

New Geothermal Project Helps Create Clean Energy Future for Los Angeles

Project Provides Around-the-Clock Renewable Energy for 208,000 Homes;
Reduces Greenhouse Gas Emissions Equivalent to Taking 135,000 Cars off the Road



LOS ANGELES — In another step toward creating a clean energy future for Los Angeles, the Los Angeles Department of Water and Power (LADWP) has entered a new 26-year power sales agreement for renewable geothermal power that will provide enough clean energy to serve 208,000 Los Angeles homes and avoid producing 701,000 metric tons of greenhouse gas emissions each year, which is roughly equivalent to removing 135,000 gas-fueled cars off the road.

Approved by the City Council May 16, 2017 and signed by Mayor Eric Garcetti May 19, 2017, the agreement with the Southern California Public Power Authority (SCPPA) will provide Los Angeles with about 150 megawatts (MW) of clean, around-the-clock renewable energy from the Northern Nevada Geothermal Portfolio Project, which will be developed by ONGP LLC, a subsidiary company of Ormat Technologies, Inc. based in Reno, Nevada.

“I promised Angelenos we would kick L.A.’s dependence on coal, and projects like this are exactly how we’ll do it,” said Mayor Eric Garcetti. “Washington may be burying its head in the sand — but by embracing geothermal energy and other renewables, we’re showing that cities can, and will, continue to lead the fight against climate change.”

“Unlike wind and solar, which only generate power when the wind is blowing or the sun is shining, a geothermal plant produces energy continuously, so we can rely on it for base-load renewable power, 24/7,” LADWP General Manager David Wright said. “This makes it an ideal renewable energy as part of our replacement of coal and other fossil fuel generation.” *(Continued on page 2)*

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Our thanks to the Metropolitan Water District Board for permitting us to reprint portions of their documents detailing:

“WATER TOMORROW
INTEGRATED WATER RESOURCES PLAN
URBAN WATER MANAGEMENT PLAN
California Waterfix Colorado River
Regional Recycled Water Project
Integrated Resources Plan Innovation Program
Conservation.”

The complete reports are available on the MWD website,
www.mwdwatertomorrow.com

Our **Power News** articles include: Geothermal, Renewals, Solar, Environmental, Transmission Lines, Coal Power Plants, Renewal Energy Targets, and more.

Water and Power Associates, Inc.

is a non profit, 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, of Southern California and of the State of California.



Articles submitted by
Thomas J. McCarthy



New Geothermal Project

(Continued from page 1) Under the agreement, LADWP will receive the full output of geothermal energy from the facility over 26 years. The project will encompass a portfolio of geothermal facilities that will be brought on line over three development periods. The first facility is expected to provide 24 MW of power by December 31, 2017, and subsequent development will bring the remainder in commercial operation by December 31, 2022.

In addition to producing fossil free power, geothermal energy offers many desirable benefits. Because it can provide continuous energy generation, a geothermal plant is expected to produce power at 95 percent or more of its capacity year-round – a higher capacity than the wind or solar renewable energy resources. With its baseload predictability, geothermal energy also saves on transmission and other integration costs, as compared to variable renewables like wind and solar power.

LADWP has been steadily building a diverse renewable energy portfolio of wind, solar and base-load renewable power such as geothermal. LADWP has achieved an estimated 29 percent of its power sales from renewable energy so far in 2017, and anticipates supplying 38 percent renewable resources by 2020 and 55 percent by 2030. The geothermal energy purchased from the Northern Nevada Geothermal Portfolio Project will represent 5 percent of LADWP's renewable energy goals.

“This agreement for geothermal power is key for LADWP to build a balanced renewable portfolio and help LADWP making the transition away from coal power while maintaining a reliable power supply for Los Angeles,” said Reiko Kerr, Senior Assistant General Manager – Power System Engineering, Planning, and Technical Services. ❖

Calif. Senators Pass 100 Percent Renewables, Environmental Bills as 'Trump Insurance'

Combative California lawmakers blasted President Donald Trump's possible exit from the Paris Agreement on climate change as "destructive," "disappointing" and downright "Neanderthal," as they passed dozens of clean energy and environmental measures they hope will counteract the White House's energy policies. "Among the marquee measures advancing ahead of a June 2 deadline for bills to pass out of their respective house of origin were Senate proposals to set a 100 percent renewable energy target, meet the state's peak energy demand increasingly with non-natural gas resources and a package of environmental protection bills designed to keep California protected by landmark federal environmental laws," SNL reports. ❖ [SNL](#), May 31



Solar Outshines Nuclear as Spring Sun Boosts UK Output

Solar energy accounted for almost a quarter of energy generated in the UK at lunchtime on Friday — a record that exceeded the combined output of the country's eight nuclear energy stations. "An almost cloudless late spring day across Britain sent solar output soaring to 8.7 gigawatts, or 24.3 per cent of overall energy generation, compared with about 23 per cent from nuclear energy," the Financial Times (UK) reports. ❖



Financial Times (UK) , May 26



Edward A. Schlotman

the President's Message



As you all know I tend to carry on at some length about water resources and supplies for Los Angeles and Southern California. From time to time I have even suggested the water in the Pacific Ocean is a source. All we would have to do is desalinate it, which to date, inter alia, is expensive calling for lots of power. This may seem an odd time to bring it up after the amount of rain fall we have seen this past winter, with dams literally washed away and flooding in lots of places and so forth. It's certainly easy to remember when you are sweeping water off the back patio because the drains are overwhelmed. But we all know that sooner or later drought-like conditions will return. That's just a fact of life in Southern California, something for which we must prepare, or at least, with which we must contend.

Anyone who has read these articles over the last several years will no doubt recall that I have concentrated attention about desalinization of Pacific Ocean water, to use it as a source as necessary. Nor is it as if there is a stationary target. The population keeps increasing and people need water. That demand drives in part the need for more water. Agricultural and mining interests also have some interest in an assured annual supply of water for their businesses. That's not the easiest thing to do, I suspect, given among other things the increasing population, something over 39 million. So when we hear of a new or different way of making seawater usable it has to be of interest.

We are advised as follows: that a Manchester-based group has now further developed graphene membranes and found a strategy to avoid the swelling of the membrane when exposed to water. The pore size in the membrane can be precisely controlled

which can sieve common salts out of salty water and make it safe to drink.

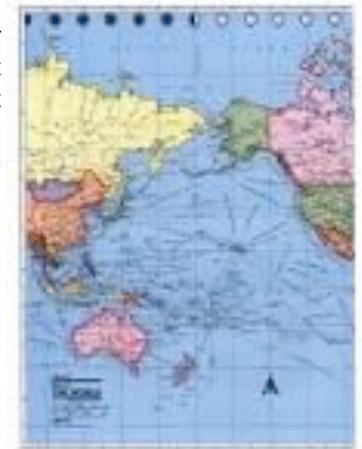
As the effects of climate change continue to reduce a modern city's water supplies, wealthy modern countries are also investing in desalination technologies. Following the severe floods in California major wealthy cities are also looking increasingly to alternative water solutions.

Professor Rahul Nair, at The University of Manchester said: "Realization of scalable membranes with uniform pore size down to atomic scale is a significant step forward and will open new possibilities for improving the efficiency of desalination technology."

By 2025 the UN expects that 14% of the world's population will encounter water scarcity. The technology described above is said to have the potential to revolutionize water filtration across the world, in particular in countries which cannot afford large scale desalination plants. It is hoped that graphene-oxide membrane systems can be built on smaller scales making this technology accessible to countries which do not have the financial infrastructure to fund large plants without compromising the yield of fresh water produced. (Source Phys.org)

If it works in other parts of the world where it is really needed shouldn't we consider it here?

As always I value your thoughts. ❖



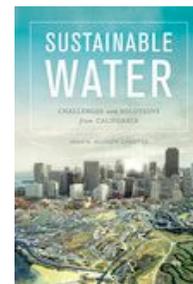
Graphene filtration

Graphene oxide membranes are capable of forming a perfect barrier when dealing with liquids and gasses. They can effectively separate organic solvent from water and remove water from a gas mixture to an exceptional level. They have even been proved to stop helium, the hardest gas to block.



By Abraham Hoffman, Ph. D.

SUSTAINABLE WATER: *Challenges and Solutions from California*, edited by Allison Lassiter. Berkeley: University of California Press, 2015. 389 pp. Maps, tables, charts, illustrations, notes, bibliography, index. Paper, \$29.95.



While everyone waited expectantly for the arrival of El Nino to pull California out of its latest prolonged drought, Allison Lassiter, Berkeley professor in the university's Department of Landscape Architecture and Environmental Planning, gathered a group of contributors to this volume that includes climate scientists, college professors, California Department of Water Resources officials, Nature Conservancy, and other experts on water resources, to produce an extremely important book assessing the state's water crisis and offering suggestions for sustainability. One can only hope politicians will heed what they have to say. The contributors deal with all types of water issues, from groundwater management to salmon protection.

What follows here is a brief description of each of the fifteen chapters. I recognize that limiting each summary to a couple of sentences doesn't do justice to their discussions and recommendations, but hopefully the descriptions will spark a public awareness of the complexities involved in the search for workable solutions in meeting the state's water issues.

1. **John T. Andrew** (assistant deputy director, California Department of Water Resources), "*Adapting California's Water Sector to a Changing Climate*," observes that California is a complex state with many regions, some wet, some arid. The water problem may not be just one of scarcity but also too much of it: as climate change reduces the Sierra's snowpack, it increases rainfall that may create flood damage. Andrew calls for greater education policies for public understanding of water issues; science needs to do better "smarting up" rather than "dumbing down" the public.

2. **Robert Wilkinson** (adjunct professor, Bren School of Environmental science and Management), "*The Water Energy-Climate Nexus in California*," connects how energy is used to promote water and treat wastewater and the way water is used to deal with energy needs. Wilkinson sees climate as a major factor in impacting both water and energy systems. He believes that we have the ability to use science and technology, along with managerial capability, to deal with the challenges of sustainability.

3. **Michael Hanemann, Caitlin Dyckman, and Damian Park**, "*California's Flawed Surface Water Rights*," trace the evolution of surface water rights from the Gold Rush era to the present days. In accepting both the riparian right and the appropriative right, confusion and conflict resulted in often prolonged litigation. Although efforts have been repeatedly made to quantify surface water rights, legislation has still not resolved issues of allocation and re-allocation. Current drought conditions impel the State Water Resources Control Board to exercise its legal authority.

4. **Brian E. Gray**, "*The Reasonable Use Doctrine in California Water Law and Policy*," explores the complexities of the simple term "reasonable" that turn out to be anything but simple. The reasonable use doctrine calls for a careful balancing act that takes in such issues as drinking water supplies, preservation of the environment, and water quality standards. If water users violate the doctrine, regulatory enforcement could be used to resolve disputes. (*Continued on page 5*)



SUSTAINABLE WATER:

Challenges and Solutions from California,
edited by Allison Lassiter.

(Continued from page 4)

5. **Juliet Christian-Smith** and **Matthew Heberger**, “*Urban Water Demand and Pricing in a Changing Climate*,” address the issue of urban population growth and the demands for water placed upon by that growth. Although major cities have succeeded in lowering water usage, agencies need to recoup revenue caused by the very conservation measures they advocate. These agencies need to exercise flexibility in planning and to deal with the realities of climate change.
6. **Howard Foster** and **John Radke**, “*Coping with Delta Floods and Protecting California’s Water Supply in a Regional Flood Management System*,” examine the state of levees in California’s Delta region. With several agencies involved in flood and levee issues, centralized planning and modern technology promise a unified approach in dealing with such events as earthquakes, the rise of the ocean level, and major storms.
7. **Ellen Hanak** and **Jay Lund**, “*Portfolio Approaches to Reduce Costs and Improve Reliability of Water Supplies*,” call for portfolio-based planning, exploring alternative options in dealing with complex issues. Under the headings of demand and allocation options, supply-management options, and general policy tools, they offer a range of choices that might be followed in a portfolio, listing both pros and cons in each method.
8. **Daniel Wendell** and **Maurice Hall**, “*The Challenge of Sustainable Groundwater Management in California*,” focus mainly on the Central Valley and the need to replenish “borrowed” groundwater. They note that it’s a misconception to state that surface water and groundwater are separate issues; the pumping of groundwater not only leads to land subsidence, it diverts and impacts surface water streams.
9. **Celeste Cantu**, “*People, Resources, and Policy in Integrated Water Resource Management*,” describes how the Santa Ana Watershed Project Authority in Southern California implemented an Integrated Water Resource Management process for the Santa Ana River watershed, a regional program that moves beyond political boundaries to utilize the watershed as an integrated whole. SAWPA brings together different agencies to reconcile policies and plans for present and future water needs. It provides flexibility and a larger context in which collaboration and cooperation benefit everyone.
10. **Sasha Harris-Lovett** and **David Sedlak**, “*The History of Water Reuse in California*,” examine how different California water agencies have dealt with wastewater management. Long considered “waste” water, treatment of sewage has been successfully done through use of new technology through recycling, treating it to different standards of necessity such as irrigation and industrial use, and making it potable.
11. **Carolina Balazs** and **Isha Ray**, “*Water Justice in California’s Central Valley*,” report on the inequities exemplified by the small community of Tooleville in Tulare County, where the largely poor Latino residents have little choice in using and drinking water with high concentrates of nitrates and arsenic. Issues of race and class, legal impediments, and lack of regulatory enforcement have caused health problems requiring meaningful action.
12. **Matthew J. Deitch** and **G. Mathias Kondolf**, “*The Incredible Mix of Salmon and Water in Mediterranean Climate California*,” examine the need for balance between protection of anadromous salmon and agricultural demands in a region depending on the same water resources. With climate change in the area, water management is essential in dealing with endangered species and human water needs. (Continued on page 6)



SUSTAINABLE WATER

(Continued from page 5)

13. **Kristen Podolak** and **Sarah Yarnell**, “*Adaptive Management in Federal Energy Regulatory Commission Relicensing*,” focus on the lengthy relicensing of the Mokelumne River Project on the North Fork Mokelumne River and the Rock Creek-Cresta Project on the North Fork Feather River in the Sierra Nevada Mountain Range. Because of the complexities involved in issues of the environment, recreation, and consumer use, the relicensing process for the projects lasted for decades, with the Mokelumne Project being the lengthiest in U.S. history. The policy of adaptive management ultimately made the relicensing acceptable to all concerned interests.
14. **Cleo Woelfle-Erskine**, “*Emerging Cultural Waterscapes in California Cities Connect Rain to Taps and Drains to Gardens*,” advocates the conservation of rainwater and graywater through installation of plumbing and storage tanks to curtail water supplied by centralized agencies. Where these installations have been done, there have been dramatic reductions of water consumption, an accomplishment that challenges orthodox policies on water supply and wastewater treatment.
15. **Julian Fulton** and **Fraser Shilling**, “*California’s Water Footprint Is Too Big for Its Pipes*,” assess the state’s water footprint in a broad definition that includes everything one needs that requires water for its production, distillation, and use. This means outside of the state’s borders as well as inside.

Afterward, by **Peter H. Gleick**, “*A Soft Path for California’s Water*,” offers a scenario for California in the year 2050 by which time the state has achieved sustainability. Success in reaching this goal is based on educating the public about the state’s limited water resources and state government inaugurating adaptive management policies to deal with evolving political, economic, social, and environmental issues.

Taken together, the chapters in this book offer a remarkable compendium of facts, figures, and analyses that in the end suggest a cautious optimism about how—and whether—California can succeed in formulating a sustainable and sensible water policy. Although this book was published before the 2016-2017 period saw record-breaking rainfall, filling reservoirs and yielding high snow levels, accompanied by sighs of relief that the drought was “broken,” the chapters remain greatly relevant in assessing the state’s most precious resource. ❖



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Members and Guests are welcome to attend luncheon Board Meetings held the second Wednesday of each month at 11:00 a.m.. Reservations must be made one week in advance at rawest@me.com.

Provide your name and contact number, phone or e.mail address.



POWER



Forest Service Approves 2 Big Transmission Lines in Western US

The U.S. Forest Service has issued its final approval of the routing for two large energy transmission projects in the Rocky Mountain West, TransWest Express and Energy Gateway South. The high-voltage lines will carry energy from mostly renewable generation sources in Wyoming to big markets in the Southwest. The USFS issued its final Record of Decision for both projects on May 31. The decisions come "after almost seven years of interagency and stakeholder collaboration and environmental analysis," according to the agency's press release. [SNL](#), June 1



Resurrecting Retail Private Solar Credits Could Cost \$1.3B, NV Energy Warns



Nevada lawmakers are considering Assembly Bill 405, which would largely restore retail private solar credits for solar customers following the state's 2015 decision to roll them back, but energy companies warn the move could be costly. "In a presentation to the Senate, NV Energy said requiring the energy company to purchase excess generation at close to retail rates would cost more than \$63 million annually, or about \$1.3 billion over two decades," Utility Dive reports.

[Utility Dive](#), June 1 Tags: NV Energy



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By Jack Feldman, Webmaster



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Electronic Newsletters are available to Associates members. Send your requests and Share your comments at comments@waterandpower.org



Changing Markets Challenging Houston Energy Companies

A surge of renewable energy, persistently low natural gas prices, and the high costs of operating coal and nuclear plants are driving some of the nation's top merchant energy companies to rethink their businesses - and consider mergers, sales or spinoffs - in an attempt to stay profitable and relevant in rapidly changing energy markets. "Three of those companies, NRG Energy, Calpine Corp. and Dynegy, are headquartered in Houston, and all have made moves to reshape their companies as they grapple with thin margins, billions of dollars in debt and energy grids that are buying more and more energy from wind and solar farms. Calpine is reportedly exploring putting itself up for sale, while Dynegy, operating under the weight of \$33 billion in debt, is said to be in talks with Dallas-based Vistra Energy about a possible merger," Houston Chronicle reports.



The power to change life: CALPINE CORPORATION



A group of men stands in front of the Lenz & Widney Tract Office at the Mulholland Townsite

Historical Notes

Walter M. Lenz and Robert J. Widney were sales agents for the project to develop the town of Mulholland and Mulholland Hills in San Fernando Valley. The project was developed by the Mulholland Development Company.

What year was Mulholland Town established?
A) 1907
B) 1912
C) 1917
D) 1922
E) 1927

What is the area (Township of Mulholland) called today?
A) Pacoima
B) San Fernando
C) Sunland
D) Sylmar
E) Tujunga

Answers at:

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

WATER



*Submitted by Duane Georgeson,,
Retired Assistant General Manager – Water
Los Angeles Department of Water and Power*



The Metropolitan Water District reported to its Board in June that the planning phase for the California “water fix” is nearing completion. Simultaneously the San Diego County Water Authority is raising charges that Metropolitan in its strategic water planning process faces the prospect of having **too much** water in the decades ahead.

Printed below are excerpts from a recent letter from Chairman Randy Record of the MWD Board to San Diego correcting the “flawed analysis” by the Water Authority. Mr. Record closes his letter with a plea for a spirit of collaboration by all MWD member agencies in preparing Southern California for a secure water future.

May 23, 2017
Mark Muir, Chairman
San Diego County Water Authority

The Metropolitan Water District of Southern California (Metropolitan) is in receipt of your May 2 letter sent to local elected officials throughout Metropolitan’s service area criticizing our water planning efforts.

I am proud to say that the level of sophistication of water planning in Southern California leads the state and is a major reason why we all survived this recent drought cycle without economic hardship. Yet your letter suggests that Southern California water planning is on a path to wasting billions of ratepayer and taxpayer dollars in unnecessary water investments. The alleged reason is that Metropolitan via its IRP and Urban Water Management Plan, is overlooking water development that is planned at the local level.

You suggest that Southern California faces the prospect of too much water in the decades ahead despite the challenges of population growth, climate change, decreases to groundwater supply production, drought, increased regulation and unresolved challenges to our imported supplies. No other Member Agency shares this concern. I repeatedly hear concerns about precisely the opposite, the prospect of significant shortages due to these same challenges. Your unique concern is based upon a flawed analysis of Southland water supplies conducted by one of your former employees.

These are the reasons why Metropolitan works closely with you and our other Member Agencies to frequently update our IRP and UWMP so that the targets for imported water supplies, local supplies and local conservation are made with the best information possible. Because these documents are updated every five years, if development of local supplies accelerates, that fact will be captured in the 2020 UWMP and IRP with targets adjusted accordingly. The concern that vast amounts of local supplies will be developed and unaccounted for at the cost of billions of dollars is complete nonsense.

Since Metropolitan’s inception, each generation has made the necessary investments so that the next generation can maintain a reliable water system. By working together in a spirit of collaboration, setting aside the false criticism, we will prepare Southern California for its water future through careful and realistic planning.

Sincerely,

Randy A. Record
Chairman of the Board

THE METROPOLITAN WATER DISTRICT of SOUTHERN CALIFORNIA

California WaterFix
Securing Reliable Water Supplies for Future Generations



About 30 percent of the water that flows out of taps in Southern California comes from Northern California via the Sacramento-San Joaquin Delta. But the Delta's delivery system is badly outdated, a problem compounded both by a declining ecosystem and 1,100-mile levee system that are increasingly vulnerable. **California WaterFix** is a comprehensive solution proposed by state and federal agencies to ensure our state has a reliable water supply for many years to come. It would modernize the decades-old delivery system through the building of three new intakes in the northern Delta along with two tunnels to carry water to the existing aqueduct system in the southern Delta.

The estimated cost of California WaterFix is about \$15 billion, with Southern California's share about a quarter of that. But the cost of doing nothing would be greater as the reliability of the state's single largest water supply, the Sierra snowpack, would remain in jeopardy.

Throughout the summer of 2017, water agencies including Metropolitan Water District, will weigh this decision. They will evaluate the costs and benefits of the project to determine whether Metropolitan should participate in California WaterFix.

The Delta water system is outdated and unreliable. The system relies on levees that are vulnerable to earthquakes, floods and rising sea levels under climate change. And when these levees fail, water rushes into the lower-than-sea level islands behind them, pulling in salt water from the bay and fouling water quality before it can be delivered to Southern California, the Bay Area and Central Valley farmland. In addition, powerful existing state and federal pumps are strong enough to cause rivers to flow in reverse. This traps migrating and endangered fish, leading to declines in native fish populations.

This project has been subjected to 10 years of detailed analysis and more environmental review than any other project in the history of the world. It is absolutely essential if California is to maintain a reliable water supply."

Gov. Jerry Brown

The Need

The Big One

New tunnel pipelines are a safeguard against a major earthquake collapsing Delta levees, which could shut off water deliveries to 25 million people, farms and businesses.

Drought

Nearly all water stored in Southern California for drought and emergency needs comes from Northern California or the Colorado River.

Big Storms

A modernized system could capture enough water to refill reservoirs after big Sierra storms, providing flexibility and reducing conflicts with fish such as salmon.

THE METROPOLITAN WATER DISTRICT *of* SOUTHERN CALIFORNIA

The Need

More Local Supplies

Sierra snowmelt is pure enough to recycle again and again in Southern California, promoting more recycling projects in the region's

future.

Groundwater

This is Southern California's largest local water source and is mainly replenished by imported supplies from Northern California.

The Fix

The California WaterFix proposes construction of three new water intakes located farther away from endangered species habitats. Two 40-foot wide tunnels located about 150 feet below ground would carry

diverted water by gravity under the Delta to pumping facilities south of the estuary. Water would be lifted into canals that flow several hundred miles through the state and as far south as San Diego. **Learn more about the proposal in the videos below or from additional videos [here](#).**

The Decision

Near the end of 2016, the final environmental analysis for the California WaterFix project was published, representing a decade of scientific study, analysis and public input. The next milestone in the decision-making process, expected in June 2017, is the release of biological opinions by the U.S. Fish and Wildlife Service and the National Marine Fisheries Service, which show the project's effects on endangered species. This opinion will be followed by the release of the federal Record of Decision and the state's

Notice of Decision, which would allow the project to proceed.

Metropolitan's Board of Directors will have a series of public meetings to review different components of California WaterFix including the physical project, the proposed water operations and key financial issues. For each of these workshops, staff will release in advance a detailed white paper. An additional workshop is scheduled for August 28. Tentatively, staff is scheduling a Board action on September 12 to decide whether Metropolitan should participate in California WaterFix.

The Toolkit

Visit our toolkit to watch more videos, read and download fact sheets, get photos, maps and graphics and find all the resources and information you need to understand and share information about California WaterFix.

- Graphics
- VIDEOS
- State of California Fact Sheets
- TOP FIVE REASONS FACT SHEETS
- Photos
- MAPS
- Powerpoint Presentations
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- Other Resources
- METROPOLITAN FACT SHEETS

For more detailed information EMAIL US: WaterFix@mwdh2o.com

THE METROPOLITAN WATER DISTRICT of SOUTHERN CALIFORNIA



- California Waterfix
- Colorado River
- Regional Recycled Water Project
- Integrated Resources Plan
- Innovation Program
- Conservation



Articles provided by
Brandon J. Goshi

and submitted by
Gerald A. Gewe



Metropolitan's planning and reporting documents focus on regional water supply reliability. **Water Tomorrow**, the Integrated Water Resources Plan, represents Metropolitan's long-term plan to assure adequate water supplies for Southern California. Metropolitan's [Urban Water Management Plan](#) describes and evaluates sources of supply, efficient uses, water recycling and conservation activities.

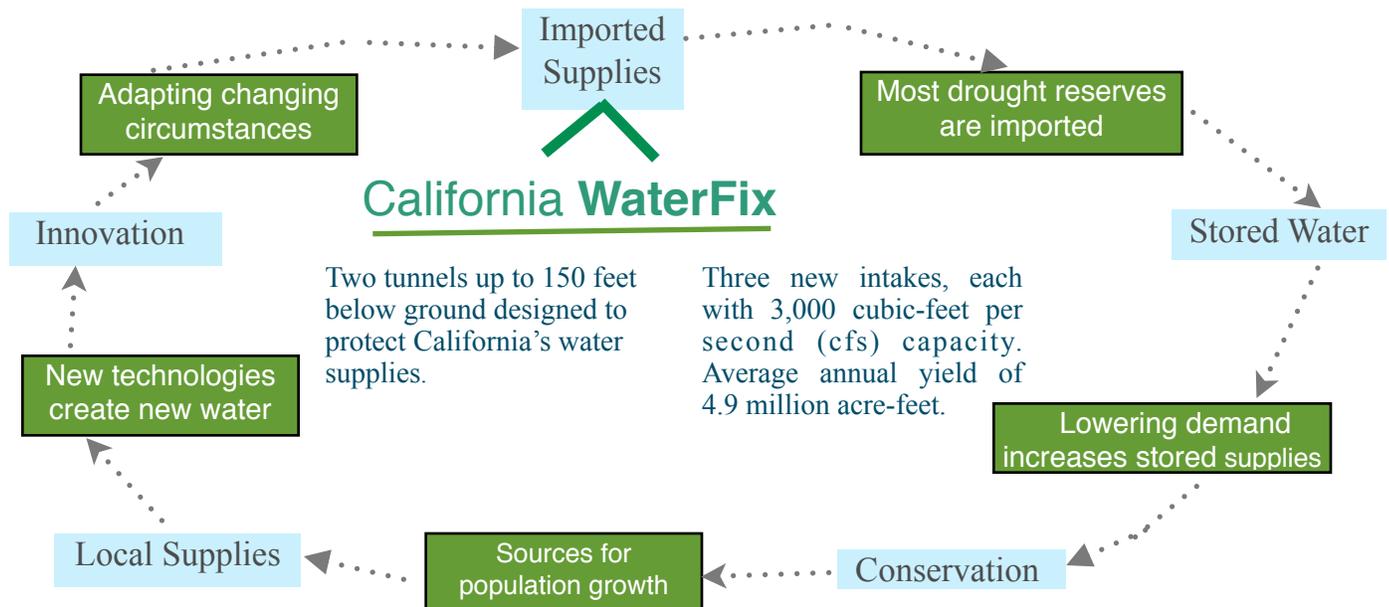
Metropolitan's **Water Surplus and Drought Management Plan** was developed in 1999 to outline policies that guide water surplus and shortage management and establish a basis for dealing with shortages in an equitable and efficient manner.

The **Long Term Conservation Plan** guides Metropolitan's investments and communication strategy for reducing regional water demands. Metropolitan's analysis of water supply reliability for the **Emergency Regulation for Statewide Conservation** is provided below.

How California WaterFix is Part of Southland's "All of the Above" Water Strategy



There is no single solution to Southern California's many water challenges. Climate change, population growth and various regulatory challenges will require actions on every front to ensure a reliable water future. Maintaining – not increasing – imported supplies is part of the Southland's long-term water strategy. Here is how California WaterFix fits into the broader plan.



SOUTHERN CALIFORNIA BUSINESSES

Why a California Water “Fix?”

Five Benefits for Southern California Businesses

Organizations representing thousands of Southern California businesses are supporting efforts to protect the region’s imported water supply from Northern California. They are joined by public safety groups, water experts, labor leaders and others. The reliability of this supply for all of Southern California is at risk due to pumping restrictions, deteriorating environmental conditions in the Sacramento-San Joaquin Delta and an aging water system that was not designed to meet today’s challenges. State and federal agencies want to modernize this system through a project known as California WaterFix that has both water delivery and ecosystem benefits. Here are five benefits to Southland businesses should the project move forward.

Protecting Southern California’s Investment

Southland businesses and residents have invested billions of dollars over the years to build and maintain the State Water Project system that delivers water from Northern California. Modernizing the system via California WaterFix helps to protect this investment and this supply for decades to come.

Minimizing Future Water Rates

Imported supplies - even with reinvestments such as California WaterFix - are much less expensive than developing new local supplies, although both are needed in some combination in the future. Maintaining lower-cost imported supplies helps to avoid a more costly water future.

Thinking Long Term

California WaterFix is designed to better capture available supplies from winter storms. Southern California has a long tradition of investing in water projects to meet the needs of future generations, resulting in one of the world’s most vibrant economies.

Preserving Jobs

A severe water shortage would come with a severe economic cost. Securing the reliability of the Northern California supply will protect nearly 1 million jobs statewide, based on a University of California study.

Advancing Statewide Progress

The water projects in the Sacramento-San Joaquin Delta help to sustain businesses and residents in the Silicon Valley and the rest of the Bay Area, as well as 19 million Southern Californians. Three million acres of the nation’s most productive farmland also depend on this supply. California WaterFix would advance water reliability statewide.

THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA



Can California really hit a 100% renewable energy target?

*Power News Articles
submitted by Thomas J. McCarthy*

Rob Nikolewski talks to Fox 5 San Diego about a bill in the Legislature that calls for a dramatic next step, getting the state's electricity grid to go to 100% renewable energy sources by the year 2045.

California takes pride in its clean energy credentials, but the state may be poised to take an even more dramatic next step: deriving 100 percent of its electrical power from renewable energy sources by the end of 2045.

"I don't think it's a big stretch, politically," said [Senate President pro tem Kevin de León](#) (D-Los Angeles), who introduced a bill in Sacramento that would lay down the zero-carbon sources threshold.

The legislation, Senate Bill 100, [passed the California state Senate](#) on May 31 on a party-line 25-13 vote and now moves to the Assembly. With the state Legislature in Sacramento dominated by Democrats and two and a half months still remaining in this year's session, the chances of Senate Bill 100 moving onto Gov. Jerry Brown's desk look promising. Through the state's [Renewables Portfolio Standard](#) (RPS), California already has a standard calling for [50 percent clean energy by 2030](#). [According to recent estimates by the California Energy Commission](#), the state now obtains about 27 percent of its electricity from renewables.

Can California, home to [the world's sixth-largest economy](#), essentially de-carbonize its entire electric grid in the space of 28 years? Is it technically feasible? And can it be done without sending ratepayers' bills through the roof?

That seems to depend on who's answering the question.

"I'm confident (Senate Bill 100) will get passed," de León said while talking to reporters at a wind energy conference in Anaheim recently.

In 2015, [De León introduced](#) a bill that became law, establishing the current 50 percent reduction target.

"The one thing I realize a year or two later is, I made a mistake. I should have shot higher with the RPS," de León said. "It is very clear to me that the investor-owned utilities are working really hard and they're meeting the goals and they're probably going to

hit 50 percent RPS in the early 2020s without breaking a sweat."

SB100 doesn't just set a 100-percent marker; it would also accelerate and expand existing California clean-energy targets.

Instead of reaching 50 percent by 2030, SB100 [speeds up the deadline by four years, to 2026](#). It also directs the state to reach 60 percent renewables by 2030. And SB100 would also require state agencies such as the Air Resources Board to use the 100 percent target in their long-term planning and decision-making. [SB100 sets a target for 100 percent renewable energy](#) but does not mandate achievement of that goal. When asked about that, de León said, "Yeah, but we always hit our goals. It doesn't make a difference."

Others are much more skeptical.

"Do you wear a seat belt when you drive a car?" asked [Gary Ackerman](#), executive director of the [Western Power Trading Forum](#), an organization based in Sacramento whose 90 members in the West buy and sell power. "There's no problem as long as there is no accident And that's the risk California is driving toward at a very fast clip. I think it's reckless."

While the share of renewable energy sources is growing, the state's largest source of electricity, by far, is natural gas, which makes up [44 percent of California's power mix](#), according to 2015 figures from the California Energy Commission.

Natural gas [burns twice as clean as coal](#) but is nonetheless a fossil fuel.

By doubling the state's clean-energy requirements from 50 percent to 100 percent, Ackerman worries, "You'll chase out all the gas-fired generators that are required to keep the grid secure and available and reliable ... and when you do that, you're taking more and more risk."

But supporters of the 100 percent renewables effort may have received support from an unlikely source three weeks ago. (Continued on page15)

Can California really hit a 100% renewable energy target?

(Continued from page14)



At an [energy conference sponsored by the UC San Diego's Institute of the Americas](#), an executive from Sempra Energy expressed confidence that the

transition from traditional energy sources to renewables may not be so difficult after all.

"If you were to ask me three years ago, as a power engineer, can we actually achieve a high percentage of renewable, my answer would probably be no, we're going to need some base-load generation," said Patrick Lee. "But today my answer is, the technology has been resolved. How fast do you want to get to 100 percent? That can be done today."

Considering that Sempra is a major player in the natural gas industry, Lee's comments generated buzz among conference attendees.

But two days later, [Lee took to Twitter](#) to say that his remarks were "incomplete" and he did not mean to say reaching the 100 percent mark can be achieved immediately. "Today a reliable grid in (California) requires natural gas-fired generation," he tweeted.

Lee is president of a new Sempra subsidiary called [PXiSE Energy Solutions](#) that is developing software technology for large-scale renewable projects.

In an email to the Union-Tribune, Doug Kline, director of corporate communications at Sempra, said Lee's comments "were aspirational in nature" and going to 100 percent renewable energy right now is "not practical nor realistic."

Natural gas "is the backbone of energy production when the sun is not shining and the wind is not blowing," Kline said. "This is not an 'either/or' equation: We need a mix of energy resources to maintain and ensure a reliable energy grid."

One of the members of the board of governors at the [California Independent System Operator](#) (CAISO), which oversees the operation of about 80 percent of the state's electric power system and electricity market, said SB100's goals can be achieved.

"It can be done and it is certainly a way to go forward," said [Angelina Galiteva](#), who is also the [founder of Renewables 100 Policy Institute](#), a think tank in Santa Monica that promotes renewable energy.

On March 11, CAISO reported a first — utility-scale solar generation in its territory [accounted for almost 40 percent of net grid power](#) produced during the hours of 11 a.m. to 2 p.m.

"We're learning a lot and we're perfectly comfortable operating a high-penetration renewables grid," Galiteva said.

At the same time, Galiteva acknowledged the challenges that come with integrating a large amount of renewable sources into the grid.

[System operators have to balance](#) supply and demand instantaneously, generating every kilowatt that is demanded by customers who expect their lighting, heating and air conditioning to come on the moment they flip a switch.

Solar and wind have problems with what's called "intermittency" — that is, generating solar power when the sun isn't shining and wind energy when the wind isn't blowing.

The power system relies on energy sources like natural gas to fill in the gaps, ramping up and down over the course of the day and night to [meet sharp changes in electricity net demand](#).

"As more solar is added, the ramping gets steeper and more challenging to manage but we're going to be able to figure out ways to manage those ramps," said Galiteva.



Energy storage systems are seen as likely solutions. Earlier this year, [San Diego Gas & Electric unveiled](#) the world's largest lithium-ion battery energy storage center — a [30-megawatt plant in Escondido](#).

Energy storage is relatively [expensive but its supporters expect costs to come down as the technology improves](#), especially by the time 2045 comes around.

[Robert Michaels, an economics professor at Cal State Fullerton](#), is not as confident and predicts SB100 will lead to higher bills for ratepayers.

"It's going to be expensive," Michaels said. "We already know there are a lot of problems with reliability, just with the percentage of intermittent renewables that you have here (in California). And until, and probably not even after, we get a lot more in the way of usable battery storage or some way of storing this stuff, it's simply not going to be feasible." ❖

Ed. Note: *Viewed online, the blue underlined words automatically accesses website additional information.*



Coal Country's Power Plants Are Turning Away From Coal

Article submitted by
Thomas J. McCarthy



Kentucky Utilities' coal fired generating plant in Ghent, Ky. Kentucky is among the coal-country states moving more of the country's electric supply to renewable sources.

LUKE SHARRETT FOR THE NEW YORK TIMES
By DIANE CARDWELL and CLIFFORD KRAUSS
May 26, 2017



Coal is on the defensive in the nation's power industry. Even in coal country.

The pressure to shift more of the country's electric supply to renewable sources is not just a rallying cry for environmentalists. Some of the power industry's biggest customers, like General Motors and Microsoft, have made a commitment to clean energy. And to help them meet it — and keep them from taking their business elsewhere — utilities are changing their ways.

West Virginia, where coal is king, is no exception. Appalachian Power, the leading utility there, is quickly shifting toward natural gas and renewable sources like wind and solar, even as President Trump calls for a coal renaissance. Appalachian Power still burns plenty of coal, but in recent years it has closed three coal-fired plants and converted two others to gas, reducing its dependence on coal to 61 percent last year, down from 74 percent in 2012.

Chris Beam, the company's president, made the industry's shifting dynamics clear in an encounter with Gov. Jim Justice, a Democrat, at his inaugural ball in January.

“Look, I'd like to see you guys build another coal plant,” he recalled the governor saying. “And our answer was: We're not going to build another coal plant.” (The governor confirmed the account, but added in an email, “I'll continue to encourage power companies to burn more coal to put our miners back to work.”)



It's the same story in Virginia, where Dominion, a leading utility based in Richmond — near where commercial coal mining got its start — designed a special rate to make it easier for Amazon Web Services and similar customers to buy renewable energy.

In Kentucky, a chance meeting between a state regulator and a Facebook employee ultimately led the Public Service Commission to advise utilities that they could offer customers renewable energy packages, part of an effort to attract new business and hold on to automakers like G.M. and Toyota.

And in Wyoming, the nation's leading coal producer by far, Black Hills Energy worked with Microsoft to create a complex arrangement for the technology giant to get enough [wind energy](#) to fulfill current and future needs at Microsoft's data center in Cheyenne.

“I've not spoken to a single utility that's truly holding on to a future of more coal,” said Brian Janous, who directs energy strategy at Microsoft. “They're looking to attract, as in the Appalachian case, new customers, and those customers aren't attracted by coal.”

Almost half of the Fortune 500 companies have adopted at least one climate or clean-energy goal, with 23 of them pledging eventually to run their businesses on 100 percent renewable energy, including Walmart, Bank of America and Google, according to a recent report by the World Wildlife Fund and other environmentally minded organizations and investors.

Though corporations are buying renewable energy across the country, energy executives and analysts say it is notable that the trend is taking hold in states where coal production is part of the economic heart and soul. ❖