Report Format

Main Staff Report: Budget Variance Analysis and Discussion

Financial Report Attachments
1: Water Sales Volumes (Acre-Feet)
2: Water Sales Revenues (Dollars)
3: Water Purchases & Treatment Costs (Dollars)
4: Budget Status Report
Attachment 1

WATER SALES VOLUMES
Budget Versus Actual (in Acre-Feet)
for the 8 Months Ended February 29, 2016

- Budgeted amounts are based on the adopted two year budget
ATTACHMENT 2

WATER SALES REVENUES
Budget Versus Actual (in Millions $)
for the 8 Months Ended February 29, 2016

* Budgeted amounts are based on the adopted two year budget
Attachment 3

WATER PURCHASES AND TREATMENT COSTS
Budget Versus Actual (in Millions $)
for the 8 Months Ended February 29, 2016

*Budgeted amounts are based on the two year budget
## Part 1: Net Water Sales Revenue

<table>
<thead>
<tr>
<th></th>
<th>FY 16 8 Months Adopted Budget</th>
<th>FY 16 8 Months Period-to-Date Actual</th>
<th>Variance with Period-to-Date Adopted Budget Positive (Negative)</th>
<th>% Period-to-date / FY16 Annual Budget</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water sales</td>
<td>$371,042,715</td>
<td>$341,529,330</td>
<td>$ (29,513,385)</td>
<td>60%</td>
</tr>
<tr>
<td>Water purchases &amp; treatment</td>
<td>(284,081,111)</td>
<td>(242,961,861)</td>
<td>41,119,250</td>
<td>56%</td>
</tr>
<tr>
<td><strong>Total Net Water Sales Revenue</strong></td>
<td><strong>$86,961,604</strong></td>
<td><strong>$98,567,469</strong></td>
<td><strong>$11,605,865</strong></td>
<td><strong>75%</strong></td>
</tr>
</tbody>
</table>
Investment Report

San Diego County Water Authority

Period Ending
March 31, 2016
Account Profile
Objectives

Consolidated Investment Objectives

The investment policies and practices of the Board of Directors and the Treasurer for the San Diego County Water Authority are based upon limitations placed on it by governing legislative bodies. These policies have three primary goals:

1. To assure compliance with all Federal, State and Local laws governing the investment of monies under the control of the Treasurer.
2. To protect the principal monies entrusted to this organization.
3. To generate the maximum amount of investment income within the parameters of this Annual Statement of Investment Policy.

Chandler Asset Management Performance Objectives

Chandler’s mandate is to invest in corporate and municipal securities with final maturities of 5 years or less.

The performance objective is to achieve a rate of return over a market cycle that equals or exceeds the return on a market index of similar duration and sector allocation.

Strategy

In order to achieve these objectives, Chandler invests in high quality corporate securities consistent with the investment policy and California Government Code.
### COMPLIANCE WITH INVESTMENT POLICY

Assets managed by Chandler Asset Management are in full compliance with State law and the Investment Policy.

<table>
<thead>
<tr>
<th>Category</th>
<th>Standard</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. Corporate (MTNs)</td>
<td>AA- or better by one NRSRO; No ratings below A-</td>
<td>Complies</td>
</tr>
<tr>
<td>Municipal Securities</td>
<td>A- or better by one NRSRO; 20% maximum; 5% max issuer</td>
<td>Complies</td>
</tr>
<tr>
<td>Maximum Maturity</td>
<td>5 years maximum maturity</td>
<td>Complies</td>
</tr>
</tbody>
</table>
## Portfolio Characteristics

### San Diego County Water Authority

<table>
<thead>
<tr>
<th></th>
<th>03/31/2016</th>
<th>12/31/2015</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Benchmark</strong>*</td>
<td>Portfolio</td>
<td>Portfolio</td>
</tr>
<tr>
<td>Average Maturity (yrs)</td>
<td>2.80</td>
<td>3.03</td>
</tr>
<tr>
<td>Modified Duration</td>
<td>2.65</td>
<td>2.88</td>
</tr>
<tr>
<td>Average Purchase Yield</td>
<td>n/a</td>
<td>1.62 %</td>
</tr>
<tr>
<td>Average Market Yield</td>
<td>1.50 %</td>
<td>1.26 %</td>
</tr>
<tr>
<td>Average Quality**</td>
<td>AA</td>
<td>AA+/Aa2</td>
</tr>
<tr>
<td>Total Market Value</td>
<td>28,569,591</td>
<td>24,109,024</td>
</tr>
</tbody>
</table>

* BAML 1-5 Yr US Corporate Rated AAA-AA Index

** Benchmark is a blended rating of S&P, Moody's, and Fitch. Portfolio is S&P and Moody's respectively.
## Issuers – Chandler Managed Portfolio

### Issuer Report
As of 3/31/2016

<table>
<thead>
<tr>
<th>Issue Name</th>
<th>Investment Type</th>
<th>% Portfolio</th>
</tr>
</thead>
<tbody>
<tr>
<td>US Bancorp</td>
<td>US Corporate</td>
<td>14.38 %</td>
</tr>
<tr>
<td>Microsoft</td>
<td>US Corporate</td>
<td>14.34 %</td>
</tr>
<tr>
<td>ChevronTexaco Corp</td>
<td>US Corporate</td>
<td>14.29 %</td>
</tr>
<tr>
<td>Berkshire Hathaway</td>
<td>US Corporate</td>
<td>14.24 %</td>
</tr>
<tr>
<td>Exxon Mobil Corp</td>
<td>US Corporate</td>
<td>14.15 %</td>
</tr>
<tr>
<td>Apple Inc</td>
<td>US Corporate</td>
<td>14.12 %</td>
</tr>
<tr>
<td>Procter &amp; Gamble Company</td>
<td>US Corporate</td>
<td>7.26 %</td>
</tr>
<tr>
<td>Wal-Mart Stores</td>
<td>US Corporate</td>
<td>7.23 %</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>100.00 %</strong></td>
</tr>
</tbody>
</table>
Duration Distribution - Chandler Managed Portfolio

San Diego County Water Authority
Portfolio Compared to the Benchmark as of March 31, 2016

<table>
<thead>
<tr>
<th></th>
<th>0 - 0.25</th>
<th>0.25 - 0.50</th>
<th>0.50 - 1</th>
<th>1 - 2</th>
<th>2 - 3</th>
<th>3 - 4</th>
<th>4 - 5</th>
<th>5+</th>
</tr>
</thead>
<tbody>
<tr>
<td>Portfolio</td>
<td>0.0 %</td>
<td>0.0 %</td>
<td>0.0 %</td>
<td>14.1 %</td>
<td>35.6 %</td>
<td>50.3 %</td>
<td>0.0 %</td>
<td>0.0 %</td>
</tr>
<tr>
<td>Benchmark*</td>
<td>0.3 %</td>
<td>0.0 %</td>
<td>4.1 %</td>
<td>28.2 %</td>
<td>31.9 %</td>
<td>19.4 %</td>
<td>16.2 %</td>
<td>0.0 %</td>
</tr>
</tbody>
</table>

* BAML 1-5 Yr US Corporate Rated AAA-AA Index
### San Diego County Water Authority

**Period Ending**
March 31, 2016

**Total Rate of Return**
Annualized Since Inception
February 28, 2015

<table>
<thead>
<tr>
<th>Period</th>
<th>San Diego County Water Authority</th>
<th>BAML 1-5 Yr US Corporate Rated AAA-AA Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 months</td>
<td>1.99 %</td>
<td>1.73 %</td>
</tr>
<tr>
<td>12 months</td>
<td>2.33 %</td>
<td>2.06 %</td>
</tr>
<tr>
<td>2 years</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>3 years</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>5 years</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>10 years</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Since Inception</td>
<td>2.57 %</td>
<td>2.20 %</td>
</tr>
</tbody>
</table>

**Total rate of return:** A measure of a portfolio’s performance over time. It is the internal rate of return, which equates the beginning value of the portfolio with the ending value; it includes interest earnings, realized and unrealized gains and losses in the portfolio.
Lake Hodges O&M Contract Amendment

Background

- Board awarded an operations and maintenance contract to ProTrans USA LLC in April 2012
- Original contract term was for 62 months, amended to 66 months
- Contract ends October 31, 2017
- Total contract award of $8,035,340
General Discussion

- Annual corrective maintenance was not included in the original contract authorization
- Contract was amended to extend pre-mobilization due to delayed start of facility
- Major unexpected repairs during March 2013 shutdown
  - Was known and considered in the Hodges litigation settlement
Authorize the General Manager to execute Amendment 5 to the operations and maintenance contract with ProTrans USA LLC, for $2,500,000 increasing the authorized cumulative contract amount from $8,035,340 to $10,535,340.
San Vicente Bypass Pipeline Notice of Completion

Engineering & Operations Committee Meeting
April 28, 2016
San Vicente Site

- TERMINAL STRUCTURE
- NEW BYPASS PIPELINE TRENCH SECTION
- NEW TERMINAL STRUCTURE ACCESS ROAD
- EXISTING 48-INCH SAN VICENTE BYPASS PIPELINE
- NEW BYPASS PIPELINE TUNNEL SECTION REACH 1/REACH 2
- SAN VICENTE MARINA FACILITIES
- NEW BYPASS PIPELINE PORTON INSTALLED IN MARINA CONTRACT
- NEW TERMINAL STRUCTURE
- SADDLE DAM
- NEW BYPASS CONNECTION PIPELINE
- SAN VICENTE DAM RAISE

San Vicente Reservoir

San Diego County Water Authority
## Contract Summary

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Original Contract Amount</td>
<td>$13,999,340</td>
</tr>
<tr>
<td>Change Orders (3%)</td>
<td>$438,158</td>
</tr>
<tr>
<td><strong>Final Contract Amount</strong></td>
<td><strong>$14,437,498</strong></td>
</tr>
</tbody>
</table>
Authorize the General Manager to accept the San Vicente Bypass Pipeline project as complete, record the Notice of Completion, and release funds held in retention to Pulice Construction, Inc., following the expiration of the retention period.
San Vicente Pumped Storage Study Owners’ Advisor Work Update

Engineering and Operations Committee Meeting

April 28, 2016
2016 Progress Update Schedule

- HPSC Consultant presents initial progress to date
- E&O Consultant presents preliminary results of Economic Analysis

Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec

- HPSC Consultant provides update on work progress
- E&O Consultant presents preliminary results of Economic Analysis
- E&O Consultant presents results of Biz Model(s) Analysis
- Staff/HESC recommend Project Go/No-Go & Biz Model(s) for Board Consideration

- HESC Consultant presents update on work progress
- E&O Consultant presents results of Biz Model(s) Analysis
- HESC Consultant presents update on work progress
- HESC Consultant presents results of Economic, Marketability, & Risk Analysis

- E&O Workshop Consultant presents results of Economic, Marketability, & Risk Analysis
- E&O Workshop Consultant presents results of Biz Model(s) Analysis

E&O Staff/HESC recommend Project Go/No-Go & Biz Model(s) for Board Consideration

GO or STOP
Types of Assets

- Civil
- Generation
- Transmission
- Land
- Water

Source: www.atlanticaenergy.org
Agenda

- Background
- Power market landscape
- Owners’ Advisor Work Update
# Federal Energy Regulatory (FERC) Commission Timeline

|------|------|------|------|------|------|

- **Received joint preliminary permit**

**Preliminary Permit (3-Year Term)**

Must submit a Preliminary Application Document (PAD) within this 3-year window

- **Submitted to FERC Preliminary Application document (PAD)**

**PAD begins FERC License Application Process (2 to 5 year process)**
FERC PAD

- Request licensing track
- Project description
- Study plan
- Stakeholder outreach
<table>
<thead>
<tr>
<th>Date</th>
<th>Event Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>September 28, 2015</td>
<td>Received FERC Traditional Licensing Process approval</td>
</tr>
<tr>
<td>November 9, 2015</td>
<td>Conducted daytime/evening scoping meetings</td>
</tr>
<tr>
<td>January 8, 2016</td>
<td>Received all stakeholder comments on study plan</td>
</tr>
<tr>
<td>In progress</td>
<td>Addressed comments in current work/study plan</td>
</tr>
</tbody>
</table>
San Vicente Pumped Storage Study Owners’ Advisor Work Team

- Water Authority
- City of San Diego
- Navigant Consulting
Owners’ Advisor Work (Phase 2)

- **Work objectives:**
  - Represent Water Authority and City (Owners) with one voice
  - Assist in project go/no-go recommendation
  - Recommend business model(s) if a go

- **Work entails:**
  - Deeper dive on initial study
    - Potential business models
    - Economic analysis
    - Risk/opportunity analysis
    - Marketability analysis
  - Go/No-Go: Business model recommendation
Work Deliverables Overview

Task 1 - Preliminary Business Models

Task 2 - Economic Analysis

Task 3 - Marketability

Task 4 - Risk Assessment

Task 5 - Recommended Business Model(s)

Preliminary Models

Market

Transmission

Cost/Schedule

Financial Modeling and Stress Tests

Outreach Plan

Documents

Meetings

Identify

Evaluate

Quantify

Recommended Model(s)
Work Progress

- **Assess current and future energy markets**
  - Higher renewable requirements leading to likely curtailment

- **Marketableability Analysis**
  - Initial outreach (developers)
  - Offtaker outreach plan completed

- **Risk Assessment**
  - Two workshops completed
  - Continued estimating cost impacts for stress tests
  - Workshop 3 date targeted for June

- **Economic Analysis**
  - Power market: Initial forecasts completed
  - Economics: Updated project estimate completed and revenue requirement underway

- **Preliminary Business Model**
  - Workshop with Owners completed
  - Internal draft Report being finalized
Agenda

- Background
- Power market landscape
- Owners’ Advisor Work Update
California Energy Grid

- Energy Grid
  - Extends from Northern to Southern California

- California Independent System Operator (CAISO)

- CAISO/Utility challenges
  - **Legislation** (2015 Senate Bill 350)
    - Renewable energy procurement targets
  - **Regulations** (CPUC proceedings)
    - Energy storage procurement
    - Time of use (peak/non-peak changes)
  - **Renewables integration**

Source: www.geni.org
Mandate that 50% of Investor Owned Utilities energy portfolio comes from renewable energy resources, such as wind and solar by 2030 (50% Renewable Portfolio Standard)

Affects CPUC’s 2016 Long-Term Procurement Plan
Investor Owned Utilities Challenge: Application of State mandate that they must procure a certain percentage of their energy supply from renewable sources (ex: wind and solar)
Long-Term Procurement Planning (LTPP)

- California Public Utilities Commission proceeding
  - Considers all electric resource procurement policies and programs in an integrated manner
  - Every two years assesses system and resources of PG&E, SCE, and SDG&E for the next 10 years
  - Determines changes to current procurement rules and examines utilities’ proposed procurement plans

- 2016 LTPP extended from May to July
  - Includes 50% Renewable Portfolio Standard
  - Delays results of Owners’ Advisor analysis
CAISO Conceptual (Supply/Demand) “Duck Curve”

Source: www.caiso.com

November 20, 2015 - Presented by CAISO at Joint California Energy Commission and California Public Utilities Commission Bulk Storage Workshop
822 Instances of curtailment in 2024 under 40% RPS scenario

CAISO Curtailment Forecast

Source: www.caiso.com

November 20, 2015 – Presented by CAISO at Joint California Energy Commission and California Public Utilities Commission Bulk Storage Workshop
Agenda

- Background
- Power market landscape
- Owners’ Advisor Work Update
San Vicente Pumped Storage Marketability Analysis

- Meeting with potential partners
  - Developers
  - Investor owned utilities
  - Private firms
  - Government agencies

- Discussing:
  - Potential business arrangements
  - Roles and responsibilities

Source: www.deu.edu.tr
San Vicente Pumped Storage Risk Assessment

- Three workshops
  - Workshop 1 and 2 (Completed)
    - Risks were identified and ranked
  - Workshop 3 (June 2016)
    - Risks will be quantified and addressed

- Risk/opportunity categories include:
  - Power market
  - Regulatory
  - Environmental/land use
  - Stakeholder acceptance
  - Technical
  - Construction

Source: www.learntotradethemarket.com
San Vicente Pumped Storage Economic Analysis

- **Power market modeling:** Determine need for Project given forecasting of short-term and long-term market demand (utility scale and localized) and potential competitors

- **Financial analysis:** Determines Project’s development cost and value
Power Market Modeling

- Simulation of California power market operation and prices
  - Software = PLEXOS

- Models the entire Western power system

- Simulates balancing power supply demand and supply on an hourly basis

Source: www.cec.com
## Key Market Drivers

<table>
<thead>
<tr>
<th>Market Driver</th>
<th>Pricing</th>
</tr>
</thead>
<tbody>
<tr>
<td>50% RPS (Renewable Procurement Targets)</td>
<td>Depresses power prices but increases variability</td>
</tr>
<tr>
<td>Solar Penetration</td>
<td>Higher solar share of renewable power increases variability</td>
</tr>
<tr>
<td>Gas Prices</td>
<td>Positive correlation with power prices, low impact on variability</td>
</tr>
<tr>
<td>Carbon Prices</td>
<td>Positive correlation with power prices, low impact on variability</td>
</tr>
<tr>
<td>Electricity Demand</td>
<td>Positive correlation with power prices, low impact on variability</td>
</tr>
<tr>
<td>Competition from Battery Storage</td>
<td>High penetration of battery storage could reduce value of both energy and ancillary services</td>
</tr>
<tr>
<td>Grid Modernization</td>
<td>Increased grid flexibility could reduce value for ancillary services from project</td>
</tr>
</tbody>
</table>
Market Scenarios and Project Configurations

- Scenarios capture uncertainty around the key market drivers

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Upper Reservoir Configurations</th>
<th>Smaller project?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>500MW 5.5 hours Storage</td>
<td></td>
</tr>
<tr>
<td>Scenario 1</td>
<td>Complete</td>
<td>In progress</td>
</tr>
<tr>
<td>40% RPS, High solar, high load (2014 LTPP)</td>
<td>Complete</td>
<td></td>
</tr>
<tr>
<td>Scenario 2</td>
<td>Complete</td>
<td>Under development with assumptions (will verify with 2016 LTPP)</td>
</tr>
<tr>
<td>50% RPS, Low solar, low load (2016 LTPP)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scenario 3</td>
<td>TBD</td>
<td>TBD</td>
</tr>
<tr>
<td>TBD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scenario 4</td>
<td>TBD</td>
<td>TBD</td>
</tr>
<tr>
<td>TBD</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
- Solar will be the second largest energy resource by 2024.
  - Causes excess generation in the middle of the day ("Belly of the Duck").
Solar will be the second largest energy resource by 2024.
- Causes excess generation in the middle of the day ("Belly of the Duck").
Forecasted Daily Pricing 2014 - (40% RPS)

Shows need to **generate** in the **morning**, **pump** in the **middle** of the day using excess solar, **generate** again in the **early evening**.
Daily Energy Demand

- Energy demand fluctuates within the hour
  - High renewable penetration
  - Behind the meter solar

- Additional value is in meeting real-time energy needs (sub-hourly)

- 15 minute prices can be earned in the CAISO Real-Time Market (valuable)

- Pumped storage quick ramp up beneficial to capture price spikes (80 seconds from off to on)
Pumped Storage Potential Value Streams

- **Energy** = Selling of stored energy

- **Ancillary Services (A/ S)** = Ability to ramp up and ramp down to align energy supply and demand

- **Capacity** = Amount of power available to meet demands during peak periods

- **Energy Storage** = Storing energy to avoid curtailing renewable energy
### Energy Market Price Forecasts (Past vs. Current)

- **RPS** has increased (33% to 50% by 2030)
- **Gas prices** have decreased ($5.67 to $5.08/MMBTU)
- **Carbon prices** have increased ($15.98 to $24.96/ton)
- **Duck Curve Issue Is Significant Driver:** Difference between peak and off peak price is higher

<table>
<thead>
<tr>
<th>Year/ Forecast</th>
<th>All-Hours</th>
<th>Off-Peak (Belly)</th>
<th>On-Peak (Shoulder)</th>
<th>Average Daily Spread</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014 33% RPS ($/MWh)</td>
<td>$55.03</td>
<td>$49.47</td>
<td>$61.13</td>
<td>$11.66</td>
</tr>
<tr>
<td>2016 40% RPS ($/MWh)</td>
<td>$40.60</td>
<td>$28.26</td>
<td>$45.49</td>
<td>$17.23</td>
</tr>
<tr>
<td>2016 50% RPS ($/MWh)</td>
<td>Under development with assumptions (will verify with 2016 LTPP)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2024 Values in 2014 dollars
Ancillary Services are purchased by the CAISO to support reliable energy grid

Four Main Types

- **Up and Down Regulation**
  - Reserves a portion of the plant capacity to pump and generate energy to balance supply and demand

- **Up and Down Movement**
  - Use of the energy generated by the reserved capacity to balance supply and demand

- **Spinning Reserve**
  - Plant is on, ability to respond to an outage

- **Non-Spinning Reserve**
  - Plant is off, but, plant can start in 30 minutes to respond to an outage
Ancillary Service Market Price Forecasts (Past vs. Current)

- Current forecast prices generally higher except non-spinning reserve

<table>
<thead>
<tr>
<th>Ancillary Service</th>
<th>40% RPS (Belly)</th>
<th>40% RPS (Shoulder)</th>
<th>33% RPS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up Regulation ($/MW)</td>
<td>$10.13</td>
<td>$17.53</td>
<td>$6.31</td>
</tr>
<tr>
<td>Down Regulation ($/MW)</td>
<td>$7.55</td>
<td>$5.68</td>
<td>$6.31</td>
</tr>
<tr>
<td>Up Movement ($/delta MW)</td>
<td>$0.06</td>
<td>$0.06</td>
<td>N/A</td>
</tr>
<tr>
<td>Down Movement ($/delta MW)</td>
<td>$0.11</td>
<td>$0.11</td>
<td>N/A</td>
</tr>
<tr>
<td>Spinning Reserve ($/MW)</td>
<td>$9.20</td>
<td>$16.62</td>
<td>$7.96</td>
</tr>
<tr>
<td>Non-Spinning Reserve ($/MW)</td>
<td>$0.41</td>
<td>$1.01</td>
<td>$3.76</td>
</tr>
</tbody>
</table>

2024 Ancillary Service Prices in 2014 dollars
### Project Value Under 40% RPS

- 2016 Total Project Net Value is Less than 2014 mainly due to lower market value of ancillary services

<table>
<thead>
<tr>
<th>Forecast Project Operating Cost and Revenue (Year 1)</th>
<th>500MW 5.5hrs storage</th>
<th>340MW/ 8hrs storage</th>
<th>500MW/ 8hrs storage</th>
<th>Prior Forecast (2014)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generated Energy Value</td>
<td>$38.6M</td>
<td>$28.4M</td>
<td>$41.1M</td>
<td>$29.3M</td>
</tr>
<tr>
<td>Pumped Energy Cost</td>
<td>($26.9M)</td>
<td>($19.5M)</td>
<td>($28.5M)</td>
<td>($14.9M)</td>
</tr>
<tr>
<td>Ancillary Services Value</td>
<td>$11.0M</td>
<td>$8.0M</td>
<td>$11.3M</td>
<td>$26.1M</td>
</tr>
<tr>
<td><strong>Total Net Value</strong></td>
<td><strong>$22.7M</strong></td>
<td><strong>$16.9M</strong></td>
<td><strong>$23.9M</strong></td>
<td><strong>$40.5M</strong></td>
</tr>
</tbody>
</table>

Note: Does not include capacity or storage value

Values in 2014 dollars

Does not include capital costs
Pumped Storage Potential Value Streams

- **Energy** = Selling of stored energy

- **Ancillary Services (A/S)** = Ability to ramp up and ramp down to align energy supply and demand

- **Capacity** = Amount of power available to meet demands during peak periods

- **Energy Storage** = Storing energy to avoid curtailing renewable energy
Capacity Payments and Energy Storage

- **Capacity Payment Assumptions**
  - Revenues under 25 year Power Purchase Agreements
  - Two off-takers
    - Non-governmental entity 80%
    - Governmental entity 20% - (tax-exempt debt financing)
  - The PPAs are “tolling” agreements:
    - Includes capacity and ancillary services payments
    - Does not include energy commodity payment

- **Potential Future Additional “Storage” Payment**
  - Recognition (share) of system benefits
  - Not yet available in the market
  - Assessment being developed
Utilities can reduce renewable energy curtailment
- Store for use later rather than shutting off during times when not needed
- Avoid paying for curtailed energy (take or pay contracts)
- Avoid need to buy more renewables to compensate for curtailment and need to meet 50% RPS
- Reduce transmission congestion from additional renewables generated in the east and being delivered west
- Reduce system operating costs with less cycling and fuel costs (coal and gas)
Network Upgrades

- A transmission study determined necessary network upgrades, including:
  - Electrical lines (Reconductoring)
  - Undergrounding
  - Transformers
  - Other

- Part of capital cost estimate/funding requirement

- Refundable over five years with interest

Source: www.elp.com
## Updating Estimate

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<td>Direct Costs</td>
<td>$754M to $1.0B</td>
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<tr>
<td>Indirect Costs</td>
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<td>$104M to $127M</td>
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<td>Network Upgrades</td>
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<td>$694M to $703M</td>
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<td>Contingency</td>
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<td>$410M to $476M (25%)</td>
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<td>Total Installed Cost</td>
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<td>$2.1B to $2.4B</td>
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<td>Refund Network Upgrades plus Interest</td>
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<td>($756M) to ($766M)</td>
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<tr>
<td>Net Cost</td>
<td>$1.0B to $1.3B</td>
<td>$1.3B to $1.6B</td>
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</tbody>
</table>

### Notes:
1. Network upgrades refunded with interest over first 5 years.
2. Not included: Escalation through years of construction.
Preliminary Business Model Methodology

- Address Key Factors
  - Power Market Risk
  - Use of Tax-Exempt Financing
  - Access to Accelerated Depreciation
  - Municipal Preference Restrictions
  - Underground Construction Risk

- Incorporate industry accepted models

- Consider project assets classes
Preliminary Business Models Under Study

1. Lease Land and Water Only
2. Build Civil Only and Sell G&T Rights
3. Build Project and Sell G&T to Utility
4. Build Project and Sell G&T to Private Party
5. Build and Sell-Leaseback Project
6. Build Project in Partnership
7. Build, Own, Operate Project

Note: G&T = Generation and Transmission
Next Steps

- **Power Market Modeling**
  - Finalize price forecasts for the 50% RPS/2016 LTPP and other Market Scenarios
  - Develop capacity payment forecasted value
  - Develop estimated range of energy storage value (avoid curtailment)

- **Financial Analysis and Risk Assessment**
  - Collaborate with Owners’ and Industry specialists, finalize financial assumptions
  - Integrate power market modeling results into Financial Model
  - Integrate Stress Tests from Risk/Opportunity Assessment

- **Marketability Analysis**
  - Continue meetings with potential partners

- **Results:** August/September report out
Overview

- History Part 1: Today
  - Before the Water Authority
  - 1940s–1950s:
    - War Baby
    - Water Authority becomes largest MWD member agency
    - Early concerns over MWD supply reliability
      - 1952: MWD’s “Laguna Declaration”
  - 1960s:
    - MWD signs first State Water Project Contract
  - 1987–1992 drought and supply cutbacks
  - 1995:
    - Water Authority Board of Directors Strategic Plan
    - Seeds of Imperial Irrigation District–Water Authority transfer are sown
1913: Los Angeles completed the LA Aqueduct system
- Imported water fueled LA’s development, including San Fernando Valley
  - Harrison Otis, owner/publisher of the Los Angeles (Daily) Times, key driving force

1924: Los Angeles filed claim for Colorado River water right for 1,500 CFS (1.1 million acre-feet)
Before the Water Authority

- 1926 City of San Diego stakes claim to water right on the Colorado River (112,000 acre-feet)
  - City Attorney placed claim in tin can in rock pile beside river
  - Studied building aqueduct from Imperial Valley to San Diego
  - Paid for capacity in All American Canal

San Diego City Attorney
Shelly J. Higgins
Before the Water Authority

1928:
- California Legislature passes the Metropolitan Water District Act
- MWD organizes with Los Angeles and 12 other cities
- LA assigned its Colorado River water right – 1.1 MAF – to MWD
Before the Water Authority

- LA was driving force to create the Metropolitan Water District of Southern California to tap the Colorado River
  - LA developers remained driving force
  - Property taxes sole source of revenues in early years
    - LA’s property tax base key to MWD’s finances
- LA pushed 1931 amendment to the MWD Act changing the preferential rights formula
  - Original provision included only property tax revenues
  - LA wanted credit for other money it provided at MWD’s inception
  - Amendment: count all revenues “excepting purchase of water”
LA believes it funded MWD’s system and San Diego did not
- “LA built the automobile plant, and San Diego just buys the cars.” – Bill Luddy, LADWP delegate
- Documents obtained from LA show it believes it has over-invested in MWD and calculated it is owed $1.9 billion
Between 1928 and 1941, MWD’s source of revenues was property taxes
- Los Angeles had largest assessed value of any MWD agency
- Completion of Colorado River Aqueduct in 1941 opened water sales as source of revenue
  - Water sales were very low; aqueduct idled months of each year
- LA launched and sustained multi-decade strategy to shift MWD’s source of revenue from property taxes to water sales
History of the Water Authority

- San Diego in World War II:
  - Long-time home of Pacific Fleet
  - 1st Marine Division at Camp Pendleton
  - Major center for warplane manufacturing

- Between 1940 and 1944, San Diego’s population doubled from 300,000 to 600,000
  - Water use also doubled

- Growth in population, wartime demands and drought threaten to outstrip water supply
History of Water Authority and MWD

- Water Authority formation
  - 1943: Legislature approves County Water Authority Act
    • Modeled after MWD Act of 1927
  - June 9, 1944: San Diego County Water Authority organizes after an election (May 16, 1944) within the nine original member public agencies
    • Options being studied for aqueduct include connecting to:
      • All American Canal to the east
      • Metropolitan Water District of Southern California’s Colorado River Aqueduct to the north
All American Canal Considered
The First 82 Miles Toward San Diego

The All-American Canal

Salton Sea
CALIFORNIA
ARIZONA
COLORADO RIVER

Westside Main Canal
New River
East Highline Canal
Central Canal
Imperial
El Centro
Alamo River
Calexico

Imperial Dam
All-American Canal
Laguna Dam
Siphon Drop
Araz Jet
Pilot Knob

11
Nov. 29, 1944: President Franklin D. Roosevelt issues directive:

- U.S. Navy to build pipeline connecting MWD’s Colorado River Aqueduct to City of San Diego’s just-completed San Vicente Reservoir in Lakeside
- Encourages Water Authority and MWD to begin annexation negotiations
  - And to repay federal govt.
History of Water Authority

Colorado Water Approved With 18 to 1 Vote

- Nov. 5, 1946, election:
  - City of San Diego voters approve assignment of Colorado River water right to Water Authority
  - Voters in Water Authority service approve annexation into Metropolitan MWD
    - MWD set Dec. 31, 1946 deadline
Dec. 17, 1946: Water Authority annexed into MWD

- MWD’s conditions of annexation:
  - Water Authority to pay $13.045 million as a special tax, including 4% interest from date of MWD’s incorporation
  - Assign City of San Diego’s 112,000 AF water right to MWD
- Also agreed on formula to repay federal government for Pipeline 1 over 50-year term
  - Agreed to split cost of San Diego Aqueduct 50-50.
    - San Diego “delivery point” established where the cost of construction was 50% of total (approximately 6 miles south of Riverside County line)
Nov. 26, 1947: first Colorado River water flows into San Diego County at the San Vicente Reservoir
- Reservoir completed by City of San Diego in 1943
- San Diego had less than three weeks of water supply left
Water Authority’s urban and agricultural water demands highly desired by MWD – and Los Angeles

- MWD’s Colorado River Aqueduct had become operational in 1941, but MWD had low water sales

- By 1949, the Water Authority is buying half of all MWD water supplies
  - Critical development in LA’s multi-decade strategy to shift MWD’s revenues from property taxes to water sales
Almost from its annexation into MWD, Water Authority raised concerns over the reliability of MWD’s water supplies

- Water Authority’s dependence upon MWD was far greater than its Preferential Right to MWD water under Section 135 of the MWD Act

1952: partly in response to the Water Authority’s concerns, MWD Board adopts the “Laguna Declaration” in which Met promised “...to provide its service area with adequate supplies of water to meet expanding and increasing needs in the years ahead.”
In November 1960, MWD’s Board of Directors voted to approve execution of a water supply contract with the California Department of Water Resources

- Water Authority supported action
- City of LA initially opposed
  - To get LA’s support, MWD agreed, “to the extent practicable,” to fund its operations and capital expenses from water revenues

Days later, California voters approved the State Water Project and the Burns–Porter Bonds to pay for project facilities
1940s–1980s: Water Authority a “Pipeline Agency;” Builds More Pipelines
1987–92 Drought: San Diego’s Wakeup Call
By the 1990s, Water Authority remained MWD’s largest member agency, buying ~30% of MWD’s water and providing largest share of all of MWD’s revenues.

Water Authority purchasing twice the amount of water than its Preferential Right to MWD’s water

- San Diego’s economy and quality of life for its residents were at significant risk during times of water shortage
  - More than half of the water purchased annually by the Water Authority “belonged” to other MWD member agencies in their preferential right
  - The Water Authority had nearly all of its “eggs” in one “basket”: MWD
1991–92: San Diego’s Drought Crisis

San Diego Civic Leaders
“Never Again!”
“No More Water Shortages!”

State to Shut Off Water Delivery to Southland

By VIRGINIA ELLIS and TED ROHRICH
TIMES STAFF WRITERS

SACRAMENTO – Gov. Pete Wilson on Monday announced new and unprecedented curbs of state water deliveries drastic that Southern Califo will be cut off from traditional source of water mid-March.

Wilson said that height/ drought conditions had force state to notify cities and ind

Limits on tap water use urged by staff

S.D. Faces 31% Cut in Imported Water Supply

By JENIFER WARREN
TIMES STAFF WRITER

Faced with record-low rainfall and no prospects for relief, the Metropolitan Water District declared a water emergency on

50% Water-Delivery Cut Will Be Blow to San Diego

Drought: Metropolitan Water District directors also vote a 90% cut in allocation for agricultural use.

Water Dependence Bodes a Dry San Diego Future

San Diego Civic Leaders
“Never Again!”
“No More Water Shortages!”

State Water Project cuts off water to farms; urban slash expected

L.A. Ready to Battle San Diego Over Water

Conservation: DWP officials weigh legal action as southern neighbor refuses to impose rationing.

Companies cringe at 50 percent cut in water

Firms offer conservation plans to mayor; some say cutbacks could cripple growth

Grim water outlook is getting even worse

San Diego County Water Authority
Shortage Allocations 1990-1992: 31% Shortage for 13 months

Stages of MWD’s Interim Interruptible Conservation Program (Shortage Allocation Plan)

31% Overall Shortage

- Stage 1: Nov. 20, 1990
- Stage 2: Dec. 11, 1990
- Stage 3: Jan. 5, 1991
- Stage 5: Feb. 12, 1991
- Added Stage 6: March 4, 1991
- Stage 5: April 9, 1991
- Stage 1: April 1, 1992

Overall Shortage: 31%
MWD Supply Cutbacks to Water Authority
1991–92 Reductions to 1990 Supply Level

Local Supplies
27,171 AF
4%

MWD
613,287 AF
96%

Stage 5
31%

Stage 6
50%

Total = 640,458 AF
MWD Drought Deliveries: Water Authority Down, LADWP Up

Los Angeles
San Diego
# Retail Impact of Stage VI MWD Shortages (1990–1992 Drought)

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<thead>
<tr>
<th>Agency</th>
<th>Retail Shortage</th>
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<tbody>
<tr>
<td>San Diego County Water Authority</td>
<td>50%</td>
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<tr>
<td>Burbank</td>
<td>20%</td>
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<tr>
<td>Anaheim</td>
<td>20%</td>
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<tr>
<td>Los Angeles Department of Water &amp; Power</td>
<td>15%</td>
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<tr>
<td>Compton</td>
<td>10%</td>
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*Source: MWD Report on Drought Response by Southern California Water Agencies dated April 9, 1991*
Governor Pete Wilson created the Drought Water Bank to acquire water from willing sellers for buyers:

- MWD purchased 390,000 acre-feet at $175/AF
- Water Authority asked MWD to purchase more – MWD refused
- Water Authority independently purchased 20,600 AF from Drought Water Bank at $175/AF
  - MWD charged full MWD full-service untreated water rate of $197/AF to wheel drought bank water to San Diego
Birth and Growth of Conservation, Recycling, and Groundwater Recovery

- MWD, Water Authority and member agencies launched water conservation programs
  - Retrofitted 600,000+ toilets, 600,00+ showerheads
  - School education programs
  - Mass market advertising programs (e.g. Don’t Be a Waterhog)

- Water Authority launched water recycling studies (created water recycling committee)
  - Following early efforts by member agencies (e.g. Padre Dam)

- Member agencies pursue groundwater recovery programs
Conclusions:

◦ “MWD’s ability to continue providing a reliable water supply at a reasonable price to the Authority is at risk.”
◦ “In the event MWD is unable or unwilling to meet its mission and its level of service objectives, the Authority must be prepared to step forward to fulfill its mission independently, either by securing another imported water source, intensive development of local resources or both.”
February 1995: IID Comes Calling

- Imperial Irrigation District GM Mike Clinton approaches MWD with offer of a second water transfer
  - MWD GM John “Woody” Wodraska declines: “MWD has all the water it needs.”
- Clinton calls DWR Director Dave Kennedy, asks whom to contact at the Water Authority
  - Kennedy refers Clinton to Mike Madigan (former chair)
  - Madigan refers him to Water Authority Chair Mark Watton.
Coming May 26, 2016: Part 2
Metropolitan Water District’s Adopted Rates and Charges

Imported Water Committee
April 28, 2016

Liz Mendelson, Water Resources Specialist
Outline

- MWD’s 2017 and 2018 Rate Setting Process
- Recommended Budget & Rate Action
- Fixed Treatment Charge
- Adopted Rates
- Next Steps
# MWD’s 2017 & 2018 Rate Setting Process

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## MWD’s 2017 & 2018 Rate Setting Process

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<td>X (F&amp;I comm.)</td>
<td>X (Board)</td>
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### March 15: MWD releases Cost of Service after its public hearing
Recommended Budget Actions

- Adopt biennial budget for FYs 2017 & 2018
  - FY 2017 revenue requirements: $1,714 M
  - FY 2018 revenue requirements: $1,721 M
  - Adding ~ $60M from unspent conservation funds to augment 2017 and 2018 conservation programs
  - Separate account for amount disputed in Water Authority’s rate litigation
    - Previously, MWD authorized $400M in short-term debt to back-fill hole in reserves
Recommended Rates Actions

To increase fixed revenues

- Recommended suspension of ad valorem tax rate limit to generate fixed revenues
  - Board must find it “essential” to maintain MWD’s “fiscal integrity”
  - ~ $111 M of additional tax revenues
- Recommended a new fixed treated water charge to increase fixed revenues
  - Final recommended charge presented for the first time on March 30

- Yet, recommended lowering other fixed charges: RTS and Capacity charges
Fixed Treated Water Charge

- 91% of 2017 treatment costs ($257 M) are fixed.
Fixed Treated Water Charge

- 91% of 2017 treatment costs ($257 M) are fixed
- Intended to recover $98 M, or 38%, of MWD’s 2017 treatment costs

- $135M (53%)
- $57M (22%)
- $41M (16%)
- $24M (9%)

Variable | Standby | Demand | Commodity
91% of 2017 treatment costs ($257 M) are fixed

Intended to recover $98 M, or 38%, of MWD’s 2017 treatment costs

Recommended Option (2 components)
1. “Standby” costs recovered based on 10-year rolling average treated water purchases
2. “Demand” costs recovered via peak day treated water purchase over most recent 3-year period

Remaining 62% of treatment costs recovered through volumetric Treatment Surcharge
Fixed Treated Water Charge

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- Remaining 62% of treatment costs recovered through volumetric Treatment Surcharge

MWD did not adopt a fixed treated water charge
## MWD’s Adopted 2017 & 2018 Rates

<table>
<thead>
<tr>
<th>Rate Category</th>
<th>Existing 2016</th>
<th>Proposed 2017</th>
<th>2017 % Change</th>
<th>Proposed 2018</th>
<th>2018 % Change</th>
<th>% Change 2016 to 2018</th>
</tr>
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<tbody>
<tr>
<td>Tier 1 Supply Rate ($/AF)</td>
<td>156</td>
<td>201</td>
<td>28.8%</td>
<td>209</td>
<td>4.0%</td>
<td>34%</td>
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<tr>
<td>Tier 2 Supply Rate ($/AF)</td>
<td>290</td>
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<td>295</td>
<td>0%</td>
<td>1.7%</td>
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<tr>
<td>System Access Rate ($/AF)</td>
<td>259</td>
<td>289</td>
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<td>15.4%</td>
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<tr>
<td>Water Stewardship Rate ($/AF)</td>
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<td>55</td>
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<td>34.1%</td>
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<td>313</td>
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<td>Untreated Tier 1</td>
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<td>6.6%</td>
<td>100.5</td>
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<td>41</td>
<td>52</td>
<td><strong>26.8%</strong></td>
<td>55</td>
<td>5.8%</td>
<td><strong>34.1%</strong></td>
</tr>
<tr>
<td>System Power Rate ($/AF)</td>
<td>138</td>
<td>124</td>
<td><strong>-10.1%</strong></td>
<td>132</td>
<td>6.5%</td>
<td><strong>-4.4%</strong></td>
</tr>
<tr>
<td>Status Quo 100% Volumetric Treatment Surcharge ($/AF)</td>
<td>348</td>
<td>313</td>
<td><strong>-10.1%</strong></td>
<td>320</td>
<td>2.2%</td>
<td><strong>-8.0%</strong></td>
</tr>
<tr>
<td>Readiness-to-Serve Charge ($M)</td>
<td>153</td>
<td>135</td>
<td><strong>-11.8%</strong></td>
<td>140</td>
<td>3.7%</td>
<td><strong>-8.5%</strong></td>
</tr>
<tr>
<td>Capacity Charge ($/CFS)</td>
<td>10,900</td>
<td>8,000</td>
<td><strong>-26.6%</strong></td>
<td>8,700</td>
<td>8.8%</td>
<td><strong>-20%</strong></td>
</tr>
<tr>
<td>Untreated Tier 1</td>
<td>594</td>
<td>666</td>
<td><strong>12.1%</strong></td>
<td>695</td>
<td>4.4%</td>
<td><strong>17%</strong></td>
</tr>
<tr>
<td>Treated Tier 1</td>
<td>942</td>
<td>979</td>
<td><strong>3.9%</strong></td>
<td>1,015</td>
<td>3.7%</td>
<td><strong>7.7%</strong></td>
</tr>
<tr>
<td>Ad Valorem Tax Revenue ($M)</td>
<td>92.2</td>
<td>98.3</td>
<td><strong>6.6%</strong></td>
<td>100.5</td>
<td>2.2%</td>
<td><strong>9.0%</strong></td>
</tr>
</tbody>
</table>
Next Steps

- Participate in workgroup
- Engage in IRP Implementation Policy Discussions
- Advocate for Long Term Financial Planning
Consideration of Position on AB 2470 (Gonzalez)

Legislation, Conservation, & Outreach Committee
April 28, 2016
Background on AB 2470

- Sponsored by the Sycuan Band of the Kumeyaay Nation
- Introduced by Assemblymember Lorena Gonzalez
- Would require the provision of water service to Sycuan tribal lands under prescribed conditions
- 9 of 11 members of the San Diego legislative delegation are author/co-authors of the bill
Problems with Existing Law

- Original Sycuan Tribe reservation lands are served only by groundwater
  - Public safety concerns in event of earthquake or other emergency situation

- Extension of water service outside of service area typically requires full annexation process

- Given its status as a sovereign nation, the Sycuan Tribe is seeking a “virtual annexation”
  - Water service contingent upon compliance with all financial, legal, and operational conditions applicable to any similarly situated party

- AB 2470 is written to only apply to provision of water service to Sycuan tribal lands
San Diego Water Agency Response

- Potentially affected agencies
  - San Diego County Water Authority
  - Otay Water District
  - Padre Dam Municipal Water District

- Agencies have worked cooperatively to identify necessary protections that would apply “as if” tribal lands were annexed into service area
  - Ensure full compliance with federal tribal laws
  - Provide comprehensive legal, fiscal, and operational protection for affected water agencies
  - Ensure consistency with service to other end users
April 26 Amendments

- AB 2470 was substantively amended on April 26
- Amendments reflect obligations of the Indian tribe to receive water service:
  - By agreement, accept all terms of, and payments to, the affected retail and wholesale water agencies
  - Acceptance of water service terms and payments are a condition of continued service to the Indian tribe
- Amendments resolve outstanding issues identified by the affected retail and wholesale water agencies
Staff Recommendation

- Approve staff recommended position of Support as amended on April 26

- Direct staff to bring AB 2470 back for further consideration if the measure is materially amended in a manner that modifies the agreed-upon provisions or water agency protections
Contract Amendment with WaterWise Consulting, Inc.

Legislation, Conservation and Outreach Committee
April 28, 2016

Carlos Michelon, Principal Water Resources Specialist
Public Outreach and Conservation
Staff Recommendation
Draft 2015 Urban Water Management Plan and Remaining Schedule

Water Planning Committee Meeting
April 28, 2016

Presentation by:
Bob Yamada, Director of Water Resources
Water Authority 2015 UWMP Update

- Includes normal and dry year regional demand projections
- Identifies projected water resources mix for the San Diego region
- Assesses supply reliability through scenario analysis
- Foundational document for other Water Authority long-range planning efforts
  - Facilities Master Plan, Long-Range Financing Plan and Integrated Regional Water Management Plan
<table>
<thead>
<tr>
<th>Activity</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distributed demand and conservation savings projections to member agencies on March 18, 2016</td>
<td>✔️</td>
</tr>
<tr>
<td>Provided technical review draft of UWMP to member agencies on April 8, 2016</td>
<td>✔️</td>
</tr>
<tr>
<td>Present staff report on public review draft of UWMP April 28, 2016</td>
<td>✔️</td>
</tr>
<tr>
<td>Release public review draft to Board/public by end of April 2016</td>
<td></td>
</tr>
</tbody>
</table>
Urban Water Management Plan
Six Main Elements

- **Demand Forecast**: Econometric Model utilizing SANDAG Regional Growth Forecast
- **Water-Use Efficiency**: Include passive and active savings, Ensure retail compliance with SBX7-7
- **Water Supplies**: Water Authority and member agency supplies
- **Water Resource Mix**: Resource mix to meet demands in normal and dry water years
- **Scenario Planning**: Process to manage supply uncertainties associated with resource mix
- **Shortage Planning**: Contingency analysis to address shortages due to drought, catastrophe or other event
What has changed during development of the draft UWMP?

- Conservation savings updated to reflect refinements in modeling assumptions

- City of San Diego categorized PURE Water project (all phases) as Additional Planned supply category

- Unused CDP capacity (approx. 6 mgd) included as “Adaptive Management Supply”
  - Approximately 5,600 AF
  - Categorized as “Additional Planned”
What has changed during development of the draft UWMP?

• More conservative approach, based on current 5–year drought, to estimate MWD dry year supplies (Preferential Rights allocation)
  • Single dry year MWD supplies set at 1.4 MAF
  • Multiple dry year MWD supplies:
    • 2017 – 2019 fixed at 1.2 MAF per year
    • Post–2020, MWD supplies set at:
      • Year 1 – 1.4 MAF
      • Year 2 – 1.3 MAF
      • Year 3 – 1.2 MAF
What has changed during development of the draft UWMP?

• Additional member agency comments on local supply projections incorporated

• Member agency comments on demand forecast will be addressed prior to May public hearing
# Draft Water Reliability Assessment (Normal Year)

<table>
<thead>
<tr>
<th></th>
<th>2020</th>
<th>2025</th>
<th>2030</th>
<th>2035</th>
<th>2040</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Long-Range Demand Forecast</strong></td>
<td>583,183</td>
<td>631,853</td>
<td>653,600</td>
<td>672,324</td>
<td>697,635</td>
</tr>
<tr>
<td><strong>Member Agency Verifiable Supplies</strong></td>
<td>132,086</td>
<td>136,798</td>
<td>139,822</td>
<td>140,082</td>
<td>140,722</td>
</tr>
<tr>
<td><strong>Water Authority Verifiable Supplies</strong></td>
<td>320,200</td>
<td>330,200</td>
<td>330,200</td>
<td>330,200</td>
<td>330,200</td>
</tr>
<tr>
<td><strong>MWD Water Purchases</strong></td>
<td>130,897</td>
<td>164,855</td>
<td>183,578</td>
<td>202,042</td>
<td>226,713</td>
</tr>
</tbody>
</table>
Multiple Dry Year Assessment Assumptions

• Very conservative MWD supply estimates

• Member agency supplies only include verifiable component

• Carryover storage withdrawn over a three-year period and up to 40,000 AF/year (consistent with prior planning estimates)

• Potential “shortages” do not account for future shortage management actions
## Multiple Dry Year Assessment

**Verifiable Supplies Only**

<table>
<thead>
<tr>
<th>Years</th>
<th>Multiple Dry Year Assessment (AF)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Year 1</td>
</tr>
<tr>
<td>2017-2019</td>
<td></td>
</tr>
<tr>
<td>2021-2023</td>
<td></td>
</tr>
<tr>
<td>2026-2028</td>
<td></td>
</tr>
<tr>
<td>2031-2033</td>
<td></td>
</tr>
<tr>
<td>2036-2038</td>
<td></td>
</tr>
</tbody>
</table>

- **Sufficient Supplies**
- **Use of Carryover Storage**
- **“Shortage” after Carryover Usage**
Scenario Planning

• Used for uncertainty analysis in water resource planning

• Wide range of future scenarios evaluated to test reliability and make planning decisions more robust

General Assumptions:
Scenarios are based on the year 2035
Verifiable supplies only
QSA supplies delivered per agreement
Lewis Carlsbad Desalination supplies delivered per WPA
MWD will allocate based on current PR method (18.62%)
# Scenario Planning Results

## 2035 Supply Gap Analysis

<table>
<thead>
<tr>
<th>MWD Available Supplies</th>
<th>Normal Weather</th>
<th>Scenario 1</th>
<th>Scenario 2</th>
<th>Scenario 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1.5 MAF</td>
<td>1.3 MAF</td>
<td>1.1 MAF</td>
<td>1.1 MAF</td>
</tr>
</tbody>
</table>

### Demands

- **Normal Year 2035**: 672 TAF
- **Drought**: 721 TAF
- **Drought with Further MWD Limitations**: 721 TAF
- **Drought with MWD & Local Agency Limitations**: 721 TAF

### Supplies

- **MWD Supply Used**:
  - Normal Year 2035: 202 TAF
  - Drought: 242 TAF
  - Drought with Further MWD Limitations: 205 TAF
  - Drought with MWD & Local Agency Limitations: 205 TAF

- **Carryover Used**:
  - Normal Year 2035: 0 TAF
  - Drought: 40 TAF
  - Drought with Further MWD Limitations: 40 TAF
  - Drought with MWD & Local Agency Limitations: 40 TAF

- **Gap**:
  - Normal Year 2035: 0 TAF
  - Drought: 19 TAF
  - Drought with Further MWD Limitations: 56 TAF
  - Drought with MWD & Local Agency Limitations: 95 TAF

---

[Source: San Diego County Water Authority]
Shortage Planning–Contingency Analysis

• Catastrophic Water Shortage
  • Integrated Contingency Plan
  • Emergency Storage Project

• Water Shortage and Drought Response Planning
  • Model Drought Response Conservation Ordinance
  • Supply allocation methodology
  • Drought emergency regulations and response
  • Dry–Year supplies and carryover storage
  • Minimum three year supply availability
# UWMP Remaining Schedule

<table>
<thead>
<tr>
<th>Date</th>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>April 7, 2016</td>
<td>Distributed 2015 UWMP technical review draft to member agencies for review and comment</td>
</tr>
<tr>
<td>April 21, 2016</td>
<td>Deadline for comments on 2015 UWMP technical review draft</td>
</tr>
<tr>
<td>Apr 28, 2016</td>
<td>Board presentation on 2015 UWMP public review draft</td>
</tr>
<tr>
<td>End of April 2016</td>
<td>Release 2015 UWMP public review draft to Board first, then general public</td>
</tr>
<tr>
<td>May 26, 2016</td>
<td>Public hearing on draft 2015 UWMP <em>(SDCWA Board meeting)</em></td>
</tr>
<tr>
<td>June 6, 2016</td>
<td>Deadline for comments on 2015 UWMP public review draft</td>
</tr>
<tr>
<td>June 15, 2016</td>
<td>Provide draft of final 2015 UWMP to Board</td>
</tr>
<tr>
<td>June 23, 2016</td>
<td>Board adoption of 2015 UWMP <em>(SDCWA Board meeting)</em></td>
</tr>
<tr>
<td>By July 1, 2016</td>
<td>Submit adopted 2015 UWMP to DWR</td>
</tr>
</tbody>
</table>
Update on Water Supply Conditions and Drought Response Activities

Water Planning Committee
April 28, 2016

Presentation by:
Jeff Stephenson, Principal Water Resources Specialist
Northern Sierra Precipitation
8-Station Index

Accumulated Precipitation (in)

1-Oct 1-Nov 1-Dec 1-Jan 1-Feb 1-Mar 1-Apr 1-May 1-Jun 1-Jul 1-Aug 1-Sep

Normal  WY 2015  WY 2016

121% of Normal (April 27, 2016)

Source: Department of Water Resources
Northern Sierra Snowpack
Water Year 2016

Water Content (in)

1-Oct 1-Nov 1-Dec 1-Jan 1-Feb 1-Mar 1-Apr 1-May 1-Jun 1-Jul 1-Aug 1-Sep

67% of Normal (April 26, 2016)

Source Data: Department of Water Resources
Lake Oroville Storage Volume
Major Reservoir State Water Project System

On April 21, SWP allocation raised to 60%

Historical Average

WY 2015

WY 2016

96% of Capacity
119% of Average
(April 26, 2016)

Source: Department of Water Resources
Water Year 2016 forecasted inflow into Lake Powell = 78% of normal
May – July Precipitation Outlook

Three-Month Precipitation Outlook
May-Jun-Jul 2016

The map shows the precipitation outlook for May, June, and July 2016 across the United States. The outlook indicates areas expected to be wetter (greater than 40%) and drier (less than 33%). The map is issued by the Climate Prediction Center on April 21, 2016.
SWRCB Emergency Regulation Update

Background

- November 2015 Executive Order
  - Extended May 2015 emergency regulation through October 2016
  - Consider modifications to emergency regulation

- February 2016 - SWRCB modified emergency regulation (drought resilient supply credit)

- April 20, 2016 - SWRCB workshop to receive input on potential modifications to emergency regulation
April 20, 2016 Emergency Regulation Workshop

• SWRCB solicited input on potential adjustments

• Water Authority comment letter
  • Take into account actual shortage conditions, if any
  • Implement self-certification supply-based approach in lieu of a conservation mandate
  • Continue water use prohibitions, reporting through Oct. 2016, maintain mechanism to implement water use reduction stages
  • Focus SWRCB support on areas with severe shortages and water quality issues
April 20, 2016 Emergency Regulation Workshop

- Water agencies were well represented
- Board members appeared to support the supply certification concept
  - Concern about water use immediately bouncing back without some regulation in place
  - Concern about water agency political will to re-impose drought restrictions, if needed
  - Need for “backstop” conservation standard if agencies do not self-certify or conditions change
- Board action scheduled for May 18
- Modifications, if any, effective June 2016 – October 2016
Total Potable M&I Water Use
State Emergency Regulation Reporting Months

Cumulative June 2015–March 2016 is **21%** lower than 2013

Source: Member Agency monthly water use reporting to the Water Authority
Upcoming Events

• **May 10** - Likely MWD Board action regarding allocation in FY 17

• **May 18** - State Water Board scheduled to act on changes to Emergency Regulation

• **May 26** - Planned Water Authority Board action on shortage management actions for FY 17