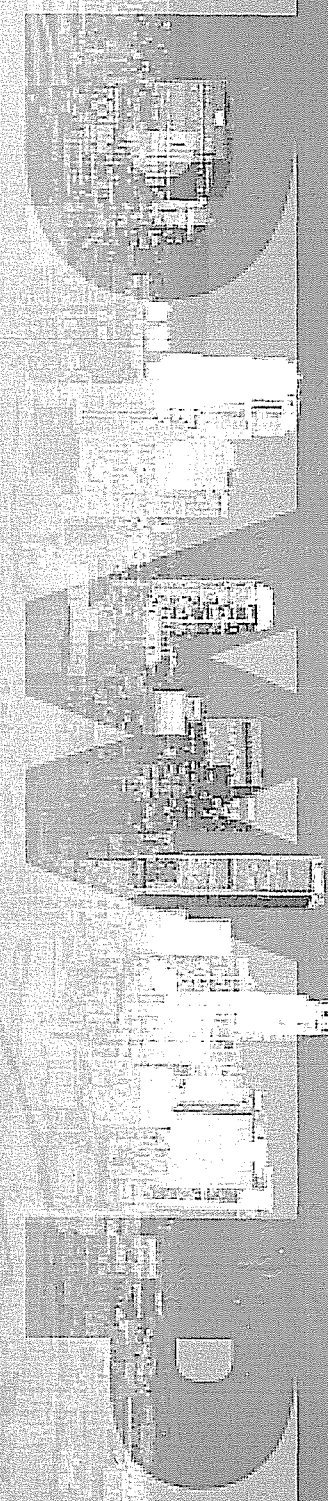


## DOCKETED

|                         |                                                                                                                               |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| <b>Docket Number:</b>   | 16-RPS-02                                                                                                                     |
| <b>Project Title:</b>   | Appeal by Los Angeles Department of Water & Power re Renewables Portfolio Standard Certification Eligibility                  |
| <b>TN #:</b>            | 213407                                                                                                                        |
| <b>Document Title:</b>  | 340 City Council File 03-2688 - LADWP Presentation to Council re Hydro Considerations 07.13.04 (Bates Nos. LA001625-LA001638) |
| <b>Description:</b>     | N/A                                                                                                                           |
| <b>Filer:</b>           | Pjoy Chua                                                                                                                     |
| <b>Organization:</b>    | LADWP                                                                                                                         |
| <b>Submitter Role:</b>  | Applicant                                                                                                                     |
| <b>Submission Date:</b> | 8/31/2016 4:54:38 PM                                                                                                          |
| <b>Docketed Date:</b>   | 8/31/2016                                                                                                                     |

Submitted in Connection 11/13/04 - Item #5 (CF03-2688)



# RENEWABLE PORTFOLIO STANDARD DEVELOPMENT

## Hydro Definition Considerations

July 13, 2004

# Overview

- LADWP Hydroelectric Power Plant Assets
- LADWP Hydro Plant Characteristics
- Hydro Eligibility Definition Analysis
- LADWP Hydro Renewable Eligibility Definition Options
- LADWP Recommendations



# LADWP Hydro Generation Assets

| NAME OF PLANT                                                                 | UNIT NO. | DATE FIRST CARRIED SYSTEM LOAD | GENERATION NAMEPLATE |        | NET UNIT CAPABILITY (kW) | MAXIMUM PLANT CAPABILITY (kW) | NET DEPENDABLE PLANT CAPABILITY (kW) | NET ANNUAL PLANT PRODUCTION (FY 02-03 MWh) |
|-------------------------------------------------------------------------------|----------|--------------------------------|----------------------|--------|--------------------------|-------------------------------|--------------------------------------|--------------------------------------------|
|                                                                               |          |                                | (kVA)                | (kW)   |                          |                               |                                      |                                            |
| San Francisquito Power Plant 1                                                | 1A       | 12/10/83                       | 25,000               | 25,000 | 26,000                   | 85,700                        | [A]<br>48,000                        | 47,559                                     |
|                                                                               | 3        | 4/16/17                        | 11,719               | 9,375  | 11,000                   |                               |                                      | 1,391                                      |
|                                                                               | 4        | 5/21/23                        | 12,500               | 10,000 | 12,500                   |                               |                                      | 171                                        |
|                                                                               | 5A       | 4/9/87                         | 25,000               | 25,000 | 26,000                   |                               |                                      | 70,302                                     |
| San Francisquito Power Plant 2                                                | 1        | 7/6/20                         | 17,500               | 14,000 | 14,500                   |                               |                                      | 0                                          |
|                                                                               | 2        | 8/7/20                         | 17,500               | 14,000 | 14,500                   |                               |                                      | 801                                        |
|                                                                               | 3        | 9/26/32                        | 17,500               | 14,000 | 18,000                   |                               |                                      | 64,102                                     |
| San Fernando Power Plant                                                      | 1        | 10/22/22                       | 3,500                | 2,800  | 3,200                    |                               |                                      | 11,521                                     |
|                                                                               | 2        | 10/22/22                       | 3,500                | 2,800  | 3,200                    |                               |                                      | 16,612                                     |
| Foothill Power Plant                                                          | 1        | 10/6/71                        | 11,000               | 10,000 | 10,000                   |                               |                                      | 16,219                                     |
| Franklin Power Plant                                                          | 1        | 6/3/21                         | 2,500                | 2,000  | 2,000                    |                               |                                      | 1,564                                      |
| Sawtelle Power Plant                                                          | 1        | 6/5/86                         | 711                  | 640    | 600                      |                               |                                      | 0                                          |
| Haiwee Power Plant                                                            | 1        | 7/18/27                        | 3,500                | 2,800  | 3,200                    | 12,600                        | [B]<br>6,000                         | 5,793                                      |
|                                                                               | 2        | 7/18/27                        | 3,500                | 2,800  | 3,200                    |                               |                                      | 2,916                                      |
| Cottonwood Power Plant                                                        | 1        | 11/13/08                       | 937                  | 750    | 1,400                    |                               |                                      | 0                                          |
|                                                                               | 2        | 10/13/09                       | 937                  | 750    | 1,400                    |                               |                                      | 21                                         |
| Division Creek P. P.                                                          | 1        | 3/22/09                        | 750                  | 600    | 650                      |                               |                                      | 2,353                                      |
| Big Pine Power Plant                                                          | 1        | 7/29/25                        | 4,000                | 3,200  | 3,05                     |                               |                                      | 7,227                                      |
| Pleasant Valley P. P.                                                         | 1        | 2/5/58                         | 4,000                | 3,200  | 2,700                    |                               |                                      | 3,008                                      |
| Upper Gorge P. P.                                                             | 1        | 6/15/53                        | 37,500               | 37,500 | 36,000                   | 112,000                       | [C]<br>112,000                       | 53,949                                     |
| Middle Gorge P. P.                                                            | 1        | 5/11/52                        | 37,500               | 37,500 | 38,000                   |                               |                                      | 58,344                                     |
| Control Gorge P. P.                                                           | 1        | 4/1/52                         | 37,500               | 37,500 | 38,000                   |                               |                                      | 57,335                                     |
| Hoover Power Plant (Capacity and energy purchase from WAPA through Sep. 2017) |          |                                |                      |        |                          | 491,000                       | 491,000                              | 641,790                                    |
| <b>TOTAL HYDRO (Based on average hydro conditions)</b>                        |          |                                |                      |        |                          | <b>701,300</b>                | <b>657,000</b>                       | <b>1,062,978</b>                           |



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# LADWP Hydro Generation Assets Summary

| Plant Name                                         | Number of Units | Max Unit Size MW | Max Plant Size MW | Total MW | Energy 02-03 MWh | % of RPS |
|----------------------------------------------------|-----------------|------------------|-------------------|----------|------------------|----------|
| 30 MW or Less Aqueduct Plants (multiple locations) | 15              | 18               | 18                | 79       | 132,137          | 0.6%     |
| Power Plant 1 (one location)                       | 4               | 26               | 52                | 76       | 119,423          | 0.5%     |
| Gorge Plants (three Different Locations)           | 3               | 38               | 38                | 112      | 169,628          | 0.7%     |
| Hoover <sup>1</sup> (one location)                 | 17              | 32.5             | 491               | 491      | 641,790          | 2.8%     |
| Total                                              |                 |                  |                   | 758      | 1,062,978        | 4.6%     |

Notes:

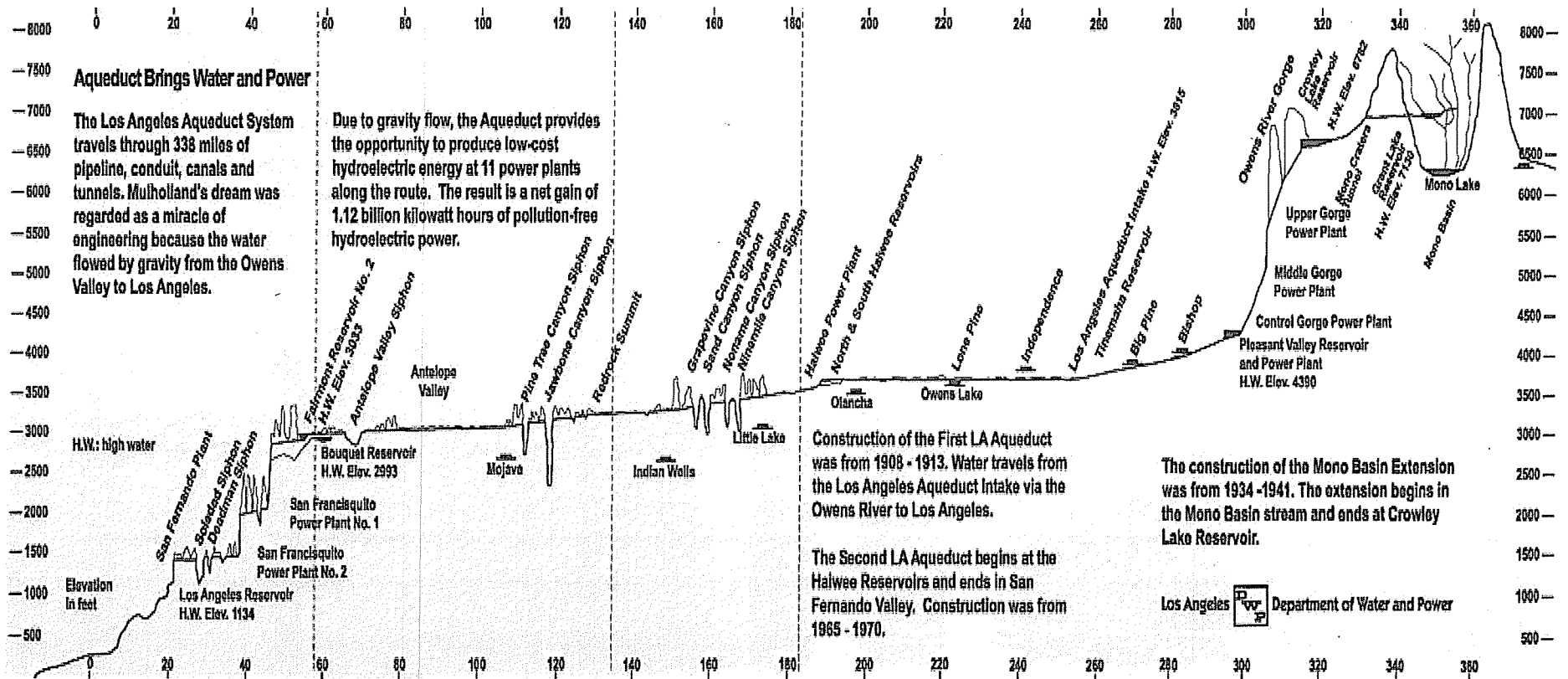
- (1) LADWP's have long-term (until 9/30/17) of 25% capacity and 15% energy.  
Unit size 130, and plant size is 2064 MW



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LA001628

# Aqueduct System Profile Diagram



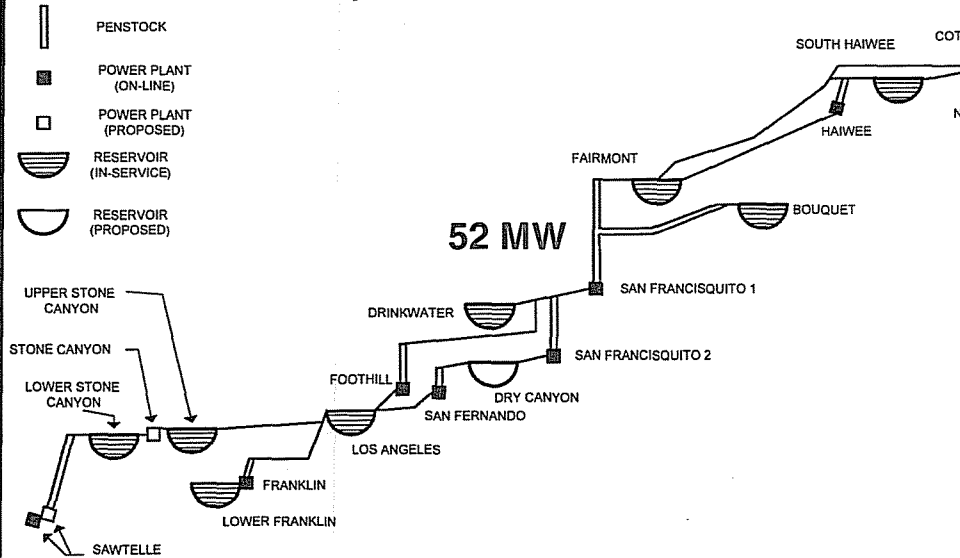
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LA001629

# Aqueduct System Reservoirs and Power Plants

**POWER PLANT DATA**

| POWER PLANT        | IN-SERVICE DATE | PLANT CAPABILITY (MW) | PLANT CAPACITY (MW) | STATIC HEAD (FT) | AVERAGE GENERATION |          |
|--------------------|-----------------|-----------------------|---------------------|------------------|--------------------|----------|
|                    |                 |                       |                     |                  | GWH/YR             | KWH/A.F. |
| UPPER GORGE        | 1953            |                       | 37.5                | 795              | 156.0              | 620      |
| MIDDLE GORGE       | 1952            |                       | 37.5                | 795              | 169.0              | 650      |
| CONTROL GORGE      | 1952            |                       | 37.5                | 780              | 166.0              | 640      |
| PLEASANT VALLEY    | 1956            |                       | 2.7                 | 78               | 13.7               | 43       |
| BIG PINE           | 1925            | 1.5                   | 3.2                 | 1239             | 15.9               | 860      |
| DIVISION CREEK     | 1909            |                       | 0.6                 | 1380             | 4.6                | 990      |
| COTTONWOOD         | 1909            | 0.6                   | 2.0                 | 1275             | 5.4                | 850      |
| HAIWEE             | 1927            | 2.5                   | 5.4                 | 177              | 31.4               | 82       |
| SAN FRANCISQUITO 1 | 1917-28         | 52.0                  | 72.0                | 935              | 287.0              | 620      |
| SAN FRANCISQUITO 2 | 1920-32         | 16.0                  | 44.5                | 540              | 117.0              | 380      |
| FOOTHILL           | 1971            |                       | 10.0                | 526              | 59.7               | 360      |
| SAN FERNANDO       | 1922            | 6.0                   | 6.4                 | 222              | 38.7               | 200      |
| FRANKLIN           | 1921            |                       | 2.0                 | 266              | 11.8               | 110      |
| STONE CANYON       | 1993            |                       | 0.3                 | 65               | 2.2                | 62       |
| SAWTELLE           | 1985            |                       | 0.6                 | 435              | 3.4                | 350      |



**Note: Higher than 30 MW are shown in Red  
all others are less than 18 MW**

**RESERVOIR DATA**

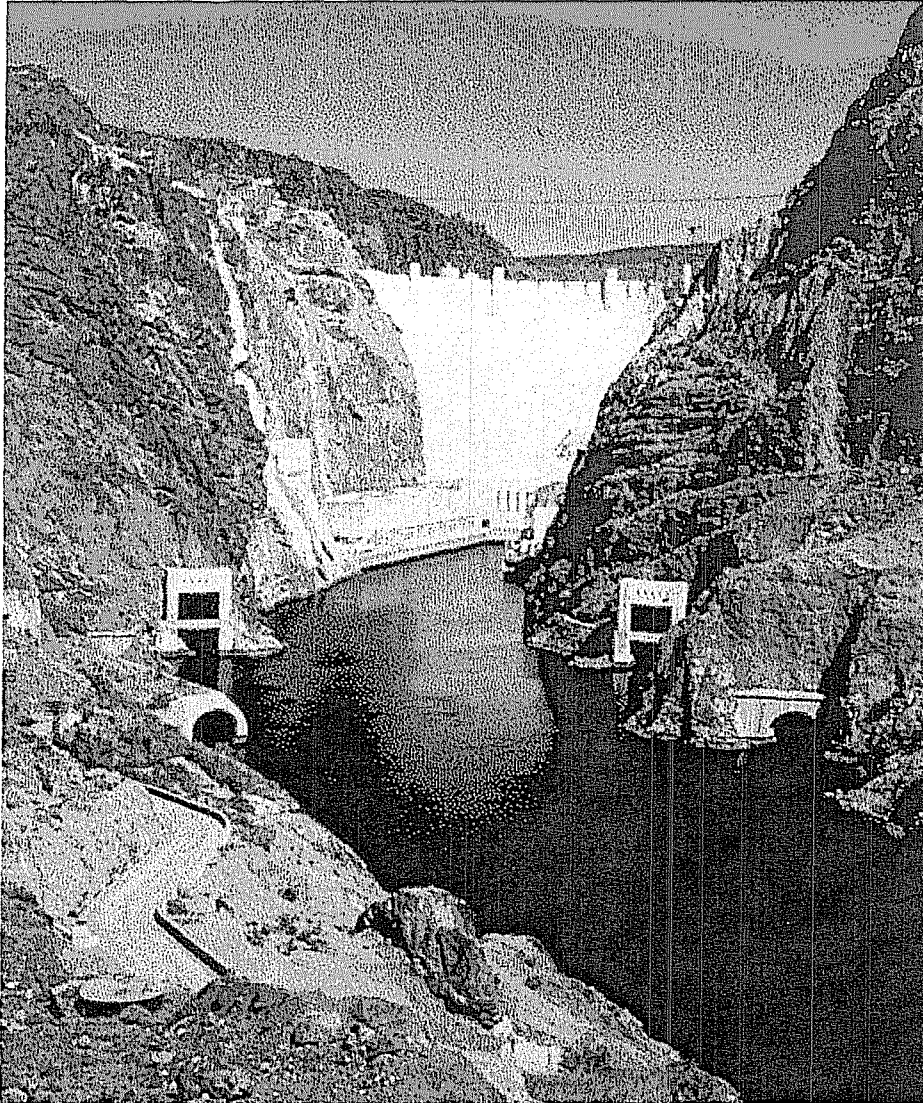
| RESERVOIR                | DATE IN-SERVICE | CAPACITY (ACRE-FT) | HIGH-WATER ELEVATION (FT) |
|--------------------------|-----------------|--------------------|---------------------------|
| LONG VALLEY              | 1941            | 183,250            | 6,781.5                   |
| PLEASANT VALLEY          | 1956            | 2,989              | 4,390                     |
| TINEMAHA                 | 1929            | 16,282             | 3,872.5                   |
| NORTH HAIWEE             | 1955            | 11,533             | 3,760                     |
| SOUTH HAIWEE             | 1913            | 29,648             | 3,744                     |
| FAIRMONT NO. 2           | 1982            | 500                | 3,035                     |
| BOUQUET                  | 1934            | 33,767             | 2,993                     |
| DRINKWATER               | 1923            | 92                 | 2,055                     |
| LOS ANGELES              | 1977            | 2,150              | 1,175                     |
| UPPER FRANKLIN (SURGE B) | 1987            | 10,170             | 854                       |
| LOWER FRANKLIN           | 1982            | 206                | 580                       |
| UPPER STONE CANYON       | 1954            | 422                | 930                       |
| LOWER STONE CANYON       | 1921            | 10,372             | 865                       |
| SAWTELLE (TANK)          | 1986            | 3.1                | 430                       |



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LA001630

# Hoover Power Plant



- Located in Arizona-Nevada boarder
- Constructed in 1935
- Hoover Dam's authorized purposes are: "flood control; improvement of navigation and regulation of the Colorado River; storage and delivery of Colorado River waters for reclamation of public lands and other beneficial uses exclusively within the United States; and hydroelectric power production."

# Eligible Renewable Resource Definition Analysis (1)

- SB 1078/SB 1038 hydro definition is 30 MW or less
- Almost all of the California municipalities that have RPS policy define all of their hydros (including Hoover power) as eligible renewable.
- There is no consistent hydro eligibility definition for hydro among the states that have eligibility definitions:
  - 10 out of 21 states have no size limit
  - 4 states have limit (<30, <60, <100, and low head)
  - 4 states do not recognize hydro as renewables
  - 3 states use criteria other than size
- California IOUs combined Small Hydro contribution to RPS is 1.9%



# States Definitions of Renewable Energy

|                                     | Wind | Solar | Geothermal | Biomass         | MSW             | Ocean-based    | Hydro           | Fuel Cells <sup>1</sup> |
|-------------------------------------|------|-------|------------|-----------------|-----------------|----------------|-----------------|-------------------------|
| California <sup>2</sup>             | X    | X     | X          | X <sup>3</sup>  | X <sup>4</sup>  | X <sup>5</sup> | X <sup>6</sup>  | X <sup>7</sup>          |
| Connecticut (Class I)               | X    | X     |            | X <sup>8</sup>  |                 |                |                 | X                       |
| Connecticut (Class II) <sup>9</sup> |      |       |            | X <sup>10</sup> | X               |                | X               |                         |
| Connecticut (SBC)                   | X    | X     |            | X <sup>11</sup> |                 | X              |                 | X                       |
| Delaware <sup>12</sup>              | X    | X     | X          | X <sup>13</sup> |                 |                | X               |                         |
| Illinois                            | X    | X     |            | X <sup>14</sup> |                 |                | X <sup>15</sup> |                         |
| Maine <sup>16</sup>                 | X    | X     | X          | X               | X               | X              | X               | X                       |
| Maryland                            | X    | X     | X          | X               | X               | X              | X               |                         |
| Massachusetts                       | X    | X     |            | X <sup>17</sup> | X <sup>18</sup> | X              | X               | X <sup>19</sup>         |
| Montana <sup>20</sup>               | X    | X     | X          | X               |                 |                | X               |                         |
| Nevada                              | X    | X     | X          | X <sup>21</sup> |                 |                |                 |                         |
| New Jersey (Class I)                | X    | X     | X          | X <sup>8</sup>  |                 | X              |                 | X                       |
| New Jersey (Class II) <sup>23</sup> |      |       |            |                 | X               |                | X <sup>24</sup> |                         |
| New Mexico                          | X    | X     | X          | X <sup>25</sup> |                 |                | X               | X <sup>19</sup>         |
| New York <sup>26</sup>              | X    | X     | X          | X               |                 |                | X               | X                       |
| Ohio <sup>27</sup>                  | X    | X     |            | X               |                 |                | X               | X                       |
| Oregon                              | X    | X     |            | X <sup>28</sup> | X               |                | X <sup>29</sup> |                         |
| Pennsylvania                        | X    | X     | X          | X <sup>30</sup> | X               |                | X <sup>31</sup> |                         |
| Rhode Island                        | X    | X     |            | X <sup>32</sup> |                 |                | X <sup>33</sup> | X <sup>34</sup>         |
| Texas                               | X    | X     | X          | X               |                 | X              | X               |                         |
| Wisconsin                           | X    | X     | X          | X               |                 | X              | X <sup>35</sup> | X <sup>19</sup>         |

## Notes on Hydro:

- (6) <30 MW
- (15) No new dam
- (24) Minimum impact
- (29) Outside protected area
- (31) Low head
- (33) <100 MW, no new dam
- (35) <60 MW

## Source:

U.S Department of Energy  
[www.eere.energy.gov/](http://www.eere.energy.gov/)  
 March 13, 2003



# Power Content Label

| <b>ENERGY<br/>RESOURCES</b> | <b>LADWP<br/>Power*<br/>(actual)</b> | <b>LADWP<br/>Green<br/>Power*<br/>(actual)</b> | <b>2002 CA Power<br/>Mix** (for<br/>comparison)</b> |
|-----------------------------|--------------------------------------|------------------------------------------------|-----------------------------------------------------|
| <b>Eligible Renewable</b>   | <b>3%</b>                            | <b>100%</b>                                    | <b>9%</b>                                           |
| -Biomass & waste            | 1%                                   | 54%                                            | 2.9%                                                |
| -Geothermal                 | 1%                                   | 0%                                             | 3.7%                                                |
| -Small hydroelectric        | 1%                                   | 23%                                            | 1.9%                                                |
| -Solar                      | 0%                                   | <1%                                            | 0%                                                  |
| -Wind                       | 0%                                   | 23%                                            | 0.5%                                                |
| <b>Coal</b>                 | <b>50%</b>                           | <b>0%</b>                                      | <b>15.4%</b>                                        |
| <b>Large Hydroelectric</b>  | <b>10%</b>                           | <b>0%</b>                                      | <b>22.5%</b>                                        |
| <b>Natural Gas</b>          | <b>24%</b>                           | <b>0%</b>                                      | <b>42.2%</b>                                        |
| <b>Nuclear</b>              | <b>13%</b>                           | <b>0%</b>                                      | <b>10.9%</b>                                        |
| <b>Other</b>                | <b>0%</b>                            | <b>0%</b>                                      | <b>0%</b>                                           |
| <b>TOTAL</b>                | <b>100%</b>                          | <b>100%</b>                                    | <b>100%</b>                                         |



## Eligible Renewable Resource Definition Analysis (2)

- CLA RPS report proposes consideration of all hydro generation as eligible renewables
- Excluding any of the Aqueduct plants (50 to 80 year old plants) from RPS eligibility will undermine future modernization of the plants
- Excluding Hoover will require providing about 2.8% of new renewables at a cost of up to \$20 million per year
- Excluding the Owens Gorge and Power Plant 1 will require providing about 1.2% of new renewables at a cost of up to \$9 million per year



# Hydro Renewable Eligibility Definition Options

1. All LADWP hydro  
(include all Aqueduct, and Hoover)
2. All LADWP owned Hydro  
(include all Aqueduct, exclude Hoover)
3. All LADWP Aqueduct Hydro except Gorge Plants  
(exclude Owens Gorge, and Hoover)
4. LADWP 30 MW or less Hydro  
(exclude Power Plant 1, Owens Gorge, and Hoover)



# LADWP Hydro Definition Option RPS Levels (2002-03 data)

| Plant Name                                            | Max Plant Size MW | % of RPS Contribution | Highest Level Included in Option No. | Total % RPS |
|-------------------------------------------------------|-------------------|-----------------------|--------------------------------------|-------------|
| 30 MW or Less Aqueduct Plants<br>(multiple locations) | 18                | 0.6%                  | 4                                    | 0.6%        |
| Power Plant 1<br>(one location)                       | 52                | 0.5%                  | 3                                    | 1.1%        |
| Gorge Plants<br>(three different locations)           | 38                | 0.7%                  | 2                                    | 1.8%        |
| Hoover<br>(one location)                              | 491               | 2.8%                  | 1                                    | 4.6%        |



## LADWP Recommendations

- Include all LADWP owned hydro generation plants as eligible renewable resources (i.e. Option 2: All Aqueduct power plants including Owens Gorge and PP1 plants).
- Include any future modernization, upgrade and/or expansion of the Aqueduct power generation system to increase the efficient utilization of the Aqueduct water.
- Acquisition of new hydro power will be limited to generation size of 30 MW or less.

