Climate Action Plan

Sustainability & Resilience

2021

EBMUD

East Bay Municipal Utility District (EBMUD) supplies water and provides wastewater treatment for parts of Alameda and Contra Costa counties in California. EBMUD is a special district formed under the Municipal Utility District Act with a seven-member publicly elected Board of Directors. EBMUD began supplying water to customers in 1923 and providing wastewater treatment in 1951. Today, the EBMUD water service area includes 20 cities and 15 unincorporated East Bay communities, and serves 1.4 million customers; the EBMUD wastewater service area includes six cities and one sanitary district, and serves 740,000 customers.

Introduction

Climate change is a growing threat to our planet and community. To prepare for the future uncertainties associated with climate change, EBMUD has undertaken a rigorous evaluation of potential impacts to ensure that we continue to provide reliable, high-quality water and wastewater services to our customers. The information in this Climate Action Plan draws on EBMUD's Climate Change Monitoring & Response Plan (2014), the Wastewater Climate Change Plan (2019), the Urban Water Management Plan, and EBMUD's Climate Action, Energy, and Sustainability and Resilience policies.

EBMUD has long been a leader in implementing policies and projects that reduce human-caused sources of greenhouse gases (GHGs) to mitigate climate change. This Plan addresses the impacts, vulnerabilities, mitigation measures, and adaptation strategies throughout EBMUD operations, from the Mokelumne River and East Bay watersheds to San Francisco Bay. Climate change has the potential to affect every aspect of our work including our water supply, water quality, environment, infrastructure, finances, customers, and employees. To address these impacts, EBMUD is preparing for more frequent and severe droughts and storms, reduced snowpack, warmer weather, longer wildfire seasons, increased water demand, and rising groundwater and sea levels. In addition, EBMUD is leading the way and investing in renewable energy production, using alternative fuel vehicles, and setting aggressive goals for GHG reductions.

Sustainability and Resilience

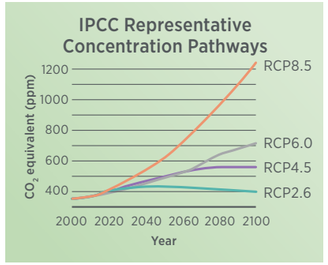
To meet these and other challenges, EBMUD is focused on sustainability and resilience. This means planning and taking actions to meet the needs of the present without compromising the needs of future generations.

> It is the policy of the East Bay Municipal Utility District to: consider the impacts of climate change and take appropriate action to understand, mitigate and adapt to those impacts through sustainable activities that manage long-term economic, environmental and human resource benefits.
>
> Climate Action Policy, June 11, 2019

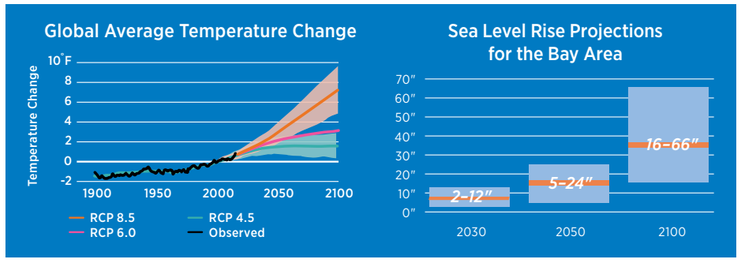
Pardee Dam and Power House

Climate Change Projections

Global mean temperatures and sea levels are rising due to the increasing emissions of carbon dioxide and other GHGs that trap heat in the atmosphere. The United Nations Intergovernmental Panel on Climate Change uses Representative Concentration Pathways (RCPs) to describe different future scenarios. EBMUD's climate change planning is based on the impacts expected from RCP 8.5, which is considered a low-possibility, high-impact case. Under RCP 8.5, carbon emissions are projected to triple by 2100. The figure to the right shows the increasing trends in GHG emission for various RCPs due to fossil fuel combustion.



RCP 8.5 results in an annual mean temperature increase of 4.4° Fahrenheit (F) by 2050 and 7.2°F by 2100 for the San Francisco Bay Area. Sea levels in the Bay Area are projected to rise 12 to 16 inches by 2050 and approximately 36 inches by 2100.[1]



Impacts and Vulnerabilities

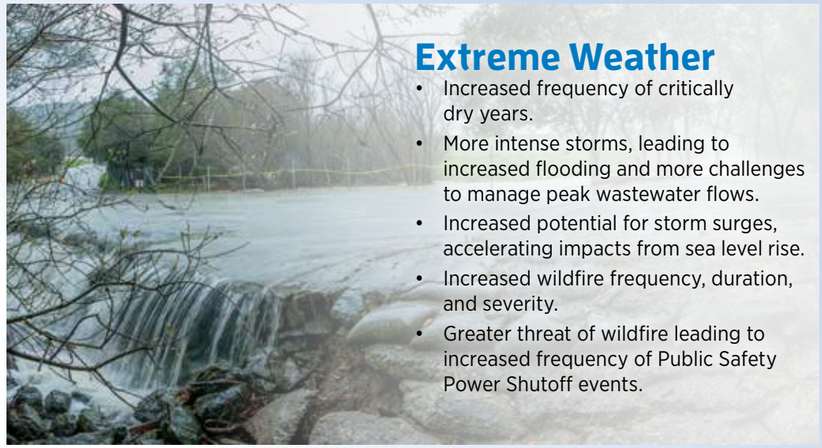
Rising Temperatures

- Increased water demand of up to 21 percent by 2050 (EBMUD 2050 Demand Study).
- Increasing energy demand due to increased water demand.
- Reduced water supply due to a reduced snowpack, changes in runoff timing, and increased evaporation.
- Increased Mokelumne River water temperatures (inflow to Pardee Reservoir) up to 2°F by 2050 and as much as 6.3°F by 2100 resulting in potential fishery impacts in lower Mokelumne River.
- Increased risk of heat stress for employees working outdoors.
- Rise in cyanobacterial (blue-green) algal blooms leading to poor water quality and increased treatment costs.

Rising Sea Levels

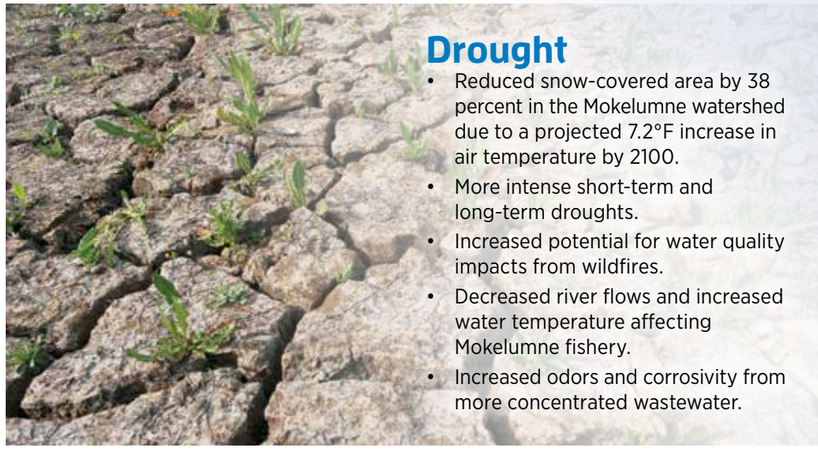
- Increased salinity to Sacramento-San Joaquin River Delta, which impairs water quality of supplemental water supplies.
- Increased risk of failure of levees protecting the aqueducts.
- Increased rate of corrosion on water distribution mains near the shoreline.
- Increased wastewater effluent pumping and energy use.
- Inundation of coastal areas and facilities due to increased groundwater and sea level near the shoreline.

[1] Ackerly, David, Andrew Jones, Mark Stacey, Bruce Riordan. (University of California, Berkeley) 2018. San Francisco Bay Area Summary Report. California's Fourth Climate Change Assessment. Publication number: CCCA4-SUM-2018-005.



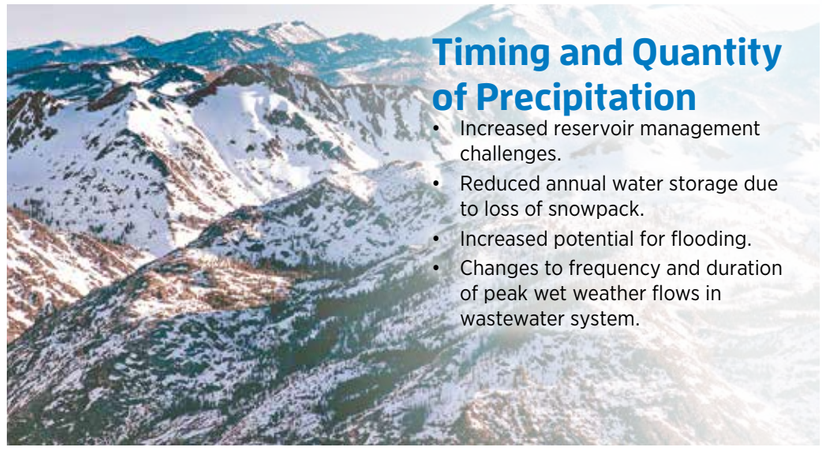
Extreme Weather

- Increased frequency of critically dry years.
- More intense storms, leading to increased flooding and more challenges to manage peak wastewater flows.
- Increased potential for storm surges, accelerating impacts from sea level rise.
- Increased wildfire frequency, duration, and severity.
- Greater threat of wildfire leading to increased frequency of Public Safety Power Shutoff events.



Drought

- Reduced snow-covered area by 38 percent in the Mokelumne watershed due to a projected 7.2°F increase in air temperature by 2100.
- More intense short-term and long-term droughts.
- Increased potential for water quality impacts from wildfires.
- Decreased river flows and increased water temperature affecting Mokelumne fishery.
- Increased odors and corrosivity from more concentrated wastewater.



Timing and Quantity of Precipitation

- Increased reservoir management challenges.
- Reduced annual water storage due to loss of snowpack.
- Increased potential for flooding.
- Changes to frequency and duration of peak wet weather flows in wastewater system.

Mitigation and Adaptation

EBMUD is committed to mitigating the impact of climate change by reducing direct and indirect GHG emissions; collaborating with local, state, and national partners; and serving as an example of what a local agency can achieve. Equally important, we are committed to adapting to climate change as it impacts our services and customers.

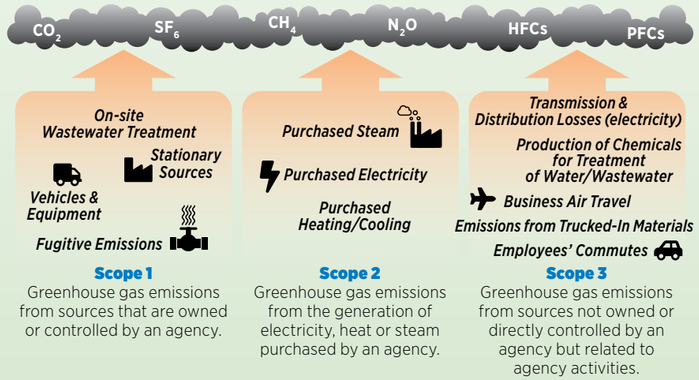
Mitigation Measures

EBMUD is reducing its GHG emissions from direct sources (Scope 1 emissions), indirect sources from purchased energy (Scope 2 emissions), and other indirect sources associated with EBMUD activities (Scope 3 emissions).

In dry years, which will be more frequent due to changing climate, energy demands will increase. EBMUD utilizes supplemental water supplies that require substantially more energy to deliver and treat. Energy for raw water pumping will generate an additional 10,000 metric tons of carbon dioxide equivalent emissions.

EBMUD was the first water agency to inventory its GHG emissions using the California Climate Action Registry protocol (now The Climate Registry). We established GHG reduction goals in 2013 and updated them in 2020, with the goal to minimize our reliance on fossil fuels, diversify energy sources, and ultimately become carbon neutral. We continue to look for opportunities to reduce our carbon footprint through renewable energy generation, water and energy conservation, partnerships, use of clean and renewable fuels, and other innovative approaches.

Common Sources of Greenhouse Gas Emissions



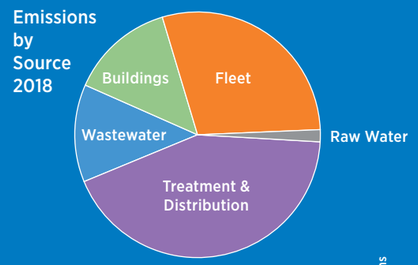
Scope 1
Greenhouse gas emissions from sources that are owned or controlled by an agency.

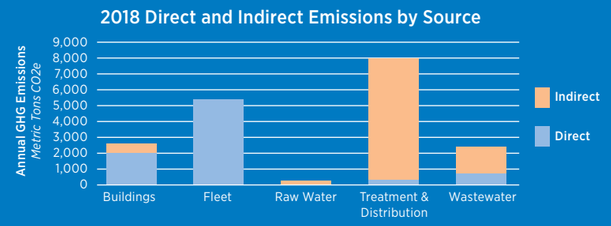
Scope 2
Greenhouse gas emissions from the generation of electricity, heat or steam purchased by an agency.

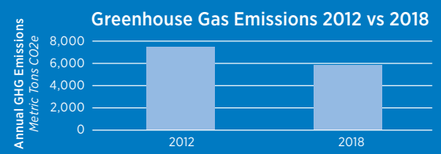
Scope 3
Greenhouse gas emissions from sources not owned or directly controlled by an agency but related to agency activities.

In 2020, EBMUD established new aggressive GHG reduction goals:

- Water System: Eliminate direct and indirect GHG emissions by 2030.
- Wastewater System: Eliminate indirect GHG emissions by 2040; reduce direct GHG emissions by 50 percent over 2000 levels.








500 Kilowatt solar panel installation at the Walnut Creek Treatment Plant

Renewable Energy

EBMUD produces approximately 150,000 Megawatt-hours (MWh) of renewable energy annually through hydropower at our Sierra Nevada foothills facilities. Similarly, EBMUD produces approximately 50,000 MWh of renewable energy annually by combusting biogas created through the wastewater treatment process. Since 2002, we have accepted various food-product related waste for direct anaerobic digestion, which has more than doubled the amount of biogas and electricity produced at the wastewater plant. These sources of renewable energy produce more electricity than EBMUD requires for its entire operations.

EBMUD also leverages its infrastructure and land to produce renewable energy through photovoltaic (PV) projects. Since 2003, we have constructed ten PV projects providing nearly 2 Megawatts (MW) of PV capacity and producing up to 3,200 MWh of electricity annually. In 2021, EBMUD plans to begin construction of the 5 MW Duffel PV Renewable Energy Project in the City of Orinda. This project will produce an estimated 10,000 MWh annually.

EBMUD will continue to look for new renewable energy opportunities, including in-conduit hydropower, battery storage, and micro-power. We also purchase clean energy through community choice aggregators. This allows EBMUD to move even faster than California Senate Bill 100, which requires 100 percent of retail electricity to be renewable by 2045.

The amount of energy produced from hydropower and biogas could power nearly 42,000 households—about the same number of households in the City of Berkeley.


Wastewater-powered electric vehicle charging stations

Resource Recovery

EBMUD utilizes anaerobic digestion to treat the solids from the wastewater treatment process, which produces biogas. This biogas is combusted and converted to energy. The Resource Recovery Program, which EBMUD has operated since 2002, creates even more renewable energy by accepting trucked-in organic wastes. The Program reduces GHG emissions in three ways. First, the enclosed anaerobic process converts methane to carbon dioxide. Without this process, the disposal of some of these wastes would result in the uncontrolled releases of methane gas, which has 30 times more global warming potential than carbon dioxide. Second, combustion of the methane generates renewable electricity, which displaces fossil fuel use and associated GHG emissions. Third, anaerobic digestion residuals, or biosolids, are land applied where some of the carbon is sequestered in the soil.

Trucked waste producing renewable electricity

Water Conservation

Reducing water demand through water conservation reduces GHG emissions associated with the delivery, treatment, and distribution of drinking water. The California Energy Commission estimates that 19 percent of the energy used in the state is for water-related activities. This relationship, called the water/energy nexus, highlights the importance of water conservation to reduce energy use. EBMUD customers have reduced their water use by about 40 percent since the 1970s. Water conservation is not only a mitigation measure, but also an important adaptation strategy. Reducing water demand prepares us for the increased risk of droughts.

Water/Energy Nexus:

Water Saved = Energy Saved = Reduced GHG Emissions

Energy Saved = Water Saved

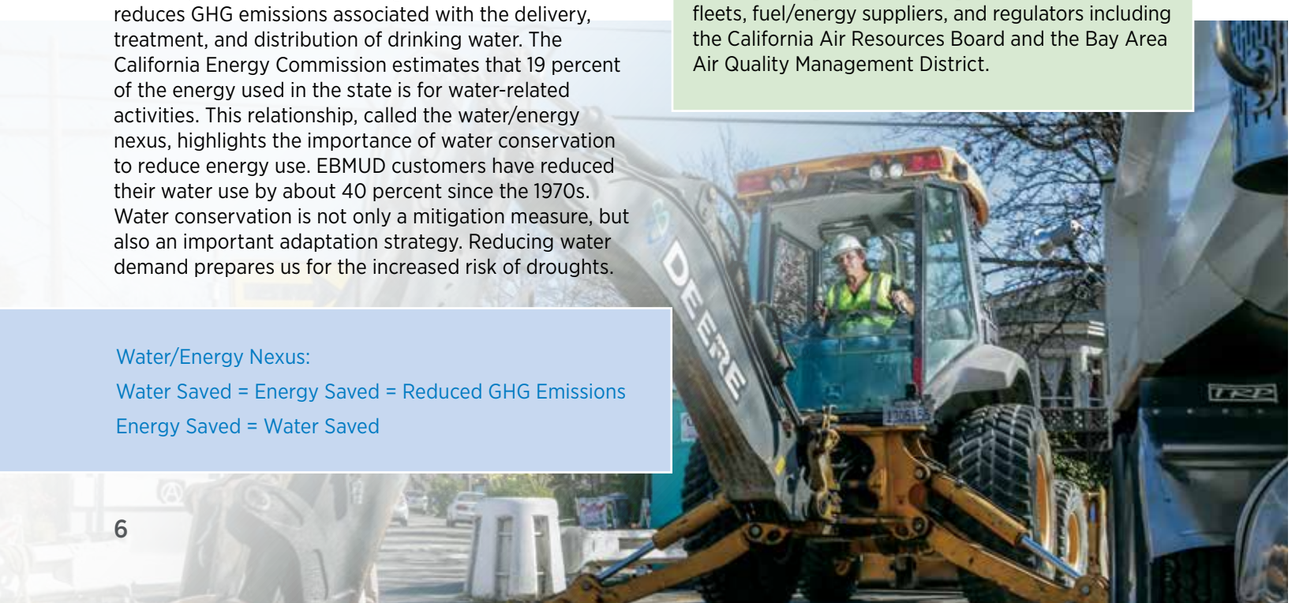
Transportation

For light-duty applications, EBMUD is investing in more fuel-efficient hybrid and plug-in electric vehicles, which has resulted in significant GHG emissions reductions. In fact, every passenger vehicle in EBMUD's fleet is either a hybrid or plug-in electric vehicle. For our medium- and heavy-duty fleet, EBMUD has transitioned to nearly 100 percent renewable diesel, which is manufactured using organic materials such as waste animal fat or used cooking oil. Renewable diesel reduces GHG emissions by up to 80 percent when compared to petroleum-based diesel, and has other benefits such as lower tailpipe particulate emissions.

Collaboration on New Vehicles

The future for medium- and heavy-duty vehicles is to utilize zero emission technologies. EBMUD is the first water utility to join CALSTART, which is a nonprofit organization working with businesses and government agencies to develop clean, efficient transportation solutions. With the help of CALSTART, we hope to identify medium- and heavy-duty vehicle technologies that will help us comply with current and future regulations and meet our GHG reduction goals.

We also signed the Drive to Zero pledge, committing our support to accelerate the growth of global zero- and near-zero-emission (ZE) commercial vehicles. The Drive to Zero effort envisions that ZE technology will be commercially viable by 2025 and widely available by 2040 in specific vehicle segments and regions. EBMUD is the first water utility to make this pledge, joining partners such as cities, regional and national governmental agencies, manufacturers, fleets, fuel/energy suppliers, and regulators including the California Air Resources Board and the Bay Area Air Quality Management District.



Adaptation Strategies

Even with these mitigation measures, EBMUD recognizes that the impacts of climate change will touch every aspect of our operations including water supply planning, water quality, infrastructure projects, wastewater treatment operations, customer services, and employee safety. We are working hard to reduce these impacts. Our goal is to be reliable, resilient, and sustainable for our customers today and for future generations. To achieve this goal, we consider and incorporate future challenges in all of our plans and operations.

Long-Term Water Supply

EBMUD has created a diverse water supply portfolio to better respond to the impacts of climate change over time. Water conservation reduces demand and recycling programs reduce reliance on existing supplies, while new sources of supplies provide resilience in the event one source experiences extreme shortages. Elements of the long-term water supply portfolio include:

- An aggressive water conservation program has offset water demands by approximately 21 percent compared to 15 years ago.
- Recycled water projects have cut the use of potable drinking water by 9 million gallons per day.
- Completion of the $950 million Freeport Regional Water Project provides EBMUD with water supplies during droughts and emergencies from the Sacramento and American River watersheds.
- Investing over $20 million in numerous water system interconnections with neighboring water agencies over the last 15 years to increase regional water supply flexibility and reliability.

Diversification of water supplies provides resiliency to changing conditions. Interties with our sister agencies—San Francisco Public Utilities Commission, Contra Costa Water District, and Dublin San Ramon Services District—add flexibility and further strengthen our reliability.

EBMUD continues these efforts which are summarized in our Urban Water Management Plan (UWMP). The UWMP has a 30-year planning horizon and is updated every five years. The following elements of this plan ensure a resilient and sustainable water supply:

- Expansion of water conservation programs to achieve a total of 70 million gallons per day of water savings by the year 2050.
- Increased use of recycled water to offset potable water use by an additional 11 million gallons per day.
- Additional supplemental supply development including surface waters, groundwater storage, and water transfers that further diversify EBMUD's water supply portfolio. Current efforts include evaluation of participation in the Los Vaqueros Reservoir expansion project.
- Fostering partnerships with other water districts to develop regional solutions to water supply challenges, such as through the Bay Area Regional Reliability program.

Freeport Regional Water Project provides resilience and diversification of water supplies

Water Quality and Environmental Protection

EBMUD is committed to protecting the Mokelumne and East Bay watersheds to ensure high-quality drinking water, long-term viability of the natural resources, and protection of San Francisco Bay. Specific activities include:

- Improving habitat, cold water management, and scientific understanding for Mokelumne salmon that has resulted in a 50 percent increase in salmon populations over the past two decades with ongoing plans to enhance spawning gravel, open up flood plains, and support migratory pathways.
- Investigating new approaches for fisheries, such as the feasibility of a temperature-control device on Camanche Dam to aid in downstream temperature management; and ozone treatment to increase survival of hatchery-reared salmon.
- Enhancing habitat throughout the various watersheds, including providing stream shading for riparian habitat along the Mokelumne River; improving East Bay creeks to support steelhead populations; and investigating pumped water for vernal pool habitats for amphibians in the Mokelumne Watershed.
- Helping watershed partner agencies to secure $10.5 million in grant funding and investing $1 million of EBMUD funds to reduce the severity of forest fires in the upper Mokelumne Watershed, which could impact EBMUD's water quality.
- Working with various partners to prevent catastrophic wildfires by reducing forest fuel loads and creating fire breaks.
- Completed North Orinda fuel break covering 1,500 acres and over 14 miles designed to protect residents in portions of Orinda, Lafayette, and Moraga.
- Working with communities to reduce impacts from post-fire erosion and high-turbidity runoff into our water reservoirs.
- Implementing capital improvements at water treatment plants to maintain production of highest-quality drinking water with a wide variety of raw water conditions that could be worsened by climate change. Ozonation systems, chemical systems, corrosion control, and various capacity upgrades have been completed at many water treatment plants. Significant future investments include disinfection improvements at Orinda Water Treatment Plant, pretreatment projects at the in-line treatment plants, and aeration systems for raw water reservoirs.
- Completed $58 million project to upgrade ozone treatment systems at two water treatment plants to help control taste and odor in the distribution system.
- Designing a new $8 million water treatment research facility to study new treatment technologies as water conditions change, which will guide future investments in water treatment plants.
- Designing a pipeline replacement program to provide improved resiliency.
- Working collaboratively with the seven wastewater collection system agencies to repair the sewer pipes to reduce stormwater inflow and infiltration, which will be exacerbated in a changing climate.
- Systematically rehabilitating aging wastewater infrastructure to comprehensively and cost-effectively reduce stormwater inflow and infiltration into sewers.
- Working collaboratively with regulators and environmental groups to advance the science of nutrients and emerging contaminants to protect San Francisco Bay.
- Making future investments in nutrient removal at the wastewater treatment plant to protect San Francisco Bay.

In laboratories and in the field, EBMUD samples and tests water extensively to make sure it is safe to drink.

EBMUD is planning and investing now to maintain the highest-quality drinking water, fishery habitat, and protection of San Francisco Bay.

Regional Collaboration to Reduce Stormwater Inflow and Infiltration into Sewer Pipes

Certifying Private Sewer Laterals

500 miles of leak-free PSLs

Fixing Sewer Mains

165 miles of pipes repaired

*non-PSL pipes, or pipes rehabilitated within the wastewater collection system (excluding the interceptor)

Finding Leaks

330 identified leaks

Long-Term Infrastructure Investment

All of EBMUD's infrastructure investments consider the need for sustainability and resiliency to future changes and more challenging conditions. New and retrofitted facilities are designed to adapt to climate change through various measures. Some examples include:

- Adopting and following sea level rise design guidelines to determine appropriate height for electrical equipment to avoid inundation due to sea level rise and storms.
- Building in capacity to withstand both flood and drought conditions.
- Reducing sediment and nutrient influx to reservoirs following wildfires.
- Reducing inflow and infiltration in the wastewater system to reduce the impacts of extreme storm events.
- Implemented major capital investments for the wastewater system to counteract the effects of sea level rise, groundwater rise, and more intense storms:
  - » $17 million to rehabilitate over 5,280 feet of nine-foot diameter sewer pipe on 3rd Street in Oakland.
  - » $14 million for the Pump Station Q Reverse Flow Project on the North Interceptor in Berkeley, which allows more stormwater to flow to the wastewater plant for treatment.
  - » $3 million to overhaul three 2.1-MW digester gas engines at the wastewater treatment plant to ensure continued generation of reliable, clean energy.
- Obtained $48 million for levee improvements to protect EBMUD aqueducts through the Bay Delta by working jointly with the Delta Stewardship Council, the Department of Water Resources, and the Reclamation Districts.
- Constructed a $12 million interconnection to the three Mokelumne Aqueducts on each side of the Bay Delta to bolster the resilience of our water supply.
- Invested $15 million over the past decades in various raw water and treated water interties for increased regional supply flexibility.
- Implementing extended boat ramps to ensure water-based recreation services can continue at different reservoir levels.
- Installing backup power at facilities to ensure reliable delivery of water during Public Safety Power Shutoff events, which are increasing with climate change.
- Increased investments in corrosion protection for our water distribution pipes that will be impacted by brackish groundwater. This includes:
  - » Reducing corrosion potential for 4,400 service laterals per year while also implementing leak detection isolating lines for water quality.
  - » Reducing corrosion potential for the most vulnerable distribution mains. Installing new distribution mains with corrosion control measures.

Rehabilitating our aging infrastructure

We are looking for other means to increase our resiliency in the future, including:

- Conducting studies to guide investments in infrastructure that would increase operational flexibility and treated water/distribution system reliability.
- Evaluating replacement of portions of the Mokelumne Aqueducts with a tunnel under the Bay Delta to add significant resilience to EBMUD's conveyance system.

EBMUD continues to invest in resilient infrastructure to ensure safe, reliable delivery of high-quality water to our customers and wastewater treatment that protects San Francisco Bay.

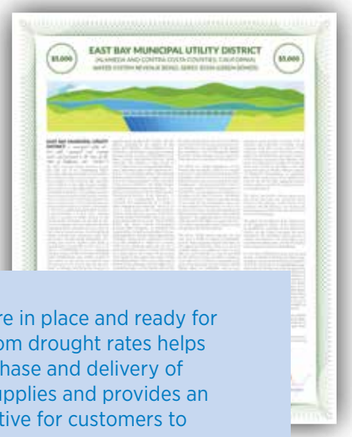
Long-Term Financial Stability

EBMUD has implemented a financial plan that addresses the revenue fluctuations that could occur from increasing droughts triggered by climate change. EBMUD is also making preparations to fund major infrastructure investments that may be needed for resiliency to future changes and more challenging conditions. Some examples include:

- Adopting drought rates that can be quickly implemented when it is clear that drought conditions are imminent to help pay for the acquisition, delivery, and treatment of more expensive supplemental supplies. The drought rates also provide an additional incentive for customers to conserve water.
- Maintaining cash reserves if water revenues continue to be low after the drought is over.
- Taking a more conservative approach when projecting water consumption in our financial planning.
- Borrowing less for capital projects, which leaves more borrowing capacity for future infrastructure projects to adapt to changing conditions.

EBMUD's bond ratings are high, reflective of a strong financial profile and stable underlying economy. For the Water and Wastewater systems, the ratings are AA+ from Fitch, Aa1 from Moody's, and AAA from S&P. High ratings help keep EBMUD's borrowing costs low. EBMUD issues Green Bonds to finance projects that enhance climate resilience or provide other environmental benefits. Eligible projects are selected from EBMUD's capital improvement program that meet certain criteria adopted by the Board of Directors in 2015. Issuing Green Bonds helps develop this market and potentially tap demand from investors with environmental goals and mandates.

EBMUD issues Green Bonds to finance climate resilience and other projects with environmental benefits



Drought rates are in place and ready for use. Revenue from drought rates helps pay for the purchase and delivery of supplemental supplies and provides an additional incentive for customers to conserve water.

Customer and Community Services

EBMUD will be meeting customer needs as we all adapt to climate change. We are committed to planning and implementing new methods to adapt to a new normal, including higher sea levels and groundwater levels, more droughts, and more intense weather events. This means providing high-quality drinking water and wastewater services not only when supplies are plentiful but also during drought conditions, on hot high-demand summer days, during wildfires, and during large storms.

EBMUD does this by maintaining a Local Hazard Mitigation Plan, an Emergency Operations Plan, and Business Continuity Plans that prepare us to respond to, work through, and recover from natural and anthropogenic hazards and emergencies.

Our commitment to continuous service also extends to keeping customers informed. As the potential increases for emergencies exacerbated by climate change, keeping the community updated is more important than ever. Digital communications—through email and social media—make it possible to deliver urgent information to wide audiences and targeted groups alike. Significant digital improvements also include enrolling more than 100,000 EBMUD customers in an improved paperless billing system, making it easier and more sustainable to pay bills electronically.

Public outreach in the Customer Pipeline newsletter, in media coverage, and on our website helps shape public understanding of how climate change impacts water and wastewater services. These tools also play a critical role in mobilizing public action.

Our Public Affairs team is expanding efforts to inform and engage the community about the importance of safeguarding our natural resources from the threats posed by climate change, including droughts, wildfires, and extreme storm events. Specifically, EBMUD aims to increase understanding about the link between healthy watersheds and high-water quality, the importance of water conservation in managing water supplies, and our shared responsibility for protecting the San Francisco Bay ecosystem—by flushing only the three Ps (pee, poop and paper) and replacing leaky private sewer laterals. In addition, EBMUD is increasing outreach to underserved communities, which often bear the brunt of the environmental and economic impacts of climate change, by offering more materials in Spanish, Chinese, and Vietnamese. EBMUD is also utilizing more virtual communication tools, such as story maps and online tours, to educate the public about how we are working to mitigate and adapt to climate change through current and future projects and programs.

EBMUD is committed to meeting customer expectations by providing responsive, trusted, and high-quality service as we adapt to the challenges of climate change.

Workers are prepared for all weather conditions

Workforce Planning and Resilience

Increased temperatures and extreme weather events impact EBMUD construction and maintenance staff, water treatment plant operators, and wastewater treatment workers, who are outside doing essential work at all hours of the day and night. Employee safety and training include proactive measures to reduce the impact of high heat days and poor air quality, which are expected to increase with climate change.

Heat illness is prevented through access to drinking water and shade; and providing rest periods and time to acclimate on high-heat days. Workers are protected from wildfire smoke by modifying or delaying outdoor work activities, providing respiratory protection, communicating the health effects of wildfire smoke, and communicating air quality levels to EBMUD workers.

Monitoring water quality

EBMUD protects our workforce so that we can provide high-quality drinking water and wastewater treatment services without interruption. Our planning and preparedness allow our essential workers to continue their vital work in the most challenging conditions. Because of the nature of our work, which does not take a break, we are already equipped to manage heat waves, extreme storms and floods, and poor air quality. EBMUD workers know the procedures and have the appropriate training and equipment. As we look ahead the only difference is that these events will happen more frequently and severely—and we will remain prepared.

Responding to customers

EBMUD is committed to ensuring the safety of our essential workers as the risk of heat stress increases with rising temperatures and the risk of flooding increases with more intense storms.

Collaboration

EBMUD actively participates on the local, state, and national levels with other agencies and professional organizations to develop and implement strategies to address climate change. We are collaborating with our regional wastewater collection system agencies, the Cities of Albany, Alameda, Berkeley, Emeryville, Oakland, Piedmont, and Stege Sanitary District to rehabilitate aging sewer pipes to reduce stormwater inflow and infiltration. On the local level, we are working with the San Francisco Bay Regional Water Quality Control Board, the San Francisco Estuary Institute, UC Berkeley, the San Francisco Bay Conservation and Development Commission, Bay Planning Coalition, Bay Area Climate Adaptation Network, the Bay Area One Water Network, and other organizations to discuss and collaborate on climate change mitigation measures and adaptation strategies in the Bay Area. On the state and national level, EBMUD works with the California Association of Sanitation Agencies, the National Association of Clean Water Agencies, the Association of Metropolitan Water Agencies, the U.S. Environmental Protection Agency, "We are Still In," and other organizations to lead climate change efforts.

After the Butte wildfire in 2015, a spectacular field of California Poppies and other wildflowers emerged on the Mokelumne Watershed.

Summary

Actions Taken

- Produce sufficient renewable energy to operate all water and wastewater operations, through biogas and hydroelectric power.
- Converted all passenger cars to electric or hybrid electric.
- Switched to renewable diesel.
- Reduced indirect and direct GHG emissions from all aspects of our operations.
- Installed ten photovoltaic projects.
- Promoted water conservation and reduced demand by 46 million gallons per day between 1994 and 2018.
- Helped watershed partner agencies to secure $10.5 million in grant funding and invested $1 million of EBMUD funds to reduce the severity of forest fires in the upper Mokelumne Watershed to protect water quality.
- Operated Pardee Dam and Reservoir to provide cold water to support Mokelumne River fisheries.
- Improved habitat for salmon fisheries on the Mokelumne River.
- Worked with communities to reduce impacts from post-fire erosion and high-turbidity runoff into our upcountry reservoirs.
- Constructed $12 million interconnection to the three Mokelumne Aqueducts on each side of the Bay Delta to bolster the resilience of our water supply.
- Implemented non-potable recycled water projects that have reduced the use of potable water by 9 million gallons per day.
- Obtained $48 million for levee improvements to protect EBMUD aqueducts through the Bay Delta by working jointly with the Delta Stewardship Council, the Department of Water Resources and the Reclamation Districts.
- Partnered with the Center for Western Weather and Water Extremes to explore impact of atmospheric rivers on water supply and flood control.
- Created interconnections with other water agencies to enhance resiliency.
- Established design guidelines to protect against the effect of sea level rise over the entire life of a project.
- Completed $58 million in ozone treatment system upgrades.
- Invested in capital improvements at the water treatment plants to protect water quality.
- Worked collaboratively with regulators and environmental groups to advance the science of nutrients and emerging contaminants to protect San Francisco Bay.
- Invested $17 million to rehabilitate over 5,280 feet of nine-foot diameter sewer pipe on 3rd Street in Oakland, which will keep rising groundwater out of the pipes.
- Invested $14 million for the Pump Station Q Reverse Flow Project on the North Interceptor in Berkeley, which allows more stormwater to flow to the wastewater plant for treatment.
- Certified over 500 miles of leak-free private sewer laterals to reduce inflow and infiltration during storms.

Actions In Progress

- Eliminating direct and indirect GHG emissions for the water system by 2030.
- Eliminating indirect GHG emissions and reducing direct emissions by 50 percent for the wastewater system by 2040.
- Identifing and implementing alternative fuel vehicles for off-road and heavy-duty fleet.
- Implementing a 5 MW photovoltaic project in Orinda.
- Collaborating with regulators, environmental organizations and other stakeholders to adaptively manage fishery releases.
- Conducting annual salmon habitat enhancement in the Mokelumne River.
- Implementing riparian plantings to provide streamshade for rivers and creeks that support salmonids in the Mokelumne and East Bay.
- Implementing flow actions to support temperature management or to stimulate outmigration of juvenile salmonids to increase survival.
- Evaluating replacement of portions of the Mokelumne Aqueducts with a tunnel under the Bay Delta to add significant resilience to EBMUD's conveyance system.
- Continuing to partner with other water districts for resiliency.
- Continuing to procure supplemental water supplies and explore regional solutions to diversify water sources.
- Expanding water conservation programs to achieve 70 million gallons per day of savings in the year 2050.
- Increasing recycled water by 13 million gallons per day by 2050.
- Supporting efforts to update the Water Quality Control Plan for the Bay Delta through Voluntary Agreements.
- Evaluating participation in the Los Vaqueros Expansion Project.
- Investing in infrastructure improvements (e.g., water treatment plants and distribution pipelines) to increase resiliency.
- Utilizing sea level rise design guidelines in all new construction and ongoing rehabilitation projects and making sound infrastructure investments.
- Designing an $8 million water treatment research facility.
- Conducting studies to guide investments in infrastructure that would increase operational flexibility and treated water/distribution system reliability.
- Making future investments in nutrient removal at the wastewater treatment plant to protect San Francisco Bay.
- Continuing investments to identify and remove sources of infiltration and inflow into the wastewater collection system, including operating a private sewer lateral program.
- Staying abreast of climate science and continue to integrate it into EBMUD's long-term planning analysis.
- Collaborating with regulators, academia, and associations in feasibility of adaptively managing for flood control operations.
- Continuing to make strategic financial planning decisions to fund critical climate mitigation and adaptation projects.
- Continue engaging and informing the community about our work to reduce, plan for, and adapt to the impacts of climate change.

EBMUD captures snowmelt from the pristine Upper Mokelumne Watershed

EAST BAY
MUNICIPAL UTILITY DISTRICT

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12.30.2020