Water Pollution Control Facility (WPCF) is a trickling filter/solids contact plant that serves the City of Hayward. The plant currently treats an average dry weather flow of 11.1 mgd, and is rated for an average dry weather flow of 18.5 mgd. The plant recently installed a cogeneration facility with a 1137 kW engine generator and a gas conditioning system. The \$10.4 million facility was partially funded with a \$2.7 million grant from PG&E under the Self Generation Incentive Program (SGIP). In addition, the City of Hayward is one of only six facilities in PG&E's service area that is operating under the Renewable Energy Self Generation Bill Credit Transfer (RES-BCT) tariff that allows the City to generate and transfer excess energy for use at other City facilities. The new engine generator, together with the plant's 1 MW solar field combined produce more power than is required at the WPCF making the plant a net exporter of electric energy.



Directions:

FROM THE NORTH	FROM THE EAST
Take I-880 SOUTH toward San Jose Take the CA-92 EAST exit, toward San Mateo Bridge Merge onto CA-92 WEST Take the CLAWITER ROAD exit Turn RIGHT at CLAWITER ROAD Turn LEFT onto ENTERPRISE AVENUE	Take I-580 WEST toward Oakland Slight LEFT at I-238 NORTH Take the I-880 SOUTH exit, toward San Jose Take the CA-92 EAST exit, toward San Mateo Bridge Merge onto CA-92 WEST Take the CLAWITER ROAD exit Turn RIGHT at CLAWITER ROAD Turn LEFT onto ENTERPRISE AVENUE

Water Pollution Control Facility
Treatment Plant
3700 Enterprise Avenue
Hayward, CA 94545



East Bay Workshop on Wheels

March 11, 2014

7:30 am - 4:30 pm



City of Pleasanton - Leo Lopez

Smart Use of Computerized Maintenance Management Systems: How the City of Pleasanton is Leveraging Technology to Optimize Operations and Maintenance

Zone 7 Water Agency - Bill Sadler

Salt Management with Mocho Groundwater Demineralization Plant

Dublin San Ramon Services District - Levi Fuller

Rehabilitation Efforts to Restore Sand Filter Performance

City of San Jose - Raj Singh

BAYWORK's On-Line Forum

San Francisco Public Utilities Commission - Steve Hanes
Using SCADA Technology to Manage Complex Water Treatment Processes

LUNCH EN ROUTE

Alameda County Water District - Milan Viau

Energy Savings through Hydroelectric and Control of Ozone Disinfection Products through Upstream Chloramination

City of Hayward - Ray Busch

How the City of Hayward is using the Renewable Energy Self-Generating Bill Credit Transfer tariff (RES-BCT) to Go Green and Save Green

Oro Loma Sanitary District - Jimmy Dang

Title: Digester Facilities Upgrade Project - Use of 3D Design Tools to Improve Design Stage Review and Construction Progress Tour



RES-BCT Find out what it means to the city

By Ray Busch and Don Clark, City of Hayward

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The Hayward City Council continues to list "green" principles as a top priority for the future. In keeping with this direction, the City is the first municipality in the entire Pacific Gas and Electric service area to apply for the Renewable Energy Self-Generation Bill Credit Transfer (RES-BCT) tariff. The RES-BCT tariffs, approved by the California Public Utilities Commission (CPUC) in accordance with Public Utilities Code 2830, were created by AB 2466 in 2008. RES-BCT tariffs allow local governments to generate electricity at one account and transfer any available excess amount as bill credits (in dollars) to other accounts owned by the same local government.

The City of Hayward has projected annual savings of \$410,000 from a new combined heat and power cogeneration project coupled with the existing solar project and excess energy of 1.66 million kilowatt hours (kWh). These savings are to be spread amongst four drinking water reservoir pump stations and one sanitary sewer lift station.

To put those numbers in perspective, 1.66 million kWh can power approximately 186 single family homes year-round. The average household in the United States uses about 8,900 kilowatt hours of electricity each year.

Value of Special Funding Opportunities

WPCF PG&E Charge Avoidance.....	\$410,000 (annually)
RES-BCT Tariff.....	Value of Bill Credit Transfer (exported energy) \$75,000 (annually)
Self Generation Incentive Program (SGIP)	\$2,825,000 (reserved over 5 years)
Performance Based Incentive (PBI).....	\$2,267,039 (reserved over 5 years)
Fats, Oil, and Grease (FOG).....	Tippling fee revenue \$219,000 (annually)

Wastewater Professional August 2013

The Environmental Green Sweet Spot

Hayward's City Council has set the agenda of going green. The Hayward Water Pollution Control Facility is helping to deliver on the directive through four methods:

1. Upgrading and upsizing the WPCF cogeneration facility. Hayward will be replacing two old and tired 500 hp Caterpillar cogeneration engine generators (rated at 375 kW) to a new Combined Heat and Power (CHP) Jenbacher 1,137 kW generator. About half of the waste heat will be captured to maintain digester temperature. Thus the overall efficiency of the CHP will be greater than 60%.

2. New Fats, Oils, and Grease (FOG) Receiving Station. To upsize the generator, the plant designed and built a new FOG receiving station that holds 20,000 gallons of FOG and delivers from 3 to 33 gpm through a double disc pump to the three digesters. This new FOG system, at 16,000 to 20,000 gpd, will add an estimated 80 scfm of bio gas. The WPCF has a high-pressure gas storage tank to smooth out the ups-and-down of gas production because the digester covers do not allow for storage. FOG diverted to the water pollution control facility is FOG not going to landfills, or being discharged into the sewer system and clogging the collection mains.

3. One Megawatt Solar Array. A one megawatt solar array with 5,152 panels attached to 202 fixed horizontal axis that track the sun from east to west was built and is owned by the City. There are plans and soil grading underway for a second one megawatt solar array.

4. Calpine Partnership. The City has partnered with Calpine and is providing 2.5 to 4.0 MGD of secondary effluent to the Calpine-owned Russell City Energy Center (a combined cycle 642 megawatt power plant). The effluent is used for cooling in the steam generator thermodynamic cycle. This reduces City-treated effluent disposal energy requirements by an average of 20%.

The Economic Green Sweet Spot

Beyond environmental benefits, the projects mentioned above qualify for unique funding and grant opportunities that can also positively impact rate payers.

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Feature Article | RES-BCT Find out what it means to the city

The RES-BCT tariff, coupled with the Self Generation Incentive Program (SGIP) funding at 2.50 cents/watt, is a significant inducement to upsize the existing cogeneration system and to pursue a first-class fats, oils and grease (FOG) receiving system.

The SGIP provides incentives to support existing, new, and emerging distributed energy resources. The SGIP provides rebates for qualifying distributed energy systems installed on the customer's side of the utility meter. Qualifying technologies include wind turbines, waste heat-to-power technologies, pressure reduction turbines, internal combustion engines, microturbines, gas turbines, fuel cells, and advanced energy storage systems.

Performance-Based Incentives (PBI) are offered through PG&E for solar projects larger than 30 kW. This measure delivers monthly incentive payments for five years based on actual performance (output) of the system as measured by a separate performance meter. Green inducements such as PBI were a strong motivator to have the 1 megawatt solar array designed and constructed at the WPCF.

In addition to seeking and maximizing funding opportunities to further their green mission, the WPCF also provides special opportunities to make sound environmental and local economic decisions such as the agreement to give Calpine's Russell City Energy Center 2.5 - 4.0 MGD of highly treated secondary effluent at no cost. The Calpine energy center pays local taxes, provides good employment opportunities, and has yielded a major construction project to the local economy. Not insignificantly, it recycles and diverts 2.5 MGD of treated wastewater from disposal.

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Wastewater Professional August 2013





Certificate of Partnership

presented to

City of Hayward's Water Pollution Control Facility

By the U.S. Environmental Protection Agency's Green Power Partnership
in recognition of efforts to reduce the risk of climate change
through the use of green power.

A handwritten signature in black ink, appearing to read "Susan Wickwire".

Susan Wickwire, Chief
Energy Supply and Industry Branch, U.S. EPA



Water Pollution Control Facility's Clean and Renewable Energy

CA Public Utilities Commission

1025

DATE NOW

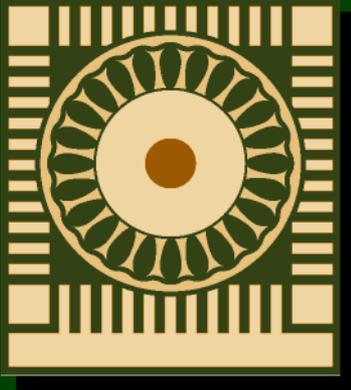
PAY TO THE ORDER OF CITY OF HAYWARD \$ 2,600,000.00

TWO MILLION, SIX HUNDRED THOUSAND DOLLARS  Security Features Included. Details on Back.

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CITY OF
HAYWARD

HEART OF THE BAY

Questions?

Comments?

Directions?

