



APRIL 2024



WATER & POWER ASSOCIATES, INC.

NEWSLETTER

For a Sustainable Los Angeles



Update on the Strategic Long-Term Resource Plan

By William Barlack

The LADWP Strategic Long Term Resource Plan, otherwise known as the SLTRP, appears to be the gift that keeps on giving. The 2024 version of the study that serves as the technical basis for the plan, kicked off with a meeting of the 2024 SLTRP Advisory Group (AG) on the morning of March 21 at the Power System Wall Street facility. Here are some of the highlights.

The LA100 Equity Strategies Steering Committee has been integrated into the 2024 AG, and thus the SLTRP AG has greatly expanded to 84 members representing eight Stakeholder Categories: Academia, Business and Workforce, City Government, Neighborhood Councils, Environmental Groups, Community-Based Groups, Premier Accounts and Key Customers, and Utilities. Of these eight categories, representatives from two, City Government and Community-Based Groups, make up 60% of the 84 members.

SLTRP staff reviewed the goals, assumptions, and results of the 2022 Study.

There were three Core Cases which all met the City Council Motion for LADWP to provide 100% carbon-free energy by 2035. Also, the SB 100 case, that reaches 100% clean energy by 2045 was run to provide context for the Core Case results. The three Core Cases differed from each other mostly in the speed at which greenhouse gas emissions will be reduced, and the speed at which renewable and distributed resources will be built out.

LADWP recommended Case 1 be adopted as the blueprint to follow to achieve 100% renewables by 2035. Case 1 assumed 80% Renewable Portfolio Standard by 2030, high level of Distributed Energy Resources, medium level of transmission additions, natural gas phase out by 2035, and green H2 as backup. The key study results are:

1. While the historic LADWP resource build rate for the period 2018 through 2021 is 200 MW per year, the 2022 SLTRP results show the build rates for Case 1 to be 1,100 MW per year between 2022 and 2035, which is double the build rate for the SB 100 case in the same period, and more than five times the historic build rate. This build rate is for resources only and do not include transmission and distribution improvements required to accommodate the new resources, nor do they include human resources needed to address existing back logs.
2. The total new capacity of resources added between 2022 and 2035 for Case 1 is about 13,000 MW, which is more than double the new capacity added for the same period in the SB 100 case of about 5,500 MW.
3. The total Case 1 portfolio cost for the period between 2022 and 2045 is 81 billion dollars, while the SB 100 case total cost is 64 billion dollars.

(Continued on page 2)



OFFICERS

Jerry Gewe
President

Julie Spacht
1 st Vice President

James McDaniel
2 nd Vice President

Ken Silver
Secretary

Rod Fishburn
Asst Secretary

William Engels
Treasurer

Phyllis Currie
Asst. Treasurer

Jack Feldman
Webmaster

Bill Glauz
Newsletter Editor

Jerry Gewe
Historical Preservation

BOARD OF DIRECTORS

William Barlak
John Dennis
Duane Georgeson
George Higgins
Walter Hoyer
Jack Humphreville
Larry Kerrigan
Razmik Manoukian
Saif Mongri
Scott Munson
Susan Rowghani
Donald Sievertson
Robert Yoshimura
Walter Zeisl

(SLTRP Update, continued from page 1)

4. Case 1 reaches zero carbon emissions by 2035, and shows better reliability, in terms of Loss of Load hours, than the current industry standard.

5. Funding the additions and betterments required for Case 1 to reach zero carbon emissions by 2035 will require an average annual retail rate increase of almost 8% between 2022 and 2035, with the average customer bill increasing by around 160% between 2022 and 2035.

6. Some of the risks and challenges to be faced in executing the blueprint of Case 1 are:

- a. Will emerging technologies be ready in time?
- b. Will there be enough human resources to plan, design, and build the renewable resources?
- c. Are the required resources constructable in the time given?
- d. Can the supply chain provide the materials in the time given?

The results of the Equity Strategies Study performed as part of the original LA100 Study by the National Renewable Energy Laboratory were also presented. The five priorities identified in the Equity effort are: affordability and energy burdens; access to and use of energy technologies, programs, and infrastructure; health, safety, and community resilience; jobs and workforce development; and inclusive community involvement. The Equity study results are very comprehensive and too detailed to present in this summary. The presentation is available at LADWP.com/SLTRP in the SLTRP LA100 Equity Strategies Presentation link.

The Power System Strategic Vision was also presented. Highlights of this vision are:

There are 34 major transmission-related projects, representing 558 miles of transmission, under development in existing rights-of-way. All of these projects are scheduled to be completed by 2030. Three projects will increase imports from the east: a conversion of Victorville-Century Lines 1 and 2 to DC; a new eastern corridor transmission line, and an increase in the capacity of the Intermountain DC line. In December 2023, LADWP released an RFP for partnerships in transmission opportunities. Developing partnerships with other entities will reduce both risk and cost.

Plans for the Distribution System include:

- 1. Expanding the 34.5kV system to accommodate more EV chargers.
- 2. Shift large customer loads from the 4.8kV system to the 34.5kV system to relieve 4.8kV loading.
- 3. Reduce the number of new Distribution Stations.
- 4. Upgrade Port of LA distribution system to accommodate electric trucks.
- 5. Continue the support of LAX with their future energy needs.

Five more AG meetings are scheduled, one each in April, May, and June, to define model runs, scenarios, and sensitivities; one in September to share preliminary results; and one in November to share feedback with the AG from public meetings conducted in October. The 2024 SLTRP study work will be completed by the end of 2024 and final approval will take place in February 2025.

In the 2024 SLTRP, Water and Power Associates should promote holding the SLTRP team to its future vision of the 2024 study as expressed in the preface of the 2022 report. “The next iteration of the 2024 SLTRP will be an update to the 2022 SLTRP with continued engagement of the Advisory Group and focus on understanding rate drivers and clean energy opportunities to refine and optimize cost over the long-term.”

NERC Long Term Reliability Assessment 2023

By Saif Mogri

North America Reliability Council (NERC) is a not-for-profit international regulatory authority with the mission to assure the reliability of the Bulk Power System (BPS) in North America. NERC develops and enforces Reliability Standards; annually assesses seasonal and long-term reliability; monitors the BPS through system awareness; and educates, trains, and certifies industry personnel. NERC’s area of responsibility spans the continental United States, Canada, and the northern portion of Baja California, Mexico. NERC is the ERO (Electric Reliability Organization) for North America and is subject to oversight by the U.S. Federal Energy Regulatory Commission (FERC, also known as the Commission) and governmental authorities in Canada. NERC’s jurisdiction includes users, owners, and operators of the North American BPS and serves more than 334 million people.

This assessment was developed based on data and narrative information NERC collected from the six Regional Entities in Table 1 on an assessment area basis to independently evaluate the long-term reliability of the North American BPS while identifying trends, emerging issues, and potential risks during the upcoming 10-year assessment period.

Regional Entity	
MRO	Midwest Reliability Organization
NPCC	Northeast Power Coordinating Council
RF	Reliability First
SERC	SERC Reliability Corporation
Texas RE	Texas Reliability Entity
WECC	WECC
Table 1	

Projections in this assessment are not predictions of what will happen; they are based on information supplied in July 2023 about known system changes with updates incorporated prior to publication. This 2023 Long Term Reliability Assessment (LTRA) assessment period includes projections for 2024–2033; however, some figures and tables examine data and information for the 2023 year.

Assumptions

In this 2023 LTRA, the baseline information on future electricity supply and demand is based on several assumptions:

- Supply and demand projections are based on industry forecasts submitted and validated in July 2023. Any subsequent demand forecast or resource plan changes may not be fully represented; however, updated data submitted throughout the report drafting time frame have been included where appropriate.

- Peak demand is based on average peak weather conditions and assumed forecast economic activity at the time of submittal. Weather variability is discussed in each Regional Entity’s self- assessment.
- Generation and transmission equipment will perform at historical availability levels.
- Future generation and transmission facilities are commissioned and in service as planned, planned outages take place as scheduled, and retirements take place as proposed.
- Demand Reductions (DR) expected from dispatchable and controllable DR programs will yield the forecast results if they are called on.
- Other peak demand-side management programs, such as energy efficiency (EE) and price-responsive DR, are reflected in the forecasts of total internal demand.

Capacity and Energy Risk Assessment

The Capacity and Energy Risk Assessment identifies potential future electricity supply shortfalls under normal as well as extreme conditions; it is a forward-looking snapshot of resource adequacy that is tied to industry forecasts of electricity supplies, demand, and transmission development. NERC’s assessment makes use of the latest demand forecasts, resource levels, and area transfer commitments along with collected information on expected generator retirements, resource additions, and demand-side resources. This assessment provides clear

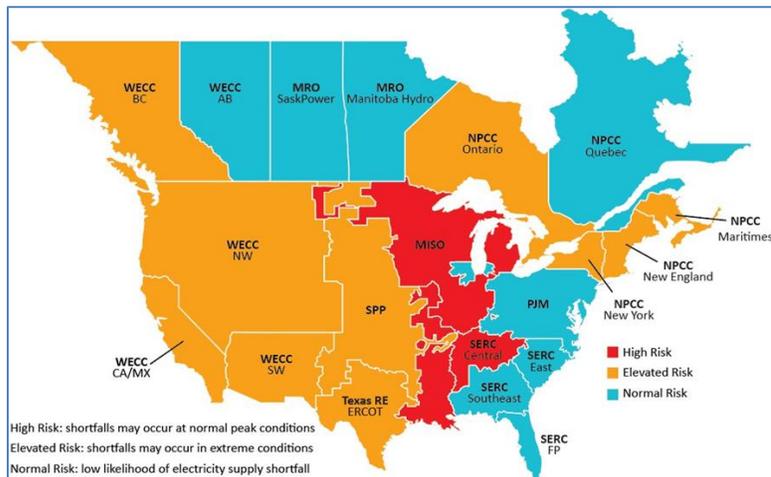


Figure 1

evidence of growing resource adequacy concerns over the next 10 years (Figure 1). Capacity deficits are projected in areas where future generator retirements are expected before enough replacement resources are in service to meet rising demand forecasts.

This article will focus on California/Mexico area of the Western Electric Coordinating Council (WECC). Resource additions, generator uprating, and service extensions have helped alleviate near-term capacity risks and lower the area’s reliance on imports to meet high demand in the California/Mexico (WECC-CA/MX) area. Since the 2022 LTRA, WECC’s probabilistic analysis indicates that risks of unserved energy and load loss in 2024 have fallen to negligible levels. However, loss-of-load and unserved energy risks emerge in 2026 concentrated in the July–September period and are primarily associated with extreme weather conditions. Anticipated Reserve Margins (ARM) continue to rise from levels reported in NERC’s previous LTRAs as new resources are added, primarily solar photovoltaic (PV), hybrid-solar PV, and battery energy storage system resources.

Planning Reserve Margins

WECC-CA/MX (California/Mexico) is a summer-peaking assessment area in the WECC Regional Entity that includes parts of California, Nevada, and Baja California, Mexico.

The reserve margins would fall below the Reference Margin Level (RML) in summer of 2027 without Tier 1 resources (3,212 MW) coming on-line. Starting in summer 2024 onwards, CA/MX shows a shortfall of existing-certain and net firm transfers, meaning imports may be necessary if new resources were to be significantly delayed.

The peak hour demand for the CA/MX subregion occurs in the summer around the second week of September at 3:00 p.m. The subregion is expected to grow from about 55.5 GW in 2023 to 64.6 GW in 2033. This represents a 16.3% load growth over this assessment period, or 1.52% annualized average rate.

CA/MX has almost three Giga Watt (GW) of natural gas planned for retirement by the end of 2023, over one GW of coal in 2025, and 2.3 GW of nuclear by the end of 2030. In total, almost six and a half GW of coal, nuclear, and natural gas are planned to be retired by 2030. This is offset by 2.8 GW of planned new natural gas, 665 MW of geothermal, 644 MW of petroleum, 627 MW of pumped storage, 35 MW of new conventional hydro, and 55 MW of biomass capacity

The table below reflects the expected 50th percentile, or 1 in 2 probability of energy availability by resource type on the peak hour.

Resource Type	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Coal	1,595	1,595	487	487	487	487	487	487	487	487
Petroleum	761	761	761	761	761	757	757	757	757	757
Natural Gas	36,884	37,644	37,644	37,644	37,644	37,639	37,639	37,639	37,639	37,639
Biomass	777	777	777	777	777	775	775	775	775	775
Solar	19,095	19,112	19,130	19,150	18,317	19,166	19,174	19,174	19,174	19,174
Wind	994	994	994	994	1,354	994	994	994	994	994
Geothermal	2,434	2,434	2,434	2,434	2,434	2,428	2,428	2,428	2,428	2,428
Conventional Hydro	3,453	3,453	3,453	3,453	3,495	3,453	3,453	3,453	3,453	3,453
Pumped Storage	1,034	1,034	1,034	1,034	1,057	1,034	1,034	1,034	1,034	1,034
Nuclear	3,880	3,880	3,880	3,880	3,880	3,874	2,770	1,667	1,667	1,667

Supply chain issues continue to be a major factor affecting the delivery of new resources, such as utility-scale solar Photo Voltaic (PV) and transmission line upgrades. These supply chain issues along with the increased costs of component suppliers have resulted in the need for renegotiations. Balancing areas report developers are seeing a 75-to-80-week delivery time for transformers and circuit breaker equipment compared to the typical 24 weeks prior to Covid-19.

Some of the conclusions and trends that are recommended are:

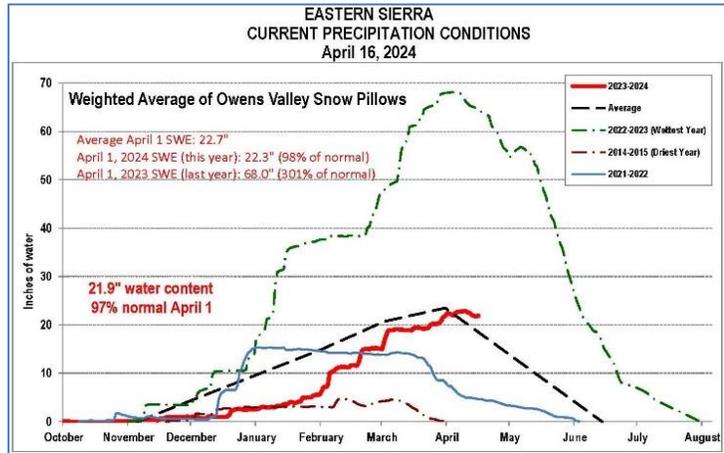
- Electricity Peak Demand is on the Rise
- Transmission Projects are Increasing
- Add new Reliable Resources
- Assess Impact of Inverter Based Resources
- Make Existing Resources more Reliable
- Expand Transmission Networks
- Adapt BPS planning, operations, and resource procurement markets for a more complex power system

2023-24 Eastern Sierra Snowpack Results

By Jerry Gewe

On April 1, this year's runoff in the eastern Sierra watershed which provides the major portion of water of the Los Angeles' supply in normal years was drastically different from that of the previous year. On April 1, 2024, the snowpack, was very close to normal and on April 16, 2024 stood at 97% of the April 1 normal as shown the adjacent snow pillow chart. Snow pillows are 6 data collection devices located at different points in the eastern Sierra watershed. The chart shows the weighted average water content of the snowpack both this year and in representative prior years. This year, until the end of January, the water content of the snowpack was tracking with the driest years of record. However, beginning with February the snow began to fall consistently and by early April it was very close to normal.

While snow pillows reflect the water content at a specific location, LADWP has been taking measurements at snow courses which are a series of 6 to 10 points in a straight line since the 1930's. These snow courses provide a more accurate measure of the water content of the snowpack than the individual data point of the snow pillows. Figure 2 shows the results of the April 1, readings for these snow courses, with water content of 97% of normal when the individual areas are weighted by their contribution to the Owens River Runoff.



EASTERN SIERRA SNOW SURVEY RESULTS April 1, 2024			
MAMMOTH LAKES AREA (Contributes 27% of Owens River Basin runoff)			
<u>Course</u>	<u>Water Content</u>	<u>April 1 Normal</u>	<u>% of April 1 Normal</u>
Mammoth Pass	42.6	42.7	100%
Mammoth Lakes	20.6	20.1	102%
Minarets 2	26.4	29.3	90%
Average:	29.9	30.7	97%
ROCK CREEK AREA (Contributes 16% of Owens River Basin runoff)			
<u>Course</u>	<u>Water Content</u>	<u>April 1 Normal</u>	<u>% of April 1 Normal</u>
Rock Creek 1	6.3	7.1	89%
Rock Creek 2	8.8	10.1	88%
Rock Creek 3	11.8	13.2	89%
Average:	9.0	10.1	89%
BISHOP AREA (Contributes 19% of Owens River Basin runoff)			
<u>Course</u>	<u>Water Content</u>	<u>April 1 Normal</u>	<u>% of April 1 Normal</u>
Sawmill	17.0	19.0	89%
Average:	17.0	19.0	89%
BIG PINE AREA (Contributes 13% of Owens River Basin runoff)			
<u>Course</u>	<u>Water Content</u>	<u>April 1 Normal</u>	<u>% of April 1 Normal</u>
Big Pine Creek 2	12.3	12.6	97%
Big Pine Creek 3	17.6	17.5	100%
Average:	14.9	15.1	99%
COTTONWOOD AREA (Contributes 25% of Owens Basin River runoff)			
<u>Course</u>	<u>Water Content</u>	<u>April 1 Normal</u>	<u>% of April 1 Normal</u>
Cottonwood Lakes 1	13.4	12.3	109%
Trailhead*	13.1	12.5	105%
Average:	13.3	12.4	107%
EASTERN SIERRA OVERALL SNOW PACK (Weighted by contribution to Owens River Basin runoff)			
<u>Average of all Snow Courses</u>	<u>Water Content</u>	<u>April 1 Normal</u>	<u>% of April 1 Normal</u>
	18.0	18.7	97%

* are based on the 1971-2020 period.
* has only been measured since 1982, so the normal is estimated.

Based upon this information, we would anticipate a runoff of slightly larger than normal due to carryover from last year's record setting runoff. This in turn indicates that there will be adequate water for Los Angeles this year and our water bills will be lower since there will be less need to buy water.

Delta Conveyance Project Update Multiple Roadblocks Challenge the Project

By Robert Yoshimura

In the January issue of this newsletter, we reported that the Department of Water Resources (DWR) certified the final environmental impact report (EIR) for the single-tunnel Delta Conveyance Project (DCP). That action was the final administrative step needed to begin the planning, design, and permitting of the project following more than 80 years of discussion.

While the final EIR fulfills all the requirements of the California Environmental Quality Act (CEQA), several roadblocks have arisen that are likely to affect the project. A total of nine lawsuits have been filed by a variety of political jurisdictions and environmental organizations



challenging the adequacy of the EIR. Thirty-three entities are represented among the participants in those lawsuits. The plaintiffs include all the counties in the Delta (Sacramento, Contra Costa, Solano, Yolo, San Joaquin, and Alameda) plus the city of Stockton, the Contra Costa County Water District, North Delta Water Agencies, the Central Delta Water Agency, Sacramento Area Sewer District, and a large coalition of environmental organizations led by the Sierra Club.

Collectively, the nine lawsuits allege violations of CEQA due to the failure of the EIR to fully assess the environmental impacts of the project, especially as it affects changes to surface water resources. Among the concerns are the failure to address wildlife harms, especially to Chinook Salmon, Delta Smelt, and other imperiled fish and the changes in temperature and degradation of water quality in the Delta due to reduced flows caused by the diversion. An attorney involved in one of the suits surmised that resolution of this litigation could take several years, despite the 270-day shot clock on challenges to CEQA processes that became law last year. This will be the first test of the shot clock provision; thus, its validity and consequences will be clarified by these cases.

The Napa Valley Register reported additional concerns about the DCP affecting the water supplies for the towns of Napa, Calistoga, and American Canyon, who get their water from Barker Slough via the North Bay Aqueduct. The concern is that environmental mitigations associated with the DCP in northern Solano County could attract more Longfin and Delta Smelt to Barker Slough which could trigger limitations in pumping from the Slough to save those fish.

Additionally, reduced freshwater flow through the Delta could increase seawater intrusion into Barker Slough and result in increased levels of bromide, which in turn may form brominated trihalomethanes, a potent carcinogen. DWR's models do not predict such a problem, but the Solano County Water Agency remains concerned.

In addition to the nine CEQA lawsuits, a separate case known as Sierra Club v. DWR concluded in January 2024. Sacramento County Superior Court Judge Kenneth Mennenmaier ruled that DWR could not issue revenue bonds to finance the DCP. This lawsuit resulted from a validation action filed by DWR in 2020 for a judicial determination that DWR's bond resolutions authorizing revenue bond financing for the DCP are valid, legal, and binding. DWR is authorized to issue bonds under the Central Valley Act (as amended in 1959) which includes the Feather River Project. The Feather River Project was renamed the State Water Project in the Burns-Porter Act prior to the start of its construction. However, the ruling in this case was based on DWR's definition of the DCP, which the judge found was not tethered to the objectives, purposes, and effects of the Feather River Project. DWR announced in February that it would appeal this decision to the California 3rd District Court of Appeals.

In February 2024, the State Water Resources Control Board issued a public notice regarding the DWR's Change in Point of Diversion Petition dated February 22, 2024. The petition is required because the DCP will draw water from two locations on the Sacramento River 45 miles north of the current SWP intake in the south Delta. Protests must be filed by April 29, 2024, and the Solano County Board of Supervisors voted on March 27 to protest the petition.

Early in March 2024, the Delta Independent Science Board, which had been working with DWR during the EIR study stage, sent a memo to DWR complaining that its comments were not addressed in the final EIR. Their primary concerns involved the climate change analysis, the seismic analysis, cumulative impacts, ecosystem restoration mitigation, and adaptive management approach.

On April 4, 2024, in a press release from the Bay Institute, Defenders of Wildlife, and SF Bay Keeper, the environmental organizations demanded immediate action to stop the SWP and Central Valley Project from killing Chinook Salmon and Steelhead which are both federally protected under the Endangered Species Act. Both water projects have exceeded the incidental take limits specified in their operating permits. Because of that circumstance, the Pacific Fishery Management Council voted to cancel the 2024 salmon fishing season for the second year in a row and the third time in history. Most of the salmon found in California coastal waters come from the Sacramento River system.

If the legal challenges weren't enough, DWR is also facing funding hurdles due to the reluctance of some beneficiary agencies to continue paying for a project with a history of frustrating defeats. Of Kern County's 13 agricultural districts, not all are committed to continue funding. Kern Delta Water Agency will stop funding the project. Tulare Lake Basin Water Storage District sent a letter to Governor Newsom objecting to further funding of the project. Other signatories to that letter include Kings County, Empire-Westside Irrigation District, and Oak Flat Water District.

On the positive side, an updated version of the California Water Plan was issued on April 2, 2024, which supports infrastructure projects to capture, store, and convey water and names Sites Reservoir and the DCP among such projects. Governor Newsom and most agricultural organizations and the Southern California water agencies strongly support the plan. Not surprisingly, environmental organizations strongly oppose the plan.

A report by DWR titled "The Economy of the State Water Project" published in December 2023 clearly and concisely describes the benefits of the SWP and DCP. The SWP service area consists of 27 million people and supports 8.7 million jobs. One third of the 27 million people live in disadvantaged communities and if the service area were a country, it would have the eighth largest economy in the world.

The SWP provides for the water needs of 750,000 acres of farmland that produces \$19 billion in crops annually. SWP water is cost effective compared to all alternative sources. SWP water costs \$250 to \$1,442/acre-foot (AF). By comparison, Desalination costs \$2,500 to \$4,700/AF, Recycling costs \$1,000 to \$3,500/AF, Stormwater Capture costs \$600 to \$5,000/AF, and conservation costs \$420 to \$1,5000/AF.

The DCP is clearly the key to California's water security. It mitigates the impacts of climate change which will result in fewer but more intense storms and more rain and less snow. Together with the Sites Reservoir Project, it will enable the capture of significantly more stormwater runoff in the future. Had the DCP been in service during the atmospheric river storms in late 2021, it would have captured and transported enough water for 2.5 million people for one year. In 2023, it would have captured and transported enough water for 5 million people for a year. Once completed, it will continue to provide enough additional water for 5 million people per year.

For these reasons, we continue to believe that the benefits of the DCP far outweigh any negative impacts on the public and that such impacts are overstated. Furthermore, none of the opponents to the project mention that incidental takes of endangered and threatened species will be reduced by the DCP because of its focus on keeping such species out of the pumping plants.

Proposed Solar Energy Center in Southern Nevada Signs Purchase Agreement with San Diego

By William Glauz

Source:

<https://www.power-eng.com/solar/purchase-agreement-signed-for-400-mw-solar-1-6-gwh-storage-project-in-san-diego/1.2024>



The 400MW solar plant is supported by a 1.6 GWh battery energy storage system. Credit: ES SO/Shutterstock.com.

Primergy, a utility-scale solar and energy storage company, has signed a long-term power purchase agreement with San Diego Community Power (SDCP) for the entire offtake of its Purple Sage Energy Center (PSEC). The PSEC is a proposed 400 MW solar photovoltaic power plant with 1600 MWh of battery energy storage. The PSEC will be built in Nevada near the California border, about 15 miles south of Pahrump and 40 miles west of Las Vegas. The PSEC is expected to begin delivering energy in 2027. It is expected to generate over 1.2 million MWh of solar energy annually. SDCP is a Community Choice Aggregator serving nearly 1 million customers.

More than 12,000 MWh of Energy Storage Installed in U.S. in Q4 2023

By William Glauz

Source:

<https://www.renewableenergyworld.com/storage/u-s-energy-storage-market-installed-more-than-12k-mwh-in-q4-2023/>



A NineDot Battery Energy Storage System.
(Courtesy: NineDot)

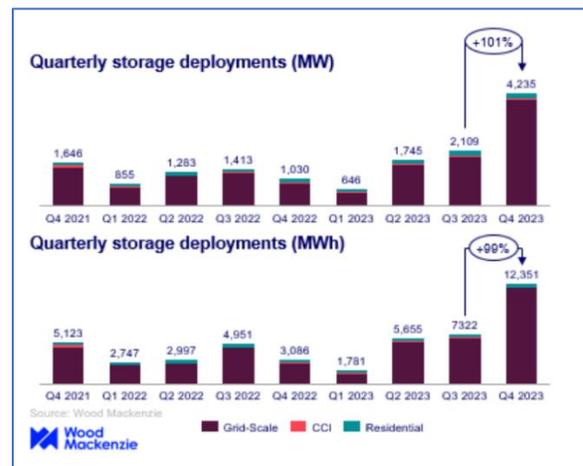
The latest U.S. Energy Storage Monitor publication from Wood Mackenzie and the American Clean Power Association reports that 4,236 MW of energy storage capacity was installed in the fourth quarter of 2023, providing 12,351 MWh of electrical energy. This was a record amount doubling the Q3 capacity installed and represented a 358% increase compared to the same period in 2022.

According to the report, total deployments in 2023 across all segments reached 8,735 MW and 25,978 MWh, representing an 89% increase over 2022.

Distributed storage exceeded 2 GWh in 2023, another first for the market. This was assisted by a busier-than-average first quarter for the community, commercial and industrial (CCI) segment, and over 200 MW of installations in Q3 and Q4 each in the residential segment.

Over the next five years, the report says, the residential market will continue to boom, with more than 9 GW due to be installed. While the cumulative volume installed for the CCI segment is forecasted to be less than that, at 4 GW, the growth rate is over double, at 246%.

Earlier this year, the U.S. Energy Information Administration (EIA) said U.S. battery storage capacity could increase 89% by the end of 2024 if all of the planned energy storage systems reach commercial operation on schedule. Developers plan to expand U.S. battery capacity to more than 30 GW by the end of 2024. Planned and currently operational U.S. utility-scale battery capacity totaled around 16 GW at the end of 2023.



Battery storage in the U.S. has been growing since 2021. This is especially true in California and Texas, two states undergoing rapid renewable energy growth. California has the most installed battery storage capacity of any state with 7.3 GW and Texas has 3.2 GW. All other states combined have a total of around 3.5 GW installed capacity.

Salton Sea Geothermal Development Could Produce Significant Source of Lithium for Growing Battery Production

By William Glauz

Sources:

<https://oilprice.com/Metals/Commodities/Worlds-Largest-Lithium-Reserve-Discovered-Beneath-Californias-Salton-Sea.html>

<https://www.energy.gov/eere/articles/celebrating-another-breakthrough-domestic-lithium-production#:~:text=The%20study%20found%20that%20the,nationwide%20transition%20to%20electric%20vehicles>



Hell's Kitchen Lithium Production & Clean Power Project

The Salton Sea, at 230 feet below sea level in the Imperial Valley in the Southern California Desert, has a huge potential for geothermal energy development. The region currently has 400 MW of geothermal energy capacity from 11 plants and has the potential for an additional 2,500 MW. A byproduct of geothermal energy development is a hot saline fluid, or brine, that contains the heat used to produce electricity. The unique geological subsurface near the Salton Sea causes the brine to contain high levels of lithium.

Of course, lithium is a primary product used in the production of lithium-ion batteries which are a critical component in electric vehicles and utility scale battery energy storage projects that will be very important in integrating significant renewable energy additions to the electric grid.

A new geothermal project, Hell's Kitchen, recently broke ground, and will be the first geothermal project in the Salton Sea region to produce both geothermal electricity and extract lithium from the brine.

Over the next 15 years, global demand for lithium is expected to grow 40 times. At present, nearly 95% of the world's lithium comes from just four countries: Australia, Chile, China, and Argentina. Just 1% of lithium used in the United States is harvested domestically. The United States currently has limited capabilities to extract, refine, and produce domestically sourced lithium. Indeed, the country typically imports nearly half of the lithium it consumes, almost all coming from Chile and Argentina.

Last November, the Department of Energy announced the results of a study, which confirmed the region has immense potential as a domestic source of lithium. The study found that the Salton Sea region could produce more than 3,400 kilotons of lithium, more than enough to support the development of 375 million batteries for electric vehicles, a complete nationwide transition to electric vehicles.

The U.S. could soon become self-sufficient in lithium, thanks to new direct lithium extraction technologies that aim to extract ~90% of lithium in brine water compared to 50% extraction rates using conventional evaporation ponds. The biggest advantage of these new technologies is that they are capable of harvesting the metal in a matter of days, way faster than upwards of one year required to extract lithium carbonate from conventional evaporation ponds and open-pit mines. Direct lithium extraction also comes with a bonus that it is portable and also able to recycle their fresh water and limit the use of hydrochloric acid.

California Water Supply Update for 2024

By Robert Yoshimura



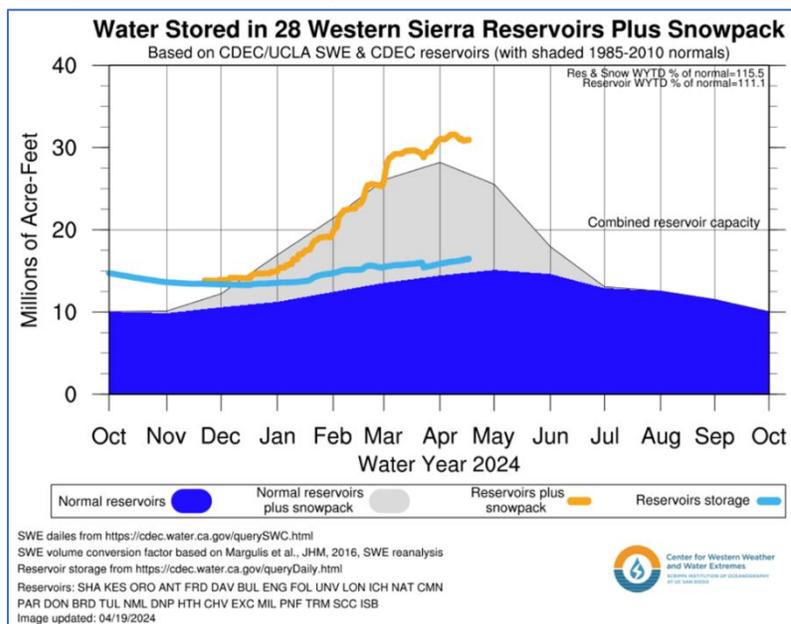
Precipitation in 2024 got off to a slow start in January and February, but atmospheric river storms in March more than made up for the shortage. As a result, this year's statewide average snowpack (see graph below) as of April 1st (the historic season peak) was 110% of normal and was characterized by the Department of Water Resources (DWR) as "unusually normal". That was a

reference to the fact that during the current 24-year drought, there have been numerous years of extremely low precipitation punctuated by a few years of extremely high precipitation with not many years in the normal range.

The DWR has made a concerted effort to capture and store water from last year's record runoff and this year's storms. Consequently, statewide reservoir conditions are excellent, especially for this time of year (see chart below). Nearly all the major reservoirs are above average for this time of year. Overall, reservoir levels are at 117% of average. Furthermore, the peak flows from snowmelt are not expected to occur until mid-June, so most reservoirs will gain storage in the next several weeks. However, runoff from the snowmelt may result in less water than anticipated because many years of drought preceding a wet year often results in lower-than-expected yield.

DWR recently increased its forecasted allocation of water to state water contractors to 30% of their contracted amount. If that allocation seems low, it is because of the uncertainty of the runoff and potential challenges to pumping rates to protect endangered species of fish. Recently, a coalition of environmental organizations called upon the state to immediately stop killing Chinook Salmon and Steelhead at the State Water Project and Central Valley Project pumping stations. Both projects have exceeded their allowed number of fish kills under their incidental take permits. DWR's response to this demand may affect the current allocation.

The adjacent graph combining snowpack and reservoir storage was recently developed by the Center for Western Weather and Water Extremes. The graph provides an accurate overview of the California water supply situation in a single image.



Mystery History Question

Presented by Jack Feldman

This 1920s photo shows a Bureau of Power and Light electric powered streetlight truck parked by the curb with a maintenance worker standing behind it. Note all the replacement globes on top of the truck's extension platform. The Bureau of Power and Light merged with the Bureau of Water Works to become today's Los Angeles Department of Water and Power (LADWP).



What year did this happen?

- A) 1927
- B) 1937
- C) 1947
- D) 1957
- E) 1967

That same year the LADWP acquired the power system of another utility operating and selling power within the city. This acquisition solidified LADWP's position as the sole power service provider in Los Angeles. What is the name of the other utility?

- A) Los Angeles Edison Electric
- B) Southern California Edison
- C) Pacific Light and Power Company
- D) Los Angeles Gas and Electric Corporation
- E) West Side Lighting Company

Answers on page 19, OR Click [HERE](#) or go to the following link:

https://waterandpower.org/museum/Mystery_History.html

GUEST SPEAKERS

Summaries by Robert Yoshimura

GUESTS OF THE MONTH
MARCH 2024

BILL HASENCAMP, MWD Manager of Colorado River Activities

CAN THE COLORADO RIVER MEET THE FUTURE NEEDS OF THE AMERICAN SOUTHWEST?

The California Aqueduct has delivered less than 50% of MWD's contracted allocation over the last 20+ years and only 30% for the last 10 years. While climate change is likely responsible for those flow reductions, had the Delta Tunnel Project been built, much of the water that discharged to the ocean during major storm events could have been diverted to Southern California and alleviated much of the shortages we have experienced recently. As it stands, this year's allocation is only 15% of the contracted amount pending further accumulations of snowpack later this spring.

Similarly, Los Angeles Aqueduct deliveries have been curtailed significantly because of efforts to save Mono Lake, prevent dust on Owens Lake, and for diversions to other environmental mitigation projects in the Owens Valley. During those 20+ years when various issues befell both the State Water Project and the Los Angeles Aqueducts, the Colorado River continued to provide at least its full allocation to Southern California. However, the 24-year drought in the Colorado watershed has caused water levels in Lake Mead to decline nearly to the trigger point for curtailment of deliveries to California.

The Colorado River Aqueduct was the brainchild of William Mulholland. Shortly after completion of the Los Angeles Aqueduct in 1913, he soon realized that the rapid development and population growth of Southern California demanded another source of water to provide for the needs of the area, particularly outside the City of Los Angeles, into the distant future. Because of the magnitude of such a project, he enlisted the cooperation of twelve other nearby cities who recognized the need for such a project and agreed that cost-sharing would yield an efficient benefit. Jointly, the 13 cities formed the Metropolitan Water District of Southern California.

The Colorado River Compact was signed in 1922. The Compact allocated annual amounts of 7.5 million acre-feet (MAF) to the upper basin states (Colorado, Utah, Wyoming, New Mexico), 7.5 MAF to the lower basin states (California, Nevada, Arizona), plus an additional 1.0 MAF to Arizona in recognition of their existing water use of Gila River, and 1.5 MAF to Mexico for a future treaty that was not signed until 1944. Subsequent agreements further apportioned the water to each state (in MAF per year) as follows: California, 4.4; Arizona, 2.8 (plus 1.0 MAF from the Gila River); Nevada, 0.3; Colorado, 3.86; Utah, 1.71, Wyoming, 1.04; and New Mexico, 0.84. A unique element of the Compact was that the upper basin states were obligated to deliver 7.5MAF annually to the lower basin on a 10-year average.

A Supreme Court decision enabled Arizona to use their full allotment of 2.8 MAF from the Colorado River plus 2.1 MAF from the Gila River for a total of 4.9 MAF from the Colorado River watershed. They thus became the largest user of Colorado River water despite the Compact limitations. This resulted in a "structural deficit" where the lower basin can use up to 9.6 MAF each year, which, of course, exceeds the average flow of the river when all allocations (upper basin, lower basin, and Mexico) are considered.

This created a dilemma for California, which had been using 5.1 MAF of Colorado River water since the 1950s due to the surplus available from other states. Because the CAP was a federally funded project requiring Congressional approval, California was able to negotiate an agreement with Arizona by which it would continue to use the surplus until the CAP needed it.

Furthermore, Arizona agreed that in the event of a shortage requiring California to cut back deliveries below 4.4 MAF, the CAP's water rights would be junior to California's. With that agreement in place, California continued to use 5.1 MAF yearly until 2002, the driest year in history for the Colorado River watershed when California was limited to the 4.4 MAF limit.

MWD was the beneficiary of all the surplus water above 4.4 MAF per year, however, because of their low priority within California for Colorado River water, when the surplus deliveries were eliminated, all the cutbacks had to be absorbed by them. Under the 1931 California Priority System, the Palo Verde Irrigation District (PVID), the Yuma Project, and the Imperial and Coachella Valley Irrigation Districts (IID and CVWD) received a combined 3.85 MAF leaving 0.55 MAF for MWD. Under this Priority System, MWD was granted the first right to any additional surplus water available from the Colorado River. Thus, during the period when 5.1 MAF was being delivered to California, MWD received 662,000 AF of additional water which more than doubled its allocation. In 2002, due to the drought, MWD essentially lost 662,000 AF of water.

To alleviate future such situations, MWD and the irrigation users in 2023 developed the Quantification Settlement Agreement (QSA) that capped the water allocations for each irrigation user to replace the shared allocation for all irrigation users that was established in the 1931 Priority System. The capped annual amounts per the QSA are as follows: 1) PVID and Yuma Project – 0.42 MAF; 2) IID – 3.1 MAF; 3) CVWD – 0.33; and 4) MWD – 0.55 MAF.

With QSA, MWD began developing the California 4.4 Plan by negotiating conservation measures with IID, where MWD pays IID to implement sprinkler irrigation and other methods to save water in exchange for the water saved. San Diego County Water Authority also developed agreements to exchange conservation for saved water. The State of California also funded the concrete lining of the All-American and Coachella canals to provide water for MWD. In 2007, because of the continued decline in Lake Mead storage, the US Department of the Interior (Bureau of Reclamation) approved the Interim Guidelines that established triggers for cutbacks of water to Arizona and Nevada based on the water level elevation of Lake Mead. It also created a concept called Intentionally Created Surplus (ICS) which enabled MWD to store water in Lake Mead in those years when abundant water was available from the SWP or other sources. It greatly increased MWD's flexibility and storage capacity for managing seasonal variations in water supply. The Interim Guidelines expire at the end of 2025 and negotiations are underway for new guidelines to enable continued use of the Colorado River in the future.

Lake Mead water levels declined significantly in the few years after the 2002 dry year. However, after the 2007 interim guidelines were established, Lake Mead water levels remained above the trigger point for cutbacks to Nevada and Arizona for 13 years and appeared to be stabilized. In



that time, California reduced its use of Colorado River water by 30 percent. Then, the hottest and driest period in history (worse than 2002) occurred in the Colorado River watershed between spring 2020 and late fall 2022. Runoff efficiency (the percentage of precipitation that runs off into the river) declined alarmingly to 57% in 2020, 37% in 2021, and 58% in 2022.



MWD was forced to turn to the Colorado River to compensate for its supply deficit from the SWP and increased demand from Los Angeles, which, combined with the reduced runoff in the Colorado River watershed, caused the water level in Lake Mead to drop precipitously between 2020 and 2022. It dropped below the trigger points for delivery cutbacks to Arizona and Nevada and briefly touched the trigger point for cutbacks to California in 2022. Adding to the problem was a reduction in releases from Glen Canyon Dam to prevent Lake Powell's elevation from

dropping below the point at which hydroelectric energy could no longer be generated.

At that point, the commissioner of the Bureau of Reclamation, Camille Touton, called for a 2 to 4 MAF annual reduction in usage from all the Colorado Basin states. In response, six states other than California sent letters to the commissioner complaining that they are already doing enough to preserve the river and that others need to do more. California, on the other hand, proposed a 400,000 AF yearly reduction for the next three years. Although California was the only state to volunteer a specific amount of water use reduction, all of the other states complained that it was not enough. Thus, it appeared that a consensus resolution to the problem was unlikely to occur.

Fortunately, two things occurred that changed the outlook for a resolution at an opportune time. First, the 2022 Inflation Reduction Act allocated \$4 billion for western drought relief. Second, the doom and gloom weather forecasts turned out to be extremely wrong and instead, record precipitation and snowpack in the west resulted in a more-than 30-foot increase in water elevation in Lake Mead by the end of 2023.

A major issue in developing guidelines for the future is determining what that future will look like. Climate scientists can't agree on the extent to which Colorado River flows will decline. The anticipated range is from 9 to 14 MAF in the future, which will require responses ranging from extreme at 9 MAF, to moderate at 14 MAF, which is not much different than flows we are experiencing now.

While USBR is hoping for a seven state solution, the upper basin has not yet agreed to work with the lower basin on the new guidelines. Consequently, the lower basin states have developed a proposal that considers the key issues:

- Address the supply-demand imbalance
- Reductions based on total system contents including all upper basin reservoirs (not just Mead and Powell)
- Two reduction tiers – one to address the lower basin structural deficit, and one to address climate impacts in both basins
- Expand storage in Lake Mead and incentivize conservation

The lower basin proposal is based on the remaining storage in Lake Mead. When Lake Mead is between 100% and 69% full, no cutbacks in deliveries are needed. From 69% to 58%, lower basin cutbacks gradually increase from zero to 1.5 MAF. From 58% to 38%, lower basin

agencies will cutback a fixed 1.5 MAF total. Between 38% and 23%, lower AND upper basin states must cutback from 1.5 to 3.9 MAF. Below 23%, all states continue to cutback 3.9 MAF.

To address the structural deficit, the lower basin states and Mexico agree to the following cutbacks totaling 1.5 MAF: Arizona, 760,000 AF/year (27%); California, 440,000 AF/year (10%); Nevada, 50,000 AF/year (16.7%); and Mexico, 250,000 AF/year (16.7%). This is a consensus proposal under which California is volunteering more water than legally needed.

As structured, the proposal reduces litigation risk, decreases risk of unfavorable Legislative action, and maintains MWD's flexibility to continue negotiating mutually beneficial initiatives such as cost-sharing on their Pure Water Recycling program in exchange for an additional portion of their Colorado River water.

The next steps involve USBR's collection and review of all submitted alternatives, which are due this month. Notably, the upper basin has submitted a proposal that offers no cutbacks from their four states. Proposals are also expected from environmental organizations and the Native America Tribes. USBR will then prepare a Draft EIS to be published in December, 2024, and obtain legislative actions by mid-2026, when the Final EIS is expected to be published.

GUESTS OF THE MONTH
APRIL 2024

DENIS OBIANG, Director of Power System Planning
UPDATE ON POWER SYSTEM STRATEGIC VISION

The Los Angeles Department of Water and Power's (DWP) strategic vision for its Power System is focused on compliance with enacted public policies at both the state and local levels. California's SB 100 mandates 60% renewable energy by 2030 and 100% clean energy by 2045. The City of Los Angeles has taken a more aggressive posture and is targeting 80% renewables by 2030 and 100% clean energy by 2035. Achievement of those targets will require significant upgrades to generation resources, the transmission system, and the distribution system.

RESOURCES PLAN

DWP's current power resource portfolio includes: 1) Hydroelectric power – 1,761 MW; Renewables – 3,640 MW; Nuclear – 387 MW; and Thermal/Gas – 4,979 MW.

The total generation capacity of DWP's current portfolio is 10,767 MW. To achieve the city's goal, the thermal/gas component of the portfolio will have to be decarbonized. Currently (2022), renewable sources account for 35.6% of the portfolio. When hydroelectric and nuclear (Palo Verde Nuclear Power Station) are added, clean energy sources account for 51.6% of the portfolio.

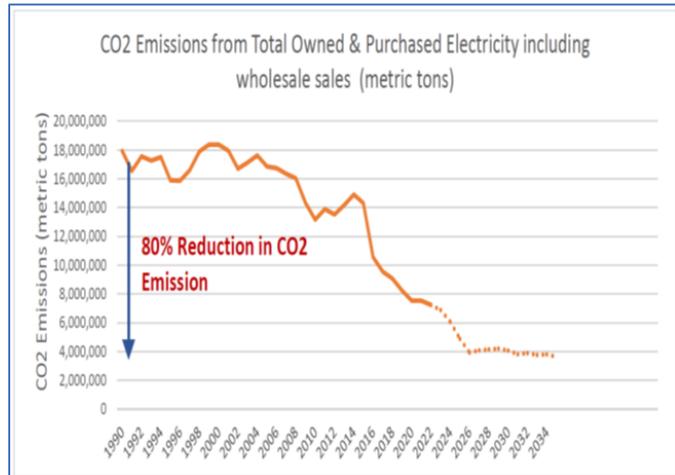
By 2030, the renewable sources will have to grow to 80% of the portfolio, and assuming the hydroelectric and nuclear components remain proportional, clean energy sources will be 96.6% of the portfolio. Electrification of the transportation and buildings sectors will concurrently require substantial increases in power generation to accommodate the growing demand, and that may "dilute" the percentages given above depending on the specific mix of new generation sources brought online.

The current plan for the existing coastal thermal plants is to pursue green hydrogen-fueled turbines at Scattergood as a test case for the technology. DWP is working with developers to determine the feasibility of purchasing green hydrogen from the open market. Environmental documentation is nearing completion. Once done, DWP will seek final approval from the City Council, but will have to show that all alternatives have been pursued. The Sierra Club has

been advocating hydrogen fuel cells instead of hydrogen combustion at Scattergood, so the feasibility, or lack thereof, of all alternatives will have to be clearly explained. DWP is receiving \$150 million in grant funding from the federal government to develop hydrogen technology for power plants.

Wet cooling at Haynes Steam Plant is concurrently being developed to comply with requirements to eliminate once-through cooling using seawater. Such technology may be applied to other coastal plants if hydrogen proves to be a feasible fuel for turbine generation, which in some form is needed for reliability.

Since 1990, DWP has achieved significant reductions in CO2 emissions from owned and purchased power and is forecasting an 80% reduction by 2030 (see chart above). This will be a significant achievement, especially compared to the rest of California, which will not achieve its 40% reduction goal by 2030.



Achievement of the 100% clean energy goal by 2035 will require extensive improvements to the resource procurement process, especially with regard to the time required by the

process as currently structured. DWP will work with resource developers to communicate needs in terms of types, quantities, and timelines. Feedback from those developers will be incorporated into the Strategic Long Term Resource Planning process to assure alignment with DWP's processes. The DWP procurement process will be enhanced to streamline the acquisition of energy and needed services.

TRANSMISSION PLAN

The transmission system currently in place for the City of Los Angeles consists of more than 15,000 miles of power lines and cable bringing diverse sources of power to the city from generation sources located throughout the southwest and pacific northwest. Expansion to accommodate energy demand growth and new sources will be a significant challenge because many of the transmission corridors are constrained or limited in capacity. DWP is pursuing 34 projects for completion by 2030 to upgrade transmission capacity in existing rights-of-way and is considering new conductor materials to improve capacity with minimal new infrastructure. The transmission plan also calls for accommodating new geothermal sources which are important because of their ability to generate on-demand. All design work will be done in-house to DWP standards.

Three transmission expansion projects will be needed, two involving existing corridors from the Victorville area and from Utah (IPP corridor). The third is a new corridor to the east to bring in wind power from New Mexico and solar from Arizona and California. The third corridor will require careful planning and routing to avoid environmental-based objections that may delay the project.

DWP is seeking collaboration with other utilities for cost-sharing (and risk reduction) on some of these transmission projects. Additionally, DWP has applied for federal funding under the Department of Energy's Grid Resilience and Innovation Partnerships (GRIP) program.

DISTRIBUTION PLAN

Upgrading the distribution system is going to be a significant problem due to the exponential growth in demand anticipated from electric vehicles (EVs), data centers, new technologies, and building electrification. Load growth and customer demands for specific services will drive the evolution of the distribution system in the next few years. Furthermore, there currently exists a 200 GWH gap in battery capacity, which is critical to the successful conversion to renewable energy. A possible solution to the battery issue is the discovery of the world's largest lithium reserve in Imperial Valley, CA, that will be developed to manufacture batteries for the entire nation's battery needs.

The DWP distribution system consists of a 34.5KV system and a 4.8KV system. Most residential and small commercial customers are served from the 4.8KV system while larger customers such as the Port of LA, the Airport (LAX), hospitals, hotels, and EV charging hubs are supplied from the 34.5KV system. Because of the unprecedented load growth especially from EVs, the 34.5KV system will have to be expanded significantly. Then large customers will be shifted to the 34.5KV system to accommodate load growth from smaller customers on the 4.8KV system. Expansion of the 34.5KV system will also accommodate significant load growth at LAX and the Port of LA.

DWP's business model for EV charging is to build EV Charging Hubs throughout the city, initially on city-owned property, then expanding to private parking lots (such as those owned by churches) as feasible. The goal is to assure easy access to such charging stations for all citizens of the city and to assure the affordability of charging especially in disadvantaged communities.



Mystery History Answers

B) 1937

D) Los Angeles Gas and Electric Corporation

More information at:

https://waterandpower.org/museum/Mystery_History.html OR Click [HERE](#)

SAVE THE DATE

2024 CALENDAR

GUEST OF THE MONTH

Meetings in Person
Room 1471, JFB and Via
Zoom, Check your WPA
Emails for the Zoom Link



BEN WONG WATER RESOURCES DIVISION LADWP	MAY 8, 2024 Water Supply for LA in 2024
LADWP COMMISSIONER INVITED	JUNE 12, 2024 Challenges Facing LADWP
ARAM BENYAMIN TENTATIVE LADWP	JULY 10, 2024
RAPHAEL VILLEGAS OPERATION NEXT MGR LADWP	AUGUST 14, 2024 Status of Operation Next
FIELD TRIP	SEPTEMBER, 2024 Headworks Reservoir

BECOMING A MEMBER

Join

- + HELP PRESERVE LOS ANGELES REGIONAL HISTORY OF WATER AND ELECTRICITY
- + DISSEMINATE KNOWLEDGE OF THE RICH MULTI-CULTURAL HISTORY OF LOS ANGELES
- + BECOME INFORMED AND GAIN INSIGHT AND EXPERTISE ON WATER AND ELECTRIC ISSUES

ANNUAL MEMBERSHIP \$30

ONLINE AT WATERANDPOWER.ORG
 BY MAIL, FILL OUT THIS CARD AND WRITE A CHECK TO:
 WATER & POWER ASSOCIATES, INC
 SEND BOTH TO:
 10736 JEFFERSON BLVD, UNIT 165
 CULVER CITY, CA 90230

NAME _____

ADDRESS _____

PHONE _____

EMAIL _____

COMPANY, TITLE/POSITION, RETIRED _____

Check if you would like to receive a digital copy of the newsletter only, to save mailing costs.

+ Water & Power Associates, Inc, is an IRC 501 (c) (4) organization. Donations are not tax deductible.