



JANUARY 2023



WATER & POWER ASSOCIATES, INC.

NEWSLETTER

For a Sustainable Los Angeles

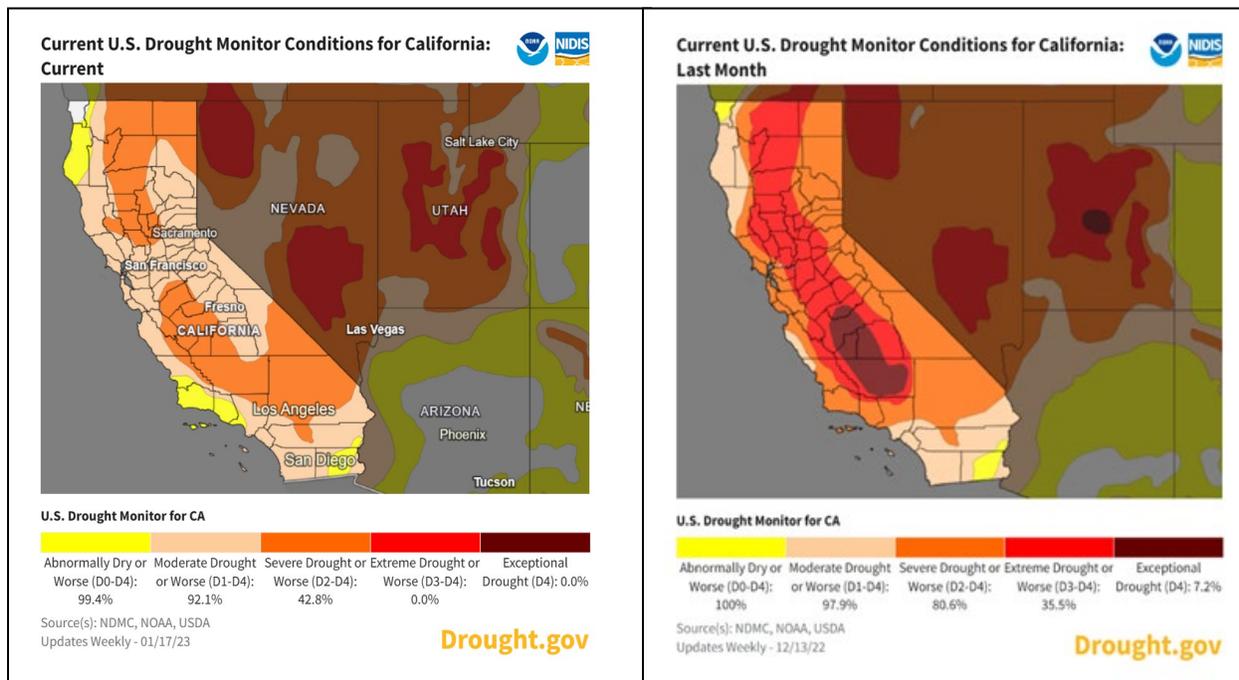


The Impact of the Atmospheric River Storms on California's Water Supply

By Robert Yoshimura

Over the past month and a half, the State of California has been deluged with a series of intense atmospheric river storms that brought record precipitation and disastrous flooding to much of the state. In the backdrop of these storms, California has experienced 23 years of drought conditions that have significantly reduced water supplies, particularly for the southern parts of the State. During that mega-drought, the availability of water from the State Water Project (SWP) and the Los Angeles Aqueduct (LAA) have been severely restricted. Average deliveries from both sources during that time frame were less than half of their respective capacities. Furthermore, numerous changes made to Colorado River's "Law of the River" during the drought (see October 2022 newsletter page 5) will begin to impact deliveries from that source this year.

So, the question this situation poses, is "what impact will the atmospheric river storms have on California's water supply in the immediate future?" As one might expect, the answer is not a simple one because of the difficulty in predicting weather for the remainder of the water year.



(Continued on page 3)

Editor's Column

This year has been a challenging year for the water agencies in Southern California.

A question on almost everyone's mind is: "will the recent rains (Atmospheric River Storms)" bring the drought to an end? The answer depends on where you are located. The featured article on page (one) gives an overview of the current status of LADWP's eastern Sierra supply, the State Water watersheds and the Colorado River supply. While there is no certain way of projecting what the rest of the winter will bring, reasonable estimates of the impact on this year's water supply are provided.



While probably currently not as high on most people's radar screens, there are activities affecting the power supplies for the future. There are articles on "What does the future hold for EV's and Smart City Technologies," the recent "Fusion Breakthrough," and "The Role of Carbon Capture in California's Climate Strategy."".

The speaker summaries from recent Board Meetings present information on important current issues facing the water and energy suppliers from managers dealing with these issues.

Be sure to see how you do with our Mystery History Question on page (13).

One thing that is certain is that in the next year there will be many important policy issues being addressed in both the Water and Energy arenas. Be sure to look for the future issues of our newsletter to stay abreast of these important issues. If you find this newsletter helpful, forward the following link to a friend or colleague, so they can get their own issue: <https://waterandpower.org/newsletters.html>

Also check out our Facebook page for the latest news.

<https://www.facebook.com/groups/118285955247256>

Jerry Gewe, Editor

The Impact of the Atmospheric River Storms on California's Water Supply (Continued from page 1)

Last year, intense storms like this year's deluged the state in late November and December and gave hope for needed drought relief. However, in the months of January, February, and March, little or no precipitation fell anywhere in the state, and that created the dire water supply situation we heard so much about in the second half of 2022. Furthermore, the situation differs for different parts of the State and for the different watershed basins we depend upon for our water.



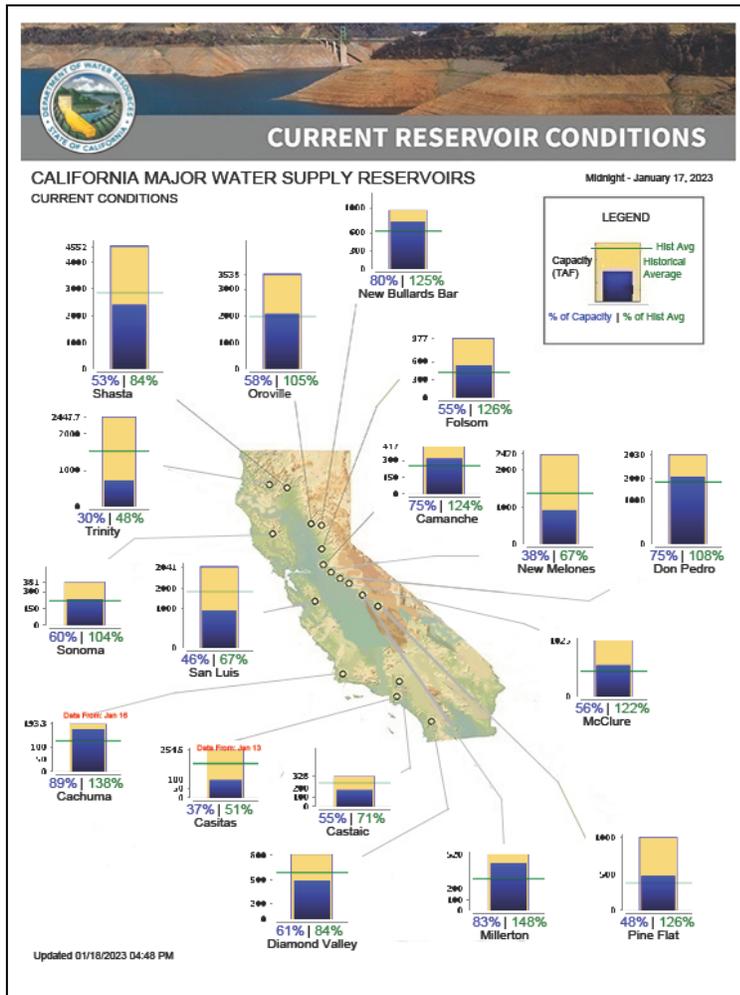
Despite the difficulties in making predictions, we have sufficient information on the water supply situation to date to take a stab at predicting the eventual outcome using reasonable assumptions about weather and demand. We begin with a graphic demonstration of the drastic change in drought conditions brought about by the storms. The maps from the National Drought Monitor (see page 1) show the drought conditions in California in mid-December and the conditions today (mid-January). The most obvious difference is the elimination of areas considered to be in either extreme (red) or exceptional (brown) drought for the first time in three years. In mid-December, about 90% of the state was considered to be in severe (orange) or worse conditions. Today 57% of the state has improved to moderate (tan) or better conditions, thanks in

large part to the 73 million acre-feet of water that fell on the state during the first seven atmospheric river storms. The eastern Sierra watershed that supplies the Los Angeles Aqueduct (LAA) with a bulk of its water supply is currently experiencing its best snowpack in its history year-to-date. As of January 17, the average snow water content was 35.2 inches or 297% of normal to date, and 155% of the April 1st average. If normal snow and temperature conditions prevail, the snowpack should be at 200% of normal on April 1st. However, should we experience a repeat of last year's weather for the rest of the winter, the snowpack would decline to 120% of the normal April 1st level. The likely outcomes for the eastern Sierra are thus a water yield of anywhere from 20% better than normal to nearly the best in history.

The western Sierra watersheds that feed the SWP, on the other hand, are more difficult to assess. Water forecasts for the eastern Sierra focus on snowpack, because nearly 100% of the precipitation on that side of the Sierra falls as snow and is stored as snow for the bulk of winter, spring, and early summer. In the western Sierra reservoir storage is a more immediate focus because so much of the precipitation captured in those reservoirs falls as rain. On the other hand, the snow water content data from the western side are excellent and show a current snowpack of 249% of normal and 121% of the April 1st average. The snowpack is expected to produce significant runoff later in the spring.

However, some of the state's largest reservoirs are at barely normal levels for this time of year. For example, Lake Oroville, the SWP's primary reservoir is at 58% of capacity and 105% of average for this time of year. The current status of other major reservoirs in California are shown in the graphic at the end of this article. Because of the disappointing reservoir conditions, the Department of Water Resources has not readjusted its initial allocation of water from 5% and will not do so until February or when data is available to reassess reservoir conditions. **UPDATE, See Newsflash on page 5.**

Had the Delta Fix, a twin tunnel project to bypass the Delta been built, a significant amount of the runoff from these storms could have been captured. Last year during the heavy storms of November and December, the Department of Water Resources estimated that 236,000 AF of water could have been diverted south for storage in reservoirs there. Unfortunately, Governor Newsom cancelled the shovel-ready project he inherited from Governor Brown and replaced it with a smaller project that will require the entire planning, design, and environmental review process to be repeated.



On the Colorado River, the water supply outlook remains dire with current storms having very little impact on Lake Mead elevations so far. During the 23-year mega-drought, water levels in Lake Mead dropped from 1,215 ft in 1999, to a low of 1040 ft in July of 2022. Since then, the summer monsoon storms and the atmospheric river storms have together managed to raise the water level by 6 feet to 1046 ft. Upper basin snowpack is currently at 153% of normal for the date, which is encouraging, but much less than the current snowpack in the Sierra Nevada. The six-foot increase in water level represents only a one percent increase in storage, and because the water level in Lake Mead is still just slightly above a Level 2 shortage condition, current efforts to further curtail water uses by the lower basin contractors are likely to continue.

So, as a final conclusion, how will the atmospheric river storms affect California's water supply?

1. The eastern Sierra watershed has sufficient snow to predict at least a 20% better than normal water supply for the LAA for the remainder of the year, and perhaps much, much more.
2. The SWP water supply appears to be in good shape except that reservoir levels are disappointing. The heavy snowpack is expected to fill those reservoirs by summer. Regardless, the Department of Water Resources will need another month or so before it can comfortably increase allocations to the SWP contractors.
3. The outlook for the Colorado River has not changed sufficiently to believe that efforts to curtail deliveries will not continue. The lower basin states (California, Nevada, and Arizona) and Mexico will continue to negotiate additional curtailments to assure that Lake Mead elevations do not drop below 1,020 ft.



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California Drought News Flash!

As a result of the record rainfall and snowpack provided by the recent atmospheric river storms, the California Department of Water Resources has just (as of January 26, 2023) announced an increase in its allocation of water to SWP contractors from the initial 5% to 30% for the current water year. The additional water will help to alleviate the anticipated supply problems that another year of drought would have caused and will offset any curtailments of Colorado River water that may be experienced.

Notice of Annual Meeting of Water & Power Associates

The 2023 Annual meeting of the Water and Power Associates (WPA) will take place on Saturday, February 11, 2023, at the John Ferraro Building at 10:00 am. In the Cafeteria Conference Center.

At this meeting reports on the activities of the Association during the last year will be provided.

Approval of the Financial Statement for the year will also take place.

The William Mulholland Public Service Award will be awarded to Jeff Kightlinger, former General Manager of the Metropolitan Water District for his leadership in developing and maintaining water supplies for Southern California.

Thomas J. McCarthy Public Service Awards will be presented to Jack Feldman for his role in the development of the WPA website and David Oliphant for his many years of service as Secretary.

Our guest presenter Marty Adams, the General Manager of LADWP will update us upon the progress and challenges facing the Department at this challenging time.

In addition, the recently appointed Chief Operating Officer, Aram Benyamin, will be present.

Important Notice

Regarding Strategic Long Term Resource Plan

The body of this report (about 500 pages) is now available for review on the LADWP website. The appendices covering equity issues and resource requirements will be added shortly. Review this important document if you want to see the proposed plans for the future of power in Los Angeles

Status of Strategic Long-Term Resource Plan (SLTRP)

Bill Barlak reported on a presentation to the DWP Board of Commissioners on October 11, 2022 by Jay Lim, Manager of the SLTRP Process for LADWP regarding the status of the Strategic Long Term Resource Planning process. Highlights of his presentation follow:

- Two major transmission line upgrades (Toluca-Hollywood I and Tarzana-Olympic I) are now in the permitting stage and pushback from the communities they traverse is expected. In addition, ten other transmission upgrades will be needed by 2029 to meet the SLTRP's aggressive schedule for 100% renewable energy by 2035.
- DWP has established a goal of achieving 330 MW of energy storage by 2023.
- The current total system generation capacity of 10,800 MW will have to double by 2045 in order to achieve the goals of the SLTRP. In addition, all existing fossil-fueled sources will have to be replaced by renewable sources by 2035.
- Public hearings on the SLTRP were held during September and October. Public concerns expressed at those meetings were focused on the \$75 to \$80 billion cost of the program and the impact of those costs on rates and on the transparency of the decision-making process particularly related to rates.
- One significant concern of the planners is how climate change may affect energy demand.
- In order to achieve 100% renewable energy by 2035, the current build rate of new energy sources of 200 MW/year will have to increase by a factor of 5 or 6 between now and then. Additionally, a proportional amount of distribution and transmission upgrades will also be needed in that same time frame.
- Board President Cynthia McLaine-Hill stopped the presentation at this time to express her concerns about the enormity of the task at hand and questioned how and if we are going to be able to succeed.
- All three cases being studied have a predicted reliability of 0.4 loss of load hours per year, compared to the industry standard of 2.4 hours/year. Thus the eventual final project will be exceptionally reliable due to the redundancy designed into it.
- In addition to McLaine-Hill, other Board members also chimed in with their concerns about the feasibility of completing this project by 2035. Some believe that the program is aspirational and not executable. In any event, the Board is beginning to understand the difficulty of the schedule established by the City's leaders.
- A DWP staff member who is involved in rate calculations reported that she is unable to make precise rate determinations until a more detailed plan of the project is produced.
- Rate Advocate Fred Pickel testified that the 2035 deadline commits DWP to the use of today's technology that will burden the project for its lifetime and result in much higher costs than would be expected if a slower timeframe is selected that would enable technological advancements to be taken advantage of and costs to be spread over a longer time span.
- Mr. Pickel also testified that he believes the early 2035 deadline will result in a net reduction of jobs in Los Angeles because the significant increase in commercial and industrial power rates (roughly triple) will force many businesses to leave the City.
- The SLTRP Advisory Committee reported its concerns with hydrogen combustion in local generating plants (which are needed for reliability) and suggested that the team refocus on hydrogen fuel cells instead.
- The presentation and discussion at this Board meeting was an epiphany of sorts that instilled a better understanding of the many factors outside the control of DWP that complicate the planning and execution of this project.

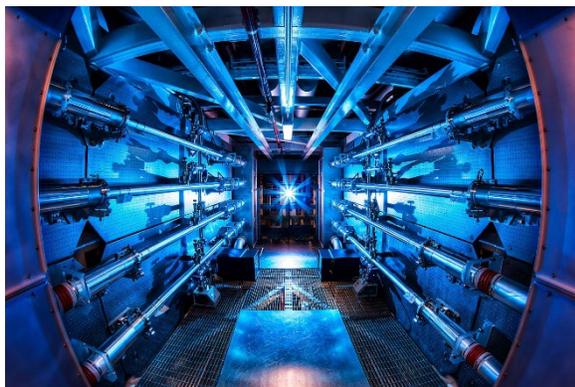
Fusion Breakthrough Brings Cheers, Though Challenges Remain

Excerpted by William Glauz

Original Article from Power Magazine, December 19, 2022

<https://www.powermag.com/fusion-breakthrough-brings-cheers-though-challenges-remain/>

The announcement that scientists at a California laboratory achieved a net energy gain from a fusion reaction sparked plenty of debate about what it means for the power generation industry. The breakthrough at the world's largest nuclear-fusion site, the National Ignition Facility (NIF) at the Lawrence Livermore lab, which occurred on December 5 and was publicly announced by Energy Secretary Jennifer Granholm on December 13, brought excitement from the global fusion-research community. It showed that harnessing the energy that powers the sun could be used to potentially provide nearly unlimited clean energy on Earth.



Nuclear power experts marveled at the accomplishment. According to researchers, the NIF used its set of 192 lasers to deliver 2.05 megajoules of energy onto a pea-sized gold cylinder. The cylinder contained a frozen pellet of two hydrogen isotopes: deuterium and tritium. The pulse of energy caused the capsule to collapse, which created extremely high temperatures. The hydrogen isotopes fused into helium, which released more energy and set off a cascade of fusion reactions.

Scientists who analyzed the process said the reactor released about 3.15 megajoules of energy, which means that about 54% more energy was created than was consumed by the reaction. A milestone, to be sure, even if commercialization of the technology likely remains years away.

One company already has announced plans to build what it said would be the world's first laser fusion power plant. Longview Fusion Energy Systems, a group with ties to the Livermore lab, soon after Granholm's announcement said its power plant design "would combine the NIF's laser fusion breakthrough with modern, efficient lasers and a patented design to replicate these conditions several hundred times a minute." The company said it expects to break ground on a fusion-based power plant "in five years," adding "this revolutionary energy source will play a significant role in meeting the global growing need for clean energy."

Longview's vision echoes that of the scientific community that for years has looked at the potential of fusion-based power generation. Most experts still believe commercialization of fusion power will take years to develop. Kim Budil, director of the Livermore lab, said, "I don't want to give you a sense that we're going to plug the NIF into the grid ... that is definitely not how this works. But this is the fundamental building block of an inertial confinement fusion power scheme."

Budil, asked about a possible timeline for commercial fusion, said, “Probably decades. Not six decades, I don’t think. I think not five decades, which is what we used to say. I think it’s moving into the foreground and probably, with concerted effort and investment, a few decades of research on the underlying technologies could put us in a position to build a power plant.” Budli acknowledged the challenges, though, saying “There are very significant hurdles, not just in the science, but in technology.”

And the challenge of turning the fusion reaction’s heat into usable electricity, certainly at large scale, remains. Experts have said a viable laser fusion power plant would almost certainly require much higher energy gains than those achieved in the Livermore test.

Vandals, Outages Highlight Power Grid Security Concerns

Excerpted by William Glauz

Original Article from KTLA, December 11, 2022

<https://ktla.com/news/vandals-outages-highlight-power-grid-security-concerns/>

A series of vandalism reports throughout the country, including a pair of outages in North Carolina that left thousands without power for days, points to vulnerabilities in securing some of the nation’s power grids. Law enforcement has also recently been called to investigate suspected acts of intentional vandalism in areas including Florida and Washington state. Also, a substation in the Portland, Oregon, area was damaged late last month.



New efforts by vandals to target power grids could be emerging. An August memo by federal law enforcement detailed the time a suspected white supremacist entered an online chat and shared a file that contained substation locations in the U.S., Canada and Mexico. The database uses public information from the Department of Homeland Security and shows the exact coordinates of what’s believed to be every substation in the U.S., including some of those recently struck in North Carolina, Florida and Oregon.

Workers work on equipment at Substation in West End, N.C., Monday, Dec. 5, 2022, where a serious attack on critical infrastructure caused a power outage to many around Southern Pines, N.C. Karl B DeBlaker/AP

Should We Really Use Renewable Electricity to Make Green Hydrogen? Not Always

Excerpted by William Glauz

Full Article from Power Magazine, January 3, 2023

<https://www.powermag.com/should-we-really-use-renewable-electricity-to-make-green-hydrogen-not-always/>

There's a growing belief that hydrogen will play a key role in lowering CO₂ emissions. However, there are several caveats in realizing that vision, and in some cases, hydrogen may not be the right choice.

To many, hydrogen's CO₂-free combustion characteristics make it an attractive replacement for the portion of fossil fuels that are currently burned to release energy, including applications in power generation, transportation fuels, industrial processes, and central heating. However, there are some problems with using hydrogen on a large scale to replace fossil fuels.



The amount of hydrogen needed to supply even a fraction of our future energy requirements is massive, possibly ten times the amount of hydrogen generated today. And the methods commonly used today to generate hydrogen emit large amounts of CO₂ as a byproduct.

The primary way envisioned to make much of this hydrogen is by electrolysis. In this process, electricity is supplied to an electrolyzer, which splits water molecules into hydrogen and oxygen with no direct CO₂ emissions. But to meet the definition of green hydrogen, the electricity used must also be renewable. And the amount of renewable electricity needed to produce the large amounts of green hydrogen will be huge.

Even if the hydrogen from the electrolyzer is used for generating electricity to replace what was consumed, the losses of the conversion from renewable electricity to hydrogen and back to electricity creates a net deficit of electricity. For example, 1,000 MWh of renewable electricity may only produce about 700 MWh of energy in the form of hydrogen from electrolysis, the balance of the initial energy is lost. If the hydrogen is subsequently converted back into electricity via a fuel cell, there are more losses,

resulting in perhaps only about 500 MWh of electricity that can be fed back into the grid. If instead the hydrogen is burned in a power plant, the losses could be more severe, resulting in perhaps only 400 MWh of electricity that can be fed back into the grid. Some may argue that actual electrolyzer and fuel cell efficiencies are somewhat higher, but the resulting compound losses are still large enough to illustrate the point, and the laws of physics ensure that some losses will always be realized.

If the renewable electricity allocated to the electrolyzers was otherwise directly dispatched to the grid, these losses of conversion/reconversion would be avoided and the full 1,000 MWh would be available to displace fossil power. Dispatched renewable power will likely reduce far more CO₂ emissions if it is used directly to displace fossil power than if it is converted to hydrogen for eventual use in power generation.

What Does the Future Hold for EVs and Smart City Technologies in 2023?

Excerpted by William Glauz

Full Article from Power-Grid International, January 5, 2023

<https://www.power-grid.com/der-grid-edge/what-does-the-future-hold-for-evs-and-smart-city-technologies-in-2023/#gref>

Recently, aging infrastructure and severe natural disasters have been major concerns to the utility industry. However, EVs remain the most disruptive element to the energy grid to date. When you consider the full scope of electrification (cars, fleets, trains, planes, etc.) energy demands are unprecedented and rising daily. Though just 3 million EVs were sold in 2020, the global market is expected to skyrocket to over 230 million by 2027. On top of that, if every motorist in the U.S. switched to an EV, utilities would have to find a way to generate 25% more electricity. Adapting to these surges with resilience in the grid will be the biggest challenge for utilities moving forward. While the accelerated adoption of EVs will introduce unique challenges to the grid, it will also provide opportunities for new revenue streams.

Many utilities foresee major distribution challenges over the next five years. Consumers are catching onto this as well, as a leading concern with EV adoption is the availability and reliability of charging stations. Switching to an EV makes more sense for a California urban resident with access to charging stations every few miles, compared to those who live in more rural areas. In 2023, utilities will be met with both a challenge and an opportunity to install charging infrastructure that meets current EV adoption rates.



Image by Tumisu from Pixabay

Utilities are reaching an inflection point with countless opportunities for new revenue streams. Many businesses will begin to view EV charging stations as a way to differentiate themselves from nearby competitors, with hotel chains across the country already making these investments. We will begin to see charging stations replace gas stations – with some California cities banning new gas stations altogether. Capitalizing on these industry changes will require education across the industry, leading to many more planning initiatives, pilots, testing, validating and scaling over the next year.

The low and medium-voltage network, from the distribution transformer on down to the meter at the home or business, and increasingly behind the meter, will provide many emerging business opportunities. In today's dynamic energy industry, the low-voltage network plays a critical role through the increased adoption of EVs and distributed energy resources (DERs), including wind, solar and battery storage. What was once a one-dimensional flow of power from generation to end user is becoming an interactive, two-way transactional grid with more unpredictable variables than ever.

The Smart City concept uses critical data to ensure that utilities and other important city services, are working efficiently. The data obtained from the increased use of EVs and other DERs will be important in the development of the Smart City concept.

Agreement for 200MW Compressed Energy Storage Plant Near Rosamond

Excerpted by William Glauz

Original Press Release from Hydrostor, January 12, 2023

<https://www.hydrostor.ca/california-moves-closer-to-carbon-free-electricity-goals-as-central-coast-community-energy-signs-25-year-power-purchase-agreement-with-hydrostor/>

On January 12, 2023 Hydrostor, a Toronto based energy storage developer, and Central Coast Community Energy, one of California's largest community choice aggregators, announced they had executed a 25-year energy storage power purchase agreement for 200 MW/ 1600 MWh to be produced from Hydrostor's proposed Willow Rock Energy Storage Center (Willow Rock). Willow Rock is a proposed compressed air energy storage project located near Rosamond, California. The project is proposed to be a 500 MW facility with 8 hours of energy storage. The billion-dollar project is still in the permitting stage with the California Energy Commission and Kern County. If approved, the project could be in service by 2028.

The facility would compress air into a purpose-built underground cavern, most likely using off-peak, excess, or surplus electricity from the grid. The heat from the air compression process would be captured and stored in an aboveground thermal storage system. The compressed air would then be stored in the cavern under hydrostatic pressure created by an onsite, above-ground water reservoir. When electricity is needed by the grid, the compressed air would be released, re-heated using the stored thermal energy, and directed through aboveground turbine-generators to produce electricity.

Mystery History Question

Presented by Jack Feldman



Model of a proposed nuclear power plant to be built near Los Angeles. This photo appeared in the June 21, 1965 edition of the Los Angeles Times.

DWP engineers viewed nuclear power as the perfect solution to a looming electricity shortage. The proposed plant would be larger than any atomic plant in existence and would have the capacity to generate about 20 percent of the power for every home, office and factory in Los Angeles, the agency predicted.

The federal Atomic Energy Commission was willing to classify the new reactor as a nuclear power demonstration project. As such, the commission would pay a large percentage of the costs for the design of the plant and would waive fuel-use charges for years.

City officials thought that the atomic plant plan would sail through federal and local reviews. In 1963, they entered into a tentative agreement with the Westinghouse Corp. to buy the generating equipment. The Atomic Energy Commission named a Boston company to design and build the reactor. Officials announced that the plant would be completed by 1967.

Question

What was the proposed location of this nuclear power plant?

- A) San Luis Obsibo
- B) Oxnard
- C) Malibu
- D) Santa Monica
- E) Pacific Del Rey
- F) Huntington Beach

Answers on page 20, or Click [HERE](#)

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

GUEST SPEAKERS

Summaries by Robert Yoshimura

GUEST OF THE MONTH
OCTOBER 2022

Delon Kwan, Assistant Director of Water Resources, LADWP

Summary of Current Issues Facing the Water System

SWP-Dependent Areas. In April of this year, MWD established an Emergency Conservation Program for the six water agencies in its service area that rely on SWP water. In that part of the service area, MWD can deliver only water from the SWP up to the human health and safety limit of 55 gallons per capita per day. The program provides two paths for compliance. Path 1 requires watering restrictions (one day per week), while Path 2 limits those agencies to a maximum volume of water per month. Los Angeles chose Path 2. As of the end of September, the six SWP-dependent agencies are 8% below the volumetric use limit and are thus on target to achieve MWD's goal at the end of the year. Individually, LADWP is right on target with its water use reductions to date.



MWD Supply Status. Because of drought-related supply shortages, MWD is projecting a total regional storage of 2.2 MAF at the end of 2022. That represents a 1 MAF decline since 2020 when MWD's regional storage reached its highest level in history. The 2.2 MAF of storage is distributed as follows: Approximately 0.5 MAF on the SWP system, 1.4 MAF in Lake Mead, and 0.3 MAF in-region in reservoirs and groundwater basins.

The outlook for 2023 is poor and MWD is facing three major water supply problems next year: 1) Acute shortages of supply in SWP-dependent areas will continue because of depleted storage in SWP reservoirs, and because the initial allocation of Table A water is expected to be near-zero. 2) Colorado River supply conditions continue to deteriorate, and conservation mandates will likely require cuts in deliveries to California eventually. The Colorado River lower basin is close to a Level 2A shortage condition (Lake Mead <1,045') below which California will have to curtail deliveries. 3) MWD's in-basin storage has been depleted by the severe drought conditions of the past two years.

Colorado River Supply Status. The 1922 Colorado River Compact initially allocated 7.5 MAF each to the Upper and Lower Basins. In 1944, the Mexican Water Treaty allocated an additional 1.5 MAF to Mexico. Lower basin allocations are divided among three states as follows: California – 4.4 MAF, Arizona – 2.8 MAF, and Nevada – 0.3 MAF. California’s total is further allocated to seven agencies including MWD, which receives 550,000 AF/year. The remaining 3,850,000 AF is allocated to a variety of irrigation agencies at a higher priority than MWD.

When comparing the Colorado River hydrologic and legal situation 100 years ago to today, we find that flows have declined by 7.5 MAF/yr., while allocations have increased by 1.5 MAF/yr. In response to that dilemma, basin-wide conservation planning began in the early 2000s and has accelerated since then. In 2007, Interim Shortage Guidelines were adopted under which Arizona and Nevada were required to curtail deliveries based on Lake Mead pool elevations. In 2019, Drought Contingency Plans (DCP) were developed that require further curtailments for Arizona, Nevada, and California, again based on Lake Mead pool elevations. In 2021, the Lower Basin states signed the Colorado River 500+ Plan that provided funding for conservation and fallowing strategies to further reduce demands on Lake Mead by 500,000 AF/yr. In June of 2022, the US Bureau of Reclamation (USBR) called for an additional 2 to 4 MAF of conservation from Colorado Basin users because all of the efforts to date appear insufficient to sustain current uses.

USBR’s 24-month study of future Lake Mead elevations revealed a likely decline in water level to 1,021 feet by the end of 2023, and further declines in the following year. Lake Mead water level is thus expected to decline below the critical Level 3 Shortage elevation of 1,025, below which MWD can no longer access its Intentionally Created Surplus storage of 1.2 MAF.

In 2022, operations in the lower basin will result in a 613,000 AF combined curtailment among the three states and Mexico. In 2023, the combined curtailment will be 721,000 AF. The following year, if, as predicted, Lake Mead’s elevation drops below 1,025’, the combined curtailment for the lower basin will increase to 1,188,000 AF. In order to achieve the USBR’s call for 2 to 4 MAF of additional conservation, the Lower Basin will have to contribute at minimum, almost 1 million additional AF

California has formally proposed a 400,000 AF curtailment as part of the 500+ plan contingent upon the receipt of funding from the Inflation Reduction Act (IRA) for conservation and fallowing programs. If California’s proposal gains traction, it would contribute significantly towards achieving the additional curtailments called for by USBR and in relieving some of the pressure on California to do more to maintain Lake Mead water levels

Los Angeles’ Drought Response. Since the MWD’s emergency declaration in April of this year, DWP has stepped up its drought response efforts using multiple strategies. On May 10, DWP announced implementation of Phase 3 of its conservation ordinance, which reduced the number of lawn watering days from 3 to 2 days per week. That announcement combined with outreach efforts and enforcement resulted in water use reductions of 3% in May, 9% in June, and 11% in July. The City of Los Angeles’ long term conservation achievements have reduced per capita water use by over 30% over the last 15 years

Operation NEXT. Planning for Operation NEXT, the City's plan to recycle all of the effluent from its Hyperion Water Reclamation plant for beneficial uses within the City and region is ongoing. A master plan will be developed considering the best strategies for either or both direct potable reuse and indirect potable reuse through groundwater replenishment. Groundwater recharge would occur in the West, Central, and San Fernando groundwater basins. Direct potable reuse would require treatment at the Los Angeles Aqueduct Filtration Plant. Depending on how the wastewater is allocated for those uses, treatment facilities at the Hyperion Plant will be planned and designed appropriately.

Delta Conveyance Project (DCP). On July 27, 2022, the Department of Water Resources released the Draft EIR for the new single-tunnel pipeline that will carry water around the Delta and into the SWP pumping station. Public outreach meetings were conducted in September, and the public review/comment period will close in December.

Studies regarding the impact of climate change on water deliveries from the Delta show an 800,000 AF/yr. decline in total exports for both the SWP and Central Valley Project (CVP) between 2020 and 2040 if no project is built. If the single-tunnel Bethany Alternative is built, deliveries from the Delta will still decline due to climate change impacts; however, the decline will be limited to 248,000 AF/yr.

The benefit to the SWP of building the preferred project is an increase in normal operating deliveries (Table A) that are projected to be 98,000 AF/yr. higher than no project and a 211,000 AF/yr increase in deliveries during high-flow storm events compared to no project. Thus the major impact of the project will be the ability to capture runoff during storms that today are allowed to flow to the sea. The net impact of the project will be an annual increase in deliveries of 309,000 AF compared to no project.

Fixing the SWP Dependency Problem. The SWP-dependent areas' water shortages are caused by the lack of infrastructure to enable Colorado River water and SWP water stored in Diamond Valley Reservoir to be delivered to West Branch water users. At an August 2022 meeting, the MWD Board was briefed on this problem and acknowledged the need for a structural solution. That acknowledgement is an important first step in resolving the issue.

LADWP has been collaborating with MWD and the other affected agencies on potential solutions. MWD has proposed expansions of its Greg Avenue Pumping Station and its Sepulveda and Venice Pumping Stations to move an additional 225 cfs of water northwesterly into the affected areas. MWD is considering a major pipeline project of 300 cfs to 600 cfs capacity from the East Branch area into the West Branch area that is currently dependent on SWP water.

Next year when the DWP Groundwater Remediation projects go online, they will provide additional groundwater that can be pumped into the northeast SWP-dependent area within the City to provide a portion, but not all of the deficiency.

**Brad Coffey, Manager of Water Resources
Metropolitan Water District of Southern California**

“Living in the Dash – Managing through the 2020 - ??? drought”



The title of this presentation is intended to convey the uncertainty facing MWD as it attempts to sustain its mission through the current drought. All three of the major water supply sources for Southern California are stressed. The State Water Project (SWP) which normally provides 30% of our water is experiencing the driest three-year period in its history. The Colorado River which normally provides 25% of our water has been in a 23-year drought. Local supplies that

normally provide 45% of our water are suffering from reduced yield due to drought in the eastern Sierra, depleted groundwater, and groundwater contamination that eliminates a part of those sources.

The SWP provides an average of 3.2 million acre-feet (AF) of water in any normal 3-year period. In the last 3 years, it has provided only 0.6 million AF, which is less than SWP’s projected minimum 3-year flow of 1.0 million AF. The severe cutback in SWP deliveries has exposed a flaw in MWD’s distribution system in which two areas, one on the west side of the service area and one in the Rialto area are 100% dependent on SWP water and cannot be served from other sources. In the west side area, only 50 cfs of the 1,500 cfs of demand can be supplied from the Colorado River or Diamond Valley Lake (DVL). In the Rialto area, none of the 600 cfs of demand can be supplied from Colorado/DVL.

The two SWP-dependent areas encompass six agencies representing one-third of the total demand upon MWD. Those agencies are under an emergency water shortage declaration requiring them to either implement a one-day-per-week watering restriction or meet a monthly volumetric limitation for that agency.

Part of the long-term solution to water supply volatility is increasing storage capability. MWD has increased its total storage capacity thirteen-fold from 0.5 million AF in 1983 to more than 5.5 million AF today. Since 2020 (when the mega-drought on the Colorado River Began) it has very effectively drawn upon that storage to minimize the impacts of dry years on water deliveries. As of the end of 2022, MWD predicts that it will have 2.3 million AF in non-emergency dry year storage in its reservoirs. However, 1.2 million AF of that storage is in Lake Mead in an account

known as Intentionally Created Surplus (ICS) which was created during wet years in MWD's California sources.

However, as part of the Colorado River Drought Contingency Plan, California has committed to allocate some of that ICS to help sustain the elevation of Lake Mead to preserve its capability to generate hydroelectric power. Thus, if conditions do not improve over the next few years, all of that ICS may have to remain in Lake Mead. If that is the case, the actual usable total storage in MWD's system is 1.1 million AF, and not the 2.3 million AF mentioned above. The potential impact on MWD's customers could occur as early as 2023 and result in further reduced deliveries.

These challenges to MWD's water supplies have resulted in the concept of "One Water" which is defined by the Water Research Foundation as follows: "An integrated planning and implementation approach to managing finite water resources for long-term reliability and resiliency, meeting both community and ecosystem needs." For MWD, this translates to conservation programs, water recycling, water-conserving device rebates, education, and codes and regulations. Conservation programs have reduced per-capita water use from 208 gallons/day in 1985, to 127 gallons/day today. Additionally, a number of long-term solutions to reliability issues are being planned.

Among those long-term reliability options are:

- Infrastructure improvements and additions to enable SWP-dependent areas to be supplied by Colorado River Water, Diamond Valley Lake, and in the future from MWD's recycling program Pure Water SoCal.
- Pure Water SoCal that will provide for both groundwater replenishment and direct potable reuse at some of MWD's existing water treatment plants. Ultimately, 60 miles of large diameter pipelines will need to be built.
- Balancing connected watersheds – MWD's distribution system connects the two largest watersheds in the western US (Northern Sierra and Upper Colorado River) and enables water to be selectively withdrawn from one watershed when the other is in a dry period. It also enables MWD to solicit investment in its Pure Water SoCal program from water users in Arizona and Nevada in exchange for a part of MWD's share of Colorado River water.
- Continued collaboration with the California Department of Water Resources on a Delta solution.
- Drought actions – since August of 2021, the MWD Board has acted on five occasions to implement emergency conditions in response to the drought. Its most recent action in December 2022 expanded on the regional drought emergency first declared a year ago and warned of possible regional water supply allocations (cutbacks) beginning in April 2023.

Winifred Yancey, Director of Electric Vehicle Strategy and Implementation

Future Plans and Programs for Electric Vehicles

As of August 2022, the City of Los Angeles had a total of 18,000 public electric vehicle (EV) charging stations, the most of any city in the country. The construction of those charging stations is part of the State's overall strategy to electrify the transportation sector and are needed to support more than 7.5 million EVs statewide by 2030. Furthermore, Governor Newsom's Executive Order N-79-20 prohibits the sale of fossil-fueled passenger vehicles after 2035 and prohibits fossil-fueled medium and heavy-duty trucks after 2045.



As of today, there are 101,452 registered EVs in the City of Los Angeles. DWP's planning for EV infrastructure needs is based on an expected 250,000 EVs in 2025 and 750,000 EVs by 2030. Based on the number of existing and in-progress charging stations, an additional 13,000 new charging stations will be needed by 2025 and an additional 86,000 new charging stations will be needed by 2030. Also, the City of Los Angeles will need 1,000 direct-current fast chargers by 2025 and ultimately 3,000 such chargers total. The goal for fast chargers coincides with the current total number of gasoline pumps in the City.

A study of where EV owners charge their vehicles revealed significant differences between multi-unit dwelling (MUD) residents compared to those who live in single family homes (non-MUD). The primary charging location for non-MUD EV owners is home, with 65% reporting that location, compared to only 21% of MUD EV owners. Among Non-MUD EV owners, 16% use DC Fast-charge stations, 6% use Level 2 public chargers, and 13% charge at work. For MUD EV owners, primary charging locations are 43% DC Fast-charge stations, 16% L2 public chargers, and 19% charge at work. The need for publicly accessible charging stations is thus especially critical in parts of town with higher density housing.

DWP plays a vital role in converting the City's car culture into clean, carbon free vehicles and transit. Its master plan for this conversion includes programs to help other City agencies achieve their own zero-emission vehicle goals, incentive programs to encourage customers to drive electric, and expanding the charging infrastructure to make EVs a convenient and reliable mode of transportation for its citizens.

The DWP is leading the way by converting its own fleet of passenger vehicles to nearly 100% plug-in hybrid or battery electric. Thus, it has built a network of charging stations within its service area and all of its remote locations such as the Owens Valley and other places where it operates facilities.

The Master Plan for the EV program includes equity provisions to assure that disadvantaged communities have the ability to participate in the EV transition. Rebates of \$1,500 are offered for the purchase of used EVs and \$1,000 for the installation of residential L2 chargers. Additionally, for low-income individuals, rebate adders of \$1,000 and \$500 are offered in addition to the rebates described above.

In moving forward with the EV program, a major focus will be on distribution system readiness for the significantly increased demand that is expected over the next few years. As the power grid is fully loaded, this will be a major challenge to DWP. Other immediate initiatives in the program include partnerships with public agencies, education, and outreach programs to demonstrate the benefits available to customers, and the aforementioned expansion of the charging network.



Mystery History Answers

C) Malibu

More information at:

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

SAVE THE DATE

2023 CALENDAR

GUEST OF THE MONTH

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



MARTIN ADAMS GENERAL MANAGER LADWP	SATURDAY, FEBRUARY 11, 2023 Annual Meeting @JFB, 10:00 am Update on Issues at LADWP
SIMON ZEWDU DIRECTOR OF POWER TRANSMISSION PLANNING LADWP	WEDNESDAY, MARCH 8, 2023 In-Person and Zoom Mtg, 10:00 am What Upgrades are Planned for the Transmission System?
LOUIS TING DIRECTOR OF POWER ENGINEERING AND TECHNICAL SERVICES LADWP	WEDNESDAY, APRIL 12, 2023 In-Person and Zoom Mtg, 10:00 am What's In Store for the Power Distribution System?
SPEAKER TO BE DETERMINED	WEDNESDAY, MAY 10, 2023 In-Person and Zoom Mtg, 10:00 am

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