



Services of the San Francisco Public Utilities Commission

TESTIMONY OF:

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BEFORE THE:

**Water and Wildlife Subcommittee
Committee on Environment and Public Works
of the United States Senate**

ON THE TOPIC OF:

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Introduction

Chairman Cardin, Ranking Member Boozman, and distinguished members of the Water and Wildlife Subcommittee of the Senate Committee on Environment and Public Works, thank you for the opportunity to share the work of the San Francisco Public Utilities Commission (SFPUC) and how we manage our utility in a manner that is inclusive of economic, environmental, and community interests.

I want to start by thanking you for passing the Water Resources Reform and Development Act and the inclusion of the Water Infrastructure Finance and Innovation Authority. I would also like to thank the committee for the expansion of eligible projects and the extension of repayment terms under the Clean Water State Revolving Fund.

Water and wastewater systems are the backbone of our cities and essential for growth, development, and economic prosperity. For over a century, utilities across the country have been putting people to work to construct, operate, and maintain the water and wastewater infrastructure that we rely on daily. Since its earliest days, water has been vital to the growth and prosperity of the Bay Area. From Silicon Valley to San Francisco, the Bay Area's rich regional history and thriving economy were made possible by building reliable water and wastewater infrastructure.

Water agencies across the country have been working tirelessly to maintain high quality and reliable service while preserving affordable rates. Yet, nationwide water and wastewater infrastructure is in dire need of repair. In 2013, the American Society of Civil Engineers gave drinking water and wastewater systems a D grade, on average. The 1.7 trillion gallons of treated water per year we are losing from our aging and failing water distribution systems is costing us \$2.6 billion annually. The United States Conference of Mayors estimates that \$4.8 trillion in capital investment will be needed over the next 20 years to bring our water and wastewater systems to a state of good repair and maintain current levels of service.

Local utilities are reinvesting. In San Francisco, that has meant a nearly \$5 billion investment in our drinking water system and a needed investment of \$6.9 billion in our wastewater system. We have seen firsthand how our investments make San Francisco a more viable place to work and live. These investments are not only improving our water infrastructure, but are also creating a positive ripple effect throughout the regional economy. And we are not alone.

According to the *National Economic and Labor Impacts of the Water Utility Sector*, 30 of the largest public water and wastewater agencies will be investing \$233 billion through operational and capital spending over the next decade. These investments will generate over half a trillion dollars in economic output over the next ten years and support 289,000 jobs annually¹. With our investments, we have the opportunity and the responsibility to think about how we can maximize our returns.

After decades of working on large infrastructure projects, I have seen firsthand how investments in water and wastewater infrastructure can present opportunities to create jobs, grow the economy, address broader city challenges, and improve communities. As general manager of the SFPUC, I have watched our industry transform over recent years and embrace innovative approaches. The 2013 report from the National Association of Clean Water Agencies (NACWA), *Water Resources Utility of the Future... A Call for Federal Action*, is indication that our field is moving in a new direction, one that the SFPUC

¹ *National Economic and Labor Impacts of the Water Utility Sector*. (2014, September). Water Research Foundation and Water Environment Research Foundation.

embraces. Utilities across the nation are pushing past traditional mandates of service delivery to integrate innovative technologies, partnerships, and business approaches of the 21st century.

As general manager, it is my priority that we have 21st century infrastructure to support a 21st century city. This testimony will share how we are investing in our infrastructure in a way that integrates new technologies, addresses climate change concerns, and provides benefits to the community, all while optimizing our core mandate of providing efficient, high-quality water and wastewater services to the people of the San Francisco Bay Area.

About the San Francisco Public Utilities Commission

The San Francisco Public Utilities Commission is a department of the City and County of San Francisco that provides retail drinking water and wastewater services to San Francisco, wholesale water to three Bay Area counties, and green hydroelectric and solar power to San Francisco's municipal departments. We are the third largest public utility in California, with 2,300 employees working in seven California counties, and a combined operating budget of nearly \$1 billion.

Our regional water system traverses over 167 miles and over three active fault lines to deliver 265 million gallons of pristine, high-quality water per day from the Sierras to 2.6 million residents and businesses in San Francisco, San Mateo, Santa Clara, and Alameda counties. A collateral benefit of this gravity-driven system is that it generates over 400 megawatts of hydroelectric power along the way. Combined with our in-city solar arrays and biogas energy generation, our power enterprise generates 1.7 billion kilowatt hours (equivalent to the annual power usage of 350,000 San Francisco homes) of clean renewable energy for San Francisco public schools, fire and police stations, and other municipal customers. On the wastewater side, we operate and maintain San Francisco's combined sewer system, which collects and treats sanitary flows and stormwater run-off to protect public health, the environment, and the San Francisco Bay and Pacific Ocean. This expansive network includes 1,000 miles of sewers, tunnels, and transport/storage boxes that carry flows to one of our three treatment facilities, where we treat an average of 83 million gallons of wastewater per day, and up to 575 million gallons per day during storms.

System Challenges and Vulnerabilities

Like other utilities across the nation, our infrastructure systems face critical challenges. Our systems are aging. On the sewer side, 130 miles of our system is over 100 years old and 60% of the system is over 70 years old. Our largest wastewater treatment plant, which treats 80% of the city's flow, still relies on 1940s technology. While we conduct video inspections on 150 miles and replace 15 miles of sewers annually, we are beginning to experience additional failures to our pipes and treatment plants that threaten service reliability. Last year alone we experienced around 100 water main breaks in San Francisco. In many cases, water or sewer main breaks or emergency failures have substantial impacts on residences, businesses, transportation routes, and the tourism industry. We cannot afford to allow incidents like this to continue to occur in our communities.

In the Bay Area, we also have to consider issues of redundancy and seismic reliability. According to a U.S. Geological Survey study, there is a 63% chance our city will face a 6.7 or larger quake in the next 30 years². A major earthquake could cause catastrophic failure to both the water and wastewater systems

² *The Uniform California Earthquake Rupture Forecast, Version 2.* (2008). US Geological Survey, 2007 Working Group on California Earthquake Probabilities.

and could cause service interruption for water delivery for up to two months, which is why seismic upgrades are a significant part of our capital improvement programs.

Our Capital Programs

To ensure our systems continue to provide essential services for future generations, we are undertaking significant improvements to our water and wastewater infrastructure. Our capital programs are driven by a 10-year capital plan, which outlines approximately \$10 billion in fiscal needs and takes into consideration infrastructure demands, sustainability, and ratepayer affordability.

We currently have two capital programs underway: the Water System Improvement Program (WSIP) and the Sewer System Improvement Program (SSIP). In developing these capital programs, we established levels of service goals that address the deficiencies in the current systems and foreseeable future challenges, and ensure that the SFPUC continues to meet our core mission. All projects within the WSIP and SSIP are developed and selected to fulfill these benchmarks. This process compliments our results-driven approach to establish specific, measurable goals and objectives that guide project selection and implementation, and measure success.

Water System Improvement Program

In 2004, the SFPUC launched the Water System Improvement Program, a capital program to improve the water system's reliability and seismic safety. Now over 80% complete, this nearly \$5 billion program is one of the largest infrastructure programs in the country, consisting of 82 projects across seven counties. The most notable WSIP projects include the first tunnel under the San Francisco Bay, the second largest ultra-violet treatment facility in California, and a seismic upgrade project that will create a new pipeline crossing the Hayward fault that can shift up to 6.5 feet during an earthquake.

The program has been an excellent opportunity to expand employment and small business opportunities across our service territory. To date, this rebuild has generated 11,000 jobs and over 7 million craft hours since 2007. De-bundling contracts for the program allowed contracting opportunities to reach a broader group of local contractors in our service territory. In 2007, we adopted a Project Labor Agreement to cover all WSIP projects of \$5 million or greater. The agreement binds projects to California prevailing wages, local workforce hiring, apprenticeship training, and other labor practices that benefit both the program and workers.

Sewer System Improvement Program

Building on the success of the WSIP, in 2011, we embarked on a 20-year, multi-billion dollar Sewer System Improvement Program that will bring our sewer infrastructure to a state of good repair through a phased-approach. Our commission validated a \$6.9 billion need and approved \$2.7 billion for Phase 1, mission-critical projects, including vital repairs at the Southeast Treatment Plant, which is located in one of San Francisco's most disadvantaged neighborhoods, the Bayview Hunters Point. The repairs will modernize treatment facilities, transform our campus into a community asset, and address community impacts such as odors. The SSIP presents a historic, once-in-a-generation opportunity to utilize a large-scale infrastructure program to reinvest in the community through contracting, procurement, and local employment opportunities.

Phase 1 of the SSIP also includes \$57 million for eight large-scale stormwater management demonstration projects that will utilize and evaluate green infrastructure technologies, and determine lifecycle costs and standards to pave the way for future green infrastructure implementation. Based on

these assessments, up to \$350 million is designated for additional green infrastructure projects in future phases of the SSIP.

As we build the infrastructure of the future, we are also integrating new technologies, initiatives, and business strategies that make us a utility of the future. The SSIP is an opportunity to embed new innovations into our work and set an example for the nation in areas of climate resiliency, resource recovery, integrated planning, and community benefits.

Taking an Integrated Approach to Stormwater Planning

The U.S. Environmental Protection Agency promotes an Integrated Municipal Stormwater and Wastewater Planning Approach Framework to help local governments meet consent decrees and Clean Water Act water quality objectives, as well as prioritize capital investments. The framework is a means to maintain regulatory standards in a cost effective manner while considering sustainable technologies, community impacts, and affordability.

While the SFPUC is currently in full regulatory compliance, this is a principle that we have long integrated into our planning efforts. As we plan and prioritize our capital programs, we evaluate projects based on our core priorities: 1) delivery of high-quality, reliable 24/7 services; 2) maintenance of our infrastructure; and 3) ratepayer affordability.

As we developed the SSIP, we wanted to institutionalize our integrated approach to planning on the front end. The Urban Watershed Assessment (UWA) is the SFPUC's most innovative and comprehensive planning effort to date and is a critical part of the SSIP. UWA uses a watershed approach to planning to develop a long-term plan for our collection system by assessing seismic reliability, stormwater management, odor reduction, water quality protection, flood reduction, and the effects of climate change on rainfall, sea level rise, and storm surges.

Our city is divided by a natural ridge that runs north and south and splits our drainage areas into eight urban watersheds. The UWA process begins with a needs assessment that spatially depicts the features of our watersheds by looking at elements such as soil composition, flood areas, rainfall runoff, and lack of redundancy issues so we can prioritize projects in areas where needs are the greatest. There are many alternative solutions to addressing the challenges in each watershed, and potential projects could include any combination of grey and green infrastructure. Each alternative is evaluated based on its fulfillment of the SSIP levels of service goals and our Triple Bottom Line (TBL) assessment.

The TBL assessment model, developed specifically for our agency, balances the values and priorities of the SFPUC including engineering performance, financial costs, and environmental and social benefits. The model includes 19 indicators for evaluation, such as odor, noise, construction impacts, lifecycle costs, climate change resiliency, and habitat; the logic for these indicators is based on specific city policy standards. The tool helps us weigh our alternatives and allows for flexible and transparent decision making.

Based on the information collected through our assessments, we are developing a tailored suite of projects that will address the challenges specific to each watershed. Using this method of integrated planning for stormwater management we can make informed and economical decisions about how to improve the performance of our system through grey and green approaches. The UWA helps us maximize green infrastructure solutions where they make sense and build them in a way that also maximizes the economic, environmental, and social benefits provided.

One of the most innovative ways we have conducted this integrated planning is by employing unique and creative public engagement strategies. From 2007 to 2009 and again in 2013 and 2014, we hosted Urban Watershed Planning Games to engage the larger community in creating a vision for what stormwater management could look like in San Francisco's future. Participants contributed their input and generated ideas for green and grey solutions to address specific watershed challenges through an interactive, award winning game. In addition to the game, input was gathered via MetroQuest, a customized online survey software, and various social media platforms including Twitter, Instagram, and Facebook. By making this an inclusive process, we were able to further integrate the values and inputs of community members and stakeholders into the rebuild of our sewer system.

Expanding Resource Recovery at Wastewater Treatment Plants

Water and energy are inextricably tied together. Pumping, treating, transporting, and distributing water and wastewater requires a great deal of energy, with treatment systems typically accounting for 30-40% of municipal government energy usage³. The average amount of energy used to treat one million gallons of wastewater is 1,200 kilowatt-hours⁴. Energy efficiency improvements at water and wastewater treatment facilities have high rates of return, and can significantly reduce facility costs. In addition to making efficiency improvements, the U.S. EPA recognizes a great opportunity for utilities to reduce their carbon footprint by recovering resources at wastewater treatment plants. For the SFPUC, this means finding ways to generate energy through our treatment process and our innovative fats, oils, and grease program.

SF Greasecycle

The SFPUC's biofuel program, SF Greasecycle, is a successful resource recovery program. The program collects fats, oils, and grease (FOG) throughout the city and treats it to be used for biofuel generation. FOG traditionally causes clogging and malfunctions in the sewer collection system, costing the city millions of dollars each year. To date, more than 1 million gallons of used cooking oil have been collected from eight residential drop-off points and over 1,000 restaurants. After removal of impurities (food scraps and water) and primary polishing, the SFPUC sells the grease byproduct to be converted into biodiesel. The biofuel can then be sold to city transit fleets, with the potential to replace over 250,000 gallons of petroleum diesel each year.

Biogas to Energy Programs

In San Francisco, methane gas currently produced during the wastewater treatment process at our Southeast Treatment Plant has the potential to meet up to 40% of the plant's energy needs. Unfortunately, at this time our plants do not have the technology or capacity to convert all biogas to energy, and excess is burned off in waste flares. With the SSIP, the SFPUC is well poised to take advantage of groundbreaking technologies to increase energy extraction and improve resource recovery capacity at our wastewater treatment plants.

As we upgrade our treatment plants, we are embarking on two projects that will improve biogas production and the biogas-to-energy conversion process. A \$1.2 billion biosolids project at the Southeast Treatment Plant will update this important facility to produce enough biogas to generate

³ *Water and Energy: Leveraging Voluntary Programs to Save Both Water and Energy* (viii). (2008, March). U.S. Environmental Protection Agency.

⁴ *Clean Energy Opportunities in Water and Wastewater Treatment Facilities*. (2009, January). U.S. Environmental Protection Agency.

7MW of power, increasing on-site energy generation to 87.5% of the plant's needs. At the Oceanside Treatment Plant, we are investing \$48 million in a gas utilization project that will replace the existing biogas handling and power cogeneration process equipment with new systems that will reliably increase existing peak energy production capacity at the plant by over 150%. Collectively, these improvements will produce over 9 MW of renewable energy, improve our ability to capture and convert energy for useful purposes, eliminate the need to burn excess biogas, reduce energy costs and greenhouse gas emissions, provide ratepayer savings, and improve air quality in the surrounding neighborhoods.

The SFPUC is also exploring options for a biomethane generation demonstration facility pilot project at the Southeast Treatment Plant. Biomethane generation at wastewater treatment plants could potentially be a source of significant generation of renewable energy; however, additional information is needed to assess the feasibility of this sort of activity on-site at local treatment plants. A biomethane generation demonstration project would give the SFPUC, and the broader utility industry, more precise data on the feasibility of large-scale biomethane generation. If successful, it could lead to significant investment in the generation of renewable energy.

Building Resilient Systems in the Face of Climate Change

As an agency responsible for vital natural resources, we are on the front lines of environmental protection. From droughts that threaten water supplies, to super storms that cripple sewer systems, we are already seeing the adverse effects of climate change across the country. Preparing our communities and infrastructure systems to be resilient against climate change is one of the biggest challenges our cities faces. The SFPUC is working to integrate climate change adaptation strategies into the rebuild of our sewer system.

Climate Change Adaptation Planning Framework

As we implement the SSIP, it is important that we have precise data on the impact of rising sea levels, storm surges, rainfall patterns, and temperature variations on our system to inform engineering and design. To do this, we are employing an Adaptation Planning Framework to guide our agency through risk analysis and adaptation implementation. Using scientific studies and scenarios, the framework assesses the vulnerability of our assets (exposure, sensitivity, and resiliency), the likelihood of climate risks, and consequences of inaction to develop adaptation plans. As we implement these adaptation measures, we are constantly monitoring our adaptive capacity and are ready to make adjustments as new information becomes available.

Design Standard Revisions for Storm Intensity

Climate scientists have long warned that weather events will increase in intensity in the future, but quantifying these predictions has proven very difficult. For example, in San Francisco we experienced three 5-year storms (two of which were in the same year), one 10-year storm, and one 25-year storm, just over a five year period. Few, if any, municipalities have revised design standards that accommodate changes to the return rate of storms or their intensity. As part of the SSIP, we are undertaking a survey of the latest projection data emerging from the Intergovernmental Panel on Climate Change's Fifth Assessment Report (2013) to determine how we can make changes to the Intensity-Duration-Frequency curves that we currently use for rainfall predictions.

Sea Level Rise Inundation Mapping

We are already experiencing saltwater intrusion into our sewer system during storm surges, which causes significant challenges to our wastewater treatment process and harms our facilities. With sea levels predicted to rise 11" by 2050 and 36" by 2100, we are developing sea level rise inundation maps

for all three of our shorelines. These maps will help with broader city-wide planning efforts to address sea level rise challenges through capital planning. Our inter-agency Sea Level Rise Committee is developing guidelines that will ensure future capital projects undertaken by city departments are resilient to projected effects of sea level rise. These guidelines are a first of their kind at the local level and demonstrate how we can incorporate uncertainty into our planning efforts, a further example of how San Francisco and the SFPUC are providing leadership in areas of national concern.

In San Francisco, we recognize our vulnerability as a coastal city, and the SFPUC has stepped up to ensure our systems are sustainable, resilient, and will meet the needs of a changing environment through our capital programs.

Being a Good Neighbor

As one of the largest city agencies in terms of revenues, contracts awarded, and land owned, the SFPUC has a major economic impact in our city.

Providing benefits to the community is especially important in a city like San Francisco, where prosperity and poverty coexist. In many ways, San Francisco is experiencing a period of incredible growth and prosperity as vast numbers of people and businesses are moving into the city. The City has a low 4.3% unemployment rate⁵, and median home prices have increased 15.5% year to year⁶. At the same time, the gap between the average household income of wealthy residents and that of poor ones has grown wider and faster in San Francisco than any other city in the country⁷.

We have an opportunity to leverage our capital dollars to provide community benefits as we bring our infrastructure to a state of good repair, and have been able to accomplish this through our landmark “good neighbor policies”. The SFPUC was the first public utility in the nation to proactively adopt an Environmental Justice Policy (2009) and Community Benefits Policy (2011) that guide the agency to be a good neighbor and positively impact the communities that are affected by our operations. But in order to be successful, these can’t be stand-alone policies—this way of doing business has to be integrated into all aspects of the organization.

To help the SFPUC operationalize these policies, we started a community benefits program through which we are investing in career pathways for adults and youth, education initiatives to educate the next generation of environmental stewards, and more.

Environmental Justice

Our environmental justice policy directs the SFPUC to integrate environmental justice principles into all business decisions that affect the agency’s core operations, programs, and policies. For example, as part of our urban watershed assessment to inform sewer system planning, we identified particular environmental justice areas of concern and incorporated metrics that allowed us to assess if our public outreach efforts were adequately engaging residents in neighborhoods of concern. Furthermore, the process also highlighted considerations for SFPUC project managers at each relevant step of the assessment to analyze potential social, health, and economic impacts of various projects, with a special focus on more beneficial alternatives or redesigns.

⁵ San Francisco-San Mateo-Redwood City Metropolitan Division. Labor Market Information Division. State of California (Employment Development Department) (2014, July).

⁶ *County market update*. (2014, June). California Association of Realtors (CAR). CAR Research & Economics.

⁷ *San Francisco’s widening income inequality and economic trends*. (2014, May). San Francisco Human Services Agency (City & County of San Francisco).

Workforce Development

With nearly one-third of the water sector workforce⁸ and 25% of SFPUC employees currently eligible to retire, workforce development is a major issue for our agency. As one of the City's largest employers, we have a role to play and a vested interest in building a skilled workforce that meets the future needs of our city. We are committed to supporting and initiating successful workforce investment strategies that create a career pipeline for our future workforce. Internally, we have a 9910 stationary engineer apprenticeship program for individuals from underserved communities. So far 100% of participants have secured employment opportunities after completing the program. In addition, every summer we support over 1,000 youth interns working with the SFPUC, with over half of them producing final service learning projects tied to SFPUC issues.

We also work with community organizations to provide apprenticeships, on-the-job trainings, and internships for youth and adults that are aligned with our core operations. For instance, we partner with the Sheriff's Department and The Garden Project, a local nonprofit, to employ at-risk youth and ex-offenders for watershed maintenance on SFPUC land. This creates a win-win situation: the SFPUC fulfills maintenance and landscaping needs, and participants receive wages and important work experience.

Contracting and Business Opportunities

Perhaps one of our most measurable contributions to the community is achieved through embedding community benefits requirements in professional services contracts over \$5 million. This ensures that we partner with businesses that are also committed to leaving positive impacts in the communities they work in. By the end of the year, we will have commitments in 30 contracts with multinational and local engineering, construction, and architecture firms and will have leveraged more than \$6 million to local nonprofit organizations, small businesses, and schools in the form of direct financial contributions, volunteer hours, and in-kind donations over the life of their SFPUC contracts.

While leveraging contracts with large firms is important, small local businesses must be equipped with the tools and resources to adequately get access to, compete for, and perform on large contracts. Our Contractors Assistance Center offers a range of free, tailored services to new and existing local small businesses—from technical assistance and classroom training to networking events—to increase their competitiveness for city contracting opportunities. It's an integral part of our efforts to support workforce and economic development that moves beyond local hire policies and Local Business Enterprise goals.

At the end of the day, being a good neighbor is good for business. Through our community benefits program, we can meet operational goals, raise visibility of our services, build community trust, and serve as catalysts for economic, social, and environmental improvements in the community.

Conclusion

As public utilities look to the future, our challenges have never been greater. Balancing infrastructure needs, regulatory demands, climate risks, and financial considerations has never been more critical. Yet, our opportunity has never been more abundant. Our sector is driving innovations in technology, engineering, and social well-being.

⁸ *The National Economic and Labor Impacts of the Water Utility Sector*. (2014, September). Water Research Foundation & Water Environment Research Foundation.

I thank you again for recognizing the importance of this issue and holding this hearing. I look forward to continuing to work with the Committee to think creatively about innovative infrastructure investment opportunities in America, and in so doing, advance the Utility of the Future paradigm. It has been an honor to share the work of the San Francisco Public Utilities Commission with you.