



VOL. 1 ISSUE 2 · JULY 2020

NEWSLETTER

For a Sustainable Los Angeles



LA100 STUDY OF LOS ANGELES LONG TERM ENERGY SUPPLY OPTIONS

BILL ENGELS



DOWNTOWN LA - LADWP ARCHIVE

At the request of Mayor Eric Garcetti, and in response to a Los Angeles City Council Resolution passed in 2016, LADWP launched the LA100 Study (also known as the 100% Renewable Energy Study) to determine what investments need to be made by LADWP to achieve a 100% renewable energy supply for its customers by 2045, thereby allowing LADWP to match the requirements of California Senate Bill (SB) 100, the landmark renewable energy and zero-carbon resources policy. The 100% Renewable Energy Study is being conducted by the National Renewable Energy Laboratory (NREL), under contract to LADWP. NREL is tasked with conducting an objective

This issue:

LA100 STUDY OF
LOS ANGELES LONG TERM
ENERGY SUPPLY OPTIONS

DEVELOPMENT OF THE
2020 URBAN
WATER MANAGEMENT PLAN

U.S. RENEWABLE
ENERGY CONSUMPTION
SURPASSES COAL
FOR THE FIRST TIME
SINCE BEFORE 1885

REVISITING CALIFORNIA'S
DROUGHT, WHERE ARE WE TODAY?

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HISTORY OF THE ELECTRIC CAR

UPDATING TRANSMISSION SYSTEMS
TO ACCOMMODATE RENEWABLES,
SINCE 2010

"THE DEEPEST DAM IN THE WORLD"

Guest of the Month

PAUL SCHULTZ

ANNOUNCEMENTS,
UPDATES

economic and reliability analysis of options for reaching the 100% renewable energy supply goals. NREL leverages the extensive data and modeling capabilities developed by the Department of Energy to lead a detailed technical analysis that considers long-term and short-term economic and reliability metrics. As Project Manager, NREL has assembled and leads a world class research team to develop and execute the project scope approved by LADWP. The research team is comprised of technical staff from national laboratories, universities, and consulting groups that are collectively responsible for the research methodology, technical assumptions, and final results of the study.

The comprehensive study is being developed with input from the LA100 Advisory Group, which is comprised of technical experts, research universities, commercial/industrial customers, local government officials, and community interest groups, among other interested parties.

The LA100 Advisory Group plays an essential role in helping to guide the 100% Renewable Energy Study, providing input and feedback based on the expertise, knowledge, and resources of the organizations, institutions, and/or constituent groups represented by its members, which reflect the diverse perspectives and expertise necessary to understand the challenges and possibilities for serving 100% of LA's electricity demand with renewable energy. Advisory Group participants have expertise on such topics as power systems, public policy, transportation, economic development, and sustainability.

LADWP provides leadership and guidance with support from the Mayor's Office and City Council. In addition, LADWP's Power System participates in the study by providing data, analyzing methods, and reviewing results to ensure current system characteristics, and capabilities are accurately reflected in all analyses. LADWP convened the first meeting of the 100% Renewable Energy Advisory Study participants in June 2017 to launch the initially-envisioned two-year time frame for the study. These Advisory Group meetings are open to the public and have occurred at least once per quarter at LADWP's John Ferraro Building. (currently through zoom.)

The 100% Renewable Energy Study's stated considerations are to maintain system reliability, types, and availability of clean energy resources, roles of energy storage, energy efficiency, demand response, energy imbalance market, and development of new technologies. additionally analyzed by NREL and presented to the Advisory Group at the quarterly meetings to date include:

- Definitions of clean energy, renewable energy, and carbon neutrality, Integrating the LA Green New Deal and the Mayor's decision banning in-basin repowering related to the use of ocean cooling,
- Achieving economy-wide deep GHG reductions, incremental effects of climate change, high customer electrification, and increased electrification of automobiles and mass transit,

“

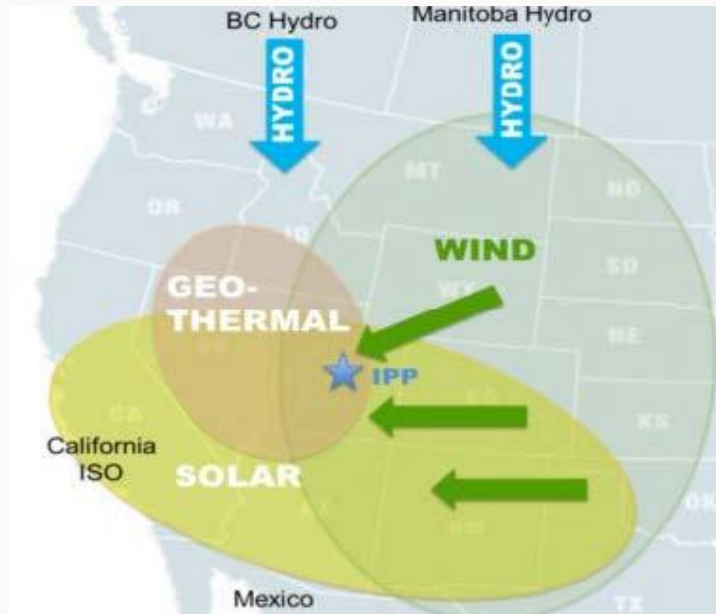
“Take steps to ensure that 100% renewable is not just a buzzword, but is the end goal brought about through an actionable plan.”

Comment by
Advisory Group member.
*The National Renewable Energy
Laboratory (NREL)*

”




WIND, SOLAR, NATURAL GAS AND HYDRO POWERS - STOCK PHOTOS
RIGHT: LADWP GRAPHICS



- Renewable options and trade-offs to achieve last 10% of 100% renewable energy requirements,
- Energy supply/demand mismatch dynamics,
- Power flow and LADWP Power System stability,
- Required upgrades to LADWP's Distribution System,
- Required upgrades to LADWP's in-basin and external Transmission System.

The Advisory Group last met in person in December 2019, with subsequent meetings occurring and scheduled by video conference because of the effects of COVID-19. Draft and final results of the study are currently scheduled for the third and fourth quarter meetings of this calendar year.

In addition, over the course of the study, LADWP planned to work with local academic institutions to examine the potential for high quality careers and local hiring programs that must be performed to modernize the city's electric system infrastructure.

A webpage dedicated to the 100% Renewable Energy Study provides information about the study. Advisory Group meeting summaries and incremental working papers from the technical team, presentations, and other documents are posted on the website as they become available. Additionally, people can sign-up for email announcements and updates at www.ladwp.com/CleanEnergyFuture. 



Highlights



From the Desk of Jerry Gewe

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The debut of our newly-formatted WPA's newsletter Volume 1, April 2020 issue was received with a warm and positive welcome. We were thrilled to have our LADWP colleague Thu Pham stepped out of her "fun" retirement to give us a helping hand redesigning the WPA newsletter. Besides a new format, a new look with a new logo, a new layout concept with a new color scheme, Thu also helps with reorganizing and broadening content. You may notice, in addition to the main two categories Water and Energy, a third one, Sustainable, is added in this issue. A sub-topic to each category, Buzz, a compilation of short "hot" news-worthy stories is also added.

Please join me to give Thu a warm welcome aboard.

In this July 2020 issue, we will review significant planning decisions that the Los Angeles Department of Water and Power will make in 2021, They will affect the sources of Water and Energy for the next 25 years; the impact on the environment that will be made by use of these resources; the reliability of the Angelinos' Water and Energy delivery; and the relative payments that will be required from the consumers.

Summaries of two important plans will be discussed in this issue are:

- The plans regarding the energy supply are being developed with broad input from the LA100 Committee that has been given the task of making recommendations for the appropriate future power supply development.
- The plans for the future of the water supplies made in the context of the state-mandated 2020 Urban Water Management plan, which every water agency is required to prepare every 5 years.

And did you know that in the early 1900's electric vehicles accounted for about 1/3 of the vehicles on the road?

Thank you for your support of our efforts.

Jerry Gewe

The Los Angeles Water and Power Associates, Inc. is a nonprofit, independent, private organization incorporated in 1971 to inform and educate its members, public officials and the general public on critical water and energy issues affecting the citizens of Los Angeles, Southern California and the State of California.

Our secondary mission is to preserve the regional history of water and electricity and show its role in the development and growth of the city of Los Angeles. Also, to disseminate knowledge of the rich and diverse multicultural history of the greater

Los Angeles area; to serve as a resource of historical information; and to assist in the preservation of the city's historic records.



DEVELOPMENT OF THE 2020 URBAN WATER MANAGEMENT PLAN




JERRY GEWE

The Water System of LADWP has begun the process of developing the 2020 Urban Water Management Plan which will guide the Water System’s development and investments for the next 25 years. The current plan, which every water agency in California is required to update every 5 years, was developed in 2015 and approved by the Board of Water and Power Commissioners in 2016.

The goal of the Plan is to require water agencies to develop their plans for the future balancing of Water QUALITY, RELIABILITY, AFFORDABILITY, SUSTAINABILITY, and RESILIENCY. It also mandates water agencies to consider water shortage contingency planning and to implement California’s Water Use Efficiency Standards.

- **QUALITY**
- **RELIABILITY**
- **AFFORDABILITY**
- **SUSTAINABILITY**
- **RESILIENCY**

The process, which began in February, 2020, is being guided by a stakeholder group representing Academia, Government, Business and Workforce Groups, Neighborhood Council Alliances, Environmental Groups, Key Accounts, and Partner Agencies, and includes W&P Associates. A draft plan is to be published in January or February 2021 and at least four public hearings will be held on the plan prior to adoption of the final plan by the Board of Water and Power Commissioners by July 1, 2021.

The process starts with a projection of what the “Demand” for water will be in the future. Los Angeles has actually reduced its water use by almost 30% from the maximum water use in 1986. The consumption has been reduced from 795,000 Acre Feet that year to 488,000 Acre Feet in 2019, while at the same time the population went from about 3 million to 4.07 million. Modelers will be looking at population trends and projected per capita water use to project the demands through the next 25 years. This will include looking at the feasibility of achieving the Mayor’s Green New Deal which calls for recycling 100% of LA’s wastewater and capturing 150,000 Acre Feet of storm water by 2035. 

Mystery History



“The deepest dam in the world”

JACK FELDMAN

The above image shows a one-of-kind dam known as “the deepest dam in the world”, mainly because it extends 247 feet below the water bed. Its primary purpose was to create a reservoir, seen behind it, that today provides up to 60% of Southern California’s water supply.

What is the name of the dam?

- A) **Oroville Dam**
- B) **Parker Dam**
- C) **Shasta Dam**
- D) **New Melones Dam**
- E) **New Bullards Bar Dam**

It took over 5 years to construct this dam. In what decade was it built?

- A) **1920s**
- B) **1930s**
- C) **1940s**
- D) **1950s**
- E) **1960s**
- F) **1970s**

***Answers on page 16**

W

WATER & POWER
ASSOCIATES, INC.

P

NEWSLETTER TEAM

Jack Feldman
Bill Glauz
Jerry Gewe
David Oliphant
Thomas McCarthy
Robert Yoshimura
Thu Pham - GRAPHICS

VISIT US AT

WATERANDPOWER.ORG

Do you know...?

During the last year, more than 150,000 visitors viewed 273,000 pages on our website.

Members and guests are invited to our monthly meeting held every second Wednesdays of each month via Zoom. Please contact any Board member or send us a request at comments@waterandpower.org

Interested in becoming a member? Join us online at waterandpower.org or find information in this newsletter to join by mail.

The July 2020 newsletter issue will not be printed and distributed as usual due to the closing of all non-essential commercial businesses including printing facilities.

In the meantime, enjoy our online newsletter in a new format.

GUEST OF THE MONTH
JUNE 2020

PAUL SCHULTZ

**Director of Power External Energy Resources
Los Angeles Department of Water and Power**


IPP RENEWAL USING HYDROGEN FOR POWER GENERATION



SUMMARY BY ROBERT YOSHIMURA

The IPP was completed in 1987 and as currently configured consists of two coal-fired generators producing a combined 1,800 MW. Since then, wind power consisting of 287 MW from Milford Wind, and 82 MW from Pleasant Valley have been constructed nearby and contractually utilize IPP transmission facilities. The coal-fired units are scheduled to shut down in 2025 and all current power supply contracts will expire in 2027. Most of those contractors have renewed their obligations for 50 more years through 2077. Locally, Los Angeles, Glendale, and Burbank have renewed, while Pasadena, Riverside, and Anaheim have chosen to end their participation in IPP. The IPP Renewal project will replace the existing coal-fired units with two combined-cycle turbine generators producing a total of 840 MW. Initially, the units will be fueled by a mixture of 30% hydrogen and 70% natural gas. By 2045, they will run on 100% hydrogen to conform to Los Angeles' 100% clean energy goals. A natural gas pipeline will be constructed to provide fuel during the transition to hydrogen, and the replacement of two aging converter stations will also be needed. The project will reduce reliance on local in-basin gas generation as well as the Aliso Canyon gas storage facilities. It will also enable integration of other renewable sources by providing energy storage to balance supply and demand.

A contract has been awarded to Mitsubishi-Hitachi to provide the turbines. To generate renewable energy, hydrogen fuel will be produced by electrolysis of water and stored in caverns to be constructed in the salt dome (salt formation) that underlies IPP. Up to 100 caverns could be constructed, each capable of storing 5,500 tons of hydrogen gas. The large storage capacity thus created will enable seasonal shifting of renewable energy by storing hydrogen during periods of energy surplus for use a few months later during periods of energy deficit.

The economics of power generation using hydrogen are not favorable because of the cost of electrolyzers. Those costs are expected to decline significantly when hydrogen generation by electrolysis becomes more common. However, the cost of energy storage using hydrogen storage in salt caverns is the lowest of all storage alternatives. Hydrogen storage is also the best alternative for long term energy storage because of its flexibility to provide storage for a range of 1 hour to 8 months. By comparison, the storage capabilities of alternatives are: pumped storage projects - 1 day to one month, compressed air - 1 hour to a few days, and batteries - less than 1 day. 

REVISITING CALIFORNIA'S

DROUGHT

ROBERT YOSHIMURA



WHERE
ARE
WE TODAY?



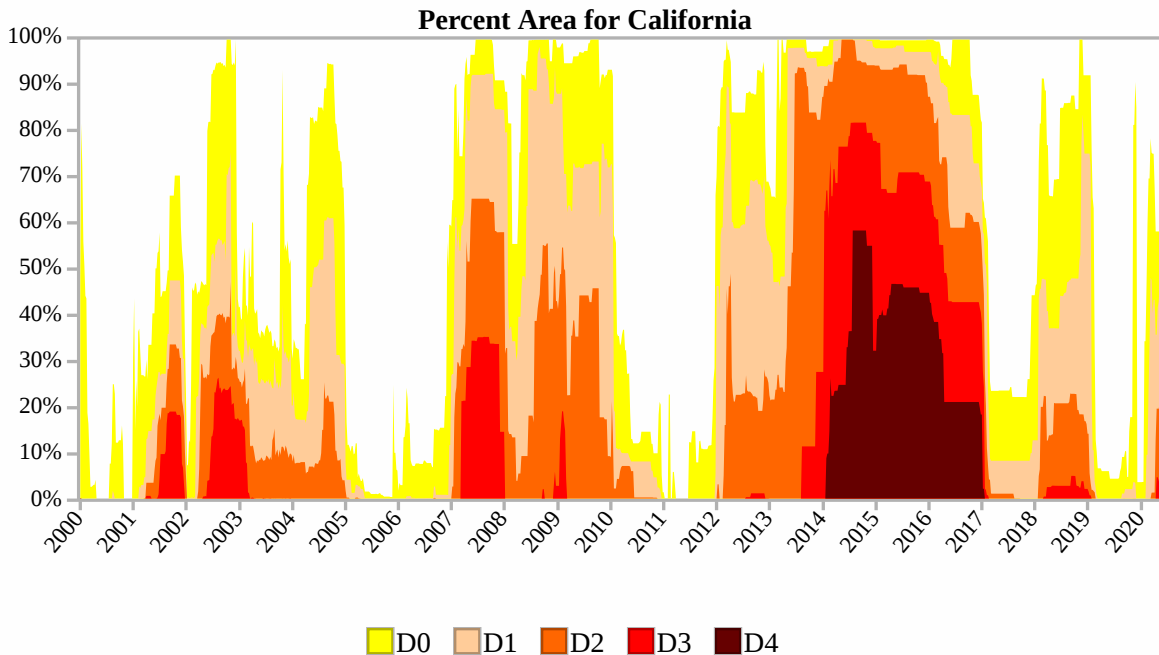
SAN LUIS RESERVOIR

It has been slightly over three years since then-Governor Jerry Brown lifted the strict mandatory conservation measures that had been in effect over the previous three years. Subsequently, in March 2019, the National Integrated Drought Information System (NIDIS, also known as Drought.Com) officially declared an end to the longest (seven+ years) drought in California's history. The people of California breathed a big sigh of relief and the drought has since faded from the memories of most residents. However, drought is a recurring feature of California's climate, and a growing population combined with looming climate change is likely to severely challenge the ability of water agencies to supply water during future droughts which are certain to recur. Furthermore, in the recent history of California, droughts have become more frequent, more intense, longer lasting, and more impactful than in the past. The point of this discussion is to explore exactly where we stand today and whether we are actually "out of the drought."

According to Bill Patzert, a former NASA climatologist who was interviewed by Paul Duginski for an article published in the Los Angeles Times in February 2020, he believes we are in the midst of a 20+ year drought characterized by an average rainfall (in Los Angeles) during the period that is nearly 2-1/2 inches less than the long term average. He points out that in the last 21 years, we have had 14 years of below-average precipitation and only seven years of plentiful rain. He also points to the water level in Lake Mead, a


DROUGHT IN CALIFORNIA FROM 2000 - 2020

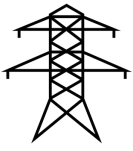
THE U.S. DROUGHT MONITOR STARTED IN 2000. SINCE 2000, THE LONGEST DURATION OF DROUGHT (D1-D4) IN CALIFORNIA LASTED 376 WEEKS BEGINNING ON DECEMBER 27, 2011 AND ENDING ON MARCH 5TH, 2019. THE MOST INTENSE PERIOD OF DROUGHT OCCURRED THE WEEK OF JULY 29, 2014 WHERE D4 AFFECTED 58.41% OF CALIFORNIA LAND.



major source of water for Southern California, which has steadily dropped in elevation by more than 120 feet since 1999 and has consequently lost more than half of its stored water. According to his research, droughts are slow to develop and long lasting to such an extent that we cannot assume that it has ended yet.

On the NIDIS website, maps are provided that characterize drought according to five levels of dryness as follows: D0 - Abnormally Dry, D1 - Moderate Drought, D2 - Severe Drought, D3 - Extreme Drought, and D4 - Exceptional Drought. During the most recent drought, on average more than 95 percent of California was in one of the above states of dryness or drought. During the worst year, 100 percent of California was in severe drought (D2) or worse, and half of the state was in exceptional drought (D4). Since 2000, each of the three California droughts has progressively been more severe than the previous one. While NIDIS declared an end to the drought in early 2019, the subsequent and current year (2020) suffered a dry winter and a recurrence of moderate to severe drought conditions in the northern half of the state.

So where are we today? It depends on who you ask, and the answer is either we are entering a new drought, or we are continuing a long-term drought that has plagued us for more than 20 years. According to the California Department of Water Resources, the late-season storms in March and April of this year were insufficient to overcome the dry winter. Statewide, the snowpack measured at 130 electronically monitored stations averaged 37 percent of normal as of May 1, 2020. The lack of snow was offset in part by reservoir storage which is near average for this time of year and is sufficient to provide the needed water for the rest of the year. However, should subpar rainfall occur next year, we are likely headed to a return to stricter conservation measures. 



PG&E EMERGED FROM BANKRUPTCY

COMPILED FROM INTERNET SOURCES

A federal court approved a \$58 billion plan by the nation's largest utility to end a contentious bankruptcy saga that began after Pacific Gas & Electric's outdated equipment ignited wildfires killing more than 100 people, and wiping out entire towns, leading the company to confess to crimes driven by its greed and neglect.

The confirmation came ahead of a June 30 deadline that the company had to meet to qualify for coverage from a \$21 billion wildfire insurance fund created by California last year. The company plans to find a new CEO to replace Bill Johnson, who will step down June 30 after just 14 months on the job. It has overhauled its board of directors, including 11 members who were just recently appointed. PG&E also has committed to slicing up its sprawling territory into regional units to be more responsive to the different needs of the 16 million people who rely on it for power.

Financing the plan requires PG&E to nearly double its debt, saddling the company with a burden its critics fear will make it more difficult to raise the estimated \$40 billion for improvements that the utility still needs to make to its electrical grid.



U.S. RENEWABLE ENERGY CONSUMPTION SURPASSES COAL FOR THE FIRST TIME SINCE BEFORE 1885


TALOR BENTLEY, AMERICAN PUBLIC POWER ASSOCIATION. JUNE 5, 2020

In 2019, the annual energy consumption from renewable sources in the U.S. exceeded coal consumption for the first time in over 130 years.

According to the U.S. Energy Information Administration (EIA), this outcome mainly reflects the continuous decline in the amount of coal used for electricity generation over the past decade and the growth in renewable energy, primarily from wind and solar.

In 2019, U.S. coal consumption decreased for the sixth consecutive year to 11.3 quadrillion Btu – its lowest level since 1964. In 2019, Electricity generation from coal fell to its lowest level in over 40 years. Natural gas consumption in the electric power sector has significantly increased in recent years and has replaced much of the electricity generation from retired coal plants.

Total renewable energy consumption in the United States increased for the fourth consecutive year to an all-time high of 11.5 quadrillion Btu in 2019. Since 2015, the growth in U.S. renewable energy is almost completely from the use of wind and solar in the electric power sector.

Electricity generation from wind surpassed hydro for the first time in 2019, and is now the most-used source of renewable energy for electricity generation in the United States on an annual basis. 





A MESSAGE FROM RAZMIK MANOUKIAN
DIRECTOR OF LADWP WATER QUALITY

LA's DRINKING WATER QUALITY

First and foremost, I want to assure you, that the water delivered to your tap continues to be of the highest quality and is 100 percent safe to drink. Despite the pandemic of COVID-19, there is no threat to your public drinking water supply and no need to use bottled water. LADWP's treatment processes are specifically designed to protect the public from all viruses and harmful bacteria. Our drinking water supply undergoes proven scientific techniques and treatments before it reaches your tap, including ozonation, filtration, ultraviolet light and chloramine disinfection. In 2019, LADWP tested for over 220 constituents and performed more than 124,000 tests on samples taken throughout our vast distribution system. Analyses of these samples are undertaken at our Water Quality Laboratory. I am proud that all regulated constituents detected were at very low levels. In fact, our water quality performance was at least 50 percent better than safety levels set by the US EPA and SWRCB - Division of Drinking Water.



Milestones:

**OUT OF THE
120 CONSTITUENTS
WE ARE REQUIRED TO
MONITOR, NONE
WERE FOUND AT
LEVELS CONSIDERED
UNSAFE BY
HEALTH AGENCIES.**

CALIFORNIA LEADS AGAIN BY SETTING STRICTER REGULATORY STANDARDS



California finds itself once again taking the lead by setting regulatory standards stricter than the rest of the nation. At issue is the presence of certain Per and Polyfluoroalkyl Substances (PFAS) chemicals in drinking water, a problem being addressed by many regulators. The California State Water Resources Control Board (SWRCB) lowered its reporting levels to below the thresholds set by the U.S. Environmental Protection Agency (EPA), and requires water agencies in California to take action earlier than agencies anywhere else in the country.

The PFAS family of chemicals are synthetic organic compounds known for their resistance to stains and heat and their nonstick, waterproof qualities. These qualities have led to PFAS chemicals being used in innumerable applications, from fast food wrappers to stain-resistant fabric and carpet to firefighting foam. Unfortunately, the same qualities that make PFAS chemicals so useful also cause them to persist in the environment, accumulating in soil and groundwater without degrading for decades.

All of this increased regulatory attention on PFAS, as well as the ever-evolving state of scientific knowledge about the chemicals, will necessarily increase costs not only for businesses developing or using PFAS chemicals as they find replacements for them, but also utilities treating them.

UPDATING TRANSMISSION SYSTEMS TO ACCOMMODATE RENEWABLES, SINCE 2010

THOMAS MCCARTHY

How the LADWP Eastern Power and Owens Valley Transmission Systems have changed over the past 10 years to meet renewable energy requirements.

Navajo Transmission Project

Navajo Generating Station supplied LADWP about 477 MW of capacity since 1974. In 2016, LADWP sold its share in this coal-fired generating station to Salt River Project to reduce the City's coal-fueled generation by 25% in response to the Mayor's mandate toward renewable energy generation rather than fossil fuel power generation. Since the Navajo Project included a 273-mile 500kV Transmission Line to the Boulder area it was important that LADWP keep this energy route for the future. This will allow LADWP to maintain capacity from the Navajo Station at Page, Arizona for future renewables including wind and solar as well as selling capacity or wheeling on these existing lines to other utilities. Likewise, these lines provided additional non coal energy into the Los Angeles System in 2014 when Southern California Public Power Authority Purchased Apex Combined Cycle Generating Station.

Pine Tree Wind Farm

In 2013, the power on this system was increased by the LADWP with the addition of the Pine Tree Wind Farm's 80 - 1.5MW wind generators. This was the first wind generation on the LADWP system. This power joined the Owens Valley Transmission Line near highway 395 north of the town of Mojave, Ca. This was accomplished with the construction of Barren Ridge Switching Station.




LADWP BEACON SOLAR PROJECT

Beacon Solar

In 2017, LADWP added the Beacon Solar installation in the vicinity, terminating into Barren Ridge Switching Station. Beacon is made up of 900,000 solar panels installed on 2500 acres of land. The output of this station is 250 MW. In 2018, LADWP added battery storage to increase the storage capacity to 20 MWatts and storage to 10 MW-hours.

Solar Storage

The LADWP recently signed a development contract with 8minute Solar Project for 400 MW capacity of clean energy and storing 300MW totaling 1200 MW-hours dispatchable energy. The plant will be close to California City's 2000 acres of barren desert land. The project will be completed by 2023 with energy prices to be at record low 2 cents / kWh. This project will also terminate into the Barren Ridge Switching Station. 



SUNRUN PLANS TO BUY VIVINT SOLAR


JULIA GHEORGHIU | UTILITY DIVE

On July 6, 2020, the nation's top home solar installer, and Vivint Solar, a leading full-service residential solar provider, entered into a definitive agreement under which Sunrun will acquire Vivint Solar in an all-stock transaction for an enterprise value of \$3.2 billion, a price tag that rivals that of other high-profile clean energy acquisitions: Tesla bought SolarCity for \$2.6 billion in 2016, while Google acquired Nest for \$3.2 billion in 2014. The stock-for-stock deal will grow the portfolio of Sunrun to more than 3 gigawatts and around 500,000 customers. That would make Sunrun the third-largest owner of U.S. solar capacity across all market segments.



CPUC PROPOSES TO INCORPORATE CLIMATE PLANNING INTO UTILITY RATE CASES

On July 6, 2020, the California Public Utilities Commission (CPUC) issued a proposal to have the state's investor-owned utilities incorporate climate change vulnerability assessments into their general rate case cycles in an effort to guide infrastructure investments over the long term.

If the proposed decision is approved, utilities will file these climate vulnerability assessments with the CPUC every four years. These assessments will look at the effects of temperature changes, sea level rises, changes in rainfall, wildfire and other climate impacts. The filings will become the basis by which utilities plan infrastructure investments, and prioritize whether to strengthen, move or simply remove generation, transmission and distribution equipment that is vulnerable to climate change. 

History of the

BILL GLAUZ

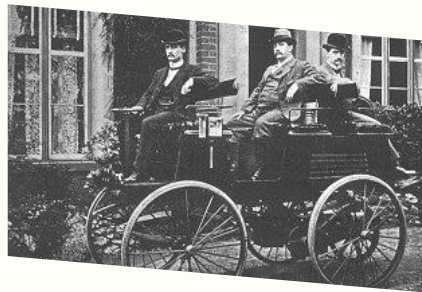
ELECTRIC CAR



LADWP has been involved with support for the development of electric vehicles for several decades. This is the first of at least two articles on the electric car. This first article is a general overview of the history of the electric car, with most of the content from the U.S. Department of Energy.

Not an invention of modern times, the electric car has a long and storied history. In the early 1800s, horse and buggies were the primary mode of transportation. But in the late 1820s and early 1830s, innovators in Hungary, the Netherlands and the U.S. dreamed of the future, creating some of the first small-scale electric cars. Around 1832, Robert Anderson developed the first crude electric vehicle, but it wasn't until the 1870s that electric cars started to become practical. William Morrison, from Des Moines, Iowa, created the first successful electric vehicle in the U.S. His car was little more than an electrified wagon, but it sparked an interest in electric vehicles. This 1896 advertisement shows how many early electric vehicles were not much different than carriages. Compared to the gas- and steam-powered automobiles at the time, electric cars were quiet, easy to drive and didn't emit smelly pollutants -- quickly becoming popular with urban residents, especially women.

Thomas Barker Electric car. Circa 1884



By the turn of the century, electric vehicles were all the rage in the U.S., accounting for around a third of all vehicles on the road. Many innovators took note of the electric car's high demand, exploring ways to improve the technology. For example, in the early 1900s Thomas Edison thought electric vehicles were the superior mode of transportation and worked to build a better battery. In 1901 Ferdinand Porsche, founder of the sports car by the same name, created the Lohner-Porsche Mixte -- the world's first hybrid electric car. The vehicle was powered by both electricity stored in a battery and a gasoline engine.

The mass-produced Model T made gasoline-powered cars widely available and affordable. In 1912, the electric starter was introduced, helping to increase gasoline-powered vehicle sales even more.

Better roads and the discovery of cheap Texas crude oil helped contribute to the decline in electric vehicles. By 1935, they all but disappeared. Over the next 30 years or so, cheap, abundant gasoline and continued improvement in the internal combustion engine created little need for alternative fuel vehicles. But in the 1970s, gas prices soared through the roof, creating an interest in electric vehicles again. Around this same time, the first manned vehicle was driven on the moon. NASA's Lunar Rover ran on electricity, helping to raise the profile of electric vehicles. Many big and small automakers began exploring options for alternative fuel vehicles. For example, General Motors developed a prototype for an urban electric car, which the company displayed at the First Symposium on Low Pollution Power Systems Development in 1973.

One successful electric car at this time was the Sebring-Vanguard's CitiCar. The company produced more than 2,000 CitiCars -- a wedge-shaped compact car that had a range of 50-60 miles. Its popularity made Sebring-Vanguard the sixth largest U.S. automaker by 1975.

Compared to gasoline-powered cars, electric vehicles at this time had drawbacks, including limited performance and range, causing interest in electric cars to fade again. In the early 1990s, new federal and state regulations created a renewed interest in electric vehicles. The result: Automakers began modifying popular vehicle models into electric vehicles, enabling them to achieve speeds and performance much closer to gasoline-powered vehicles.



In 1996 General Motors released the EV1, an electric vehicle that was designed and developed from the ground up. The EV1 quickly gained a cult following. Soon after, Toyota introduced the first mass-produced hybrid, the Prius. In 2000, Toyota released the Prius worldwide, and it became an instant success with many, increasing its (and the electric vehicle's) profile.

Behind the scenes, scientists and engineers worked to improve electric vehicles and their batteries. In 2006 Tesla Motors, a Silicon Valley startup, announced it will produce a luxury electric sports car with a range of 200+ miles. Other automakers took note, accelerating work on their own electric vehicles. In 2010 GM released the Chevy Volt, making it the first commercially available plug-in hybrid. In late 2010, Nissan released the LEAF, an all-electric, zero tailpipe emissions car. In January 2013, Nissan began assembling the LEAF in Tennessee for the North American market. The battery is the most expensive part in an electric vehicle. In just four years, from 2009-2013, battery costs dropped by 50 percent, helping make electric vehicles more affordable for consumers. To help consumers charge their vehicles, the U.S. Department of Energy and electric utilities, including LADWP, have invested in a charging infrastructure consisting of residential, commercial and public chargers.

Consumers now have a multitude of choices when buying an electric vehicle, including hybrids, plug-in hybrids and all-electric. Electric vehicles hold a lot of potential for helping the U.S. create a more sustainable future.

If the U.S. transitioned all the light-duty vehicles to hybrids or plug-in electric vehicles, we could reduce our dependence on foreign oil by 30-60 percent, while lowering the carbon pollution from the transportation sector by as much as 20 percent. U.S. Department of Energy




EL PUEBLO MUSEUM PROGRESS UPDATE

MICHELLE FIGUEROA, LADWP CORPORATE COMMUNICATIONS

The planning for the El Pueblo de Los Angeles Historical Monument in Olvera Street began nearly a year ago in August 2019 when stakeholders including representatives of WPA met with the project development team (from the Museum of Natural History) to establish its direction. A design charrette was conducted with the stakeholders in January 2020 to define how history would be presented and to explain the role of water in the growth of Los Angeles and its implications for the future.

While the initial plans for the exhibit focused solely on the role of water development in Los Angeles, consideration is being given to adding the role electricity played in the construction of the Los Angeles Aqueduct and the role of Power Plant One in the development of the City.

LADWP staff will soon be meeting with the design staff to determine layout, exhibit placement, and visitor flow. A design report is expected this summer to establish criteria for final plans and construction/installation of exhibits. Development of detailed plans, procurement of contracts, and construction is expected to take up to two years.

Establishment of such an exhibit covering LADWP history has been a goal of the WPA for many years and it is gratifying to see this moving forward. 

Mystery History

Answers to
“The deepest dam in
the world”
mystery questions

Answers

B) Parker Dam

B) 1930's

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