



- Board of Directors  
*Engineering and Operations Committee*

9/9/2014 Board Meeting

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**7-2**

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## **Subject**

Appropriate \$1.69 million; and authorize design of solar generation facilities at the F. E. Weymouth and Joseph Jensen Water Treatment Plants (Approp. 15391)

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## **Executive Summary**

This action authorizes staff to proceed with design of two solar power generation projects: (1) a 3-megawatt (MW) facility at the F. E. Weymouth Water Treatment Plant; and (2) a 1-MW facility at the Joseph Jensen Water Treatment Plant.

### **Timing and Urgency**

The addition of solar facilities at the Weymouth and Jensen plants will enhance Metropolitan's long-term power use efficiency and hedge against projected increases and volatility in the price of electricity. Moving forward with solar facilities at this time will take advantage of incentive programs that will be phased out in the near future.

This project has been reviewed with Metropolitan's Capital Investment Plan (CIP) prioritization criteria and is categorized as a Cost Efficiency/Productivity project. Funds for this action are available within Metropolitan's capital expenditure plan for fiscal year 2014/15.

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## **Details**

### **Background**

In 2010, Metropolitan's Board adopted Energy Management Policies which are intended to contain energy costs and reduce exposure to price volatility through the implementation of cost-effective alternative energy projects. The policies which are directly related to solar power development include:

- Develop strategies to hedge against cost increases and price volatility.
- Track and assess impacts of greenhouse gas (GHG) regulations.
- Pursue cost-effective energy projects in the areas of energy efficiency or conservation improvements, small hydroelectric energy, and solar energy.

Metropolitan has assessed the potential benefits of constructing solar facilities in the past, and has developed two solar projects to date. In 2006, a 540-kilowatt (kW) system was installed during initial construction of the Center for Water Education at Diamond Valley Lake, while a 1-MW system was installed at the Robert A. Skinner Water Treatment Plant near Hemet. In 2009, Metropolitan's Board authorized design of a 2-MW solar facility at the Weymouth plant. This project was deferred due to the large volume of construction then getting underway at the plant, including the Weymouth Oxidation Retrofit Program (ORP), which impacted most of the site. At that time, Metropolitan also prioritized the CIP in order to focus on needed infrastructure reliability projects.

Staff recently updated its assessment of potential opportunities for solar power generation at Metropolitan's five water treatment plants. This assessment considered a number of factors which impact the cost effectiveness of solar power. First, the cost to procure solar panels has decreased significantly over the past five years. Today's

price for panels is approximately 60 percent of the price in 2009. Solar panel manufacturers have also increased the overall efficiency of solar energy conversion and reduced panel degradation. As a result, solar facilities now require a smaller footprint. Second, staff also examined currently available solar incentive programs. The California Solar Initiative (CSI) program will end shortly, but new incentive programs are commencing. These programs are discussed in detail below. Finally, higher electricity rates and greater volatility are expected in the future from electrical utilities.

### **Incentive Programs Available for the Weymouth Plant**

The state of California launched the CSI program in 2007 to provide incentives for installation of solar facilities to customers in the investor-owned utility territories of Southern California Edison (SCE), Pacific Gas and Electric, and San Diego Gas and Electric. The CSI program was provided with a budget of \$2.167 billion over a 10-year period, and is now entering its final phase. The CSI program is currently at Step 10 of 10, with an available rebate of \$0.088 per kW-hour (kWh). Since the Weymouth plant is located within the SCE service area, a solar facility at that location would be eligible to receive a rebate for the initial 1 MW in generation capacity.

In April 2013, SCE introduced the Renewable Energy Self-Generation Bill Credit Transfer program (RES-BCT), which would also be applicable for a solar facility at the Weymouth plant. This incentive program supports development of solar facilities up to 5 MW per site. The RES-BCT program allows any solar energy not consumed on-site to be credited and transferred to other SCE accounts of the sponsoring entity. Since Metropolitan has more than 400 accounts with SCE, this credit transfer incentive would be beneficial in reducing Metropolitan's overall energy costs. The RES-BCT program has a program-level cap of 124 MW in generation capacity. At the present time, there is sufficient capacity available in the program to include a solar facility at the Weymouth plant.

### **Incentive Programs Available for the Jensen Plant**

The Jensen plant is located within the Los Angeles Department of Water and Power's (LADWP) service area. LADWP administers a Solar Incentives Program (SIP) which provides reimbursement for construction of solar facilities up to 1 MW in generation capacity. The LADWP program is currently at Step 8 of 10, with an available incentive of approximately \$1.45 per installed watt. A solar facility at the Jensen plant would be eligible to receive a rebate for construction of a 1-MW installation.

### **Recommended Solar Option**

Based on space available at the Weymouth site and the plant's projected power demands following completion of the ORP, two options for development of solar facilities at the Weymouth and Jensen plants were identified by staff. The first option includes a 1-MW system at the Jensen plant and a 2-MW system at the Weymouth plant. The second option includes the same 1-MW system at the Jensen plant and a 3-MW system at the Weymouth plant.

The payback periods have been calculated for each of the projects, based upon two estimated annual escalation rates for the cost of electricity: 4 percent per year and 8 percent per year, over the 30-year expected life of the solar systems. These escalation rates were selected as reasonable estimates which demonstrate the payback sensitivity to increasing electricity rates. For a 1-MW solar system at the Jensen plant, the payback period would be 8 to 9 years. At the Weymouth plant, the payback periods for 2-MW and 3-MW systems would be 10 to 12 years and 10.5 to 13 years, respectively.

The composite payback periods for the two identified options for proceeding with solar facilities are as follows:

- Option #1: 1 MW at Jensen and 2 MW at Weymouth – Payback period is 8.5 to 10 years
- Option #2: 1 MW at Jensen and 3 MW at Weymouth – Payback period is 9 to 11 years

These two options for development of solar facilities at the Weymouth and Jensen plants were discussed with the Engineering and Operations Committee in June and August 2014. While both of the identified options would provide significant cost savings to Metropolitan, staff recommends the larger 3-MW system at Weymouth and a

1-MW facility at Jensen in order to maximize use of SCE's bill credit transfer program and maximize generation potential at the Weymouth plant.

**Project No. 1 – Weymouth Solar Facility– Final Design Phase (\$782,000)**

The Weymouth plant is a 520 million-gallon-per-day (mgd) facility that delivers a blend of waters from the Colorado River and State Water Project into Metropolitan's Central Pool portion of the distribution system and an exclusive service area. The plant consumed over 10 million kWh of electricity in 2013, at a cost of approximately \$1.4 million. Power demand will increase by 30 to 50 percent when the Weymouth ozonation facilities commence operation in 2016/17.

A 3-MW solar facility could generate up to 7.7 million kWh of clean renewable energy annually, which could directly offset full-retail electricity rates and reduce operating costs associated with energy consumption at the Weymouth plant. Through the RES-BCT program, any excess energy produced by the 3-MW facility would be used to offset energy costs at other Metropolitan facilities. The solar system would be ground-mounted and would include a single-axis tracking system to allow the panel arrays to track the sun's path from east to west on a daily basis. Approximately 15 acres would be required for the installation.

The solar facility would be placed at two locations within the Weymouth plant's operational boundary, near the southwest and northeast corners of the site. These locations were selected to avoid interference with current treatment plant operations or with potential future treatment processes.

Final design of the solar facility is recommended to be performed by MWH Americas, Inc., as discussed below. The planned scope of work includes conducting a load flow study and short circuit study, preparing construction and bidding documents, and developing a construction cost estimate. MWH Americas, Inc. will also provide technical support for SCE's required interconnection study and for the applications for solar incentive rebates.

Metropolitan staff will acquire permits, apply for and manage the rebate incentive process, and integrate the work with other activities underway at the Weymouth plant.

This action appropriates \$782,000 and authorizes final design phase activities of a 3-MW solar facility at the Weymouth plant. The requested funds include: \$332,000 for final design, \$250,000 for the electrical grid interconnection study by SCE; \$114,000 for rebate applications, permitting, receipt of bids, and project management; and \$86,000 for remaining budget.

The cost of final design is approximately 2.8 percent of the estimated construction cost. Engineering Services' goal for design of projects with construction cost greater than \$3 million is 9 to 12 percent of the total construction cost. The estimated construction cost for this project is anticipated to range from \$12 million to \$14 million.

The total estimated cost to complete this project, including the amount authorized to date, current funds requested, and future construction cost, is anticipated to range from \$14 million to \$16 million.

**Project No. 2 – Jensen Solar Facility – Final Design Phase (\$907,000)**

The Jensen plant was placed into service in 1972 with an initial capacity of 400 mgd. The plant was expanded to its current capacity of 750 mgd in the early 1990s. The Jensen plant treats water from the West Branch of the State Water Project and delivers it to Metropolitan's Central Pool and to exclusive service areas on the west side of the distribution system. The plant consumed over 11 million kWh of electricity in 2013, at a cost of approximately \$1.4 million.

A 1-MW solar facility could generate up to 2.4 million kWh of clean renewable energy annually, which could directly offset full-retail electricity rates and reduce operating costs associated with energy consumption at the Jensen plant. The solar system would be ground-mounted and would include a single-axis tracking system to allow the panel arrays to track the sun's path from east to west on a daily basis. Approximately 5 acres would be required for the installation.

The planned location of the facility is within the Jensen plant's operational boundary, near the southwest corner of the site. This location was selected to avoid interference with current treatment plant operations or with potential future treatment processes.

Final design of the solar facility is recommended to be performed by MWH Americas, Inc. under an existing professional services agreement, as discussed below. The planned scope of work includes designing the interconnection of the solar facility with the plant's electrical distribution system; designing the switchgear, transformers, and related electrical equipment; preparing construction and bidding documents; and developing a construction cost estimate. MWH Americas, Inc. will also provide technical support for LADWP's interconnection agreement and for the application for the solar incentive rebate.

Metropolitan staff will acquire permits, apply for and manage the rebate incentive process, and integrate the work with other activities underway at the Jensen plant. Preparation of environmental documentation is recommended to be performed by Rincon Consultants, Inc. under an existing professional services agreement, as discussed below.

This action appropriates \$907,000 and authorizes final design phase activities for a 1-MW solar facility at the Jensen plant. The requested funds include: \$120,000 for preliminary design, \$348,000 for final design; \$10,000 for development of the interconnection agreement with LADWP; \$150,000 for preparation of environmental documentation; \$151,000 for preparation of the rebate application, permitting, receipt of bids, and project management; and \$128,000 for remaining budget.

The cost of final design is approximately 8.7 percent of the estimated construction cost. Engineering Services' goal for design of projects with construction cost greater than \$3 million is 9 to 12 percent of the total construction cost. The estimated construction cost for this project is anticipated to range from \$4 million to \$5 million.

The total estimated cost to complete this project, including current funds requested and future construction cost, is anticipated to range from \$5 million to \$6 million.

#### **Design Services – MWH Americas, Inc. (No Action Required)**

Final design of the Weymouth and Jensen solar facilities is recommended to be performed by MWH Americas, Inc. under an existing board-authorized agreement. The planned scope of work is discussed above in each project's description. The estimated cost for MWH Americas, Inc. to provide these services is \$800,000.

In August 2013, Metropolitan's Board authorized a five-year agreement with MWH Americas, Inc. in an amount not to exceed \$2 million per year, to provide engineering services in support of board-authorized capital projects. MWH Americas, Inc. was selected through a competitive process via Request for Qualification (RFQ) No. 1032. For the Weymouth and Jensen solar facilities, MWH Americas, Inc. was selected due to its experience in the design of similar projects and the expertise of its project team. For this agreement, Metropolitan has established a Small Business Enterprise (SBE) participation level of 18 percent. MWH Americas, Inc. has agreed to meet this level of participation.

#### **Environmental Documentation – Rincon Consultants, Inc. (No Action Required)**

Preparation of environmental documentation is recommended to be performed by Rincon Consultants, Inc. under an existing board-authorized agreement. The planned scope of work includes preparing California Environmental Quality Act-related documents and performing technical studies that address issues such as air quality, traffic, and noise. The estimated cost to provide these services is \$150,000.

Rincon Consultants, Inc. was selected through a competitive process via RFQ No. 956. This work is specialized and Metropolitan has insufficient technical staff in-house to perform these activities. Rincon Consultants, Inc. was selected due to its experience in the preparation of environmental documents for similar projects, and the expertise of its project team. For this agreement, Metropolitan has established an SBE participation level of 18 percent. Rincon Consultants, Inc. has agreed to meet this level of participation.

## Summary

Three options have been developed for the solar generation facilities, consistent with previous discussions held with the Engineering and Operations Committee. Option #1 would authorize design of a 2-MW solar facility at the Weymouth plant and a 1-MW solar facility at the Jensen plant. Option #2 would authorize design of a 3-MW solar facility at the Weymouth plant and a 1-MW solar facility at the Jensen plant, while Option #3 would not proceed with the two solar generation projects at this time.

Staff's recommendation is to proceed with Option #2, which appropriates \$1.69 million and authorizes final design of a 3-MW facility at the Weymouth plant and a 1-MW facility at the Jensen plant. This option would maximize use of SCE's bill credit transfer program and maximize generation potential at the Weymouth plant. Both projects have been evaluated and recommended by Metropolitan's CIP Evaluation Team, and funds are available within the biennial 2014/15 and 2015/16 capital expenditure plan. These projects were not identified within the biennial budget because results of the assessment for potential solar projects were received following adoption of the budget. Upon approval of this action, the biennial capital expenditure plan will be adjusted to reflect the new work. See [Attachment 1](#) for the Financial Statement and [Attachment 2](#) for the Location Map.

Staff will return to the Board at a later date to award contracts for construction of the two solar facilities.

Both projects are included within capital Appropriation No 15391, the Power Reliability and Energy Conservation Appropriation. With this present action, the total funding for Appropriation No 15391 will increase from \$34,537,000 to \$36,227,000.

## Project Milestones

June 2015 – Completion of final design of a solar generation facility at Jensen plant

September 2015 – Completion of final design of a solar generation facility at Weymouth plant

## Policy

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Metropolitan Water District Administrative Code Section 5108: Appropriations

### California Environmental Quality Act (CEQA)

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CEQA determination for Options #1 and #2:

The proposed action to authorize preliminary and final design consists of basic data collection and resource evaluation activities which do not result in a serious or major disturbance to an environmental resource. This may be strictly for information gathering purposes, or as part of a study leading to an action which a public agency has not yet approved, adopted, or funded. Accordingly, the proposed action qualifies for a Class 6 Categorical Exemption (Section 15306 of the State CEQA Guidelines).

The CEQA determination is: Determine that the proposed action is exempt from CEQA pursuant to Section 15306 of the State CEQA Guidelines.

CEQA determination for Option #3:

None required

## Board Options

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### Option #1

Adopt the CEQA determination that this action is categorically exempt from CEQA, and

- a. Appropriate \$1.69 million;
- b. Authorize design of a 2-MW solar facility at the Weymouth plant; and
- c. Authorize design of a 1-MW solar facility at the Jensen plant.

**Fiscal Impact:** \$1.69 million of capital funds under Approp. 15391

**Business Analysis:** Under this option, Metropolitan will receive up to \$1 million in rebate incentives for the Weymouth solar facility from SCE's CSI program over the first 5 years of operation and a lump sum

reimbursement of up to \$1.4 million from LADWP’s SIP program for the Jensen solar facility when it commences operation. Based on a range of potential annual increases in retail electrical rates of 4 to 8 percent, the payback period for this option would be 8.5 to 10 years.

**Option #2**

Adopt the CEQA determination that this action is categorically exempt from CEQA, and

- a. Appropriate \$1.69 million;
- b. Authorize design of a 3-MW solar facility at the Weymouth plant; and
- c. Authorize design of a 1-MW solar facility at the Jensen plant.

**Fiscal Impact:** \$1.69 million of capital funds under Approp. 15391

**Business Analysis:** Under this option, Metropolitan will receive up to \$1 million in rebate incentives for the Weymouth solar facility from SCE’s CSI program over the first 5 years of operation and a lump sum reimbursement of up to \$1.4 million from LADWP’s SIP program for the Jensen solar facility when it commences operation. Based on a range of potential annual increases in retail electrical rates of 4 to 8 percent, the payback period for this option would be 9 to 11 years. This option would maximize use of SCE’s bill credit transfer program and maximize generation potential at the Weymouth plant.

**Option #3**

Do not proceed with the solar generation facilities at this time.

**Fiscal Impact:** None

**Business Analysis:** Under this option, staff would continue to monitor industry cost trends and available incentives for solar facilities, and would reassess potential projects annually.

**Staff Recommendation**

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Option #2

 8/18/2014  
 \_\_\_\_\_ Date  
 Gordon Johnson  
 Manager/Chief Engineer,  
 Engineering Services

 8/25/2014  
 \_\_\_\_\_ Date  
 Jeffrey Kightlinger  
 General Manager

**Attachment 1 – Financial Statement**

**Attachment 2 – Location Map**

### Financial Statement for Power Reliability & Energy Conservation Appropriation

A breakdown of Board Action No. 11 for Appropriation No. 15391 for solar generation facilities at the Weymouth and Jensen plants<sup>1</sup> is as follows:

	<b>Previous Total Appropriated Amount (Aug. 2013)</b>	<b>Current Board Action No. 11 (Sept. 2014)</b>	<b>New Total Appropriated Amount</b>
Labor			
Studies and Investigations	\$ 683,550	\$ -	\$ 683,550
Final Design	882,000	-	882,000
Owner Costs (Program mgmt, right-of-way, permitting, bidding process)	1,389,100	255,000	1,644,100
Submittal Review	481,500.00	-	481,500
Construction Inspection and Support	2,372,250	-	2,372,250
Metropolitan Force Construction	574,500	-	574,500
Materials and Supplies	1,025,000	-	1,025,000
Incidental Expenses	140,105	11,000	151,105
SCE interconnection study	-	250,000	250,000
LADWP interconnection agreement	-	10,000	10,000
Professional/Technical Services	3,553,900	-	3,553,900
MWH Americas, Inc.	-	800,000	800,000
Rincon Consultants, Inc.	-	150,000	150,000
Equipment Use	49,100	-	49,100
Contracts	22,622,000	-	22,622,000
Remaining Budget	763,995 <sup>2</sup>	214,000	977,995
<b>Total</b>	<b>\$ 34,537,000</b>	<b>\$ 1,690,000</b>	<b>\$ 36,227,000</b>

#### Funding Request

<b>Program Name:</b>	Power Reliability and Energy Conservation Appropriation		
<b>Source of Funds:</b>	Revenue Bonds, Replacement and Refurbishment or General Funds		
<b>Appropriation No.:</b>	15391	<b>Board Action No.:</b>	11
<b>Requested Amount:</b>	\$ 1,690,000	<b>Budget Page No.:</b>	155
<b>Total Appropriated Amount:</b>	\$ 36,227,000	<b>Total Appropriation Estimate:</b>	\$34,537,000

<sup>1</sup> The total amount expended to date on the Weymouth Solar Facility is approximately \$1.76 million. The total estimated cost to complete this project, including the amount authorized to date, current funds requested, and future construction cost, is anticipated to range from \$14 million to \$16 million.

This is the initial appropriation for the Jensen Solar Facility. The total estimated cost to complete this project is anticipated to range from \$5 million to \$6 million.

<sup>2</sup> Reflects previous reallocation of \$200,000 from Remaining Budget to update Metropolitan's Energy Management Plan; to evaluate current solar opportunities; and to perform an assessment of in-line hydroelectric generation technology.

# Distribution System

