ORANGE COUNTY SANITATION DISTRICT

Answers to questions about...

Central Power Generation System

Background

The Orange County Sanitation District (OC San) is a public agency that provides wastewater collection, treatment, and recycling services for approximately 2.6 million people in central and northwest Orange County. We operate two facilities — Reclamation Plant No. 1 in Fountain Valley and Treatment Plant No. 2 in Huntington Beach — and treat more than 180 million gallons of wastewater each day.

What is the Central Power Generation System?

The energy costs to run our treatment plants are a significant part of our annual operations and maintenance budget. As such, we continuously strive to improve the efficiency and cost-effectiveness of our operations, while ensuring compliance with strict environmental regulations as well as conservation of natural resources.

Consistent with these efforts, for more than 30 years we have used digester gas, also called biogas, a by-product of the digestion process, as a fuel at our plants to save energy and reduce greenhouse gas emissions. The Central Power Generation System helps us achieve our productivity, energy conservation, and resiliency goals by using the biogas we create. It allows us the option to operate independent from the electric company while increasing operational reliability. We have been able to substantially reduce electricity costs, we saved $9.8 million in 2022 and, in turn, are keeping our rates low for our ratepayers.

How Does the Central Power Generation System Work?

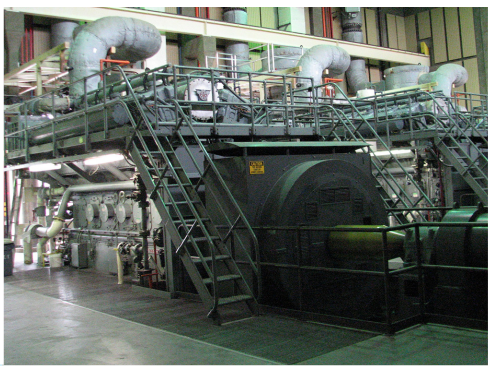
Eight clean burning, internal combustion engines drive generators that produce electricity to run our two treatment plants. The three engines at Plant No. 1 and the five engines at Plant No. 2 were designed to minimize the emissions from engine exhaust and are fueled by natural gas and digester gas. Digester gas is produced during the treatment process by the anaerobic (not requiring oxygen) bacteria in the digesters. The bacteria convert about 50 percent of the solids to digester gas. This biogas is approximately 65 percent methane and 35 percent carbon dioxide and is an excellent fuel.

What Are the Benefits of the Central Power Generation System?

We are able to improve plant reliability, and save ratepayers money by producing our own electricity. In the 1990s, Central Power Generation replaced 23 smaller internal combustion engines with eight larger engines. These new engines greatly reduced emissions of oxides of nitrogen and carbon monoxide because digester gas has a low heat value, approximately two-thirds that of natural gas, burns cooler, and thus produces less air emissions. Additional catalytic emission controls have been installed to meet the latest South Coast Air Quality Management District standards.

How Does This Process Improve Reliability?

The Central Power Generation System, along with the Southern California Edison grid, are two sources of power. Our major plant processes require continuous, reliable, uninterrupted operations. One engine at Plant No. 1 and two at Plant No. 2 are on standby, providing even greater reliability. The water pumping systems and critical unit processes have a third source of electricity, from emergency diesel generators.



Answers to Questions about Central Power Generation System

How Much Did the Central Power Generation System Project Cost and How Will It Be Paid For?

The original project cost was approximately $75 million to plan, design, and construct and was financed through borrowing. It is estimated that it will pay for itself in less than 20 years through deferred electrical costs. However, several projects have either upgraded, repaired, or rehabilitated the engines in the last twenty years.

How Does the Central Power Generation System support energy conservation?

OC San cannot reduce power to the plant without affecting the treatment quality. The Central Generation facilities at each plant provide approximately 63 percent of the power required for operations. OC San continues to design energy efficiency into all new and rehabilitation projects, which help to reduce the impact to the statewide power limitations.

How Much Does It Cost to Operate the Central Power Generation System?

July 2022 through June 2023, the combined costs from the Central Power Generation Systems at both treatment plants were as follows:

Operating and Maintenance Costs	$3,175,714
Fuel Costs	$1,651,000
Total Costs	$4,826,714

The treatment plants produced an average of 7.3 million kilowatt hours (kWh) per month during the year, or enough to power about 11,100 homes. Because we only pay for the natural gas and not the digester gas, our cost to produce power is only 5 cents per kWh.

Central Power Generation System Facts

	Plant No. 1	Plant No. 2
Operating Engine–Generator Sets	2	3
Standby Engine–Generator Sets	1	2
Each Engine Horsepower (at full load)	3,471	4,166
Engine Speed (rpm)	400	360
Number of Engine Cylinders (each)	12	16
Engine Weight (pounds each)	214,000	260,000
Generator Output (in kilowatts each)	2,500	3,000
Generator Voltage (volts)	12,000	12,000
Average Power Output (megawatts)	5.2	6.0

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