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AGENDA
MUNICIPAL SERVICES COMMITTEE
July 25, 2017

MEMBERS

Margaret McAustin, Chair, District 2
Terry Tornek, Mayor
Tyron Hampton, District 1
Andy Wilson, District 7

STAFF

Gurcharan Bawa, General Manager
Valerie Flores, Recording Secretary

MISSION STATEMENT

The City of Pasadena is dedicated to delivering exemplary municipal services, responsive to our entire community and consistent with our history, culture and unique character.

Public meeting begins at 4:00 p.m.

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*Materials related to an item on this Agenda submitted to the Municipal Services Committee **after** distribution of the agenda packet are available for public inspection in the City Clerk's Office at 100 N. Garfield Avenue, Room S-228, Pasadena, during normal business hours.*

REGULAR MEETING OF THE
MUNICIPAL SERVICES COMMITTEE
Tuesday, July 25, 2017 4:00 P.M.
100 North Garfield Avenue, Pasadena, Council Chambers

AGENDA

1. **CALL TO ORDER/ROLL CALL**

2. **PUBLIC COMMENTS ON MATTERS NOT ON THE AGENDA**

3. **APPROVAL OF MINUTES** May 23, 2017 – Regular Meetings*

4. **NEW BUSINESS**

   A. Adopt a Resolution of the City Council in Support of California Waterfix and California Eco Restore*

5. **INFORMATION ITEMS**

   A. Power Delivery Master Plan Update*

6. **ADJOURMENT**

*Attachment

NEXT MEETING
August 8, 2017 - scheduled to be canceled

Margaret McAustin, Chair
Municipal Service Committee

POSTING STATEMENT:

I HEREBY CERTIFY that this Agenda, in its entirety, was posted on the Council Chamber Bulletin Board S249, the bulletin board in the rotunda area at City Hall, 100 North Garfield Avenue, the City Clerk's Office, and a copy was distributed to the Central Library for posting on the 20th day of July, 2017 by 6:00 p.m.

Susana Castro

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CITY OF PASADENA
MEETING OF THE CITY COUNCIL
MUNICIPAL SERVICES COMMITTEE
MAY 23, 2017
COUNCIL CHAMBER
100 N. GARFIELD AVENUE (2ND FLOOR)

OPENING

The Chair called the regular meeting of the Municipal Services Committee to order at 4:05 p.m.

ROLL CALL:

Councilmember Margaret McAustin, Chair
Mayor Terry Tornek
Councilmember Tyron Hampton (Arrived at 4:10 p.m.)
Councilmember Andy Wilson

Staff:

Julie Gutierrez, Assistant City Manager
Lisa Hosey, Deputy City Attorney
Ara Maloyan, Director of Public Works
Carmen Rubio, Program Coordinator, Public Works
Gabriel Silva, Environmental Programs Manager, Public Works
Gurcharan Bawa, General Manager of Water and Power
Roumiana Voutchkova, Engineer, Water and Power
Valerie Flores, Recording Secretary

MINUTES

It was moved by Councilmember Wilson, seconded by Mayor Tornek, to approve the minutes of March 14, 2017 (regular meeting) as submitted. (Motion unanimously carried) (Absent: Councilmember Hampton).

NEW BUSINESS

ADOPTION OF A RESOLUTION AND SETTING A PUBLIC HEARING ON JUNE 19, 2017 TO CONSIDER GRANTING NON-EXCLUSIVE SOLID WASTE FRANCHISE RENEWALS

Councilmember Hampton arrived at 4:10 p.m.

Ara Maloyan, Director of Public Works, introduced the agenda item, and Carmen Rubio, Program Coordinator, provided a PowerPoint presentation summarizing the agenda item, and responded to questions.

Gabriel Silva, Environmental Programs Manager, responded to questions regarding staff's work to ensure franchise haulers are in compliance with Assembly Bill (AB) 1826, and efforts to incorporate residential organic diversion measures in the near future.

The Chair and Councilmember Hampton requested staff to include information on the measures taken to divert residential organic material in the Zero Waste Master Plan update.

Following discussion, it was moved by Councilmember Hampton, seconded by Councilmember Wilson, to approve the staff's recommendation, and forward the item to the full City Council for consideration. (Motion unanimously carried) (Absent: None)

INFORMATION ITEM

NON-POTABLE WATER PROJECT UPDATE

Gurcharan Bawa, Water and Power General Manager, provided a PowerPoint presentation summarizing the agenda item, and responded to questions.

Following discussion, the Committee expressed concerns regarding the implications of the City of Los Angeles' comment letter filed with the State Water Resources Control Board (SWRCB), specifically as it relates to the grant approval application that the City submitted to SWRCB, with Councilmember Wilson requesting staff to provide information on the matter to the full City Council, and to include information on potential litigation that may impact the City's water source.

The following individuals provided comments and questions regarding the Non-Potable Water Project:

Nina Chomsky, Linda Vista-Annandale Association
Ken Kules, Pasadena resident
Marie Levine, Pasadena resident
Avis Kawahara, Pasadena resident

On the order of the Chair, and by consensus of the Committee, the information was received and filed.

GLENARM GT-2 REPAIR OR REPLACEMENT STUDY UPDATE

Gurcharan Bawa, General Manager of Water and Power Department, introduced the agenda item, and Anthony D'Aquila, Wholesale Operations Manager, reviewed the agenda report as part of a PowerPoint presentation, and responded to questions.

Following discussion, the Mayor inquired about the air quality implications of utilizing Glenarm Gas Turbine No. 2 (GT2), and asked staff to provide data as it relates to the matter.

Following additional discussion, Chair McAustin requested staff to examine new technologies for alternatives being developed that the City may be able to utilize as opposed to repairing/replacing GT2.

On the order of the Chair, and by consensus of the Committee, the information was received and filed.

ADJOURNMENT

On the order of the Chair, the regular meeting of the Municipal Services Committee was adjourned at 6:11 p.m.

_____
Margaret McAustin, Chair
Municipal Services Committee

ATTEST:

_____
Valerie Flores
Recording Secretary

4.A

Agenda Report

August 28, 2017

TO: Honorable Mayor and City Council

THROUGH: Municipal Services Committee (July 25, 2017)

FROM: Water and Power Department

SUBJECT: **ADOPT A RESOLUTION OF THE CITY COUNCIL IN SUPPORT OF CALIFORNIA WATERFIX AND CALIFORNIA ECO RESTORE**

RECOMMENDATION:

It is recommended that the City Council:

1. Find that adopting a resolution in support of the California WaterFix project and the California Eco Restore is exempt from the California Environmental Quality Act ("CEQA") per Guidelines Section 15061 (b)(3); and

2. Adopt a resolution in support of California WaterFix and California Eco Restore.

BACKGROUND:

The Sacramento River and San Joaquin River form a confluence known as the Sacramento-San Joaquin Delta ("Delta"), which is located approximately 40 miles north-east of the San Francisco Bay. The Delta is a wetland complex consisting of marshes, diked islands, levees, and a network of channels. For more than a hundred years the Delta has supported agricultural, industrial and municipal economies, while providing resources for recreational activities and sustaining the habitat.

The Delta provides an average of 4.9 million acre-feet ("MAF") annually in water supplies to more than 25 million California residents and 3 million acres of agricultural land by way of two large and complex water systems known as: (1) The Central Valley Project ("CVP") that provides approximately 2.2 MAF of water annually to farms and agencies in the San Joaquin Valley; and, (2) The State Water Project ("SWP") that serves Southern California, the San Francisco South Bay Area, and Central Valley as well.

The SWP was developed in the 1960s and is operated by the California Department of Water Resources ("DWR") under contracts with 29 water agencies including its largest contractor, Metropolitan Water District of Southern California ("MWD"). SWP contract deliveries average 2.7 MAF annually and MWD purchased an average of 1.3 MAF over

the past 16 years. SWP exports represent only about 8% of the total water flowing through the Delta.

The water supplying the CVP and SWP is pumped from a man-made reservoir known as the Clifton Court Forebay ("Forebay") located at the south end of the Delta, about 50 miles east of the Golden Gate Bridge. The Forebay feeds two large pumping systems and marks the starting point for the California Aqueduct which conveys SWP water and the Delta-Mendota Canal for the CVP water. When these large pumps operate, natural flow patterns in the Delta may reverse ("reverse flows") causing fish to swim in a direction that is away from their spawning grounds and towards the Forebay and pumps. Some of the fish species are endangered or critically close to being endangered. In addition, the reverse flows have been found to alter tidal flows from the San Francisco Bay and to introduce higher salinity levels deeper into the Delta.

The current Delta conveyance system is vulnerable to levee failure and sea level rise, either of which could have severe and long-lasting adverse impacts on water supplies from the SWP and CVP. Water must travel several hundred miles through the Delta along exposed river channels and canals prior to entering the Forebay. Much of the surrounding embankments or levees are at a higher elevation than the adjacent grade due to subsidence. If a large section of the levee is breached, water delivery may be jeopardized and repairs could take months to complete. A breach could also introduce chemicals used for agricultural fertilizers and pesticides into the water and adversely affect the water quality. There is no practical or economically efficient way to construct, heighten and reinforce the existing levees to keep pace with sea level rise or prevent the levees from collapsing during a large earthquake.

Bay Delta Conservation Plan

In 2009 California's legislature passed the 2009 Delta Reform Act which established co-equal goals of providing a more reliable supply of water and protecting, restoring, and enhancing the Delta ecosystem. The Bay Delta Conservation Plan ("BDCP") was developed as the long-term strategic solution for addressing the co-equal goals and considered more than 19 project alternatives. The recommended alternative, known as "Alternative 4A," proposes a series of below grade tunnels that would divert water from the Sacramento River more than 30 miles north of the Forebay. In December 2013, the environmental impact report ("EIR") for the BDCP was made available for public review. Over the subsequent year, thousands of comments were received and key project proponents came to the conclusion that timely certification of the EIR was improbable.

In April 2015, the DWR and United States Bureau of Reclamation, as principal backers of the BDCP announced a significant change in the approach to accomplishing the co-equal goals. Recognizing that certification of the EIR would be challenging given the project dependence on issuance of a long-term environmental permit, the agencies proposed to forego the long-term permit and separate the proposed project into two components. Under this approach the projects are now known as California WaterFix and California Eco Restore.

California WaterFix

The California WaterFix project proposes to construct a series of reinforced concrete tunnels located up to 150 feet below the Delta and divided into two general sections known as the North Tunnels and Main Tunnels. The North Tunnels would start approximately 34 miles north of the Forebay with three intake structures, each diverting up to 3,000 cubic feet per second (1.35 million gallons per minute) of water from the Sacramento River. The most northern intake would be served by a 28-foot diameter tunnel then combining with a 40-foot diameter tunnel at the second intake. The third intake would be connected to a separate 28-foot diameter tunnel. The intakes connected by the North Tunnels then join the Main Tunnels consisting of two 40-foot diameter tunnels that span approximately 30 miles south to the inlet of the Forebay. At this junction tunnel water would either be pumped or flow by gravity into the Forebay and then the water would be distributed at the existing pumping facilities to the SWP and CVP contractors.

California WaterFix offers a number of benefits. The water entering the intake is located away from fish spawning grounds and sensitive habitat, thus impacts to sensitive fish species and salinity issues due to reverse flows would be significantly reduced because water would no longer be pulled through the Delta by the large pumps. Levee failures due to continued subsidence or a large seismic event would result in minimal impact to the conveyance since the water is protected by the tunnels deep underground. A rise in sea levels due to global warming would not affect the quality of the water in the Forebay since the inlet would be relocated much further inland and upstream from the San Francisco Bay. Although California WaterFix does not guarantee or intend to provide greater water supplies, it provides a higher level of reliability compared to continued existing operations and mitigates the potential for future reductions in water supplies.

At present, DWR is pursuing a water rights permit for the California WaterFix project, and it may take up to a year to complete the hearing process. In December 2016, the final EIR and the Environmental Impact Statement ("EIS") for the project were released. Now that the EIR and EIS are completed, additional biological studies can be finalized to complete the environmental clearance of the project and allow issuance of regulatory permits in late 2017 or early 2018. Final design is anticipated to take four years to complete, with construction starting in the third and take up to 13 years for completion. Conservatively, project completion is anticipated sometime in the mid-2030s.

The financial burden for completing California WaterFix and associated operations will be the responsibility of SWP and CVP contractors, not tax payers. The cost to construct California WaterFix is estimated at $15 billion with operation, maintenance, mitigation, and monitoring adding $2.5 billion over a 50-year period. While the cost allocations have not been finalized, MWD's share of construction costs is expected to be under $4 billion and MWD is projecting the California WaterFix will increase their Tier 1 water rates by approximately $138 to $166 per acre-foot. The current Tier 1 rate is $979 per acre-foot. For an average household, the water bill is projected to increase by less than $5 per month as a result of funding and operating the California WaterFix (excluding the effect of any other potential water cost increases).

California Eco Restore

California Eco Restore is an initiative to restore at least 30,000 acres of critical habitat in the Delta by 2020. The project is supported by advanced and proven science and an adaptive management strategy through multi-agency coordination. California Eco Restore includes a broad range of habitat restoration projects, including aquatic, sub-tidal, tidal, riparian, flood plain, and upland ecosystem. The restoration efforts will contribute to the long-term health of the Delta by providing subsidence reversal, carbon management, flood plain protection, and improved fish passage and protection.

Costs for California Eco Restore are expected to reach at least $300 million in the first four years, the majority of which will be borne by the SWP and CVP contractors. Funding is also provided by Propositions 1 and 1E grants, state agencies, and private donations.

Benefits and Risks to Pasadena

Pasadena Water and Power ("PWP") purchases approximately 60% of its water supplies from MWD, which in turn procures approximately 60% of its imported water supply from the Delta via the SWP. MWD procures the remaining 40% of its imported water from the Colorado River, which is also vulnerable to climate change and water shortages. MWD has made significant investments in regional storage, conveyance, and treatment systems in order to deliver SWP water. As a member agency, Pasadena has contributed millions of dollars towards these water system and infrastructure investments.

Implementing the California WaterFix creates risks that are manageable and can be mitigated to a reasonable extent.

- Strong opposition challenging the project creates political risk and the possibility of delays. These opposing groups believe that Southern California benefits from increased water supplies at the cost of the Delta and the local communities. However, California WaterFix does not guarantee greater water supplies, but rather is intended to support the co-equal goals of improving the system reliability and restoring the ecosystem.
- Any project of this scale has exposure to construction overruns. The current cost estimate was calculated by an engineering and construction management firm specializing in large and complex projects. This estimate was also independently verified by a second company. The estimated cost also includes a sizable contingency to further mitigate cost risks.
- MWD's volumetric rate recovery presents a risk of escalating MWD rates if overall sales decline. This will have a greater impact on member agencies that have limited alternatives for alternative water supplies. The estimated increase to MWD's Tier 1 water as a result of the California WaterFix was derived assuming relatively low future sales volumes. However, it is more likely that volume sales will be greater than those forecast, thus reducing the unit costs.

Moving forward with California WaterFix and California Eco Restore will protect investments made by MWD and its member agencies. By doing nothing to address the

Delta issues jeopardizes access to critical water supplies that are necessary to continue sustaining California's economy and quality of life.

PWP recommends that the City Council support and advocate for the implementation of California WaterFix and California Eco Restore as it collectively represents the most cost-effective large-scale solution to improving regional water supply reliability for Southern California and hence for Pasadena.

COUNCIL POLICY CONSIDERATION:

Support of California WaterFix and California Eco Restore is consistent with the City of Pasadena 2017 State Legislative Platform; the 2011 Water Integrated Resource Plan; the 2015 Urban Water Management Plan; and, City Council's goal to improve, maintain, and enhance public facilities and infrastructure.

ENVIRONMENTAL ANALYSIS:

The proposed action is exempt from CEQA pursuant to State CEQA Guidelines Section15061 (b)(3), the general rule that CEQA applies only to projects which have the potential for causing a significant effect on the environment. The action proposed herein is simply a policy statement in support of the projects (California WaterFix and California Eco Restore), and not a commitment to either by the City of Pasadena. Where it can be seen with certainty that there is no possibility that the action in question may have a significant effect on the environment, the action is not subject to CEQA.

FISCAL IMPACT:

Assuming the California WaterFix is constructed and funded as currently envisioned, the cost of imported water from MWD would increase by approximately $138 to $166 per acre foot, resulting in an estimated $1.8 to $2.2 million increase in PWP's annual purchased water costs. For an average household, the water bill is projected to increase by $5 per month as a result of funding the California WaterFix. Conversely, if the project is not constructed, MWD and PWP would need to seek alternative water sources to replace declining supplies from the Delta at an unknown but undoubtedly much higher cost.

Respectfully submitted,

GURCHARAN S. BAWA
General Manager
Water and Power Department

Prepared by:

Gary Takara
Engineering Manager

Approved by:

STEVE MERMELL
City Manager

RESOLUTION NO. _____

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF PASADENA SUPPORTING CALIFORNIA WATERFIX AND CALIFORNIA ECO RESTORE

WHEREAS, the Sacramento-San Joaquin Delta ("Delta") is a major water hub for California's water supply system for the majority of the State, accounting for approximately 30% of the supplies for Southern California, and therefore supports the overall economy of California; and

WHEREAS, the Delta has been significantly altered over the last 100 years, and will continue to worsen and decline at an ever increasing rate as sea level rises and subsidence occurs, resulting in salinity intrusion and levee related failures, which will become more frequent and more expensive to mitigate or repair as time passes; and

WHEREAS, 25 million residents in California rely on water from the Delta, and local conservation efforts will not be able to replace the water that the Delta has historically supplied to Southern California; and

WHERAS, there is no economically efficient way to construct, heighten and reinforce the existing levees to keep pace with sea level rise or prevent the levees from collapsing during a large seismic earthquake. The consequences to the Bay Delta ecosystem, the water supply, and the California economy would be immediate, severe and negative if these events occur; and

WHEREAS, Governor Brown's California Water Fix and California Eco Restore proposals provide a framework for how best to approach the management of the Delta's combined water and land resources in a manner that will achieve improvements in both water supply reliability and ecosystem protection for the Delta; and

WHEREAS, California Eco Restore will pursue more than 30,000 acres of critical Delta restoration over the next three years, including improvements of habitat conditions for fisheries and native wildlife; and

WHEREAS, California WaterFix includes the construction of three intakes north of the Delta, two underground tunnels 30 miles in length and each rated at 4,500 cubic feet per second, and modification of Clifton Court Forebay. The three new intakes and tunnels will improve existing environmental conditions in the Delta by reducing reverse flow conditions thus minimizing harm to migrating fish, provide operational flexibility to enhance water deliveries, and protect against water supply disruption due to sea-level rise, earthquakes and flood events; and

the statewide water supply reliability coupled with a comprehensive environmental restoration plan for the Delta; and

WHEREAS, Metropolitan Water District of Southern California ("MWD"), consisting of 26 member agencies including the City of Pasadena, is the largest State Water Project ("SWP") contractor receiving approximately 60% of its imports from the SWP and the remaining 40% from the Colorado River that is vulnerable to climate change and susceptible to water shortages. If California WaterFix does not proceed forward, the projected water shortages would be too frequent and overall reliability would not be sustainable by as early as 2030; and

WHEREAS, the City of Pasadena imports approximately 60% of its water supplies from MWD, and it should continue to support and strongly advocate for the implementation of California WaterFix and California Eco Restore proposals, as they represent the most cost-effective large-scale reliability solution to improving regional water supply reliability for Southern California and hence the reliability for the City of Pasadena; and

WHEREAS, the City of Pasadena ratepayers have already invested millions of dollars over the years to build and maintain the SWP system in Northern California as well as portions of MWD's regional storage, distribution, and treatment systems that take delivery of SWP supplies; and modernizing the system through California WaterFix will help protect this investment for decades to come; and

WHEREAS, California WaterFix and California Eco Restore will not be an inexpensive endeavor; however, to do nothing in the Delta is far costlier to the businesses, residents, and economy in California and the City of Pasadena, and all of the costs for California WaterFix will be paid for exclusively by water agencies benefiting from the project; and,

NOW, THEREFORE, BE IT RESOLVED by the City Council of the City of Pasadena that it hereby supports California WaterFix and California Eco Restore as described in the August 28th, 2017 Agenda Report.

Adopted at the regular meeting of the City Council on the ____day of August 2017, by the following vote:

AYES:

NOES:

ABSENT:

Adopted at the regular meeting of the City Council on the ____day of August 2017, by the following vote:

AYES:

NOES:

ABSENT:

ABSTAIN:

Mark Jomsky, CMC
City Clerk

APPROVED AS TO FORM:

7/19/17

Lisa Hosey
Deputy City Attorney

5.A

PASADENA WATER AND POWER

MEMORANDUM

July 25, 2017

To: Municipal Services Committee

From: Gurcharan S. Bawa
General Manager

Subject: Power Delivery Master Plan Update

This report is for information only.

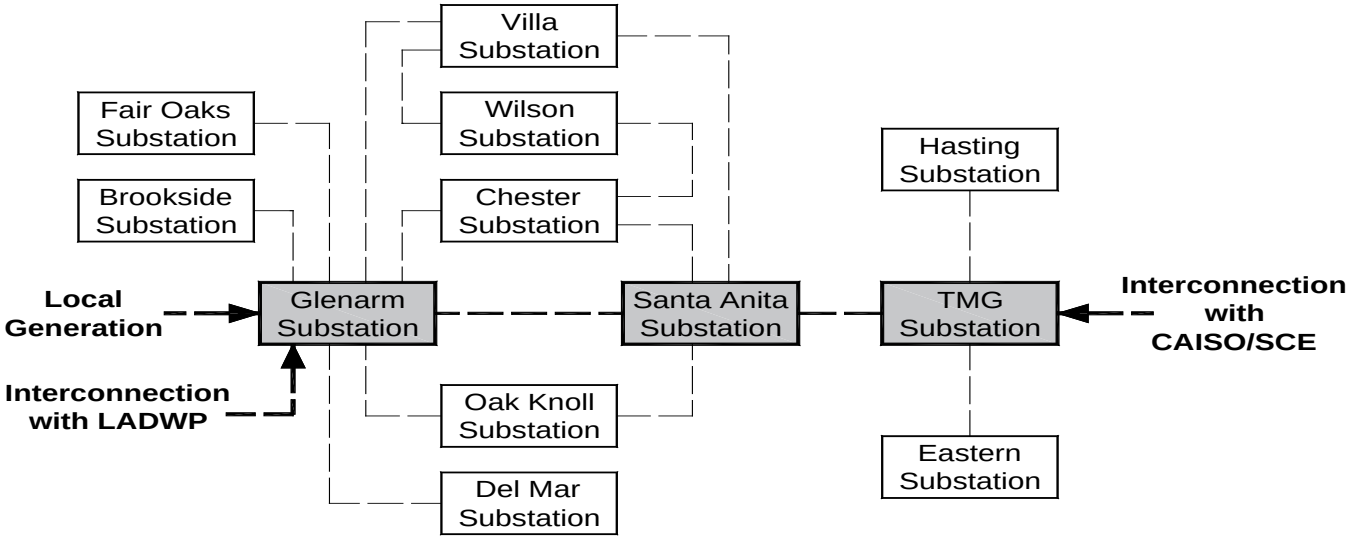
Background:

The City of Pasadena Water and Power Department ("PWP") has been a municipally owned and operated utility for over one hundred years and currently serves over 65,000 electric customers. PWP is vertically-integrated utility that manages all three core functions of electric utilities:

- **Generation** – The major sources of power needed to supply customers, including PWP's local generating plant and contract resources throughout the west.
- **Transmission** – High voltage lines that move power from remote generation sources to the Distribution system. PWP has numerous transmission contracts that are operated by the California Independent System Operator ("CAISO") and deliver power to the PWP at the TMG receiving station.
- **Distribution** – Lower voltage lines that receive power from bulk Generation and Transmission sources and deliver that power to end-use customers.

PWP owns and operates an electric distribution system and all associated electric distribution equipment that deliver power to its end-use customers. The PWP distribution system receives power from its own power generation station and a 220kV intertie with Southern California Edison and the CAISO at TMG. PWP's sub-transmission system feeds 12 substations at 34.5kV and distributes power to its customers through both 17kV and 4kV distribution systems. The sub-transmission system has three receiving stations; these stations receive power from local generation and outside sources for dissemination to distribution substations. Receiving stations have more than one hundred 34kV breakers interconnected by 34kV cross-town and distribution station lines. Figure 1 illustrates a simplified version of PWP's electric system:

Figure 1 – PWP's Simplified Electric System



As with all electric utilities, the vast majority of electric power outages experienced by customers occur on the distribution system, typically as a result of either: (i) contact with animals or objects such as tree limbs or mylar balloons; (ii) equipment failures or overloads; or, (iii) planned outages for maintenance or customer connections. Thus, having a robust electric distribution system is critical to ensuring reliable electric service.

2005 Master Plan

On March 28, 2005, the City Council adopted the Power Distribution Master Plan ("Master Plan") to provide a structured approach and clear framework for planning, maintaining, and operating the distribution system over the next two decades. The plan provided a comprehensive distribution system analysis to identify and address system infrastructure and operational vulnerabilities in order to improve safety, reliability, and operating cost efficiency. Based on those findings, three broad categories of challenges were identified:

1. Replacement of aging infrastructure;
2. Need for additional reliable power distribution capacity;
3. Lack of organizational preparedness to address the next 20 years of providing safe, reliable and cost-effective service.

The Master Plan provided for a range of solution scenarios (Gold, Silver and Bronze) to address each of the challenges identified during the development of the plan. The Gold plan intended to provide the highest level of safety, reliability, and operating cost efficiency while the Silver Plan represented a compromise between initial costs, reliability, and safety. The Bronze Plan strictly minimized initial capital costs without meeting reliability criteria and while accepting substantial risks of injury and property

damage. Table I summarizes the key project targets to be achieved by 2025 for the three Master Plan scenarios, along with the current level of progress to date. Additional details are provided in the "*Master Plan Implementation*" section narrative.

Table I –Master Plan Infrastructure Targets for 2025

Major Projects	Master Plan Scenarios - 2025 Targets			Current Status	
	Gold	Silver	Bronze		
Switch Replacement	830	415	277	497	Exceeding the Gold Scenario Goals
Substation Oil Containment	11	11	7	7	Exceeding the Gold Scenario Goals
Substation Capacitor Bank Addition	5	4	3	3	Exceeding the Gold Scenario Goals
4kV to 17kV Conversions	5.65 mi/yr	2.82 mi/yr	1.4 mi/yr	2.0 mi/yr	Exceeding the Silver Scenario Goals
Circuit Breaker Replacement	270	135	90	66	Meeting the Silver Scenario Goals
Substation Capacity Addition	20 units	10 units	4 units	3 units	Exceeding the Bronze Scenario Goals
Cable Replacement	700 miles	462 miles	350 miles	99 miles	Behind the Bronze Scenario Goals
Vault Replacement/Repair	502	502	502	132	Behind the Bronze Scenario Goals
220kV 2nd Interconnection at TMG	By 2010	By 2012	By 2014	Determined infeasible	
220kV TMG-Glenarm Transmission Line	By 2010	By 2012	By 2014		

The City Council action to adopt the Master Plan did not specify a particular implementation scenario, but rather contemplated that PWP would incorporate appropriate elements from any of these scenarios into five-year and annual Capital Improvement Project ("CIP") budget processes.

Master Plan Implementation

Since the adoption of the Master Plan, PWP has initiated a dynamic infrastructure replacement program as a core component of annual operating and capital improvement project planning. The replacement or repair of aging equipment occurs consistently and includes circuit breakers, oil filled switches, underground cable,

overhead wires, underground transformers, underground vaults, and other aging equipment that has exceeded its useful life.

In order to add reliable power distribution capacity, PWP embarked on an aggressive 4kV to 17kV conversion program to improve system efficiency and reliability by reducing system loses. The system efficiency has shown continuous improvements as a result of this program. In fact, the system losses in Fiscal Years 14, 15 and 16 have been 15% lower than those in Fiscal Years 04, 05 and 06. This program also provides the utility with the infrastructure to support new development activities to meet customer service demands.

Other programs initiated to address the reliability of the distribution system included the installation of new substation units, automation equipment and enhancements of the Supervisory Control and Data Acquisition ("SCADA") system. Customer service has improved due to investment in technological advances in system monitoring and Interactive Voice Response ("IVR") systems which were implemented as part of the Outage Management System ("OMS"). These systems enable PWP to provide timely outage updates to its customers on PWP's website and on social media accounts including Facebook and Twitter.

To increase organizational preparedness for current and future customer service demands, various internal initiatives have been implemented to allow the utility to perform reliably and competitively. PWP has established a project management group in Power Delivery, acquired additional staffing resources, procured supplemental engineering and construction contracts, implemented advanced technological systems and resources, developed engineering standards, and maintained regulatory compliance.

The vitality and viability of the power distribution system relies heavily on ongoing analysis, planning, and investments. PWP continues to address the issues identified in the Master Plan while simultaneously monitoring industry standards, system stability, and planning infrastructure improvement projects in-line with operational needs and long term goals.

Since the adoption of the Master Plan, PWP has made the following major system/infrastructure improvements:

1. Converted approximately 20 circuit miles from 4kV to 17kV
2. Repaired or replaced 132 underground vaults
3. Replaced 64 34kV circuit breakers
4. Replaced 33 substation switches
5. Replaced 464 distribution switches
6. Replaced 939 distribution transformers
7. Replaced 99 miles of underground cable
8. Implemented the OMS
9. Installed three capacitor banks at the Santa Anita Substation
10. Negotiated new interconnection agreement with SCE

11. Installed new switchgear at the Eastern Substation
12. Installed new substation units at the Glenarm, Chester and Hastings Substations
13. Installed new oil containment systems at the TMG, Santa Anita, Brookside, Fair Oaks, Chester, Eastern and Hastings Substations
14. Upgraded the test lab and installed testing equipment at the City Yards

Aforementioned programs and initiatives have resulted in improved safety conditions for the Public and employees while improving system reliability and operational efficiency. The latest reliability benchmarking performed by PA Consulting highlights PWP's outstanding system reliability record amongst publicly and privately owned utilities. The benchmarking compares the following reliability indices:

System Average Interruption Duration Index ("SAIDI"): SAIDI is commonly referred to as customer minutes of interruption or customer hours, and is designed to provide information as to the average time the customers are interrupted. It is the sum of the restoration time for each interruption event times the number of interrupted customers for each interruption event divided by the total number of customers.

- System Average Interruption Frequency Index ("SAIFI"): SAIFI is the average frequency of sustained interruptions per customer over a predefined area. It is the total number of customer interruptions divided by the total number of customers served.
- Customer Average Interruption Duration Index ("CAIDI"): CAIDI is the average time needed to restore service to the average customer per sustained interruption. It is the sum of customer interruption durations divided by the total number of customer interruptions.

Table II illustrates PWP's 2015 reliability indices in comparison to the industry averages:

Table II – Key Electric System Reliability Metrics

Reliability Index	PWP	Industry Average
SAIDI	31.04	175.9
SAIFI	0.29	1.55
CAIDI	106.71	154.9

In spite of PWP's accomplishments over the last decade, there are still challenges ahead. Regulatory changes, risk management or mitigation, hiring skilled/qualified professional labor, engineering resources, switching and rerouting power flows, minimizing customer impacts, and the increasing costs of materials or equipment can impact the ability to execute necessary improvements in a timely manner.

Some of the major challenges that PWP is currently faced with are:

1. Aging infrastructure at the T.M. Goodrich receiving station and the 34kV transmission system backbone replacement;
2. Uncertain load growth related to efficiency and demand response programs, customer-owned generation or storage, evolving electric vehicle penetration, and future electrifications;
3. Technological advancements related to distribution system automation, distributed generation, energy storage, advanced metering, communications, and increased data volume;
4. Integrated Resource Planning (IRP) and Regulatory Changes

Future Outlook

The power distribution system is well positioned and capable of maintaining reliable electric service to the customers as limitations and challenges are addressed. The focal point of all operations and capital project plans are the continuous development of detailed analysis and proactive approaches to challenges as they arise, or are anticipated to arise, in the future.

PWP continues to provide 24-hour system monitoring and immediate response to customer trouble calls or system outages. System conversions from 4kV to 17kV continue to expand capacity, allowing PWP to meet customer load demands while systematic equipment health/risk assessments help the utility to prioritize replacement programs to increase the system reliability.

PWP is committed to the careful implementation of advanced technologies to further improve safety conditions and increase the distribution systems efficiency. This effort will include the installation of additional distribution automation devices (such as automated switches and fault indicators) and possible deployment of an Advanced Metering Infrastructure (“AMI”).

PWP continues to effectively develop its workforce and intends to increase this effort in the future by implementation of various enhanced training programs and recruiting competent professionals. These well prepared and seasoned professionals will assist the utility in preparing and adapting to forthcoming challenges and maintaining safe, efficient and reliable electricity to its customers.

In Fiscal Year 2018, PWP plans to comprehensively reassess the current distribution system conditions and develop an updated Power Distribution Master Plan to meet the evolving needs of PWP’s customers, industry trends, policy and regulatory directives, and stakeholder interests. PWP anticipates a year-long process to seek community input, develop objectives, analyze options, and prepare recommendations so that a draft of the updated plan can be presented to the Municipal Services Committee by June 2018.