



NEXT CENTURY POWER FOR L.A.

The Biggest Transformation of LA's Power Supply is Happening Now

By Carol Tucker

“Never before has LADWP needed to make so many far-reaching changes in our power and water systems to meet our key goals and legal mandates with so many specific deadlines, all bearing down on us at the same time – and all require funding.”

- Ronald O. Nichols, General Manager

Imagine over one-third of the city’s power supply coming from renewable energy like solar and wind power, and none from high carbon, polluting coal power.

Now consider how LADWP and its customers can achieve even greater sustainability by partnering to reduce the amount of electricity that they use every day through heightened conservation and energy efficiency efforts. Combined energy efficiency and renewable energy will comprise over 45% of Los Angeles’ power supply around the end of this decade. At the same time, LA will be on a firm path to cut in half the amount of imported water we rely upon, on average, from Northern California.

Aging infrastructure is another major driver. Both water and power systems have rapidly aging infrastructure in need of replacement. “That’s going to start catching up with us. We need to increase those investments beyond the level that they are being funded today,” Nichols said.

LADWP’s main objective is to accomplish the transformation of water and power supplies while continuing to provide customers with reliable service at competitive rates. Toward that end, LADWP introduced a two-year water and power rate action in 2011 to support critical investments needed to meet State mandates and replace aging infrastructure.



In two major outreach efforts in the summer of 2011 and from April through July in 2012, LADWP staff engaged community members, customer groups, elected officials and other stakeholders in conversations about challenges facing the utility, required investments and associated proposed rate actions. In February, the City Council approved a focused increase in a segment of LA’s water rates to fund ongoing water quality improvements mandated by State and Federal law. The electric rate action was approved by the City Council in October 2012, while

further action on water rates was deferred. (Read more about the electric rate action on Page 6).

Policy Goals and Mandates

“It took over 100 years to develop the power resources we use today, and we will need to replace nearly 70 percent of it in the next 10 to 15 years,” Nichols says.

Before the next two decades are over, the goals and objectives of LADWP, along with various State mandates require replacing ocean water cooling systems at LADWP’s 9 power plant units at three coastal power plant sites by 2029; expanding renewable energy to 33 percent of all retail power sold to customers by 2020; expanding the energy efficiency program to achieve between 10 and 15% reduction by 2020, and eliminating imports of coal power when LADWP’s contracts with

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A new solar array is under construction by LADWP crews at the site of the Pine Tree Wind Farm in the Tehachapi Mountains. Clustering renewables this way makes the most of existing resources, so it is a cost-effective approach to expanding renewables. It also reduces environmental impacts.

This vision of a brave new LADWP is the ultimate outcome of what General Manager Ronald O. Nichols describes as “the biggest transformation of water and power supplies in LADWP’s history,” driven by a set of strong self-imposed goals and a series of legal mandates that require LADWP to replace or rebuild over 70% of our energy resources and 50% of our imported, purchased water supplies.

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Similar challenges are facing the Water System. In the next issue of Intake we will tell the water story.



two coal power plants expire in 2019 and 2027, or sooner. Other State targets require net-metered customer rooftop solar, and feed-in tariff solar, the latter in which LADWP purchases solar power from third-parties for distribution on the city's power grid. (See "A New Twist on Solar Power," Page 9.)

The Power System has been making progress toward meeting these goals and legal mandates for several years without raising electric rates. LADWP's base rate for electricity and its reliability cost adjustment hadn't been increased since July 2009. The fuel cost adjustment had not been raised since July 2010 despite costs increasing. After a major cost-cutting program implemented in the first half of 2011, LADWP had no choice but to seek rate adjustments in 2012.

Aram Benyamin, Senior Assistant General Manager – Power System, said meeting the environmental and reliability objectives of LADWP along with the compliance deadlines for the various legal mandates will require consistent investments and meeting strict timetables. Without a steady infusion of new funds, compliance deadlines are in danger of slipping, since large capital projects require long lead times to finance, acquire permits, marshal and train the workforce, and other steps leading up to construction.

To address the state mandates, ensure reliability and keep customer electric costs competitive, LADWP is focusing on three key initiatives:

- Power Supply Replacement Program,
- Power Reliability Program, and
- Customer Opportunities Program.

Power Supply Replacement

As the Power System confronts the realities of the transformation, one of the biggest challenges is to manage the system reliably with a revamped power portfolio that includes one-third renewable energy and no coal power, balanced with more efficient natural gas.

Because renewables like wind and solar are intermittent (they do not generate power when the wind is not blowing or the sun is not shining), utilities are grappling with the best ways to incorporate more of them into their power dispatch scenarios.

Through its Integrated Resource Plan, LADWP is running studies with various scenarios (looking at factors such as energy resources and energy-use profiles during peak and non-peak periods) to determine how to operate under the new configuration. "We're running a lot of studies, but there's no playbook," said Randy S. Howard, Director of Power System Planning and Development.

▲ The Adelanto Solar Power Project, completed in June 2012, is LADWP's first utility-scale solar power array. Sun power will play an important role in the power supply transformation in the coming decade.

Rebuilding Local Power Plants

A negotiated agreement with the State Water Resources Control Board prescribed a strict compliance schedule for LADWP to stop using ocean water to cool nine generators at three coastal natural gas power plants — Haynes, Harbor and Scattergood Generating Stations — to protect marine habitat. This cooling process, known as Once-Through-Cooling (OTC), must be eliminated and replaced with dry cooling between 2013 and 2029.

Along with rebuilding the generators to meet OTC requirements, LADWP plans to modernize them to help integrate renewable energy, reduce NOx emissions, and improve reliability and fuel efficiency. (See “Haynes Repowering Project,” Page 16)

Because LADWP will be transitioning out of coal power and adding renewables during this same period, LADWP must ensure that its in-basin generators continue providing the same level of power they do today – so no one unit

can be shut down before a new one is ready to support the same amount of power production. It also requires about \$2.2 billion in capital funding, complex engineering and design, and construction in tight quarters without disrupting neighbors.

They say timing is everything. Senior Assistant General Manager-Power System Aram Benyamin couldn't agree more.

“I liken it to flying a 747 jet across the Atlantic and needing to repair or replace the engine while in mid-flight,” Benyamin says. “We have a plan to get there but it has to run like clockwork.”

Rise of Renewables

LADWP was proudly one of the first California utilities to meet the state's renewable energy portfolio standard (RPS) of 20% by the end of 2010, positioning it to meet the revised RPS of 33% by 2020.

Adopted in 2011, State legislation Senate Bill (SB) 2 (1X) requires the following RPS:

- 20% average from 2011-13,
- 25% by 2016, and
- 33% by 2020.

In a few short years, LADWP had expanded renewable energy from under 5% in 2005 to 20% in 2010. Among other actions to reach the target, LADWP built the 130 MW Pine Tree Wind Power Plant, which is the

nation's largest wind farm owned and operated by a single municipal power utility. LADWP also entered into several power purchase agreements for new wind power projects in Utah and the Pacific Northwest.

LADWP's RPS program has been guided by several key strategies: locating projects near existing LADWP resources and clustering them to increase cost efficiency and reduce environmental impacts; pursuing contracts for projects with ownership opportunities; using LADWP work forces to support local green jobs; and diversifying the types and locations of resources.

The Power System is looking toward the sun to meet the next renewable energy targets after focusing mostly on wind power for the past five years. “There's a tremendous potential in the Mojave Desert and High Desert areas, home to some of the highest quality solar resources in the world,” Howard said. A big advantage of locating new utility scale projects in the desert is the proximity to existing transmission, switching stations and other LADWP infrastructure.

For example, LADWP's first large-scale, utility-built solar array is the 10 MW Adelanto Solar Power Project, located at its Adelanto Switching Station in Adelanto, Calif., near Victorville. Adelanto went online in Spring 2012.

A second utility-scale solar project – the 8.5 MW Pine Tree Solar Power Project – is under construction at the site of the Pine Tree Wind Farm in the Tehachapi Mountains. Both solar farms are located on LADWP-owned property near existing transmission systems to minimize costs and environmental impacts. (See Adelanto, Page 26) In October, the Board of Water and Power Commissioners approved two long-term purchase agreements for 460 MW of clean solar power. Combined with a new LADWP-owned property that will support a 250 MW solar array planned in Kern County, the three solar projects will provide enough green energy annually to serve approximately 283,000 Los Angeles households.

Transitioning Out of Coal

In 2010, coal-fired power comprised 39% of LADWP's power portfolio—the lowest amount in decades, thanks to the use of more renewable energy. In the next 15 years, however, LADWP will wean itself off coal completely to meet the state's emissions performance standards. Under SB 1368, LADWP must stop importing coal-fired power when its current contracts with Navajo Generating Station in Arizona and Intermountain Power Plant in Utah expire in 2019 and 2027, respectively. LADWP is seeking to divest of its interests in Navajo well before the contract ends — as early as 2015.

The Pine Tree Wind Farm in the Tehachapi Mountains creates wind power for Los Angeles.



The early exit strategy allows significant reduction of greenhouse gas emissions sooner, and avoids the potential cost of paying for energy that is no longer needed as LADWP increases its renewable power resources according to state mandates.

LADWP plans to replace the 477 MW of power from Navajo with a combination of renewable energy and efficient natural gas as well as stepped-up energy efficiency measures aimed at reducing the city's total power demand.

The LADWP's exit from its contract for IPP coal power is more complex, because unlike with Navajo Generating Station, LADWP does not own any part of the plant. Rather, LADWP is one of many California utilities that purchase power from the plant (and serves as its contracted operating agent). LADWP is working diligently with the Intermountain Power Agency (IPA), a consortium of Utah utilities that own the plant, to develop alternative uses of the facility for non-coal power production. As a first step, the Utah State Legislature has allowed the IPA to own resources other than coal-fired generation.

Rebuilding for Reliability

Beyond all of the legal mandates that are driving the power supply transformation, LADWP must continue making steady investments in replacing aging infrastructure to improve reliability.

LADWP customers experience the most direct impact from failures in the power distribution infrastructure such as power poles, underground cables, cross-arms, station transformers and other equipment.

"So much of our critical infrastructure is approaching or has exceeded its recommended lifespan and requires more investment," Benjamin said. Keeping up needed investments in power reliability has been difficult without increased revenues, because while reliability is fundamental, it is not a legislated mandate. As a result, funding for infrastructure replacements and upgrades was deferred in favor of spending on projects required to meet regulatory deadlines.

LADWP's extensive transmission system is also aging, and in many cases, has reached its capacity and needs expanding within the Los Angeles Basin. Studies are underway to deploy new technology that will minimize energy losses along LADWP's longest transmission systems that reach into Utah, the Southwest and the Pacific Northwest. LADWP also adheres to Federal Energy Regulatory Commission (FERC) requirements to ensure reliability, since transmission is interconnected throughout the Western power grid.



Customer Opportunities Program

Beyond power supply, operations and infrastructure, LADWP's next century of power will have a renewed focus on customers.

"We need to do a better job of reaching people, making them understand that using energy more efficiently is a partnership," Nichols said.

The Customer Opportunities Program focuses on expanding energy efficiency, local solar power, and other ways for customers to control their energy costs and use.

Investing in energy efficiency saves money for customers, reduces total power use and emissions, and improves reliability by reducing demand and strain on the power infrastructure. For all these reasons, energy efficiency is a highly cost-effective strategy for meeting legal mandates facing LADWP, and supporting the Power Supply Replacement and Power Reliability Programs. (See New Approach, Page 20)

Expanding local solar programs is also strongly supported by customers, and will help meet renewable energy goals. Local solar, a type of distributed generation, benefits customers by supplying power directly to where it is needed. It also is a means of boosting jobs and the green economy in Los Angeles.

LADWP offers a new Feed-in Tariff (FiT) Program, which began in 2012 as a demonstration program for up to 10 MW (See "A New Twist on Solar Power," Page 9). Based on lessons learned from the pilot phase, LADWP expects to launch a full 150 MW program early in 2013. Customer participation in the Solar Incentive Program (SIP) has nearly quadrupled over the past two years as residents and businesses tap into more of the city's famous year-round sunshine.

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As part of the power supply transformation, LADWP will be replacing all ocean-water cooling systems at its coastal power plants while modernizing the generating units. Planning is currently underway for repowering and replacing the cooling system at Scattergood Generating Station Unit 3.



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