



# Plant Upgrade ROI: Improvements That Boost the Bottom Line

WEF eShowcase Webcast

Wednesday, November 2nd, 10 AM PT | 1PM ET



# Speakers

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**Ravi K. Bhaskar, PhD,**  
*Senior Wastewater Engineer and  
Water/Wastewater Commercial Lead*

**ENGIE North America**



**Aaron Winer,**  
*Director of Water Quality and  
Resource Recovery*

**West County Wastewater**

# Agenda

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**Common Challenges and Opportunities  
Facing Professionals 01**

**Process-based Infrastructure Upgrades 02**

**West County Wastewater  
Project Summary 03**

# 01

## Common Challenges and Opportunities Facing Professionals



# Common Challenges Facing Professionals

## Compliance requirements and unfunded mandates

- Nutrient limits
- Increasing organic loads
- Restrictions on the disposal of biosolids

## Rising costs

- Rising energy costs
- Rising chemical costs
- Rising landfill tipping fees
- Rising organic loads (west coast)
- Rising I&I flows and CSO flows due to disrupted weather patterns



# Common Challenges Facing Professionals

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## Aging infrastructure

- Deferred maintenance and repair
- Stretched capital budgets
- Lack of predictive maintenance

## Upgrade challenges

- Lack of automation / obsolete or non-existent controls
- Ad hoc and piecemeal upgrades
  - E.G. Food waste co-digestion without side stream treatment
- Lengthy procurement processes



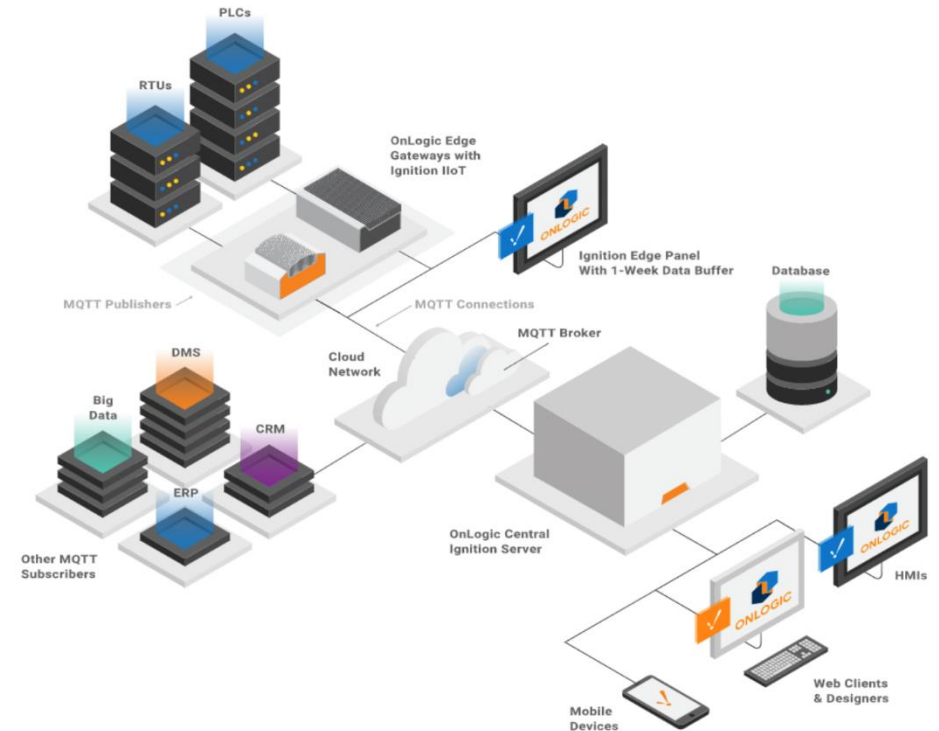
# Consider Total Cost of Ownership

## Comprehensive views of facility that consider long term benefits

- Evaluate potential changes in flow and load
- Consider potential changes in workforce, automation, remote work and remote management

## Consider all grants and incentives

- Significant investment tax credit for biogas projects
- Self Generation Incentive Program (SGIP) and resiliency incentives
- Resiliency and be worth up to 25% of the annual electric bill (CA Public Utilities Commission)



# Consider Alternate Revenue Sources

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## Some process upgrades may pay for themselves

- Co-digestion with high strength food waste
  - Revenue from tipping fees
- Conversion of Biogas to RNG
  - Federal RIN and California LCFS credits
- Sale of tertiary treated effluent as reuse water
  - Agricultural reuse water commands high prices in CA
- Sale of class A biosolids repackaged as fertilizer





# 02

## Process-based Infrastructure Upgrades



# Process Based Infrastructure Upgrades

## Integrated approaches for entire unit operations

- Consider entire unit operations, not individual pieces of equipment
- Screening, settling, aeration, digestion, biosolids
- Evaluate potential unintended consequences
- May call for alternate delivery methods



# Wastewater Facility Upgrades

ENGIE's improvement services cover all wastewater treatment processes, from ingestion of influents through discharge of treated water and disposal of sludge.

## Aeration Systems

- Coarse to fine bubble diffusers
- High efficiency blowers
- Dissolved oxygen controls
- Mixer replacements

## Biogas Production

- Anaerobic digestion
- Codigestion
- Cambi
- Gas cleaning

## Automation

- Controls
- SCADA
- Remote monitoring

## Revenue Enhancement

- High strength waste
- FOG (fats, oils & grease)
- Recycled food waste
- Renewable natural gas

## Biosolids Handling

- Digesters
- ATAD systems
- Incinerators
- Thermal drying

## Demand Reduction

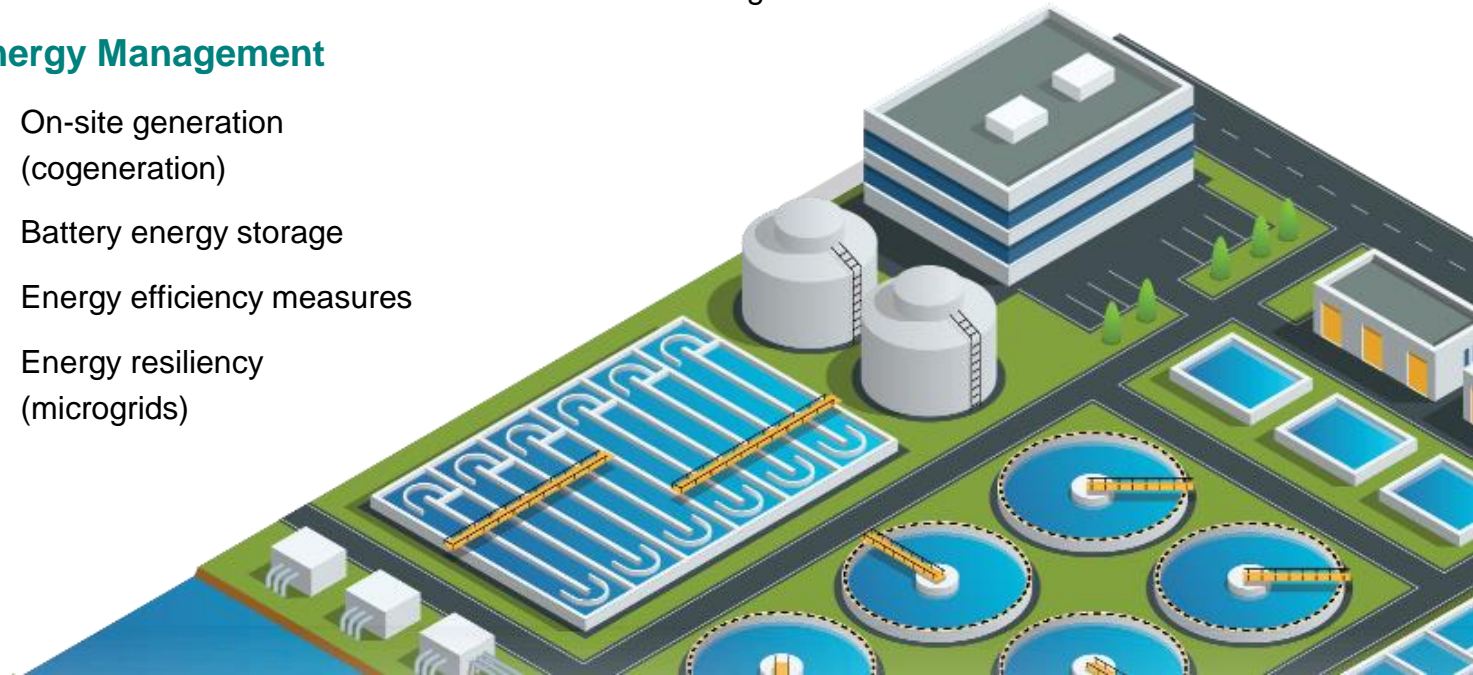
- Aeration
- Pumping
- Process optimization

## Energy Management

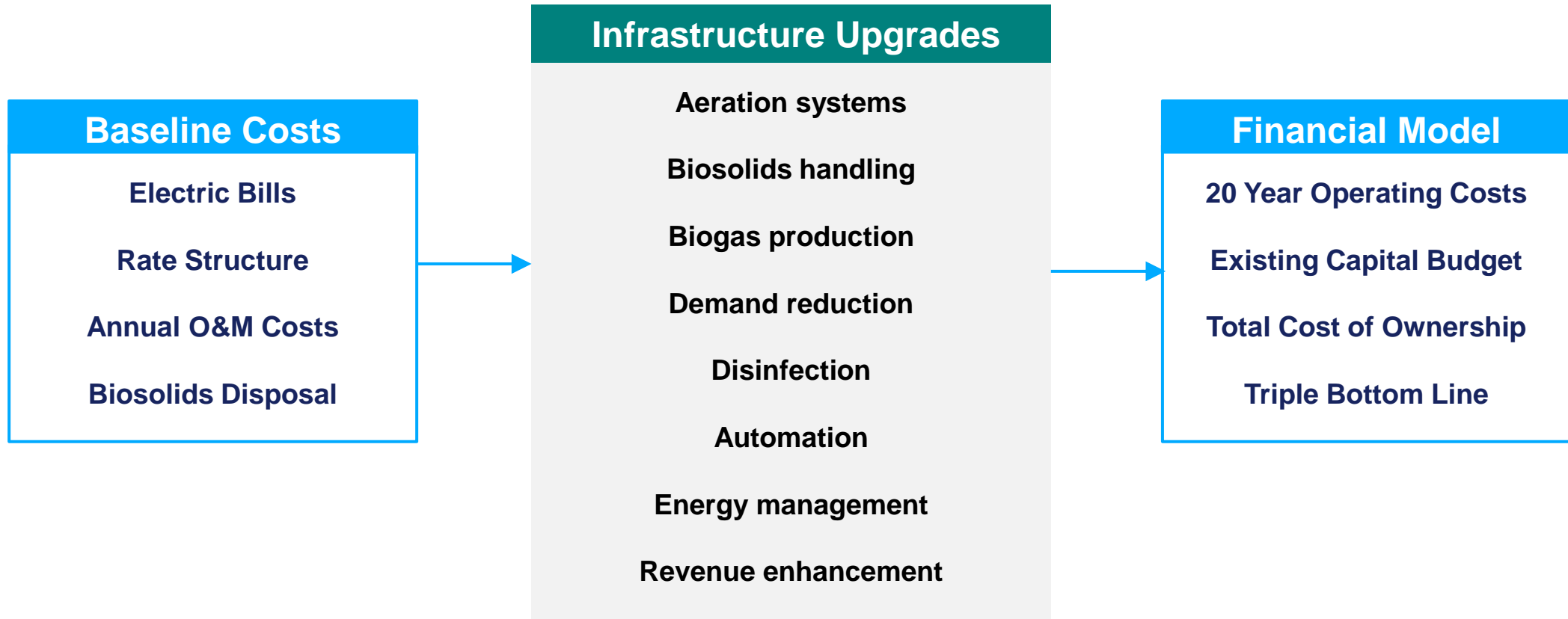
- On-site generation (cogeneration)
- Battery energy storage
- Energy efficiency measures
- Energy resiliency (microgrids)

## Disinfection

- Onsite generation
- Ultra-violet



# Strategic Planning



# ENGIE's Comprehensive Approach

ENGIE is with you every step of the way providing detailed infrastructure audits, financing solutions, project management, and stakeholder engagement.



## Planning



- **Infrastructure & inventory assessment:** state of current equipment and operations (needs assessment)
- **Solution integration:** technology options and configuration (including sensors, controls, other peripheral smart technology)
- **Financial analysis:** cost and savings estimates, incentives, financing and ownership structures
- **Stakeholder engagement:** communications, outreach and approvals



## Implementation



- **Design:** engineering, mechanical and electrical design
- **Incentive applications:** filing and compliance support
- **Procurement:** energy infrastructure, process equipment, pumps, instrumentation and controls, MCCs, VFDs, etc.
- **Installation:** construction, testing and commissioning



## Operation



- **Operations & maintenance:** preventive maintenance and repairs
- **Energy management:** SCADA, predictive maintenance, vibration monitoring, energy management dashboards
- **Measurement & verification:** report on performance and savings against benchmark metrics (kWh/pound of BOD, kWh/MG)
- **Community engagement:** programming and project impact

Delivering comprehensive, integrated services across the entire energy value chain. A preferred provider to cities, counties, government agencies, universities, school districts, and other social infrastructure organizations.

## #1 Clean Energy Provider

### 48+ Years' Experience

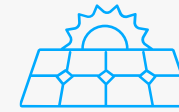
in the U.S. researching, designing, operating, and investing in a wide range of energy solutions

### 1,740 Public Serving Organizations

served in the U.S. (municipalities, universities, schools and hospitals)

### Access to Intelligence

from ENGIE's \$334 million annual R&D and new ventures investment



## 31.1 gw

of renewable energy capacity worldwide in 2020



## 21 Mt

of CO<sub>2</sub>eq emissions avoided globally by ENGIE projects with customers



# Why Partner with ENGIE?

ENGIE offers process-based, turnkey solutions that overcome budget constraints, improve services, and meet compliance requirements.



## In-Depth Assessments

We assess your existing facilities to devise a scope and sequence of improvements that meet operational needs and regulatory requirements.



## Turnkey Solutions

We design, implement, and manage the entire project as a turnkey solution, minimizing budgeting complexity and the administrative burden on your staff.



## New Revenue Streams

We can help prioritize and fund equipment upgrades that increase capacity or process additional types of waste for revenue generation.



## Energy & Operational Savings

ENGIE can design projects with efficiency measures that significantly lower operating expenses – covering implementation costs.



## Performance Guarantees

ENGIE uses an energy savings performance contracting (ESPC) approach to guarantee operational and energy efficiency savings.

*“With so many challenging events facing our community including fire and drought, our district is at the forefront of proactive problem-solving. It is time for a more integrated approach to address the challenges and opportunities of the water-energy nexus.”*

**Joseph Zoba, General Manager, Yucaipa Valley Water District**

# West County Wastewater Comprehensive Infrastructure Project



## Need for Comprehensive Energy, Infrastructure, and Process Improvement

West County Wastewater District, located in Richmond, California, needed comprehensive energy, infrastructure, and process improvement programs designed to significantly reduce the organization's carbon footprint and greenhouse gas emissions.

### Solution

By partnering with ENGIE, WCWD will move toward a cleaner future, by:

- Implementing renewable energy generation: **1.1 MW** solar PV, LED lighting, and EV charging stations
- Upgrading the wastewater treatment plant
- Implementing a **450 kW** cogeneration system powered by biogas
- Generating Class A biosolid for agricultural and reclamation uses

### Benefits

- **4.2 million** kWh energy use reduction per year
- **93%** greenhouse gas reduction over program life
- **\$83 million** net program life savings
- Significantly improve process control over wastewater treatment and digestion
- Reduce disposal costs of organic material destined to landfills
- Includes robust community impact program with internship opportunities and career paths for high school and college students



# 03

## West County Wastewater Project Summary



# Where is West County?

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## WCW's Service Area covers:

- The City of San Pablo
- Tara Hills neighborhood
- Northern subdivisions of Richmond
- Designated sectors of the City of Pinole
- El Sobrante
- Rollingwood
- Bay View
- Parts of unincorporated Contra Costa County

## WCW serves approximately:

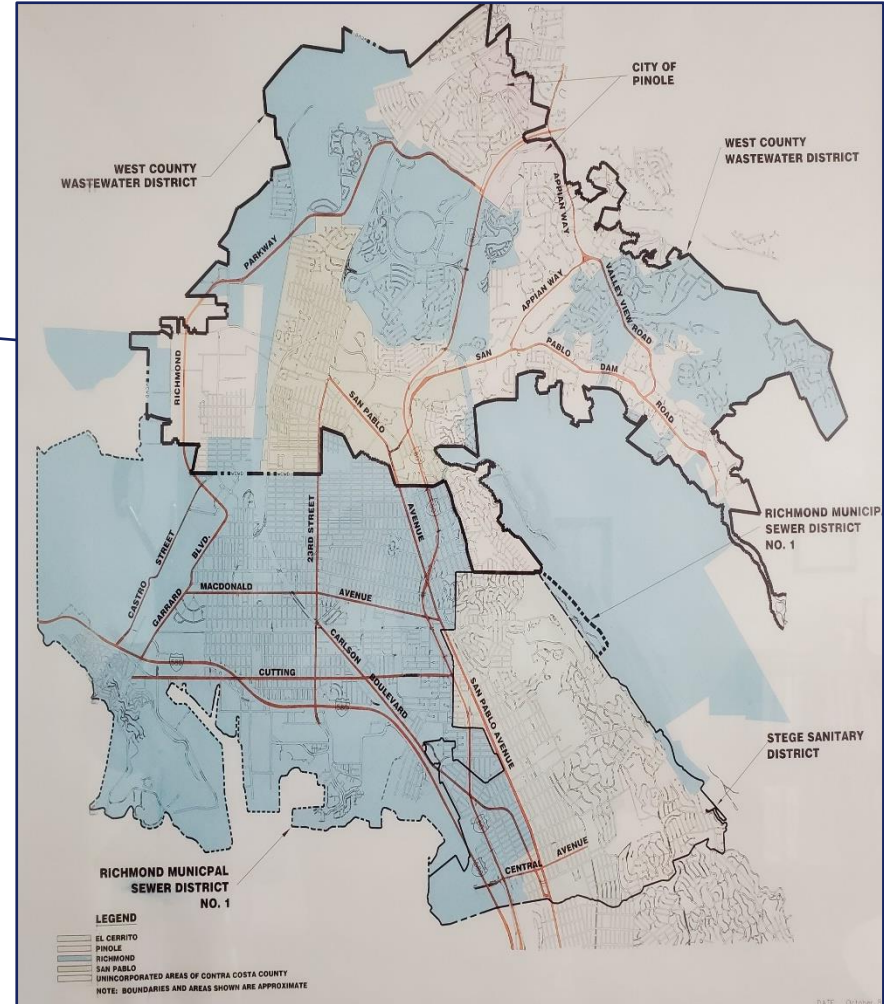
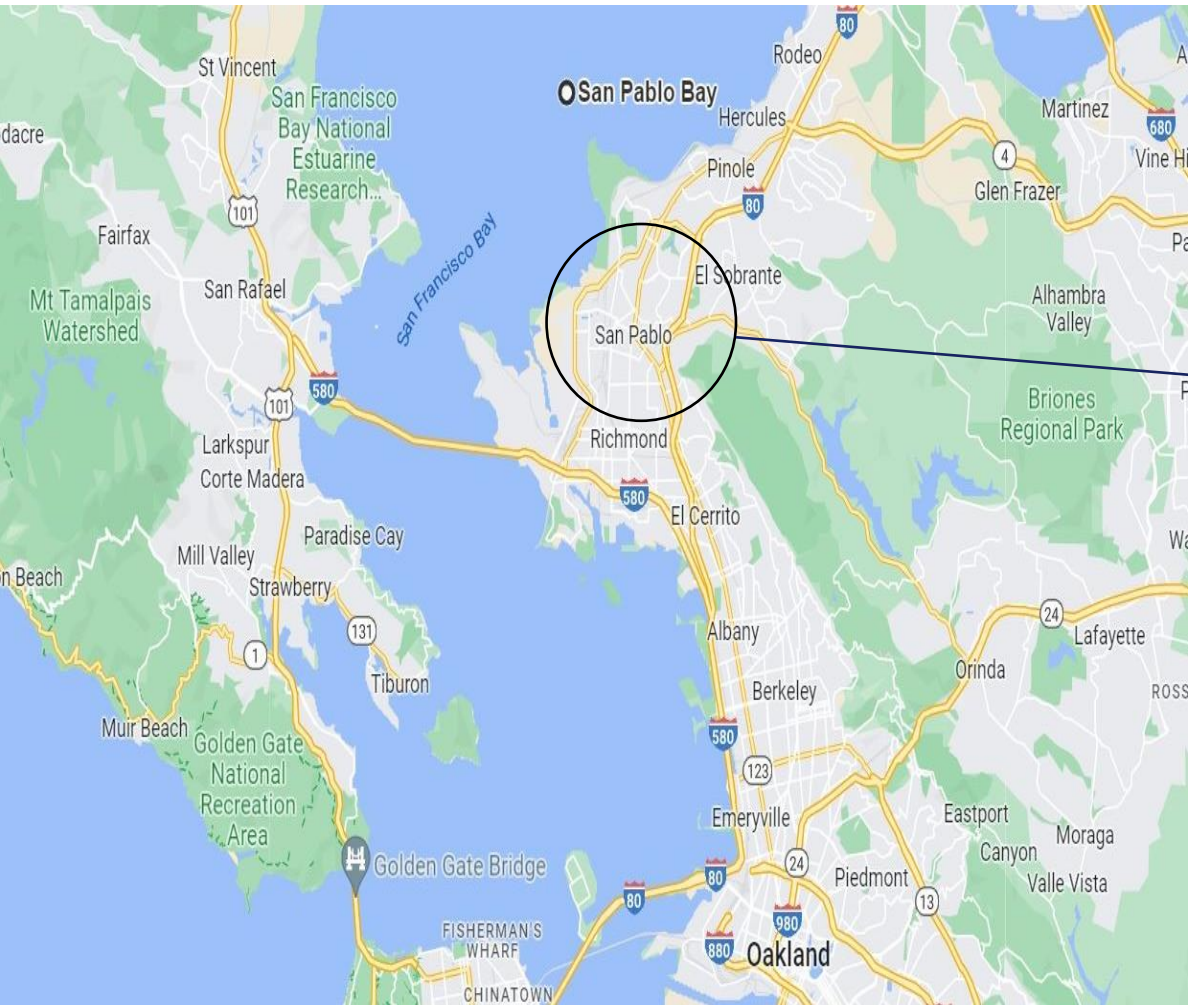
- **34,000** residences
- **900** commercial and industrial businesses
- A total population of **100,000 residents**

## WCW service area covers almost 17 square miles, and:

- Contains about **250 miles** of underground pipes
- Contains **6 miles** of force mains



# West County Wastewater Service Area

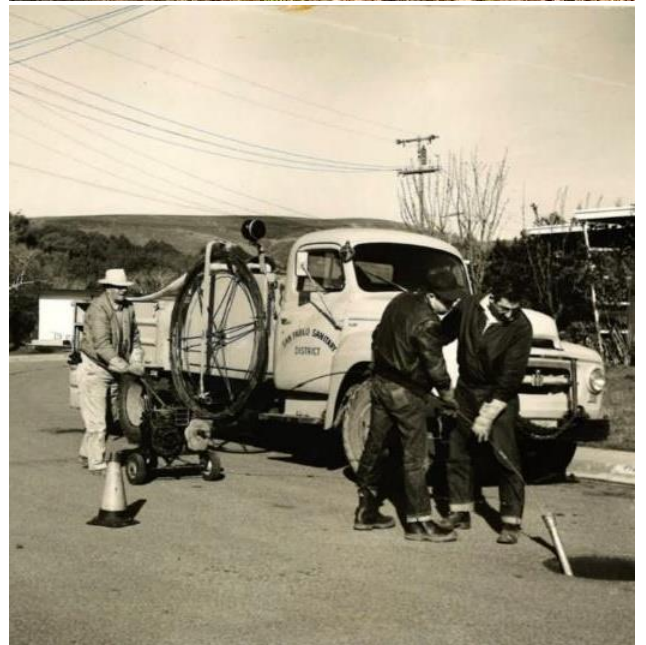


# The Work We Do

## West County Wastewater

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- For over 100 years, WCW has run the Water Quality & Resource Recovery Plant (WQ&RR) in Richmond, California
- For more than 20 years, through agreements with East Bay Municipal Utility District (EBMUD), WCW has partnered to reclaim water for industrial use
- During dry weather, over 90% of WCW's fully treated secondary effluent (7.0 – 7.5 MGD avg) is reclaimed and replace potable use



# The Work We Do

## West County Wastewater

- ✓ Operate the Water Quality & Resource Recovery Plant (WQ&RR) in Richmond
- ✓ Operate, maintain and, manage 17 sewer lift stations and WCW's nearly 250 mile network of sewers and force mains
- ✓ WCW provides contract O&M for 2 lift stations and one storm pump station
- ✓ Operate a certified environmental laboratory
- ✓ Manage and implement State approved Industrial Pretreatment and Pollution Prevention Program



# Challenges & Motivation for Improvement Initiative

## West County Wastewater

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### Changes to CA regulations targeting climate pollutants

- CA Senate Bill 1383 (2016); mandate to reduce organic waste to landfill estimated to contribute 20% of the State's methane production (75% by 2025).
- BAAQMD Regulation 13: Rule 4 (2019); Air District started looking at municipal anaerobic digestion as it relates to methane production and emissions.
- About 70 acres of WCW drying lagoons historically used to store/dry digested sludge; those emit methane and other undesirable materials (CO<sub>2</sub> and odors). The project eliminates the need for lagoons which will be repurposed.



# Challenges & Motivation for Improvement Initiative

## West County Wastewater

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**Offset increasing utility (PG&E) electricity prices**



Wildfire and Public Safety Power Shutdowns (PSPSs) (along with inflation) have increased utility's risks and costs.



**Improve resilience in the face of wildfire- related, utility imposed, PSPSs**



Utility will preemptively shut off power to select areas during periods of drought, excessive heat and high winds

# The Near Past and Future

## West County Wastewater

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- **Early 2019** - WCW issues RFP for ESCO services
- **September 2019** - Agreement signed with ENGIE to conduct Energy Savings Assessment
- **March 2020** - Greenhouse Gas Baseline Emissions Assessment (March 2020)
- **Roughly March 2020** - September 2021, the scope of the project was refined and expanded to include new digesters and additional stormwater equalization
- **October 2020** - WCW Clean and Green Project Charter executed (internal WCW doc)





# The Near Past and Future

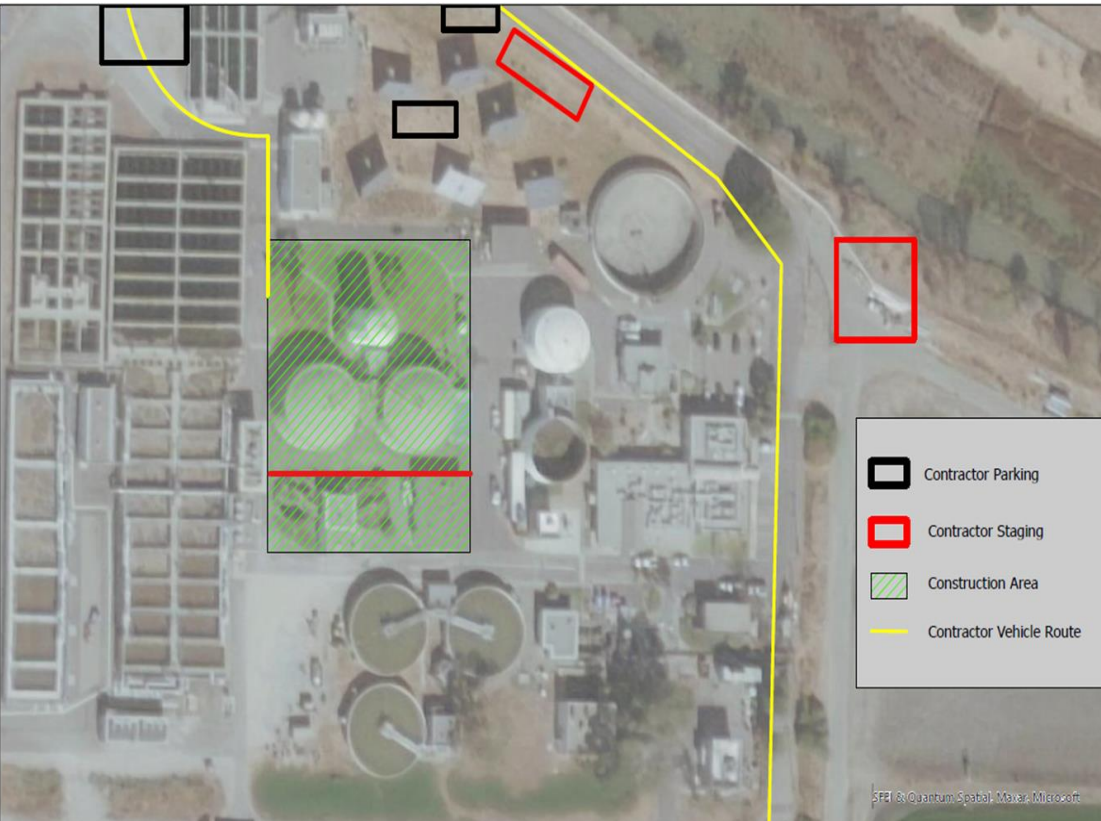
## West County Wastewater

- **September 2021** – Construction agreement signed for ENGIE to build the project
- **Second half 2021** – WCW worked through a successful Bond Issue to fund the project
  - Much of the ESCO project is funded by energy savings, operational savings, and rebates
  - WCW continues to seek grants thru the Infrastructure Investment Act
- **Spring of 2022** - WCW kicked off construction of the Clean & Green Project (formally the Comprehensive Energy and Sustainability Upgrade) for the WQR&R



# Clean and Green

## Water Quality Resource and Recovery Plant



- Replacement of Influent Pumps and Motors
- New Grit Separation System
- Carbon Redirection System
- New Primary Sludge Pumps and Comminutors
- Rotary Drum Thickener System
- High-Efficiency Aeration Blower
- New Digesters
- Cogeneration System
- Sludge Centrifugal Dewatering System
- Sludge Thermal Dryer System
- Richmond Sludge Piping Upgrade
- Conversion of Drying Beds into Equalization Basin
- Solar Energy Installations at WCW Office
- Atlas Lift Station
- Tara Hills Lift Station
- Lakeside Lift Station
- WQRRP
- Lighting Upgrades at WCW Offices and WQRRP
- Electric Vehicle Charging Stations at WCW Office

# Clean and Green – Today

## Water Quality Resource and Recovery Plant

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# Clean and Green – Tomorrow

## Water Quality Resource and Recovery Plant



# Clean and Green – One Last Time

## Solar



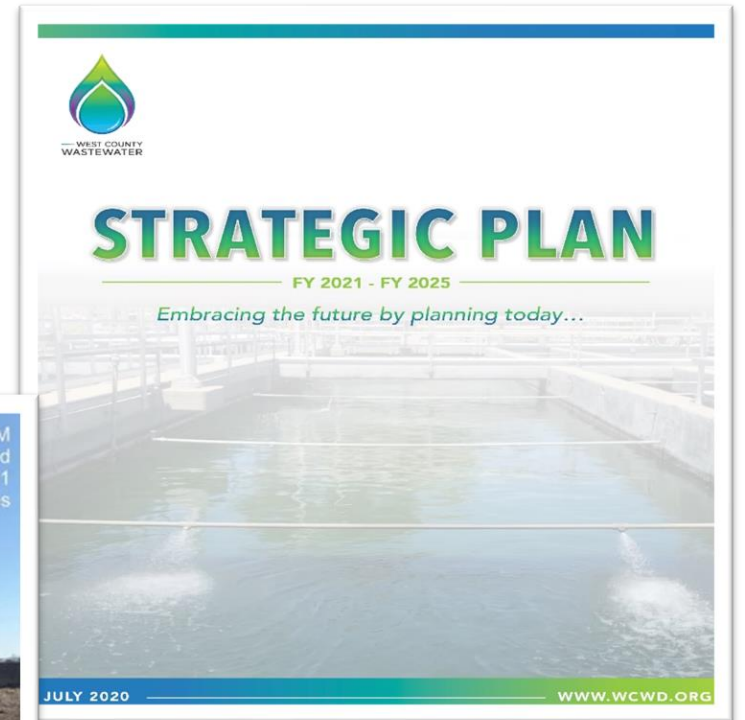
# CLEAN & GREEN

## Project Summary

The purpose of the project is to reduce energy consumption and greenhouse gas (GHG) emissions, improve operational reliability, safety and efficiency and improve the quality of biosolids produced.

### These goals are consistent with the goals of the West County Wastewater strategic plan:

- Adopt infrastructure maintenance and modernization strategies
- Environmental Steward
- Community Engagement



# Q&A

Thank you!

