

## On to Governor Brown's Desk: What 100% Clean Energy Means for California

The big goal is set, but the path to get there is still unknown.  
August 29, 2018 [Julian Spector](#) Staff Writer Greentech Media

Julian is a staff writer at Greentech Media, where he reports on energy storage, solar power and other clean energy sectors. He also has experience covering clean transportation, state and federal energy policy, and climate adaptation. Previously, Julian reported for CityLab at The Atlantic and conducted grant-funded climate change reporting in Bangladesh. He graduated from Duke University.



California's 100 percent carbon-free electricity bill has nearly crossed the finish line.

The state legislature formally approved the decarbonization legislation Wednesday [August 29], which comes as the Trump administration attempts to [revive coal power](#).

After Tuesday's [August 28] more suspenseful [Assembly vote](#), the Senate affirmed [SB 100](#), authored by outgoing State Senator Kevin de León. If signed by Governor Jerry Brown, it will raise California's renewable energy requirement to 60 percent by 2030 with interim targets, and give the state until 2045 to generate the rest of its electricity from carbon-free sources.

"It's a real monumental time in California history, and maybe this will mark a turning point for the country," said Dan Jacobson, state director for Environment California and a supporter of the bill.

Article submitted by  
*Thomas J. McCarthy*



California will be the most populous and economically productive jurisdiction to commit to removing greenhouse gas emissions from its electrical grid. As de León told his Senate colleagues before Wednesday's vote, that's just the beginning. The state still has to tackle major greenhouse gas emissions from automobiles and buildings. *(Continued on page 2)*

### CONTENTS

- 1-3 On to Governor Brown's Desk:  
What 100% Clean Energy Means  
for California
- 4 Mystery History
- 4 Our Recent Guests
- 5 California Wildfire Bill Clears Committee
- 6-7 Guest Presentation: City of Los Angeles'  
Commitment to Clean Energy
- 7 Associates Board of Directors
- 8 Book Review  
*THE SAINT FRANCIS DAM: A Guide to  
the Los Angeles Aqueduct and the Site of the  
Ill-Fated Saint Francis Dam,*  
by Paul H. Rippens.
- 8-9 Book Review  
Los Angeles and the Owens Valley –  
Essays on a Century-Long Water Dispute
- 9 "Proposed Actions Involving  
Water Rights in California
- 10-11 Hoover Dam as Giant Battery?  
The Hurdles are More Legal Than Technical

# On to Governor Brown's Desk: What 100% Clean Energy Means for California

## Earning passage

*(Continued from page 1)*

Where the world's fifth-largest economy leads, others tend to follow. Now California just has to figure out how to deliver on the promise of a carbon-free grid. That's going to be a lot more complex and interesting than just building more wind and solar.

If he signs it, the bill would burnish Governor Brown's legacy on climate change and clean energy ahead of a major [summit on the subject](#) in San Francisco next month.

It also gives de León a triumphant note to end his state Senate career on, as he challenges Senator Dianne Feinstein for her seat in November.

Despite the support of these and other powerful figures in California politics, SB 100 never had a surefire chance of success. Just last year, it [failed to advance](#).

In that case, the unions representing utility workers withdrew support, citing concerns about distribution system jobs and the security of the grid.

This year, however, the International Brotherhood of Electrical Workers [chose not to oppose the bill](#). Among other things, the major utilities and their associated unions had a new priority in addressing [liability for the wildfires](#) that tore through the state last year.

Though the bill hadn't changed, organized labor warmed up to it this year. A representative of the State Building and Construction Trades Council of California, with which IBEW is affiliated, spoke after the bill's author at the [committee hearing July 3](#). Instead of airing concerns about the bill's impact on distribution grid jobs, he endorsed it as a job-creation opportunity, saying, "The industry is ready and waiting, the workforce is ready and waiting."

The 100 percent clean energy vision will force a departure from the electrical system's status quo, which introduces some risk, but it will also spur new construction of utility-scale facilities under project labor agreements, stimulating union jobs.

With labor on board, no major source of opposition remained, although several Republican legislators expressed concern about the bill's effect on California's electricity prices. Backers spent the last several days lining up the votes needed to assure passage ahead of the August 31 legislative deadline.

## How it might work

In 2017, California got [29 percent of its power mix](#) from renewables. Another 9 percent came from nuclear and 15 percent from large hydropower; both of those would count as carbon-free, although the state is closing [Diablo Canyon](#), its last nuclear plant.

Natural gas provides 34 percent of California's electricity.

The new energy directive has two major components: the near-term renewable portfolio standard increase and the longer-term carbon ban.

The first part will look like an extension of the current program of wind and solar power purchases, with gas plants balancing out the variable generation. Achieving 100 percent zero-carbon electricity requires a more profound shift: finding alternatives to natural gas for flexible capacity.

Furthermore, the text of the law stipulates that California must do this without causing additional greenhouse gas emissions elsewhere in the Western grid, meaning it cannot simply outsource fossil fuel combustion beyond state borders.

The challenge, then, is to not only derive most of the state's power from sunlight and wind, but to guarantee electricity when those resources are limited or unavailable.

"California has long been the home of big thinkers, innovators and change-makers, and while intermittency is an important issue, it can be addressed by a combination of solutions that include regional power transfers, energy storage, flexible demand and emerging technologies like wave, tidal and ocean thermal, which can be used to balance loads with supply," said Ed Smeloff, director of grid integrations at solar advocacy group Vote Solar.

Energy storage technology currently tops the list of likely candidates for the grid-balancing role. California pioneered large-scale lithium-ion battery deployments as a swift response to grid crises like the closing of the San Onofre nuclear plant and the gas shortage following the Aliso Canyon leak. *(Continued on page 3)*

# What 100% Clean Energy Means for California

*(Continued from page 2)*

By now, California regulators and utilities have grown familiar with evaluating the technology for grid-scale applications. PG&E is building the [world's largest batteries](#) to replace gas-powered plants that are shutting down, in a preview of things to come.

The Assembly also passed SB 700, which extends the state's small-scale storage incentive for five years. That will boost deployment of batteries in homes and business, potentially lessening the burden on utility-scale facilities.

Questions remain about how much it would cost to build enough storage to make the zero-carbon system work. Recent battery plants have yielded four hours of energy duration, but technology to [store energy for weeks or months](#) remains a distant hope for the industry.

"Today's energy storage technology and the amount of transmission investment that would be required would be incredibly expensive to meet 100 percent compliance," said Wade Schauer, research director for Americas Power & Renewables Research at Wood Mackenzie. "Technology 20 years from now may make it less of a challenge, but the design of energy markets will need to be reinvented if all of the resources have variable costs of \$0 per megawatt-hour."

## Keeping options open

SB 100 originally called for [100 percent renewable energy](#), but switched to carbon-free energy in the course of its legislative evolution. That opens the door to other technologies, although it isn't clear which might come into play.

"The state is not trying to prescribe exactly what your energy is going to look like in 25 years — we don't know what utilities are going to look like in 10 years," Jacobson said.

California previously opted to eliminate its existing nuclear resources. Diablo Canyon, which single-handedly supplies 9 percent of the state's electricity, must close by 2025. A bill passed last week would require that the plant's 2.2 gigawatts be [replaced by clean generation](#), so that, after considerable effort, the state's share of clean electricity won't drop from the closure.

Gas generation that captures its emissions could qualify as a zero-carbon resource, but that might also face political opposition as California models a future of clean energy. Such technologies currently operate in a few places, but have not achieved widespread use.

Siting concerns and high costs have blocked new pumped hydro facilities, which are still the largest source of grid storage in the U.S.

With a 27-year time horizon, it's entirely possible that new technologies will mature by the time the zero-carbon rule kicks in. Just 27 years ago, wind and solar played negligible roles on the grid and large batteries were reserved for camcorders.

The flexibility of the law acts as insurance against locking out promising new tools.

"Personally, I don't think we will need the flexibility, because of the progress that solar, wind and energy storage are all making," wrote Daniel Kammen, founding director of the Renewable and Appropriate Energy Laboratory at UC Berkeley, in an email. "But in terms of building in the capacity for new technologies, and surprises, it is good policy to be diverse and inclusive in such long-range bills."

Framing the goal around ends rather than means improves its chances of success, MIT decarbonization researcher Jesse Jenkins wrote in an email.

"Study after study confirms that an inclusive mix of low-carbon resources is a more cost-effective and less risky route to decarbonize electricity than a more narrow focus on wind, solar and energy storage," he said.

Future legislatures could always revise the goals based on how the compliance process goes, although that would be a blow to California's reputation. The onus will be on regulators and the energy sector to show they can fulfill the mandate without ballooning costs for electricity.

For now, though, California has solidified its leadership role in building the future paradigm for clean energy and the grid. If it succeeds, others will learn from it. If it falls short, that expensive experiment will be instructive, too. ❖



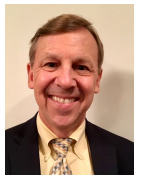
# MYSTERY HISTORY

By Jack Feldman.  
Webmaster



## Our Recent Guests

☞ **Bill Engels, Presenter.**  
Not shown:



☞ **Eric Montag, Presenter:**  
LADWP Planning Strategic Manager, Senior Manager of Planning Planning Development and Engineering Division. Spoke on the two DWP ongoing studies on once-through-cooling and analyses of renewable energy programs (see article pages 6 & 7).

☞ **Michael Webster, Presenter:**  
Southern California Public Power Administration.

☞ **Bill Engels, (Not pictured) Presenter** retired from the LADWP Power System.



☞ **Jason L. Rondou, Presenter**  
Manager of Strategic Development & Programs, Power Planning & Development Division, LADWP. He spoke on DWP solar programs and electric vehicles.

☞ **Abraham Hoffman, WAPA Member,** Historian Book Reviewer.

☞ **Ed. Gladbach,, WAPA Member,** Director Castaic Lake Water System.



☞ **Donna Schlotman, WAPA Member.**

☞ **Thomas Soulanille, WAPAMember;**

☞ **Donald J. Waldie, Historian,** City of Lakewood.

Thank You

### Historical Notes

The Los Angeles Oil Field (seen below) was once the top producing field in California, accounting for more than half of the state's oil. In its peak year, approximately 200 separate oil companies were active on the field, which is now entirely built over by dense residential and commercial development.



View showing an oil field located just east of 1<sup>st</sup> Street and Belmont Avenue near downtown Los Angeles.

What year was this famous oil field discovered?

- A) 1850      B) 1870      C) 1890      D) 1910

Which of the following public facilities was built directly on the area of the former oilfield operations?

- A) Shriners Hospital for Children  
B) St. Vincent Medical Center  
C) Belmont High School  
D) Edward R. Roybal Learning Center

Answers at: [https://waterandpower.org/museum/Mystery\\_History.html](https://waterandpower.org/museum/Mystery_History.html)

# California Wildfire Bill Clears Committee

August 29, 2018

By Hudson Sangree



Wildfires ravaged Santa Rosa, Calif., in October 2017.  
*Army National Guard, Capt. Will Martin*



*Submitted by  
Thomas J. McCarthy*

SACRAMENTO — Members of California’s Senate and Assembly hastily passed a conference committee report Tuesday [August 28] night intended to protect ratepayers and help utilities pay for wildfire damages.

Both utilities and ratepayer advocates were unhappy with the measure, leading the committee’s co-chairman to suggest he and his colleagues had done an OK job.

“It may be a little bit encouraging that utilities and ratepayers both have a problem with this,” said Sen. Bill Dodd, a Napa Valley Democrat.

The final [conference committee report](#) on Senate Bill 901 was approved in a confused rush Tuesday night as a deadline approached to get the bill in print 72 hours before the legislature reaches the end of its two-year session at midnight Friday [August 31].

Earlier versions of the bill would have removed the strict liability that California imposes on utilities if electrical equipment is a substantial cause of a wildfire.

Under the legal doctrine, Pacific Gas & Electric potentially faces billions of dollars in damages for last year’s devastating wine country fires, which leveled a swath of the city of Santa Rosa. State fire investigators said the utility was at least partly to blame for a number of those blazes because trees or branches hit PG&E power lines.

The conference committee deleted the provision eliminating strict liability and replaced it with a procedure that would allow the utilities to issue revenue bonds to cover wildfire costs. Charges would be added

to customers’ bills to pay off the bond debts. (See [Bond Sales Eyed to Fund Utility Wildfire Costs.](#))

That didn’t make utilities happy. A lobbyist for San Diego Gas & Electric told the committee Tuesday it was a step backward from the prior version of the bill.

Ratepayer advocates were outraged.

“We strongly oppose this bailout for PG&E,” said Mark Toney, executive director of The Utility Reform Network. “Billions of dollars at stake should not be decided in such a rushed process.”

Other groups, including cities, counties and plaintiffs’ attorneys, supported the conference committee’s report because it left intact the strict liability standard, sometimes called “inverse condemnation,” which allows those harmed to be compensated without proving negligence.

The conference committee report also contains measures to prevent wildfires, including provisions governing forest management and tree removal. And it allows the California Public Utilities Commission to consider the reasonableness of a utility’s conduct in determining whether to allow it to recover wildfire costs from ratepayers.

The conference committee report will be incorporated into SB 901, which now goes back to the Senate and Assembly. Both houses must approve the bill by Friday [August 31] if they want it to reach the desk of Gov. Jerry Brown. ❖

## City of Los Angeles' Commitment to a Clean Energy Future

August Board Meeting GUEST PRESENTATION by  
Eric G. Montag, Senior Manager Planning & Strategies-  
Los Angeles Department of Water And Power  
Summarized with David J. Oliphant



David J. Oliphant,  
WAPA Secretary

All power utilities have a wide variety of resources available to generate electricity including: hydro power, oil, coal, natural gas, nuclear, geothermal, biomass, wind, and solar generation. The Department of Water and Power (DWP) currently utilizes all these except oil, and has committed, along with the State of California, to remove coal from their portfolio by 2025. Los Angeles has led the way in higher renewable energy targets, with current Renewable Portfolio Standard (RPS) targets set at 33% by 2020, 55% by 2025, and 70% by 2036. These targets are higher than the SB100 bill recently signed by Governor Brown that sets new RPS goals of 52 percent by 12/31/2027, and 60 percent by 12/31/2030 and 100% by 2045.



Over the years, DWP has taken steps through various initiatives to comply with this renewable requirement while maintaining present customer load servicing. A supply of electricity sufficient to satisfy the present continuous load requirements of DWP's large customer base with uninterrupted safe, reliable power at a reasonable cost, along with an aging infrastructure makes such a major changeover challenging. Further complicating the planning, the State of California has forbidden use of seawater cooling for power generation and so the DWP in repowering present generation units must also study replacement of once-through cooling with air cooling methods for new generation.

*At the August meeting of the Associates, Eric Montag, the senior manager of Power System's Strategic Initiatives and Resource Planning, outlined two studies DWP has commissioned to examine what investments would be needed to meet these higher RPS targets and achieve a 100% clean energy future. Eric is very familiar with the various subject matter components of these studies. Over the last 17 years, he has worked on the first Haynes Repowering Project, managed the construction activities for the Pine Tree Wind Farm, was the Project manager for both*

*Distributing Station 144 and the Barren Ridge Renewable Transmission Project, and was the Power Energy Manager over Scattergood repowering, Beacon and Springbok Solar projects. He is currently Senior Power Energy Manager over DWP's Strategic Initiatives and Resource Development, which includes both the Once-Thru Cooling (OTC) and 100% studies, the Integrated Resource Plan, Transportation Electrification program, and all Solar programs.*

The first study, the (OTC study), is a two-year system reliability assessment that examines the system impact of retiring some or all of the remaining ocean cooled units with non-emitting generation sources (solar, wind, geothermal) along with load management practices (energy efficiency, demand response, etc). DWP has contracted some of the top electric utility engineering firms to work hand in hand with DWP's various technical and operation experts to perform this analysis. The consulting firms had previously performed studies on parts of DWP's system, and already had a working knowledge of it. The study analyzes one key question: if DWP retired some or all of their current natural gas OTC units, what alternatives could be used in lieu of that repowering. That is, how to replace fossil fuel repowering with non-emitting repowering for each unit.

It is important to state that the State had previously banned all use of ocean water for generation cooling. One could ask, if ocean cooling is the issue, why not just replace ocean cooling with air cooling and continue to use natural gas? The simple answer is that until 2016, that was DWP's strategy. In 2016, the Los Angeles City Council directed the Department to commence the 100% Renewable Study (described below). This new direction, which was in-line with the legislative direction from Sacramento for the SB100 bill, put into question the remaining natural gas repowering projects. The most significant aspect of this study is that the study primarily focuses on impacts to system reliability related to non-reliant (i.e. non-fossil-fueled) generation. *(Continued on page 7)*



## Los Angeles' Commitment to a Clean Energy Future *(Continued from page 6)*

The models analyzed units at Scattergood, Haynes, and Harbor, looking to see system impacts to various retirement scenarios that utilize non-CO2 emitting power. The proposals are replacing pieces of a total working system, hence requiring factoring in maintenance of the total system in a balanced manner while continuing the system in operation..

The study methodology filtered non-emitting alternatives based on the following **six areas**: 1. resource adequacy, 2. technical feasibility, 3. transmission system reliability, 4. system economics estimate, 5. generation balancing and load following (operating ability analysis), and 6. constructability assessment. Alternatives that passed this rigorous filtering would then be "ranked" by the consultant to come up with final recommendations. At the time of this article, the modeling was completed and the ranking process was underway. Final recommendations are scheduled to be released in early November through a series of public outreach meetings. Stay tuned.

The second study, the 100% Renewable Energy Study, builds upon the OTC study to examine what long term investments would be needed to achieve a 100% Renewable Energy future. DWP hired the Department of Energy's National Renewable Energy Lab (NREL) to lead this study. A significant facet of this study includes input from an advisory group that involves interested stakeholders: environmentalists, neighborhood councils, taxpayer/ratepayer groups, business groups, and conservationists, among others.



One representative and an alternate represent each interested stakeholder. This study looks at the system into a 2045-2050 timeframe. At this time, various scenarios have been developed and NREL's team is building their models to model these. One of these scenarios is in-line with SB100.

The advisory group, many of whose goal is 100% renewability, has provided, and is providing, input and guidance throughout the study process. This group meets at least quarterly with Eric and members of the study consultants. Eric distributed an outline with a graph of the most recent **Technical Feasibility Evaluation**. Each renewable proposal (solar, wind, geothermal, hydro, nuclear, battery backup, etc.) was evaluated with three possible analyzed outcomes: **1) does not pass technical feasibility evaluation; 2) passes technical feasibility evaluation, continue to next stage; 3) did not pass previous evaluation criteria.** By having the representatives meeting quarterly able to question the analysis of all proposals a useful educational process takes place. For example, a stakeholder may question why it takes so long to change the system. The answer involves explaining the complexity of an issue, e.g. time involved in replacing transmission lines requires preparation of environmental impact reports, public approval periods, land acquisition, etc.

In preparing this study, DWP maintains an unbiased neutral position – the study is aiming for a 100% renewables system within 25 years. Both study teams seek to avoid collapsing the system as happened to statewide investor-owned utilities with the 1990's disastrous electric deregulation proposal. ❖❖❖

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**BOOK REVIEW**

By Abraham Hoffman, Ph.D

**THE SAINT FRANCIS DAM:** *A Guide to the Los Angeles Aqueduct and the Site of the Ill-Fated Saint Francis Dam*, by Paul H. Rippens. Alhambra: Copy-Rite press, Inc., 2003, 92 pp. Map, Illustrations, Bibliography, Index. Paper, \$10.



For a tragedy that was long considered to be a forgotten footnote in California history, the Saint Francis Dam disaster has attracted considerable attention in recent years. In 1995 the Historical Society of Southern California reissued Charles F. Outland's classic study *Man-Made Disaster* in paperback, and in that same year, in cooperation with the Ventura County Museum of History and Art, the Society published a special issue of *Southern California Quarterly*, also publishing the special issue separately as a paperback book, *The St. Francis Dam Disaster Revisited*, with articles dealing with the causes of the dams failure, profiles of Outland and William Mulholland, and a pictorial essay. Both Outland's book and the special issue's book version quickly sold out.

Currently several studies dealing with the dam's failure have been published, including *Floodpath: The Deadliest Man-Made Disaster of 20<sup>th</sup>-Century America and the Making of Modern Los Angeles* by Jon Wilkman, and *Heavy Ground: William Mulholland and the St. Francis Dam Disaster* by Norris Hundley jr. and Donald C. Jackson. These books are heavily grounded in research and offer new perspectives on the topic. The Santa Clarita Valley Historical Society conducts tours of the dam site and what remains there ninety years later. Paul Rippens' modest work, published in 2003, serves as

a quick introduction as to why and where the dam was built. His book deftly summarizes the issue of a growing Los Angeles and the city's need for a major water supply; construction of the dam; its collapse on March 12, 1928, resulting in some 450 people dying in the torrent of water that swept down San Francisquito Canyon; and a chronology of the events. His book also provides readers with information on visiting the site of the dam as well as tracing the path of the flood down to the Pacific Ocean. Historical and modern photographs depict the region in 1928 and the same locations in the present day.

Rippens leaves the controversial issues about the dam to the past and present scholars whose books and articles examine these issues in great detail. Anyone needing an introduction to the topic will find this book useful as a starting point in learning about the second greatest disaster in the state's history, the 1906 San Francisco earthquake (a curious coincidence in their names) holding the number one spot. The books mentioned above, with extensive bibliographies, may further guide readers to a greater understanding of the failure of the St. Francis Dam. ❖

*Abraham Hoffman teaches history at Los Angeles Valley College.*



**BOOK REVIEW**

By David J. Oliphant

**Los Angeles and the Owens Valley – Essays on a Century-Long Water Dispute**, by Abraham Hoffman. Los Angeles Corral of The Westerners 2018. 145 pp. Illustrations, Bibliography



LOS ANGELES AND THE OWENS VALLEY  
ESSAYS ON A CENTURY-LONG WATER DISPUTE  
Abraham Hoffman  
Introduction by R.J. Knight  
Foreword by  
Los Angeles Corral of The Westerners

The growth of Los Angeles from a small village into a world class city would not have been possible without the early 20<sup>th</sup> century acquisition of water from 235 miles north in the Owens Valley by DWP Chief Engineer William Mulholland.

That acquisition brought with it a continuing dispute between Owens Valley advocates and the City of Los Angeles over how the land and water rights were acquired by the City. The dispute has led to a murky history because a number of books on the subject are agenda-driven, written from a biased viewpoint, and occasionally rely on erroneous factual claims from biased secondary sources.

*Los Angeles and the Owens Valley – Essays on a Century-Long Water Dispute* is a collection

of carefully-researched writings by history professor Abraham Hoffman, providing an unbiased account of various aspects of the dispute. A professional historian with an insistence on accurate reporting and providing a thorough listing of source materials, Professor Hoffman presents the conflicting sides of various aspects of the dispute over the water acquisition, noting factual errors perpetuated by other writers.

For someone who seeks a clear presentation of the facts, with factual corrections assigned as needed, this book is both an excellent introduction to the Aqueduct history and a good supply of source materials for readers to research for themselves. (Continued on page 9)

For prior book reviews in previous Newsletters go to [www.waterandpower.org](http://www.waterandpower.org) CheckNewsletters, then check the Table of Contents





by *Gerald A. Gewe*  
*Retired Assistant General Manager-Water*  
*Los Angeles Department of Water and Power*

## “Proposed Actions Involving Water Rights in California

In the late 1970’s The Audubon Society and other environmental groups challenged the City of Los Angeles’ right to waters from Mono Basin. After about 20 years of litigation they prevailed and Los Angeles’ water rights from the Mono Basin were reduced about 80% in normal and wet years and much more in dry years. This occurred under a doctrine<sup>1</sup> that stated “The State has a Public Trust responsibility to revise water rights allocations in light of the currently prevailing values of society.” The California Water Resources Board (State Board) is now proposing to extend this doctrine to cover the San Joaquin River and its tributaries along with the Sacramento River Watersheds in northern California.

The consensus of legal thinking was that the Public Trust Doctrine responsibility did not apply to water rights issued prior to the establishment of the current water rights allocations which began in 1914 (senior water rights). However the issuance of a draft decision by the State Board in September proposes to expand the scope of this doctrine to senior water rights allocations. In that draft decision, the State Board declared that the lower San Joaquin River (which is a major supply to the Bay area municipalities as well as Central Valley Agricultural Water Districts) should receive 30-50% of the water as unimpaired flows. If adopted, this would mean current water right holders would receive 7-23% less water.

In a separate action the State Board announced a framework that called for the Sacramento River and its tributaries to receive 35-75% unimpaired flows. This would reduce deliveries to the politically powerful Westlands Water District by up to 26 percent. This proposed action has created an unusual coalition of farmers in the Central Valley with environmentally oriented municipalities such as San Francisco in the bay area.

There were several San Francisco legislators who have put pressure on the State Board to rescind the draft decision and reopen the process. This has resulted in a delay in the issuance of the final decision.

In contrast with the proposed State actions, the Department of Interior Secretary, Ryan Zinke, announced that the Bureau of Reclamation will seek to increase deliveries from these river systems. Fourteen Central Valley Congressmen have sent a letter to Speaker of the House Paul Ryan to make sure that a House passed amendment to stop the State Plan is included in the next spending bill.

Given these controversial and opposing actions, the only thing that is certain is that there will be much debate as this proposed action is considered further and that there will be full time employment for many lawyers. ❖

<sup>1</sup> The **public trust doctrine** is the principle that the sovereign holds in **trust** for **public** use some resources such as shoreline between the high and low tide lines, regardless of private property ownership.

### Los Angeles and the Owens Valley –

#### *Essays on a Century-Long Water Dispute*

(Continued from page 8) Abe Hoffman has an entertaining writing style and covers here aspects of the dispute that are not readily available in other accounts.

Included, among other items, are: a discussion of the chronology of how the dispute arose; accounts of the conflicting roles that were played by the Reclamation Service, J.B. Lippincott and former Mayor of Los Angeles Fred Eaton, and a detailed account of the Investigation Board of 1912 lengthy hearings into allegations of political and management failures in the construction of the aqueduct. Professor Hoffman provides a “counterfactual” analysis of the

possible economic outcome for the Owens Valley had the imagined reclamation project which was replaced by the LA Aqueduct been carried out. This book is both an entertaining account of the LA Aqueduct development and a great source for initial research into the major issues. As a complement to his essays, professor Hoffman also includes three reviews of books which provide further objective analyses of the issues. ❖

The book is available at Amazon Books.

# Hoover Dam as Giant Battery? The Hurdles Are More Legal Than Technical

Written by [Anthony F. Arrigo](#)

Published on Sep. 21, 2018



An artist's rough rendering of a pumped-storage hydropower facility, similar to that proposed for Hoover Dam. (Image courtesy Tennessee Valley Authority)

The Hoover Dam, on the Colorado River, near Boulder City, Nev. The city of Los Angeles has proposed building a \$3 billion pumped storage facility that would essentially turn the dam into a giant battery.

Los Angeles is looking into whether it should spend an estimated \$3 billion on a massive, 20-mile underground [pumped hydropower storage](#) system that would be connected to the iconic [Hoover Dam](#) on the Colorado River outside of Las Vegas.

If it does get built, this system would essentially serve as a [giant battery](#) to store power.

Having written a book about the aggressive propaganda program behind the [Hoover Dam's construction](#) in the 1920s and 1930s, I can say that the technical and financial challenges of this plan are sure to pale in comparison to the legal and political roadblocks that will have to be overcome.

Among the biggest obstacles are the long-running fights over the Colorado River and its water, and that the Colorado is a [shrinking river](#) due to climate change and long-term drought.

## Storing power

Los Angeles has two basic motives for this plan.

First, the water level of [Lake Mead](#), the nearly 250-square-mile reservoir that provides water to Arizona, California and Nevada, continues to drop due to long-term [drought](#). The lower water levels [are reducing the power](#) that Hoover Dam's electrical turbines generate.

Second, California has mandated statewide cuts in fossil-fuel use and [increases in renewable energy](#) production.

The concept of using [pumped hydropower](#) to store energy is not new. The earliest examples date to the late 1800s in Europe, and the early 1900s in the U.S.

Many countries, including [Spain](#), [Norway](#), [Switzerland](#) and the U.S., already use large pumped hydro storage systems. The [world's biggest](#) is located along the West Virginia-Virginia border.

One key difference here is that this proposed project would use wind and solar electricity to pump the water. Another is the Hoover Dam's complicated history. The biggest hurdle, I predict, would be negotiating a new use for the Colorado River's water at a time when the region is growing more parched.

## The Colorado River

The Colorado flows from tributaries in Wyoming, Colorado and Utah down through Nevada and Arizona into Mexico.

The river is regulated by a document called the [Colorado River Compact](#), an agreement forged among seven Western and Southwestern states in 1922 that dictates how much of the river's water each state may use. The compact has helped to constrain what likely would have been endless litigation over the water.

This pact took [years to negotiate](#), with many failed attempts along the way. Arizona took 44 years to officially ratify the agreement, and it has repeatedly sued its neighbors over the river, with some cases ending up in the [Supreme Court](#). *(Continued on page 11)*

# Hoover Dam as Giant Battery?

## The Colorado River

*(Continued from page 10)*

In fact, Arizona nearly [declared war](#) against California in 1934 when its governor sent the Arizona National Guard to the border to “defend” against encroaching Bureau of Reclamation engineers scouting locations for [Parker Dam](#), 155 miles downstream from Hoover Dam on the Colorado River.

Despite the compact, litigation over access to Colorado River water continues to this day. This endless conflict is why historian [Philip L. Fradkin](#) calls the Colorado “the most used, most dramatic and the most litigated and politicized river in this country, if not the world.”

To make matters worse, Western states have long been wary of the motives of Los Angeles and California when it comes to water. Consequently, the current proposal, which calls for the Los Angeles Department of Power and Water to be put in charge of a massive new hydropower project in Nevada, would likely be met with a large dose of skepticism.

## More considerations

Proponents of the Hoover Dam battery concept say it would be an environmentally friendly way to generate more electricity without using fossil fuels. Yet there are more considerations here, too.

First, the project calls for nearly 20 miles of new underground pipes to run from below the dam back into Lake Mead. The water that it takes to fill those pipes along with the water that is circulated in perpetuity will take some coveted Colorado River water permanently out of the downstream flow.

Second, the time hardly seems right. The Colorado is in [decline](#). With climate scientists [predicting](#) that the volume of water in the Colorado River will continue to [decrease](#), states that rely on the river are [bracing](#) for potentially drastic cuts to water supplies.

Moreover, the [Bureau of Reclamation states](#) that Hoover Dam produces 4 billion kilowatt-hours of

electricity per year, which sounds like a lot. But that’s only enough to cover 1.3 million households, or roughly a third of all Angelenos.

Considering that Hoover Dam hydropower is [distributed](#) across Southern California, Arizona and Nevada, it actually provides only a small slice of the overall energy consumed in the West.

That is why, regardless of whether or not this project moves forward, I contend that the competing interests of the river’s many stakeholders will prove to be as durable a roadblock as any technical or budgetary constraint.

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A view of one of the giant hydropower turbine shafts inside Hoover Dam. In contrast, the pumped hydropower project being considered by Los Angeles would use a comparatively small pump located below the dam to return water to Lake Mead as a power reserve, and would not touch the dam itself.

Solar and wind energy seem ideal, but have one major drawback: wild fluctuations. When there’s calm wind or no sunshine, there isn’t enough power to keep the lights on. When it’s sunny and windy, there can actually be [too much power](#) for the grid to function smoothly. Even in tandem, they are not reliable enough for utility-scale electricity, without [some way to store excess energy](#).

The [proposed plan](#) would use wind and solar power to pump water from below Hoover Dam back upstream, depositing water into Lake Mead to be released again at a future time. The idea is to use the stored water to both offset renewable energy fluctuations and supplement the grid during peak electrical demand.

It would do this by pumping water when electricity generated from solar or wind power is cheap and abundant, and releasing water through Hoover Dam when demand for power is high or renewable sources aren’t generating much energy – essentially turning Lake Mead into a [giant battery](#). ❖



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