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WATER & POWER ASSOCIATES, INC.

NEWSLETTER

For a Sustainable Los Angeles



Strategic Long Term Resources Plan Update

By Robert Yoshimura

On September 14, 2022, LADWP’s Jason Rondou, Director of Power Resource Planning, and Jay Lim, Manager of the Strategic Long Term Resources Plan, spoke to the Water and Power Associates monthly meeting to provide an update on LADWP’s Strategic Long Term Resources Plan (SLTRP). The planning process for the SLTRP began approximately a year ago and is expected to be complete in October 2022. An initial presentation on the plan was given to Water & Power Associates in October 2021, in which Jason Rondou outlined the process, its structure and its goals. A summary of that presentation was published in the January 2022 edition of this newsletter.

LADWP’s effort to convert to 100% clean energy began with the LA 100 Study, mandated by the City Council to evaluate pathways and costs to achieving 100% renewable energy while maintaining current levels of reliability. The mandate also required an assessment of the benefits to the environment and public health, impacts on jobs and the economy, and how communities can shape these changes to prioritize environmental justice. The study was conducted by the National Renewable Energy Laboratory and completed in early 2021.



Key findings of the LA 100 study were:

- 100% renewable energy is technically feasible but the study did not consider political, regulatory, or other non-technical roadblocks that may arise.
- Combustion turbines fueled by hydrogen or other clean fuel are necessary for reliability and resiliency.
- Building and transportation electrification are the keys to affordability of the program.
- Transportation electrification will additionally have a huge impact on the reduction of NOx emissions in the basin.
- \$57 to \$87 billion in additional expenditures are necessary to complete the program.
- Common areas of investment occur across all scenarios and those investments have become the focus of DWP staff in the early phases of the program.

Next steps in the program address those common areas and are intended to accelerate transmission projects, convert local generation plants to hydrogen fuel, develop energy storage

(Continued on page 3)

Editor's Column

The Power System of LADWP is about to commence on what is probably the most ambitious undertaking in its history that will require a complete change in its way of supplying and delivering electricity to its customers. The last time anything close to this ambitious was attempted was in the 1970s when the Intermountain Power Project was developed.

In this issue we focus on the changes coming to the electric industry. Please carefully read our opening article which is a summary of the presentation made to the W&PA Directors by Jason Rondou, Director of Power Resource Planning and Jay Lim, Manager of the Strategic Long Term Resources Plan (SLTRP) at our September meeting. Their presentation outlines the scope and a preliminary estimate of costs to be incurred to make these SLTRP changes happen. The LADWP Board of Commissioners will be adopting the SLTRP later in the year.



We also have included the W&PA input to the Board on page 7 and excerpts from a Question-and-Answer Session by the LADWP General Manager, Martin Adams, with the LA Business Council on page 10.

On the water side, Southern California has made it through this summer's drought through substantial conservation efforts and water from the Colorado River. Read about changes that are likely to come to California's Colorado River Supplies, and why they will be required from that source in the future.

Don't miss our Mystery History feature and see how you do.

SHARE THE NEWS -

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Jerry Gewe, Editor



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Strategic Long Term Resources Plan Update (continued from page 1)

projects, and achieve other necessary common goals that are independent of the scenario chosen. The SLTRP will then provide a roadmap to 100% clean energy by 2035 by selecting a scenario that collectively optimizes environmental benefits and equity, reliability and resiliency, and affordability. Clean energy in the context of the SLTRP includes large hydroelectric and nuclear energy plus renewable sources. Large hydro and nuclear are not considered renewable by the State of California.

Achieving the clean energy goals will require unprecedented investments in diverse resources and technologies including new renewable energy sources, storage capabilities, new transmission, and local dispatchable turbines producing at least 2,600 MW combined. The power system cannot be operated with the required degree of reliability and resiliency without this local dispatchable capacity. Currently, the four in-basin generation stations in Los Angeles produce a total of 3,850 MW of which 1,660 MW is ocean-cooled (once through) and will be shut down by 2029. Thus, the remaining 2,190 MW of gas-fueled generation will either be supplemented or replaced by hydrogen-fueled units to achieve the needed in-basin generation capacity.

DWP is gathering feedback from its stakeholders through the Advisory Group of which W&PA is a member, and through public outreach meetings conducted in August 2022. As a result of the feedback received, DWP is incorporating additional studies into matters such as alternatives to hydrogen combustion turbines, long duration storage options, local air quality impacts, equitable development, and impacts on rates.

The SLTRP considers a reference case (SB 100 which mandates 100% clean energy by 2045) and three test cases which differ from each other in the speed of reducing greenhouse gas emissions and in the amount of distributed energy resources (DERs). All three test cases achieve 100% clean energy by 2035 as desired by the City Council, and all three utilize varying degrees of large hydro and nuclear power.

The required build rate to achieve each case will require exponential growth in the rate of addition of new generation, transmission, and distribution capacity each year. Even the reference case will require the addition of 500 MW of capacity per year which is 2-1/2 times the current build rate. Cases 1 through 3 will require build rates ranging from 1,100 to 1,250 new MW per year from now through 2035. That represents up to a five-fold increase in the build rate, which is technically feasible, but will require that numerous organizational, human resources, regulatory, and political challenges be overcome.

Additional bulk power resources that must be added by 2035 vary from 5,500 MW for the reference case, to 13,800 MW for Case 3.

Current bulk power resources total 10,000 MW; thus, the program will require more than a doubling of bulk power resources as well as replacement of nearly all existing bulk power with renewable energy sources. Bulk power resources include utility-scale renewable sources, utility-scale storage, and in-basin hydrogen generation.

Additional distributed energy resources that must be added by 2035 vary from 1,600 MW for the reference case, to 3,700 MW for Case 3. Current distributed resources total 600 MW, thus the program will require more than a six-fold increase in such resources. Distributed energy resources include distributed solar power, distributed storage, and demand response.

The total cost of the SLTRP cases based on the net present value of anticipated cash flow through 2045 is as follows: Reference case - \$60 billion, Case 1 - \$74 billion, Case 2 - \$78 billion, and Case 3 - \$81 billion. The total cost includes generation, transmission, and upgrades to the distribution system to handle the additional load. However, should a decision be made to increase distribution voltage from 4.8 KV to 12 KV or higher, those costs are not yet included.

The reliability of all cases was estimated based on loss of load hours (LOLH) which defines the number of hours per year when generation cannot meet demand. The industry standard for reliability is 2.4 LOLH which is the estimated reliability of the reference case. All three of the test cases are expected to produce exceptionally high reliability of less than 0.5 LOLH.

Air quality impacts of the core cases in the SLTRP were assessed in terms of the emissions of Oxides of Nitrogen (NOx). An analysis of baseline data showed that emissions from DWP's in-basin generation plants in 2012 was a tiny fraction (0.4%) of total NOx emissions. Eighty percent of NOx emissions come from the transportation sector, thus the ability to reliably provide for future clean energy needs of that sector is key to reducing the emissions from that sector as well as from commercial and residential buildings. Part of the strategy for emissions reduction is to minimize the use of each of the in-basin generation plants to 1% of the capacity factor under normal conditions compared to a range of 2.3% to 27.8% today. In-basin plants will also provide back-up power in the event of a loss of transmission or low renewable energy output. Such a strategy will reduce NOx emissions from DWP plants by 97%.



Green hydrogen is the proposed fuel for in-basin plants in all scenarios to eliminate carbon emissions while maintaining the flexibility and reliability of dispatchable turbine generation. Hydrogen will be used as a clean fuel to back up renewable energy sources when the sun isn't shining, or the wind isn't blowing. It is the only way to reliably continue serving power in the event of a transmission outage such as the 22-hour outage of the Pacific DC Intertie caused by the Saddle Ridge fire in 2019. It is needed to achieve the last 10% towards a 100% clean and reliable power grid. However, in-basin hydrogen use under normal operating conditions is estimated to account for only 1% of energy needs. The cost of using hydrogen vs. existing gas generation is \$2.9 billion for that 1% of demand.

Greenhouse gas emission (GHG) reductions achieved by the reference case and three test cases are similar between now and 2035. All four cases reduce GHGs from 8 million metric tons per year to the range of 1.5 to 3 metric tons per year by 2035. The reference case provides the slowest reduction and cases 1 through 3 progressively increase the rate of reduction. Cases 1 through 3 achieve zero carbon emissions in 2035, while the reference case continues to produce about 2 million tons of GHG annually until 2045.

The cost impacts of the program will significantly increase power rates between now and 2035. The estimated average annual rate increases for each case for the periods 2022 – 2035 and 2022 – 2045 are as follows:

- Reference case – 4.8% and 3.3%
- Case 1 – 7.7% and 5.2%
- Case 2 – 7.7% and 5.2%
- Case 3 – 8.4% and 5.6%

Obviously, a large cost penalty in terms of customer rates is incurred if a completion date of 2035 is selected instead of 2045 as required by SB 100.

The overall increase in customer bills between now and 2035 for each case is:

- Reference case – 84%
- Case 1 – 161%
- Case 2 – 161%
- Case 3 – 184%

The above numbers include the estimated cost of pass-throughs, but does not include any benefits that may result from the Inflation Reduction Act. They also assume an annual inflation rate of 2.5% for the period under consideration. All of the above cost impact estimates are preliminary as they have not yet been finalized by the Financial Services Organization.

A final presentation on the SLTRP including a recommendation of the preferred case will be made to the Board of Commissioners on October 11, 2022 at which time the Board is expected to vote on the recommendation.

Curtailment of Water Allocations from the Colorado River

By Robert Yoshimura

The following article is a summary of water curtailments affecting California. This information was taken from a comprehensive report published on September 7, 2022 by the Congressional Research Service titled “Management of the Colorado River: Water Allocations, Drought, and the Federal Role”.



The operation of the Colorado River including allocations of water to each of the seven basin states is governed by a myriad of pacts, agreements, contracts, court decisions, and the Mexican Water Treaty of 1944 which are collectively known as the “Law of the River.” In response to the current mega-drought, a number of recent amendments to the Law of the River have been made that establish curtailments of deliveries to the recipients.

In 2005, the US Bureau of Reclamation (USBR) began the development of interim shortage guidelines that mandated delivery cutbacks for the states of Arizona and Nevada based on pool elevations in Lake Mead. Those guidelines were adopted in 2007 and the first cutbacks were triggered in 2021 when the elevation of Lake Mead dropped below 1,075’ and a Level 1 shortage was declared for the first time in history. A year later, in August of 2022, a Level 2 shortage was declared when Lake Mead elevation dropped below 1050’, resulting in additional cutbacks in deliveries to Arizona and Nevada (see Table below).

| Lower Basin Water Delivery Curtailment Volumes | | | | | | | | | | | | |
|--|----------------------------------|----|--------------------------------|-----------------|----|-----|--|---|-----------|------------|------|-----|
| (values in thousands of acre-feet) | | | | | | | | | | | | |
| Lake Mead Elev (ft) | 2007 Interim Shortage Guidelines | | Minute 323 Delivery Reductions | DCP Curtailment | | | Binational Water Scarcity Contingency Plan | Total Volume of Curtailment (% of Colorado River Apportionment) | | | | |
| | AZ | NV | | Mexico | AZ | NV | | CA | Mexico | AZ | NV | CA |
| <1090 | 0 | 0 | 0 | 192 | 8 | 0 | 41 | 192 (6.8%) | 8 (2.6%) | 0 | 200 | 41 |
| <1075 | 320 | 13 | 50 | 192 | 8 | 0 | 30 | 512 (18.2%) | 21 (7%) | 0 | 533 | 80 |
| < 1050 | 400 | 17 | 70 | 192 | 8 | 0 | 34 | 592 (21.1%) | 25 (8.3%) | 0 | 617 | 104 |
| <1045 | 400 | 17 | 70 | 240 | 10 | 200 | 76 | 640 (22.8%) | 27 (9.0%) | 200 (4.5%) | 867 | 146 |
| <1040 | 400 | 17 | 70 | 240 | 10 | 250 | 84 | 640 (22.8%) | 27 (9.0%) | 250 (5.6%) | 917 | 154 |
| <1035 | 400 | 17 | 70 | 240 | 10 | 300 | 92 | 640 (22.8%) | 27 (9.0%) | 300 (6.8%) | 967 | 162 |
| <1030 | 400 | 17 | 70 | 240 | 10 | 350 | 101 | 640 (22.8%) | 27 (9.0%) | 350 (7.9%) | 1017 | 171 |
| <1025 | 480 | 20 | 125 | 240 | 10 | 350 | 150 | 720 (25.7%) | 30 (10%) | 350 (7.9%) | 1100 | 275 |

In 2017, a supplement to the Mexican Water Treaty known as Minute 323 was adopted that defined delivery reductions to Mexico based on pool elevations in Lake Mead in a similar fashion to the 2007 Interim Guidelines. Minute 323 included a Binational Water Scarcity Contingency Plan that defined additional cutbacks for Mexico and became effective when the Lower Basin States adopted a Drought Contingency Plan.

In 2019, a Drought Contingency Plan (DRP) was signed by the Lower Basin States that provided for additional curtailments for Arizona and Nevada and established first time-ever curtailments for California which were triggered in late July 2022 when the elevation of Lake Mead dropped below 1,045' and briefly reached 1,040' before monsoon storms significantly raised the water level.

Since 1999, when Lake Mead's water level reached its historical peak at 1,215', the mega-drought has lowered the water level by 170'. As of October 6, 2022, the water level was 1,045'. The average annual decline in water level from 1999 to 2022 has been 7.4', however it has declined 25' in just the last year, partly due to drought mitigation measures implemented in the Upper Basin that stopped outflows from upstream Lake Powell to preserve its ability to generate electricity.

Part of the reason for the steady decline is the reduced precipitation caused by climate change and a second part of the reason is the steady growth in population in the region served by the Colorado River. Additionally, the initial allocations of water from the river were optimistically high. The 1922 Colorado River Pact assumed an average annual river flow of 16.4 MAF (million acre-feet). Recent analyses of historical data between 1906 and 2020 revealed that actual flow as measured at Lee's Ferry, AZ averaged only 14.7 MAF. Furthermore, from 2000 to 2020, average flow was only 12.5 MAF.

That 12.5 MAF flow during the mega-drought is fully 4 MAF short of the 16.5 MAF in total allocations made under various provisions of the Law of the River. These revelations have caused widespread concerns among the basin water users and within USBR. Based on a deterioration of the hydrologic outlook for the Colorado River, on June 14, 2022, USBR called for further reductions in water use by the Upper and Lower Basin States of two to four MAF in 2023. These requested reductions are in addition to the curtailments summarized in the table above and will require at least a doubling of the curtailments outlined therein. Because of California's relatively small contributions to water curtailments due to its senior water rights, it may be pressured to contribute a larger portion of necessary curtailments in the future.

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October 6, 2022

Recommendations regarding the Strategic Long Term Resources Plan (SLTRP)

Dear Board Members:

The Water & Power Associates (WPA) strongly supports the Department's plan for a Green LA. The WPA firmly recommends that the Department establish a robust program for establishing milestones and monitoring the progress towards meeting these milestones with annual reports and a formal process for revising the plan as required.

Milestones should be established and monitored because meeting them in a timely manner has a tremendous impact on the viability and cost of the program.

Key milestones include:

1. The assumed level of load growth generated through increased electrical consumption due to the elimination of domestic natural gas appliances, and conversion of industrial natural gas-based processes to electrical processes.
2. The amount of electrical load growth created by EV's (Not all automakers are committing to EV replacement of high consumption sport vehicles and light trucks).
3. The growth of green hydrogen availability to meet reliability requirements provided by hydrogen-fueled basin generation.

In the interest of rates transparency, we also suggest a broad financial milestone be established stating that LADWP total electric bills will remain at least 5% below the electric bills of the Southern California Edison customers for similar customer class and usage. These numbers should be confirmed annually by the Ratepayer Advocate and prior to any rate action.

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Finally, a few specific rate related items include:

- A. Conduct a detailed rates analysis for the total power bill over the 12 years of the SLTRP, showing the impact on various customer classes with public hearings and review by the Ratepayer Advocate.
- B. For full transparency, the bills should represent all electric charges to the customer in the SLTRP and in Item A including the LA City 10% tax.
- C. The study should be reviewed to ensure that the impacts of high inflation are appropriately considered.

Thank you for the opportunity to comment on the SLTRP and to suggest that the Department address significant implementation issues.

The Water and Power Associates is a 501(c)(4) Corporation advocating for sound Water and Energy policies for Los Angeles, Southern California, and California.

Sincerely



Gerald A. (Jerry) Gewe

CC: Dr. Fred Pickel
Martin L. Adams

Is Hydrogen the Miracle Fuel to Address Global Warming? (Part 4)

By William Glauz

This is the fourth and final article in the hydrogen series. We will attempt to address the costs and issues associated with delivery and storage of hydrogen, equipment modifications needed to utilize hydrogen with combustion turbines/engines, and also address safety concerns with using hydrogen on a large scale. The first three articles in this series from the January, April and July 2022 editions of the Water and Power Associates Newsletter addressed global warming, policies that are aimed at reducing carbon emissions, the concept of using hydrogen as an alternate fuel, the current uses and methods of production of hydrogen and the vision for future hydrogen production and use.

As mentioned in the previous article, the cost of producing green hydrogen today is still relatively expensive compared with the cost of natural gas, even when considering the recent runup in natural gas pricing. However hydrogen could become more cost competitive than natural gas with: 1) Continued growth and cost reductions in renewable sources of electricity used for the electrolysis of water into hydrogen; 2) Improvements in the efficiency of electrolysis; and, 3) Potential regulatory costs for carbon emissions associated with carbon-based fuel use.

However there are many other issues associated with the use of hydrogen as a fuel to replace natural gas. The biggest challenges to replacing natural gas with hydrogen for electricity production are the transportation and storage of hydrogen, and the complications of burning hydrogen in utility scale turbine-based power plants.

Due to its small molecular size, hydrogen gas is difficult to contain, which makes its transportation and storage more challenging. In addition hydrogen has low energy density per volume, so storing hydrogen requires external energy to cool or compress the gas.

There is an existing hydrogen pipeline infrastructure in the United States of approximately 1,600 miles, primarily associated with the petroleum and chemical industry. A significant amount of new hydrogen pipelines will need to be built to utilize hydrogen for power generation at existing plants.



This new hydrogen infrastructure will be both costly and present technical barriers including the potential for hydrogen to weaken steel and welds in the pipelines, the need to control the potential for hydrogen leakage, and the need for lower cost, more reliable, and more durable hydrogen compression technology. Adapting the existing natural gas delivery infrastructure to accommodate hydrogen may be an option to investigate, but significant and costly modifications would be required.

Hydrogen can be stored as either a gas or a liquid. Storage of hydrogen as a gas typically requires high-pressure tanks with the ability to store hydrogen in the range of 5,000–10,000 pounds per square inch. Storage of hydrogen as a liquid requires cryogenic temperatures because the boiling point of hydrogen at one atmosphere pressure is $-253\text{ }^{\circ}\text{C}$.



Storing hydrogen therefore requires the input of energy to compress the gas. For electric power generation purposes, storage can potentially be accomplished in a large pressure vessel or a natural cavern, such as the salt dome cavern under construction for hydrogen storage near the Intermountain Power Project in Delta, Utah.

Hydrogen has characteristics that make it an attractive choice as a fuel, primarily producing no carbon dioxide emissions. However, shifting electric power generation from natural gas to hydrogen would likely require hundreds of billions of dollars of investment by the electric power industry.

Hydrogen's high flammability means that it burns at a high temperature that makes it unsuitable for use directly in the combustion turbines used to burn natural gas today. What effects would the combustion of hydrogen have on the combustors, flame, and exhaust in an existing natural gas combustion plant?

- Higher flame speed. The velocity of the unburned hydrogen into the turbine flame is over four times faster than that of natural gas. This causes concerns with the flame propagating upstream from the combustion zone into the premixing zone near the fuel nozzle, requiring hardening of turbine components to handle the increased temperatures.
- The increased combustion temperatures associated with burning hydrogen also can generate high levels of nitrogen oxides (NO_x), pollutants which contribute to ozone formation. Advanced NO_x emission technologies are being developed and deployed in new gas turbines.
- Hydrogen is also much more flammable than natural gas which brings significant safety concerns.
- Hydrogen has a different combustion air requirement index (a measurement of the air required for a gas to ignite) compared to methane, and therefore would necessitate modifications to most combustion turbines to allow the use of hydrogen as a fuel.

Today's natural gas-fired turbines would require modifications to the combustion elements to burn hydrogen. Due to the lower volumetric energy density of gaseous hydrogen, piping and valves would have to be larger to accommodate the higher gas volumes necessary to produce the same energy output.

Some of the newer gas turbines currently in service may possibly be converted to burn a mixture of natural gas and hydrogen, while many older turbines may not be suitable for a retrofit. The IPP Renewed project will take a significant step in proving the viability of hydrogen combustion at a large scale utility power plant. This project is scheduled to begin using a hydrogen/ natural gas blend in 2025.

L.A. Business Council Panel Discussion on Transitioning to Climate-Friendly Energy

Excerpted by Bill Woodson

<https://www.latimes.com/newsletters/boiling-point>

L.A. Times Staff Writer, Sammy Roth, moderated a panel discussion at USC on September 8, 2022, on California's transition to climate-friendly energy, hosted by Los Angeles Business Council. The panel was composed of several government officials, including LADWP GM, Marty Adams. Below is Q&A with Marty Adams per Sammy Roth:



Roth: Marty, let's turn to what's happening in Los Angeles. The Department of Water and Power operates its own electric grid separate from the rest of the state, and we've been nowhere close to power shortages or rolling blackouts here. Why has that been the case? And how are you going to keep the lights on during the speedy transition you're planning to 100% clean energy by 2035, a full decade ahead of what's required by law?

Marty Adams: We want to make sure the city always has adequate power, and as we take steps moving forward to convert to clean energy, that we don't lose that reliability. In other parts of the state, gas plants have gone offline as people see there is no future for gas. People stop maintaining them, stop building them. So, there's just less generation available.

Roth: Whereas here in Los Angeles, your department still operates several gas plants.

Marty Adams: We still have our four gas plants in the city. We know we need electricity generation located here in the Los Angeles Basin. That's not going to happen with batteries, not unless we take 10% to 20% of the land in L.A., take all the houses and buildings off it and put batteries there instead. And, that's assuming that people will allow massive battery farms in their communities, which will probably not happen. And so, we have to have local generation.

We'll continue to add batteries in L.A. We'll add batteries at all our power plants, and that'll help a lot of the time. But we need something above and beyond what classic batteries will do. And we're looking at green hydrogen as being the key to that.

Roth: Right, you're planning to convert your gas plants to run on hydrogen, and also your coal-fired plant in Utah. How much confidence do you have that it's going to work and work well for everyone? Nothing like this has ever been done on such a large scale, and green hydrogen is still relatively expensive. And while burning hydrogen doesn't create all the same nasty pollutants as fossil fuels, there can still be nitrogen oxide emissions in disadvantaged communities.

Marty Adams: Unless someone comes up with an idea that no one's thought of yet, there is no other clean fuel for the future. And we're going to need a clean fuel. So I am convinced this is where we are going. You have all the big turbine manufacturers racing to get to 100% hydrogen units. And they're going to reduce nitrogen oxide emissions because they see this as the future globally.

POWER BUZZ

Excerpted by Bill Woodson

CEC CA Offshore Wind Energy Plans—Updated 8/2022

<https://www.offshorewindca.org/>

In compliance with California Assembly Bill 525 from 2021, the California Energy Commission (CEC) must submit a strategic plan for offshore wind energy deployment off the California coast in federal waters by June 30, 2023. The CEC published a draft report on May 6, 2022 that proposed a preliminary planning goal of 3,000 megawatts for 2030 and also proposed to evaluate an additional 7,000-12,000 MW of offshore wind for 2045, establishing the total 2045 preliminary megawatt planning goals for the strategic plan at 10,000-15,000 MW.



In August 2022, the CEC published its final Commission Report on Offshore Wind Energy Development off the California Coast. For completing the strategic plan, the CEC establishes a preliminary planning goal range of 2,000 MW–5,000 MW of offshore wind for 2030. The upper end of this range could come from a full build-out of the Morro Bay Wind Energy Area (WEA) or a combination of a partial build-out of the Morro Bay WEA and Humboldt WEA. **In light of the Governor’s call to adopt a more aspirational target, and based on additional studies and comments received, the CEC establishes a preliminary planning goal of 25,000 MW for 2045.** These MW planning goals will guide the development of the strategic plan.

Wyoming Wind Energy Project

<https://www.latimes.com/projects/repowering-the-west/>

Carbon County, Wyoming: After 15 years of planning, crews are constructing gravel roads and clearing pads for roughly 600 wind turbines on Phil Anschutz’s Overland Trail Ranch. Bill Miller, Anschutz’s Senior Vice President, says Miller Hill (on the Ranch) has average wind speeds of 25 mph and would give wind turbines capacity factors approaching 60%. Miller says “the wind comes up in the morning and blows like hell until the middle of the night, especially those shoulder hours when solar just turns off.

Known as the Chokecherry and Sierra Madre Wind Energy Project, it has a planned nameplate capacity of 2,500 MW—3,000 MW. For all the world-class wind at his fingertips, Anschutz hasn’t found a buyer for the power—and not for the lack of trying. “Los Angeles Department of Water and Power would be a very natural customer,” Miller says. Anschutz is so confident he’ll be able to sell clean energy that he’s spent \$400 million permitting and preparing to build his wind farm and power line, out of an expected \$8 billion price tag—even without a customer lined up.



To get this power to the West Coast, Anschutz plans a 728 mile HVDC transmission line to Marketplace Substation, south of Las Vegas, Nevada. The “TransWest Express” planned route goes through Delta, Utah, home of IPP.

Wikipedia says “Although the line ends in Nevada, there is around 10 GW (10,000 MW) transmission capacity between Las Vegas and San Diego/Los Angeles in Path 46, enabling the power to continue to the West Coast.”.

The Times article goes on: It has been Anschutz’s plan to route TransWest Express through Delta—in part to give him the option of shipping wind energy the rest of the way to Los Angeles via IPP’s existing HVDC line to Adelanto, CA, should the city choose to buy some of that energy.

And on: Now L.A.’s green hydrogen plans offer another opportunity. Anschutz could supply some of the power that converts water to hydrogen. Or, his company could produce hydrogen at Overland Trail Ranch and ship it by rail.

California Independent System Operator (CAISO)— Western Energy Imbalance Market (WEIM)

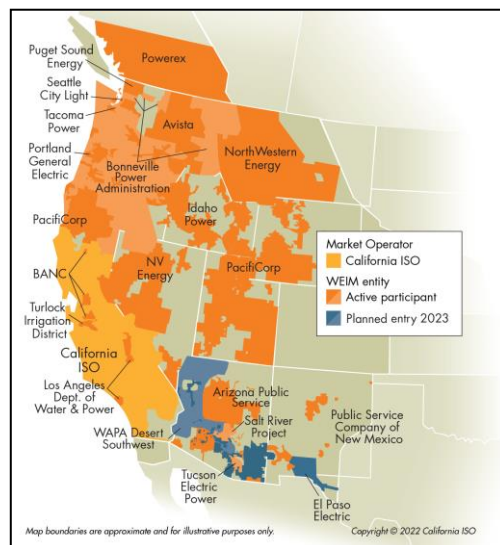
<https://www.westerneim.com>

The WEIM gained \$287 million in benefits during the second quarter of 2022.

The recent quarterly report also shows the WEIM’s cumulative benefits rose to \$2.39 billion since the market was launched in 2014.

Operated by the ISO, the WEIM is designed to enable participants to buy and sell power close to the time electricity is consumed. With state-of-the-art technology, the market finds and delivers lowest-cost resources to meet immediate power needs and manages congestion on transmission lines to maintain grid reliability. The WEIM also provides system operators with real-time visibility across neighboring grids, resulting in a more efficient balancing of supply and demand.

As a WEIM participant, LADWP second quarter benefits were \$13.78 million. The WEIM has experienced robust growth, with 19 balancing authorities now participating. In May, Bonneville Power Administration and Tucson Electric Power joined.



Building on the success of the WEIM, the ISO is collaborating with utilities, independent power producers, regulators, environmental advocates, and other stakeholders to develop an Extended Day-Ahead Market (EDAM). By optimizing diverse generation resources and transmission connectivity on a day-ahead basis across the WEIM’s wide geographic footprint, market participants could realize even greater reliability and economic and environmental benefits.

CAISO plans for EDAM implementation testing in 2023 and onboarding the first set of EDAM participants in early 2024.

WATER BUZZ

By Jerry Gewe

Desalinated Sea Water in our Future?

On October 13, 2022, about three months after rejecting the proposed Poseidon Desalination plant for Huntington Beach, the California Coastal Commission unanimously approved a permit for a smaller desalination project in Orange County near Doheny Beach.



The South Coast Water District (District) will be allowed to move forward with a five million gallon a day project that is estimated to cost \$140 million. The Commission Chair suggested that this project could be a model for future desalination projects.

This project will use slant wells to draw in water from the ocean, as opposed to intakes that have been traditionally proposed and will dilute the brine to be discharged to the ocean with sewage from a nearby sewage treatment plant. When completed (scheduled for 2027), the District will be able to reduce its reliance on imported water from 90% to between 20-40%.

The District projects that the project will add about \$7.00 a month to the average water bill, if the District does it on their own, and substantially less if they can reach agreement with other water agencies that have expressed interest in participating in the project.

Perhaps this will open the door for other similar projects.

Smart Meters

LADWP is currently offering water customers smart meters that attach to the water meter and can be accessed through your smart phone. The “Do It Yourself” installation is reported to be simple.

These meters will show your water use in real time. The algorithms built into the device will allow you to learn how much water is used by individual fixtures such as washing machines, showers, and landscaping. At \$24.00 it is a bargain for anyone who really wants to know how their water is being used.

Contact LADWP for further details.



SUSTAINABILITY BUZZ

Excerpted by William Glauz

New England Utility Will Soon Pay EV Owners to Help Back Up the Grid

Full Article from Energy News Network, September 7, 2022

<https://energynews.us/2022/09/07/this-new-england-utility-will-soon-pay-ev-owners-to-help-to-back-up-the-grid/>

The New Hampshire Electric Co-op, the largest electric distribution co-op in New England, is testing a real-time energy rate that pays owners of electric vehicles and battery storage systems for discharging power back onto the grid during periods of high demand. The new rate will enable members to become partners with the co-op, supplying energy from their batteries when it is most needed, and charging up when demand — and prices — are low.



The co-op has developed a pricing signal that can be routinely sent out over the internet showing the price of power during every hour of the following day. That's the transactive energy rate. Customers may choose to use that pricing signal to pre-determine their charging — or discharging — behavior. They may simply limit their energy usage during peak hours, thereby saving money on their bill. Or they might use bi-directional charging technology to discharge power to the grid from their EV during those peak hours and receive a bill credit for that discharge at the transactive rate.

A recent study based on the largest-ever simulation of a transactive grid concluded that consumers could save about 15% on their annual electric bill by partnering with utilities. The simulation, which was modeled on the Texas power grid, also found that a transactive model would shave peak loads by 9% to 15% and reduce daily load swings by 20% to 44%.

Renewable Energy Buildout Faces Big Hurdles

Full Article from Utility Dive, September 6, 2022

<https://www.utilitydive.com/news/clean-energy-challenges-ira-inflation-reduction-wind-solar-storage/630988/>

The recently passed Inflation Reduction Act may help the United States cut its greenhouse gas emissions by about 40% by 2030, by encouraging a significant increase in renewable energy development. The energy policy group Energy Innovation found that by 2030 there could potentially be over 1,000 GW of operating wind and solar in the United States, with “clean electricity” providing 75% of all electricity

under a “moderate” scenario. Last year, about 32 GW of wind and solar came online, bringing their total installed U.S. capacity to 226 GW, according to the Energy Information Administration. Energy Innovation’s moderate scenario envisions the U.S. having 877 GW of wind and solar by the end of this decade. Reaching that amount would require adding over 80 GW a year on average, roughly 2.5 times the pace of last year.



However renewable energy developers are warning there are a range of challenges that could keep those estimates out of reach. Some of the challenges include that the necessary transmission upgrades will be built, interconnection delays will be addressed, supply chains will provide the necessary materials to deploy these levels of clean electricity, and a sufficient workforce can supply the labor. Success will greatly depend on local and state government policies and approvals.

Why the Solar Market Is Down and Why It's Poised for a Comeback

Full Article from Power Magazine, September 8, 2022

<https://www.powermag.com/why-the-solar-market-is-down-and-why-its-poised-for-a-comeback/>

The forecast for U.S. solar energy installations in 2022 has been revised downward in a report published by Wood Mackenzie and the Solar Energy Industries Association (SEIA) on September 8, due in large part to supply chain constraints and an industry-wide slowdown caused by the initiation of a Department of Commerce investigation earlier this year on whether solar modules manufactured in several Southeast Asia countries were avoiding duties on components supplied from China.



In the second quarter of this year, 4.6 GW of solar capacity was installed in the US. That was a 12% decrease from the same period in 2021. The first quarter decrease was even more significant, a 24% decrease from 2021, which was the weakest quarter for U.S. solar installations in two years. As a result, Wood Mackenzie and SEIA have lowered their forecasts for U.S. solar installation in 2022 to 15.7 GW, the market’s lowest total since 2019.

Demand for rooftop solar continues to be strong in the U.S. The residential solar segment set a record for the fifth consecutive quarter with 1.36 GW installed in Q2, which means nearly 180,000 customers added solar panels to their homes. Commercial and community solar installations were “relatively stable,” according to the report. Utility-scale installations, however, are expected to decrease this year to only 8.1 GW, the lowest annual total for the sector since 2018.

On August 16, President Biden signed the Inflation Reduction Act into law. The law includes significant policy initiatives that will benefit clean energy, including the solar power sector. It provides long-term tax credits and incentives for a myriad of renewable energy and electrification technologies.

As Electric Replaces Gas, Who Will Pick Up the Tab for Aging Gas Infrastructure?

Full Article from Energy News Network, September 2, 2022

<https://energynews.us/2022/09/02/as-wealthy-towns-go-electric-who-will-pick-up-the-tab-for-aging-gas-infrastructure/>

This article is specifically addressing policies being developed in Massachusetts regarding the banning of fossil fuel systems for new residential construction, primarily in wealthier cities and towns, to combat climate change. Even though this article is addressing issues in Massachusetts, their concerns are similar to ours in California.

Some advocates for these policies say now is the time to create a long-term strategy to make sure lower-income residents aren't left to pay for a sprawling and aging natural gas system they can't afford to opt out of.

Massachusetts Governor Charlie Baker signed a sweeping new climate bill in August that includes authorization for up to 10 towns and cities to ban the use of fossil fuels in new construction or in substantial remodeling projects, as long as at least 10% of the housing units in the municipality qualify as affordable. New homes would not be allowed to install oil or propane tanks or use natural gas for heating or cooking.



Upgrading a natural gas line in MA

As households step away from the natural gas system, there will be fewer customers left to pay for the infrastructure. That infrastructure is aging and leak-prone, and expected to require repairs costing as much as \$16.6 billion in Massachusetts alone in coming years, according to a report from the nonprofit consulting group Applied Economics Clinic.

Statewide policies are necessary to make sure that financial burden isn't put disproportionately on lower-income residents and people of color, advocates said. And, policymakers and legislators need to start crafting these strategies immediately, they added.

Mystery History Question



Halloween Edition



Presented by Jack Feldman



This 1950's photo shows the Basserman home located on Bunker Hill at the current location of the Water and Power Building (John Ferraro Office Building). What appears to be a figure in white on the porch is not a woman, nor a ghost. It's an incinerator.

Question #1: What year was the Water and Power Building built?

- A) 1955
- B) 1960
- C) 1965
- D) 1970
- E) 1975



Before and After – View looking toward Bunker Hill as seen from the top of City Hall. Little Known Fact: The Water and Power Building was originally designed to be 20 stories tall. Things would change after the City politicians discovered that the new building would effectively be higher than the 28-story LA City Hall (mainly because it sat up on Bunker Hill). It turns out that the iconic DWP building would not be built to its original designed height and therefore City Hall would remain the tallest building in the Civic Center.

How many stories is the DWP building? _____

Answers on page 21

GUEST SPEAKERS

Summaries by Robert Yoshimura

GUEST OF THE MONTH
APRIL 2022

**Fred Pickel, PhD, Rate Payer Advocate
Office of Public Accountability, City of Los Angeles**

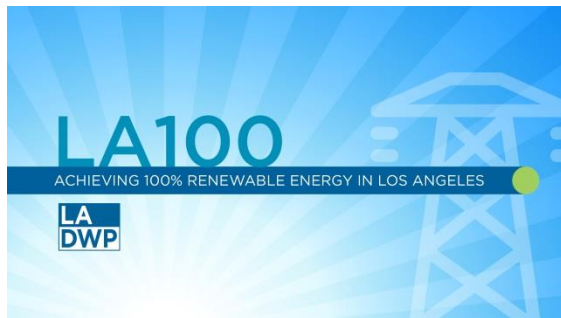
LA 100 STUDY

Fred Pickel presented a summary of the Office of Public Accountability's (OPA) review of the National Renewable Energy Laboratory's (NREL) LA 100 Study.

At the outset of the LA 100 Study of the feasibility of converting to 100% renewable energy by 2045, the OPA commissioned the Brattle Group, a research organization familiar with modeling power plants within a power system and familiar with the work NREL has done, to help monitor and develop an independent review of the study, particularly with regards to the costs, rate impacts, and risks. Dr. Pickel summarized the draft report of the review produced by OPA and the Brattle Group. The final report was presented to the LADWP Board of Commissioners.

The NREL LA 100 study assessed four scenarios: 1) SB 100 (base case), 2) Early Achievement (by 2035), 3) Transmission Focused, and 4) No New Transmission. The four scenarios are combined with one or more of three demand projections to create nine pathways to achieve the 100% renewable goal. OPA/Brattle then reviewed the costs and greenhouse gas (GHG) emissions of each pathway in 5-year increments from 2025 to 2045.

A startling conclusion of the LA 100 Study is the \$30 billion difference in cost between the SB 100 scenario and the early achievement scenario, which translates to a \$20,000 additional cost per household during the 20-year study period (2025 to 2045). Another significant conclusion is that most of the reduction in GHG emissions occurs in the first ten years of any scenario, and that the greatest reduction in GHGs results from the conversion of the Intermountain Power Project from coal to hydrogen because IPP coal accounts for nearly two-thirds of the total GHG emissions associated with power production for Los Angeles.



Another notable conclusion of the LA 100 Study is the significant benefits toward GHG reductions and health impacts resulting from electrification of buildings and transportation. While the study did not assess the cost of electrification, it did assess the cost of providing electricity to the building and transportation sectors and found that such electrification resulted in more GHG reductions at lower incremental costs.

Similarly, significant health benefits in terms of the reduction in PM 2.5 emissions (particulate matter less than 2.5 microns in diameter) also accrue from implementation of any of the scenarios. Again, the level of benefit correlates more closely with the degree of electrification, particularly in the transportation sector, than any differences among the scenarios.

A projection of retail power rates associated with each pathway over the 20-year planning period reveals that the cost of power in 2045 for every hypothetical pathway is less than the rate of inflation (the study assumed a 2.5% annual rate) except for the early achievement scenario. Even in that scenario, the cost is higher than inflation by a very small margin. However, all pathways result in steep increases in power rates over the next ten years or so, that subsequently flatten out to levels near or below the inflation rate by 2045. Thus, the near-term impact on ratepayers is significant in all pathways.

One concern expressed by the OPA is the uncertainty associated with load projections for the twenty-year planning period, because they affect the revenue from power sales that will fund the capital and operating expenses of expanded renewable energy. The LA 100 load projections begin at a level 25% higher than actual sales in 2020. This is likely because energy sales over the last ten years have been declining by about ½ percent per year and such declines have been ignored. The decline is a function of the increasing use of LED lightbulbs and the growth of behind-the-meter solar. Subsequently, depending on the load growth assumptions made (moderate, high, or stress level), future loads can vary over a huge range of values. Of further concern is the fact that LADWP's load forecasts for the past ten years have grossly overestimated the growth rate in energy use. While there is no doubt that load growth will accelerate with the electrification of buildings and transportation, the degree of that growth is difficult to estimate because it is beyond the control of LADWP. Consequently, the LA 100 estimate of revenues may be overstated which would understate the magnitude of rate increases needed.

Brattle's primary conclusions about the LA 100 Study are:

1. Focus on GHG reductions including weighing the costs and benefits of decarbonizing the power sector vs. other sectors.
2. Focus on the near-term through 2030 or 2035 where there is less uncertainty regarding pathways and costs.
3. Redevelop a plan for increasing renewables at the preferred pace for the next 10 to 15 years by revisiting the goal of the program and identifying the need for additional incentives to achieve economic and social equity benefits.

The OPA's conclusions resulting from this review are:

1. LADWP is committed and working hard to eliminate its last coal generation by 2025.
2. The most important keys to success are outside the LADWP in transportation and building electrification.
3. The LADWP's system needs to be strengthened and stay flexible to manage ever higher levels of clean resources and serve uncertain levels of electricity use, while avoiding overcommitment to technologies whose cost and performance changes may be extremely large.

GUEST OF THE MONTH
AUGUST 2022

**Stephen Kwok, Chief Information Security Officer
Los Angeles Department of Water and Power**

CYBERSECURITY ISSUES FACING LADWP

In recent years, most people have been affected by cybercrimes committed against large corporations such as Target, T-Mobile, Experian, and others in which customers' personal information has been compromised. Since the start of the pandemic in 2020, there has been a 600% increase in cybercrime, and experts predict that the total value of such crime will increase to \$10.3 trillion by 2025.

Data breaches have been affecting larger businesses and now involve huge amounts of data. Malware organizations have caused an average of \$2.5 million per year per enterprise in costs to businesses in the USA. Such organizations are major business enterprises in their own right who market to criminal elements and in some cases have customer service departments to assist their clients in perpetrating their cybercrimes.

LADWP understands the unique importance of cybersecurity strategies because of its location in a well-known metropolitan business center and because it operates critical water and energy infrastructure that must be sustained. In 2017, the Federal Government established the National Infrastructure Advisory Council that advises the president on cybersecurity issues associated with critical infrastructure. In 2018, the Department of



Homeland Security formed the Cybersecurity and Infrastructure Security Agency (CISA) to engage with private and public entities to forestall cybercrime. LADWP works closely with CISA daily for the mutual benefit of both agencies.

In 2020, Microsoft Corporation conducted a study that revealed that 46% of all cybercrimes worldwide are targeted at US businesses. Reasons for our popularity with cybercriminals is because of the lucrative outcomes of targeting American businesses and also because American businesses are a source of valuable intellectual property that is sought by foreign powers.

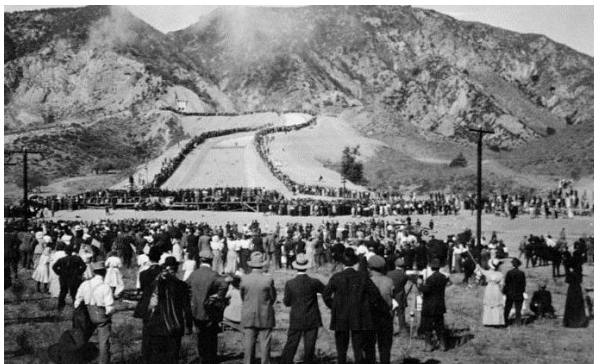
Cybercrime takes many forms, and lately one recent type of threat has increasingly affected businesses and individuals. Ransomware involves encrypting data files on a computer and demanding payment to restore access to that data. Variations on that approach include demands for payment to prevent disclosure of that data to the general public.

Phishing is another type of common cybercrime that affects DWP and its employees. Supply chain attacks involve equipment manufactured in other countries that may contain the capability to communicate with agents of those countries. For such reasons, the LADWP Cybersecurity organization now reviews purchases department-wide to assess possible threats via risk-assessment through the supply chain.

The popularity of cloud storage for business data has given rise to cloud breaches. 20% of such breaches are the result of unintended human misconfiguration – i.e., people using cloud services not being sufficiently careful. Thus, LADWP Cybersecurity has introduced the concept of being cloud smart and being selective about what information can be stored on the cloud.

Internal threats are either intentional or inadvertent. DWP is using training and education of employees to address potential mistakes that lead to internally caused breaches and to raise awareness of intentional internal threats. DWP uses a variety of tools to assess suspected internal cybercriminals and to eliminate the threat. All DWP employees are now required to take and pass cyber awareness training.

The need for awareness of cyber threats is obvious and is further demonstrated by the large number of attacks experienced daily at DWP. Yesterday, for example, 781 attacks were attempted by various cybercriminals. The DWP Cyber Security Operations Center operates 24/7 and scans and monitors all such attempts. The Center is internally staffed and engages with other state and local agencies for mutual assistance.



Mystery History Answers

Question 1: 1965

Question 2: 17 stories

More information at:


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

SAVE THE DATE

2022 CALENDAR

GUEST OF THE MONTH

MEETINGS VIA ZOOM
EXCEPT AS NOTED
Check your WPA Emails
For the Zoom Link



| | |
|--|---|
| WINIFRED YANCY DIRECTOR, POWER NEW BUSINESS AND ELECTRIFICATION, LADWP | NOVEMBER 9, 2022 LADWP's Electric Vehicle Program Luncheon at Taix French Restaurant Limit of 20 persons, Resvrn Required RSVP to jgewe@hotmail.com |
| BRAD COFFEE MANAGER WATER RESOURCES, MWD | DECEMBER 14, 2022 Bay Delta, Colorado River Issues Reliability for northern MWD Agencies |
| LADWP SPEAKER TBD | JANUARY 11, 2022 Required Improvements to LADWP Power Distribution System to Meet Future Needs |
| MARTIN ADAMS GENERAL MANAGER LADWP, INVITED | FEBRUARY 11, 2023, Saturday Annual Meeting @JFB |

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