PREPARED FOR DUBLIN SAN RAMON SERVICES DISTRICT

FINAL EXECUTIVE SUMMARY

DSRSD ENERGY FACILITIES MASTER PLAN

FINAL | June 2024

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Dublin San Ramon Services District
Water, wastewater, recycled water

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Dublin San Ramon Services District
Energy Facilities Master Plan

Executive Summary

FINAL | June 2024

Abbreviations

ACF	advanced clean fleets
Admin	administration
AHU	air handling unit
BAAQMD	Bay Area Air Quality Management District
CARB	California Air Resources Board
CAPEX	capital expenses
CIP	capital improvement program
CO2	carbon dioxide
DAFT	dissolved air flotation thickener
DERWA	DSRSD-EBMUD Recycled Water Authority
DLD	dedicated land disposal
DO	dissolved oxygen
DP-G	Distribution Panel G
DSRSD	Dublin San Ramon Services District
EBMUD	East Bay Municipal Utility District
EV	electric vehicle
FSL	facultative sludge lagoon
FOF	field operations facility
FOG	fats, oils and grease
FW	food waste
FYE	fiscal year ending
GHG	greenhouse gas
HSW	high strength waste
HVAC	heating, ventilation, and air conditioning
ICE	internal combustion engine
IRA	inflation reduction act
JPA	Joint Power Authority
k	thousand
kW	Kilowatt
kWh	Kilowatt-hour
kWh/yr	kilowatt-hour per year
LAVWMA	Livermore-Amador Valley Water Management Agency
M	million
MG	million gallons
mgd	million gallons per day
MTCO2e	metric tons of carbon dioxide equivalents
MW	Megawatt
MWh	megawatt-hour
MWh/yr	megawatt-hours per year
NG	natural gas
OPEX	operating expenses
PG&E	Pacific Gas and Electric Company
PPA	power purchase agreement
scf/yr	standard cubic feet per year
SGIP	self-generation incentive program
SRT	solids retention time
TM	technical memorandum
VFD	variable frequency drive
WWTP	wastewater treatment plant
ZEV	zero-emission vehicle

Executive Summary

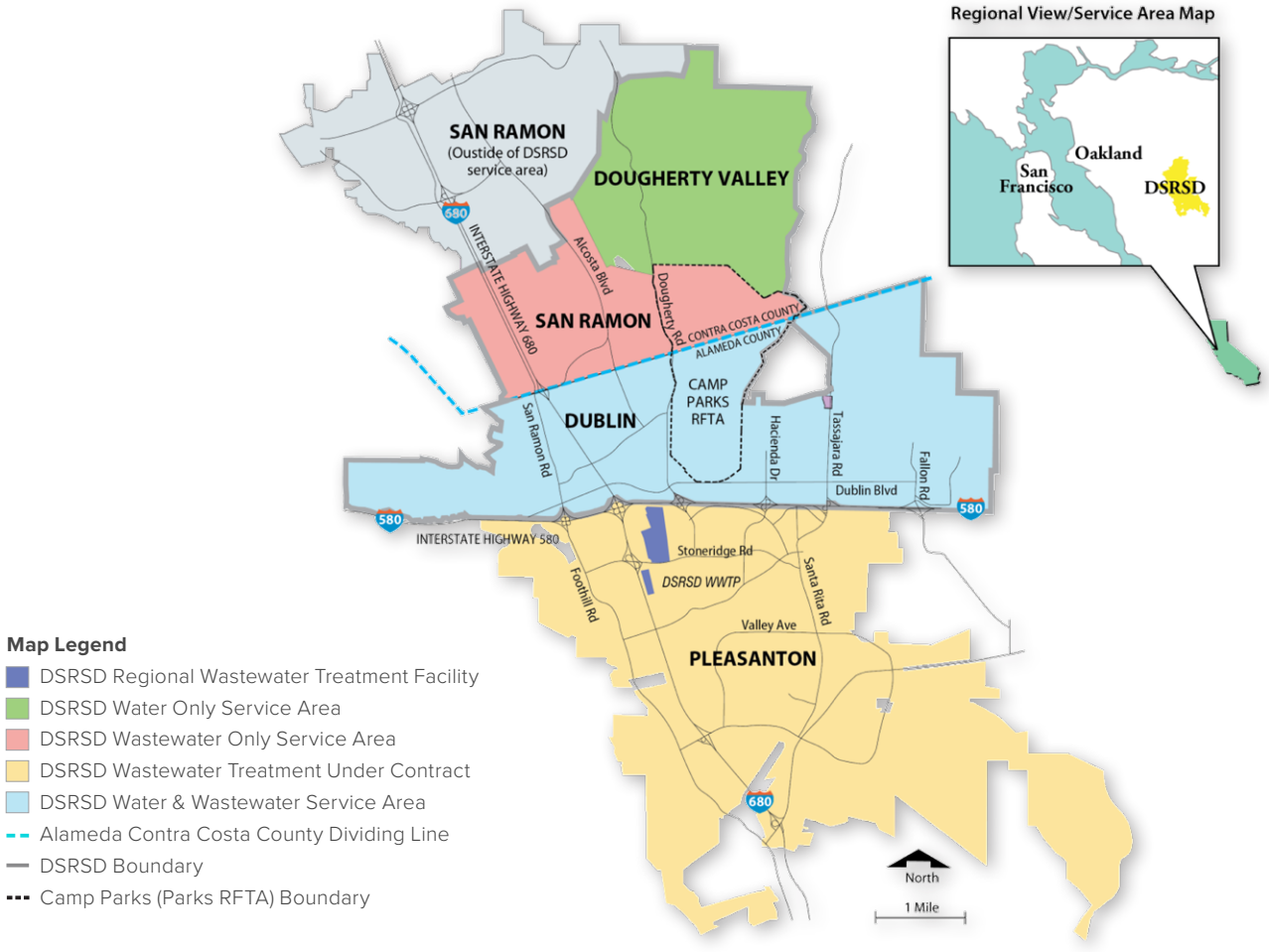
Introduction

For over seven decades, the Dublin San Ramon Services District (DSRSD) has provided safe and reliable, water, recycled water, and wastewater services to its customers in Alameda and Contra Costa Counties. Currently, DSRSD provides these services to over 192,000 customers. Since its inception in 1953, DSRSD has maintained its commitment to efficient, responsible, and effective water and wastewater facility infrastructure with an emphasis on fiscal discipline environmental stewardship, and excellent customer service. Figure ES.1 shows DSRSD's current service boundaries.

DSRSD maintains partnerships with other public agencies to provide value to the community.

These partnerships include two joint power authorities (JPA). The DSRSD-East Bay Municipal Utility District (EBMUD) Recycled Water Authority (DERWA), was created in 1995 to improve the reliability of the valley's water supply, particularly in dry years, by treating and delivering recycled water. The partnership constructed the recycled water plant adjacent to DSRSD's wastewater treatment plant (WWTP) as well as the transmission system that connects to DSRSD and EBMUD recycled pipelines, and provides service to the City of Pleasanton The other JPA, the Livermore Amador Valley Water Management Agency (LAVWMA), formed in 1974 between DSRSD and the cities of Pleasanton and Livermore, is responsible for maintaining the pipeline that transports treated wastewater from the two treatment plants serving the Tri-Valley to the East Bay Dischargers Authority pipeline for eventual discharge to San Francisco Bay.

Figure ES.1 ***DSRSD Service Area Map***



DSRSD's 2024-2028 Strategic Plan is a framework that guides decision making over a five-year period. It outlines the fundamental decisions that shape what the District plans to accomplish and sets a rational course of action. At its highest level, the Strategic Plan seeks to strengthen and build upon opportunities while addressing areas of concern. A critical objective of the Strategic Plan is to establish a long-term strategy to ensure greater energy efficiency and to bolster energy reliability across all DSRSD facilities.

Over time, DSRSD has taken strategic steps to meet increasing capacity demands, upgrading every major system to meet these demands while maintaining high quality service. Since the 1980's, DSRSD has been producing most of the energy required onsite at their WWTP through cogeneration, utilizing a blend of renewable biogas and natural gas to produce cost effective energy. Additionally, as their facilities have expanded, energy efficiency has been an important consideration. Some examples of steps taken towards improved energy efficiency include aeration system control improvements, the addition of variable frequency drives (VFD's) to reduce energy use at pumping facilities, installing energy efficient lighting, and reducing its fleet vehicle size. To continue fulfilling their commitment to environmental stewardship, DSRSD has now completed an Energy Facilities Master Plan (Master Plan). This document provides a comprehensive analysis of the District's energy demands, energy generation, and greenhouse gas (GHG) footprint for all its facilities and defines a comprehensive roadmap to cost-effectively minimize their energy and GHG footprint, while robustly achieving regulatory compliance. The key findings and recommendations from this Master Plan are described in this Executive Summary.

The Master Plan is composed of 14 technical memoranda (TM):

- **TM 1 – State of the District Energy Management and Greenhouse Gas Emissions.**
- **TM 2 – Energy and Greenhouse Gas Emissions Opportunities and Financial Impact.**
- **TM 3 – State of the Assets Review: Wastewater Treatment Plant.**
- **TM 4 – Energy Demand and Production Capacity Projections.**
- **TM 5 – Energy Savings and Efficiency Opportunities Assessment.**
- **TM 6 – Energy Generation Opportunities and Power System Reliability Assessment.**
- **TM 7 – Greenhouse Gas Reduction Opportunities and Fleet Transition to Zero-Emission Vehicles.**
- **TM 8 – Financing/Partnerships Opportunities Assessment.**
- **TM 9 – Evaluation of Separate Recycled Water Treatment Plant Power Supply.**
- **TM 11 – Alternatives Analysis.**
- **TM 12 – Recommended Capital Improvement Program.**
- **TM 13 – Electrical System Design Standards.**
- **TM 14 – Electrical Distribution Infrastructure Replacement Model Evaluation and Update.**

Baseline Energy Demand and Production and Greenhouse Gas Emissions

Serving as the foundation for this Master Plan, *TM 1 – State of the District Energy Management and Greenhouse Gas Emissions* sets a baseline of the current energy demand and production and GHG emissions for DSRSD's facilities. The Master Plan covers a 25-year planning horizon from 2022 to 2047, with 2021 serving as the baseline year. The baseline assessment included the following major DSRSD facilities/operational areas:

1 - **WWTP and its biosolids-handling facilities.**

2 - **Recycled water distribution system.**

3 - **Potable water distribution system.**

4 - **Wastewater collections system.**

5 - **District Administrative Building and Field Operation Facility.**

6 - **Vehicle fleet.**

The baseline assessment also included JPA facilities, however, these are not the focus of the Master Planning effort.

In 2021, DSRSD facilities collectively consumed 15 gigawatt-hours (GWh) of electricity, including electricity imported from the Pacific Gas & Electric Company (PG&E) and self-generated sources. This is equivalent to the energy consumed by approximately 2,500 California homes based on statistics from the California Energy Commission. The cogeneration system at the WWTP - utilizing biogas from the anaerobic digesters and supplemented with natural gas - produces both electricity and heat energy (Figure ES.2). **In 2021, the cogeneration system produced approximately 9.6 GWh of electricity, which accounts for 96% of the WWTP's total energy demand (approximately ~10 GWh).** This energy was produced at a cost of approximately $0.08 per kilowatt-hour (kWh). All combined, in 2021, the District facilities imported approximately 5.4 GWh of electricity at a cost of approximately $1.1 Million, and an average rate of $0.21 per kWh. In addition, the cogeneration system is engineered to recover thermal energy from the combustion process, and used to meet the heating requirements for the WWTP's four (4) anaerobic digesters, and heating/cooling for the various WWTP buildings. The thermal energy recovered from the cogeneration system typically meets 100% of the WWTP's thermal energy demands. Figure ES.3 shows the annual electricity use in 2021, broken down by facility.

Baseline Assessment Key Findings:

Electrical Consumption: ~15 GWh/year, equivalent to 2500 homes

Natural Gas Consumption: 720,000 therms/year, equivalent to ~2,100 homes

GHG Emissions: ~4,400 MTCO2eq, equivalent to ~140 homes

Cogen produces 9.6 GWh/year and meets approximately 96% of the WWTP's total electrical demand.

Cogen recovers 325,000 therms/year and meets approximately 96% of the District's total thermal demand

Figure ES.2 Cogeneration System Schematic

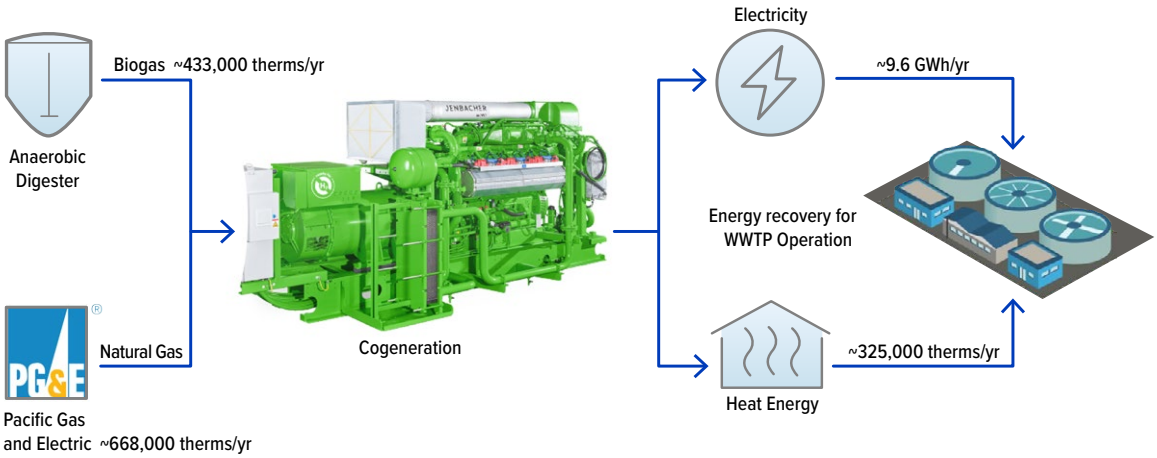
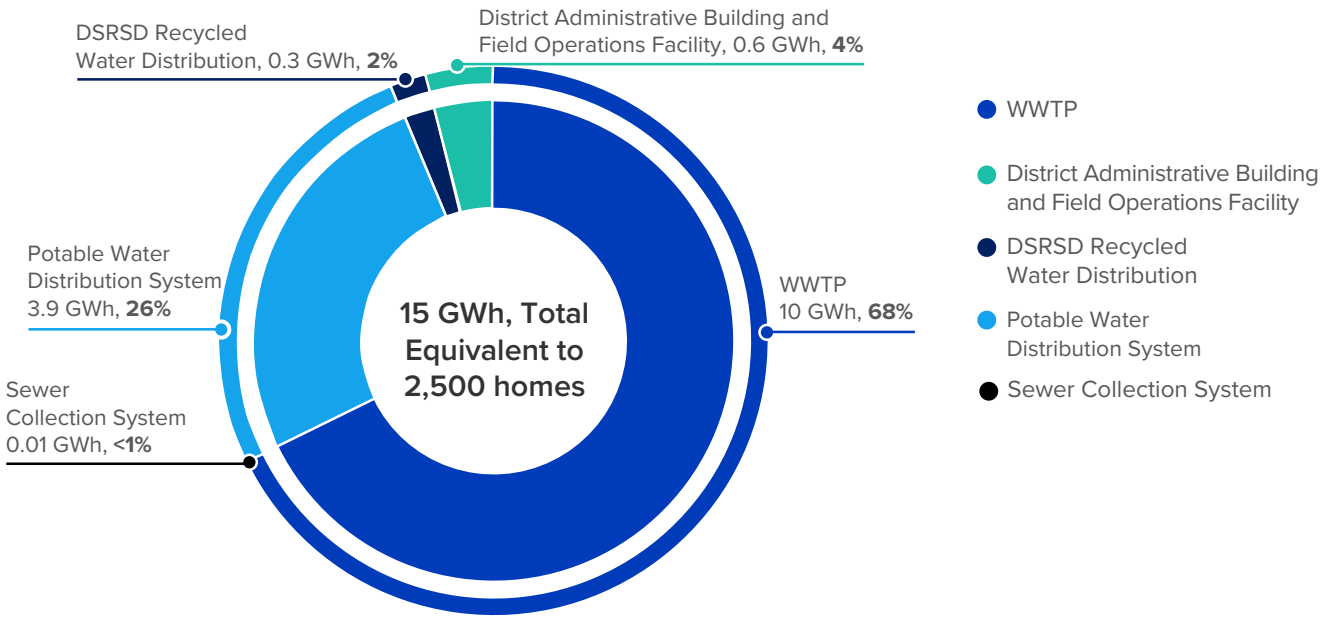


Figure ES.3 DSRSD Facilities Annual Electricity Consumption 2021



In addition to electricity, DSRSD also uses natural gas, diesel, and gasoline. Natural gas is used as a supplemental energy source for the cogeneration system at the WWTP and for building heating and cooling at the District Administrative Building and Field Operations Facility. **In 2021, these facilities used approximately 720,000 therms of natural gas at a cost of approximately $160,000, the equivalent of heating approximately 2,100 homes.** The vast majority (~668,000 therms) was used as a fuel for the cogeneration system to produce electrical power. The diesel and gasoline consumption in 2021 amounted to 9,350 gallons of gasoline and 630 gallons of diesel used to fuel the vehicle fleet, plus 3,306 gallons of diesel used for biosolids harvesting equipment at the WWTP facultative sludge lagoons (FSL's) and dedicated land disposal (DLD). The total fuel consumption by the District is comparable to 60 vehicles driven daily in the United States.

Also documented in TM 1 is a comprehensive GHG emissions inventory, which included Scope 1, 2, and 3 emissions for operations of the facilities listed above. Scope 1 includes direct emissions from on-site combustion and treatment processes. Scope 2 includes indirect emissions from purchased electricity. And Scope 3 includes indirect emissions from off-site sources such as chemical production and transport. **In 2021, all DSRSD facilities combined produced a total of approximately 4,400 metric tons of carbon dioxide equivalents (MTCO2e), the equivalent GHG footprint of approximately 140 homes.** The majority (73%) of these emissions were contributed by the WWTP, and the largest source of emissions at the WWTP (78%) was from natural gas used for cogeneration. Figure ES.4 shows the 2021 GHG emissions, broken down by facility. Figure ES.5 provides the 2021 natural gas consumption for DSRSD facilities.

Figure ES.4 DSRSD Facilities 2021 GHG Emissions (GHG units in metric tons of CO2 equivalents)

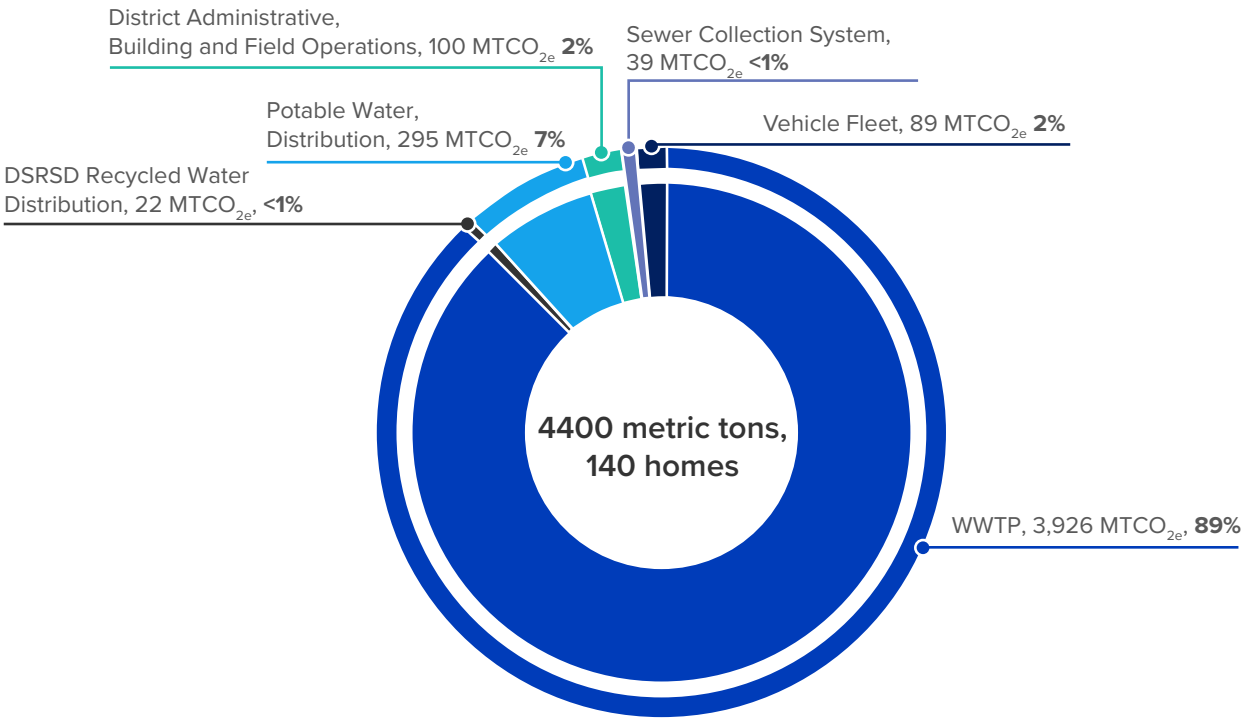
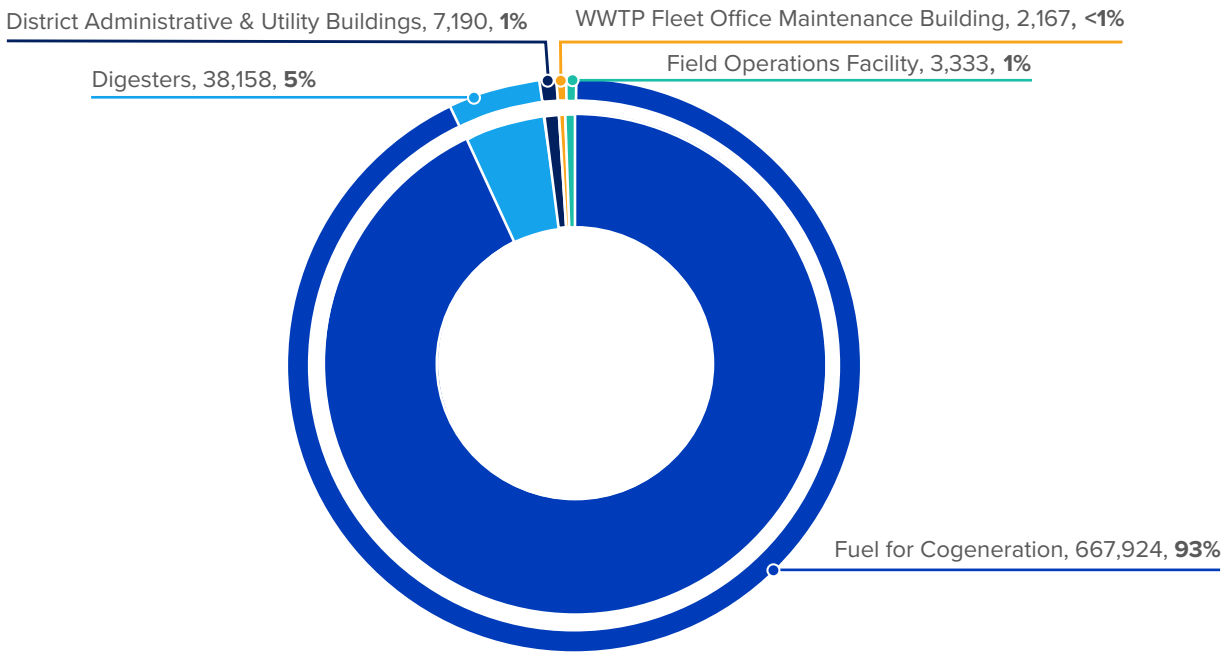


Figure ES.5 DSRSD Facilities 2021 Natural Gas Consumption (Units in Therms)



The DSRSD's Guiding Principles for Energy Management and GHG Emissions

The following four guiding principles were used in evaluating alternatives for energy and GHG improvements and the priortization of future capital investments related to energy and GHG emissions.

1 - **Strive to establish a diverse, reliable, and resilient energy supply portfolio for operation of its facilities.**

2 - **Comply with all regulatory energy and GHG related mandates and strive to exceed them when related investments are cost-effective with consideration to the anticipated payback period and life cycle cost.**

3 - **Capital improvements shall consider the impact on energy demand, energy efficiency, and GHG impacts where relevant.**

4 - **Seek opportunities to offset any additional future energy demands with renewable energy production.**

Forecasted Future Energy Demands, Energy Production and GHG Emissions

To provide a baseline comparison point for the energy opportunities evaluation, *TM 4 – Energy Demand and Production Capacity Projections* projected the energy demand, energy production and GHG emissions for the DSRSD facilities over the 25-year planning horizon of this Master Plan. These projections were then used to compare baseline conditions against alternatives to:

- Assess the estimated future energy demand and GHG emissions status quo conditions in consideration of the impact of potential future energy efficiency measures and future energy costs.
- Estimate adequate capacities for energy production equipment.
- Determine future energy supply needs and renewable energy sources to satisfy DSRSD's future energy demand and energy supply systems.

The projections assume that the wastewater influent flows and loadings will increase proportional to the population growth rate for the service area of 1.16% per year. These projections are provided in Table ES.1. It is noted that the flow projections may be conservative given additional water conservation efforts that may be implemented in the future. However, wastewater loads typically align with population and have the largest impact on energy demands.

Table ES.1 Projected WWTP Influent Flows and Electricity Consumption

Year	Average Daily Annual Flow (mgd)	Annual Electricity Consumption - WWTP (MWh)	Annual Electricity Consumption Wastewater Collection System (MWh)
2021[1][2]	11.7	10,021	10.4
2035[3]	13.7	11,777	11.6
2047[3]	15.8	13,526	13.3

Notes:
1- Baseline year for this Energy Facilities Master Plan. Electricity consumption includes electricity imported from the grid (460 MWh) and electricity from cogeneration (9,561 MWh).
2- Reference TM01 State of the District, Section 1.5.2, Table 1.11.
3- Developed based on a linear projection of the 2021 baseline using a 1.16 percent annual population growth rate.
Abbreviations: mgd – million gallons per day. MWh - Megawatt-hours

Water system energy demands were projected based on the 2020 Urban Water Management Plan demand projections and using the 2021 unit electricity consumption of 1.13 MWh per million gallons. These projections are provided in Table ES.2.

Table ES.2 Projected Potable Water Demand and Electricity Consumption

Year	Annual Potable Water Demand (MG)	Potable Water Demand Annual Electricity Consumption (MWh)
2021[1]	3,471	3,917
2035[2]	4,499	5,078
2047[2]	4,573	5,161

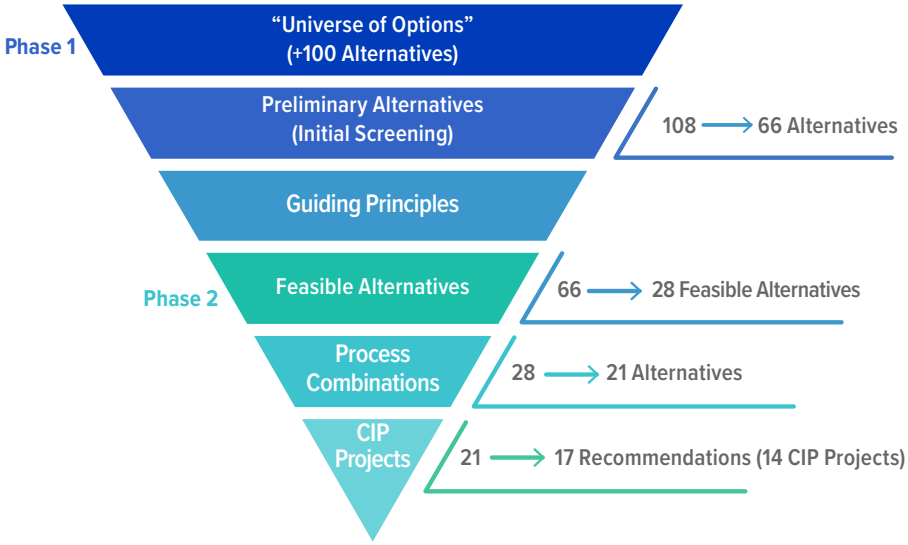
Notes:
1- Baseline year for this Energy Facilities Master Plan.
2- Developed based on the potable water demand projections in the 2020 Urban Water Management Plan prepared for DSRSD by West Yost Associates.

Evaluation of Energy Saving, Energy Generation, and GHG Reduction Opportunities

Having set the baseline and future projections, the next step in the Master Plan was to evaluate potential opportunities for DSRSD to reduce their energy consumption, produce more energy from renewable sources, and reduce GHG emissions. The opportunities evaluation focused on the facilities fully owned and operated by DSRSD; the DERWA and LAVWMA facilities were excluded.

An initial list of 108 potential energy efficiency and energy generation opportunities were screened down using the Guiding Principles as the primary screening mechanism into the final seventeen (17) proposed energy recommendations, including fourteen (14) capital improvement program (CIP) projects and three (3) non-CIP recommendations. The screening was done in close collaboration with DSRSD staff through several workshops that facilitated input from all stakeholders. Figure ES.6 provides an overview of the evaluation process.

Figure ES.6 Energy Opportunities Evaluation Process Overview



TM 2 – Energy and Greenhouse Gas Emissions Opportunities and Financial Impact documents the screening of 108 potential opportunities into 66 that were carried forward for more detailed evaluation of their cost, energy, and GHG impacts. The screening used the following evaluation criteria:

1- Implementability:
a. Capital cost
b. Operations and maintenance costs
c. Impact on staffing resources

2- Impact:
a. Operational or regulatory reliability or flexibility
b. Infrastructure resilience or ability to address aging or capacity-limited infrastructure
c. Energy demand or greenhouse gas emissions
d. Energy diversification and the generation and use of renewable energy

The detailed evaluation of cost and energy impacts of the screened opportunities is documented in TM 5 and TM 6.

TM 5 – Energy Savings and Efficiency Opportunities Assessment evaluated multiple energy savings opportunities including WWTP liquid and solids treatment process optimizations, building heating, ventilation, and air conditioning (HVAC) and lighting improvements, pump efficiency improvements for the potable water distribution system, and energy management and advanced control opportunities.

TM 6 – Energy Generation Opportunities and Power System Reliability Assessment evaluated energy generation opportunities including opportunities to increase digester gas production and cogeneration capacity, solar and wind power, battery storage, and thermal energy recovery opportunities.

TM 7 – Greenhouse Gas Reduction Opportunities and Fleet Transition to Zero-Emission Vehicles Assessment documents the evaluation of the GHG impacts of the energy savings and generation opportunities. In addition, it developed a strategy for DSRSD to transition their medium- and heavy-duty fleets to zero-emission vehicles (ZEV), as required by recent regulations adopted by the California Air Resources Board (CARB) in April 2023. **The recommendations include adhering to the State and Local Fleet requirements for transitioning to ZEV's and increasing the District's timeline for vehicle replacement.**

TM- 8 Financing Partnerships Opportunity Assessment evaluated opportunities for funding of energy-related projects through grants and loans as well as partnerships such as power-purchase agreements (PPA's) to assist DSRSD in funding large CIP expenditures. Opportunities identified include the Inflation Reduction Act tax credits, the Self-Generation Incentive Program (SGIP), and PG&E on-bill financing for efficiency improvements.

Based on the energy, cost, and GHG impacts evaluated in TM 5, TM 6, and TM 7, the 67 opportunities were screened down to 28 feasible alternatives.

TM 11 – Alternatives Analysis describes the final round of screening, where the 28 feasible alternatives were evaluated using a modeling software tool. The energy model was used to develop and compare "portfolios" consisting of various combinations of alternatives to understand the potential impacts to energy use, energy production, and GHG footprint over time. These were compared to the baseline scenario and Portfolio 2, which consisted of only projects that best aligned with the "Guiding Principles". The following scenarios where evaluated as part of this effort:

- **Baseline Portfolio:** No change scenario, no energy projects selected.
- **Portfolio 1 –** Current CIP: Only projects already included in the DSRSD CIP.
- **Portfolio 2 –** Guiding Principles: Only projects that align with the Guiding Principles.
- **Portfolio 3 –** Energy Independence: Only projects that provide independence from utility power.
- **Portfolio 4 –** Prioritized Energy Efficiency: All projects that increase efficiency.
- **Portfolio 5 –** All Renewable Energy: All projects that increase renewable energy and offset future energy demands.
- **Portfolio 6 –** GHG Neutrality: All projects that reduce GHG emissions.
- **Portfolio 7 –** Favorable Payback: Only projects that have a less than 15-year payback.

Based on the results of this analysis, the 28 feasible alternatives were screened down to the final seventeen (17) energy recommendations, including fourteen (14) CIP projects recommended for inclusion in DSRSD's CIP and three (3) non-CIP projects.

TM 12 – Recommended Capital Improvement Program provides descriptions of the 17 recommendations. It should be noted that each of these selected projects aligns with the Guiding Principles and provides at least one of the following key benefits:

- **Regulatory compliance.**
- **Energy efficiency and reliability through replacement of assets nearing the end of their useful life.**
- **Power resilience by addressing identified deficiencies in the electrical distribution infrastructure.**
- **Diversification of energy through renewable energy generation.**

In addition to the core evaluation of the opportunities described above, the WWTP's electrical system reliability and resiliency were evaluated as part of this Master Plan.

TM 3 – State of the Assets Review: Wastewater Treatment Plant evaluated the condition of existing electrical assets at the WWTP, because understanding what assets are nearing the end of their useful life is important for prioritizing projects to provide ongoing operations reliability.

TM 14 – Electrical Distribution Infrastructure Replacement Model Evaluation and Update provides a detailed evaluation of the electrical distribution infrastructure which evaluated short circuit ratings and load capacities of the existing equipment. Recommendations associated with this analysis are included in the CIP as the four (4) reliability driven projects.

Figure ES.7 provides a breakdown of the CIP including costs by project type. Figure ES.8 presents the recommended CIP projects, along with their timing and associated costs. Table ES.3 presents each recommended CIP project along with justification for its implementation. Table ES.4 presents the recommended non-CIP projects.

The total budget for the projects recommended in the Master Plan is $133.3 million. The Energy Master Plan CIP includes five projects that are already included in the District's adopted Capital Improvement Program Ten-Year Plan and Two Year Budget for Fiscal Years 2024 and 2025 (estimated at $54.3M). Therefore, this Energy Master Plan CIP is expected to increase capital expenditures by approximately $79.0 million. Approximately $88.3 million of the total CIP is planned over the next 10 years (FYE 2024-2033) and an additional $45.0 million is planned over the 11-25 year planning horizon (FYE 2034-2047).

Figure ES.7 CIP Cost by Project Type

Project Type	Total
Asset Replacement	$82,800,000
Regulatory Driven	$7,200,000
Resilience Driven	$6,500,000
Renewable Energy Generation/Diversification	$36,700,000

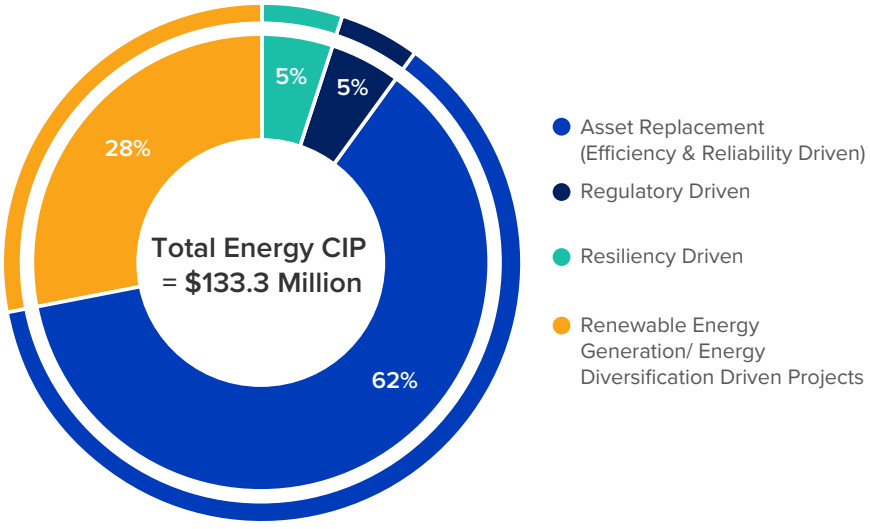


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Figure ES.8 Energy Facilities Master Plan Recommended CIP

DSRSD ENERGY CAPITAL IMPROVEMENTS PLAN

Estimated Project Cost (in 2023 dollars)

Project Description	FYE	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043
Regulatory Driven																					
Project 1: Fleet Assets Program		$7.2 M																			
Asset Replacement (Efficiency & Reliability)																					
Project 2: Cogeneration Engine Replacement						$42.8M															
Project 3: Aeration System Upgrades								$9.8 M													
Project 4: DAFT Replacement with Mechanical Thickening															$26.7 M						
Project 5: WWTP HVAC Replacements		$3.5M																			
Renewable Energy Generation/ Energy Diversification Driven Projects																					
Project 6: Off-Site Solar Power			$9.1 M																		
Project 7: Battery Storage				$4.8 M																	
Project 8: On-Site Solar Power, Battery Storage and EV Charging			$9.3 M																		
Project 9: Codigestion of Food Waste and other High Strength Waste					$3.9 M																
Project 10: Additional Cogeneration Engine															$9.6 M						
Resiliency Driven Projects																					
Project 11: Install Load Bank for DP-G					$300k																
Project 12: Reconfigure Switchgear for Power Outages					$100k																
Project 13: WWTP Electrical Improvements Phase 1			$2.1 M																		
Project 14: WWTP Electrical Improvements Phase 2			$100 k									$3.9 M									
Total Annual Cost		$1,432,000	$6,051,483	$18,797,000	$8,781,000	$3,681,000	$20,352,000	$19,750,000	$630,000	$4,410,000	$4,410,000	$390,000	$4,200,000	$3,295,000	$9,354,000	$18,107,000	$8,898,000	$742,000	$0	$0	$0
CIP Total in 2023 Dollars		$133.3M																			

LEGEND
- Planning or Design Phase
- Construction Phase

Notes: *All or portions of the highlighted projects are included in the current approved CIP.*

Table ES.3 Overview of Proposed Energy Projects Included Within the Master Plan CIP

Project	Alternatives Included Within Project	CAPEX ($)	OPEX ($/ Year)	Energy or GHG Impact	Justification
Regulatory Driven Projects					
Project 1: Fleet Assets Program	Transition to zero-emission vehicle (ZEV) fleet.	7.2M	See TM – 07	Saves 94,000 gallons of gasoline and 6,000 gallons of diesel fuel over 20 years	Compliance with California Air Resources Board (CARB) regulations.
Asset Replacement Projects (Efficiency & Reliability Driven)					
Project 2: Cogeneration Engine Replacement	Replace aging cogeneration engines with new higher efficiency cogeneration engines	42.8M	-560k	Increased onsite energy production of 2.5 MWh/yr	Near the end of useful life and newer engines have improved efficiency. Potential 16-year payback with IRA incentives. Due to higher efficiency, new engine expected to produce approximately 20% more power; additional power will offset future energy demands associated with new customers.
Project 3: Aeration System Upgrades	Model Predictive Aeration Control Low DO Operation Upgrade Aeration Diffusers Upgrade Aeration Blowers	100k 100k 1.0M 7.6M	-95k -190k -95k -38k	Energy efficiency savings of approximately 1 MWh/yr	Blower equipment is nearing the end of useful service life (10 years remaining) and newer blowers have improved efficiency. Diffuser and control improvements timed with blower replacement for added efficiency improvements.
Project 4: DAFT Replacement with Mechanical Thickening	Mechanical Thickening instead of DAFT Real time SRT control	26.6M 50k	-630k -10k	Energy efficiency savings of approximately 1.4 MWh/yr	DAFT structure and equipment nearing the end of its useful life (15-20 years remaining) and a significant improvement in energy efficiency is expected.
Project 5: WWTP HVAC Improvements	Replacement of HVAC components for various buildings at the WWTP	3.5M	Not evaluated	Replaces aging assets with new more efficient equipment.	Units are near the end of their useful life (<5 years remaining) and newer models have improved efficiency.
Renewable Energy Generation/Energy Diversification Driven Projects					
Project 6: Off-site Solar Power	Off-Site Solar Installation (At LAVWMA site)	9.1M	-311k	Renewable energy production of approximately 1 MWh/yr	Estimated 14-year payback with IRA incentives. Increased energy independence and increased diversity of renewable energy are also beneficial outcomes of these projects. The project also offers advantageous return on investments through a purchase power agreement structure.
Project 7: Battery Storage	Battery Storage for Peak Demand Charges (At WWTP)	4.8M	-480k	Saves approximately $430,000/yr in electricity costs	Estimated 7-8 year payback. Offsets peak demand charges and improves energy independence.
Project 8: On-site Solar Power, Battery Storage, and EV Charging	On-Site Solar Installation Solar Power for EV Fleet Recharging Stations (At WWTP, FOF, and Admin Bldg)	9.3M	-191k	Renewable energy production of 3.2 MWh/yr	Estimated 20-year payback with IRA incentives. Increased energy independence and increased diversity of renewable energy.
Project 9: Codigestion of FW and other HSW	Co-digest Food Waste Slurry and HSW	3.9M	Not evaluated	Over 3,400 MTCO2e reduction in GHG emissions per year through offsetting NG useage with renewable biogas production. Additional renewable energy production of approximately 761,000 KWh/yr	Gas production associated with these facilities will offset future energy demands associated with new customers.
Project 10: Additional Cogeneration Engine	Increase Cogen Capacity for Peak Demand and Redundancy	9.6M	Not evaluated	Over 600,000 KWh/yr in additional onsite power generation.	Provides redundancy if an engine is out of service and allows for meeting future and peak demands with onsite renewable energy production.
Resiliency Driven Projects					
Project 11: Install Load Bank for DP-G	Install load bank to protect Standby Generator G5 and provide reliable operation.	300k	Not evaluated	NA	Adding an automatic load bank to DPG would allow sufficient load on G5 whenever it's running, whether due to a PG&E outage or routine exercising of the generator.
Project 12: Reconfigure Switchgear for Power Outages	Reconfigure the switchgear at the WWTP to allow for automatic restoration of power after a PG&E power outage	100k	Not evaluated	NA	Improves performance and provides reliability of existing assets.
Project 13: WWTP Electrical Improvements Phase 1	Upgrade WWTP's electrical equipment with inadequate short circuit ratings.	2.1M	Not evaluated	NA	Improves performance and provides reliability of existing assets.
Project 14: WWTP Electrical Improvements Phase 2	Upgrade WWTP's electrical equipment with marginal or overloaded performance.	4M	Not evaluated	NA	Improves performance and provides reliability of existing assets.

Notes: *All or portions of the highlighted projects are included in the current approved CIP.*
Abbreviations: AHU - air handling unit; CAPEX - capital expenses; DERWA - Dublin San Ramon Services District - East Bay Municipal Utility District Recycled Water Authority; DLD - dedicated land disposal; FOG - fats, oils, and grease; FSL - facultative sludge lagoon; FW - food waste; HSW – high strength waste; k - thousand; M - million; NG - natural gas; OPEX - operating expenses; PPA - power purchase agreement.

Table ES.4 Recommended Non-CIP Energy Projects

Project	Opportunities Included	Justification
Project 15: Fats, Oils, and Grease (FOG) Facility Activation	Co-digest FOG	Reduction of 1,230 metric tons in carbon dioxide equivalents for a slight increase in operating costs ($300k).
Project 16: Potable Water Distribution System Improvements	Address pump performance issues identified.	Efficiency issues associated with poor pump performance not only impact energy use but reduce the life of equipment and impact system reliability.
Project 17: Energy Management Improvements	Renewable Energy Generation Partnerships Alternative Power Monitoring Energy Decision Management Tools Staff Focus on Energy Management	Allows for better energy management decisions by understanding where power is consumed.

This is a sizable effort for the District to undertake and will strain its staffing resources. Although the scope of the Master Plan did not include a staffing analysis, it is likely that DSRSD will need to employ additional engineering staff to manage the implementation of the recommended energy projects. Additionally, because the food waste and FOG receiving facilities will demand significant operator attention, DSRSD may also need to consider bolstering its operational staffing.

The proposed CIP will provide significant benefits to the District over the next 25 years, including regulatory compliance, diversification of energy supplies with more renewable energy, stabilization of long-term energy costs by minimizing the use of grid power and natural gas, and offsetting future energy demands with renewable energy generation. It will also increase energy efficiency (25% reduction by 2030 and 50% by 2047), and significantly reduce the District's carbon footprint (57% reduction by 2030 and 66% by 2047).

The DSRSD's Energy Policy

The Energy Master Planning process was also used to assist DSRSD in developing its Energy Policy. The Energy Policy was adopted by the DSRSD Board on February 20, 2024. The purpose of this policy is to provide an adaptable framework to enhance energy system resilience and reliability, optimize energy efficiency, increase renewable energy production, comply with current and future energy and greenhouse gas mandates, and promote environmental sustainability.

Energy CIP Key Points

Total Energy Facilities CIP
$133.3 M ($79.0 M to be added to Capital Improvement Program)

14 Projects:

- Regulatory Compliance
- Energy Efficiency through Asset Replacement
- Energy Diversification through Renewable Energy Sources
- Electrical Reliability

Key Benefits:

Improved Energy Reliability

Energy Efficiency
25% reduction by 2030,
50% reduction by 2047

GHG Emissions Reduction
57% by 2030, 66% by 2047

Regulatory compliance for vehicle fleet

Diversification of energy supplies with more renewable energy

Stabilization of long-term energy costs

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