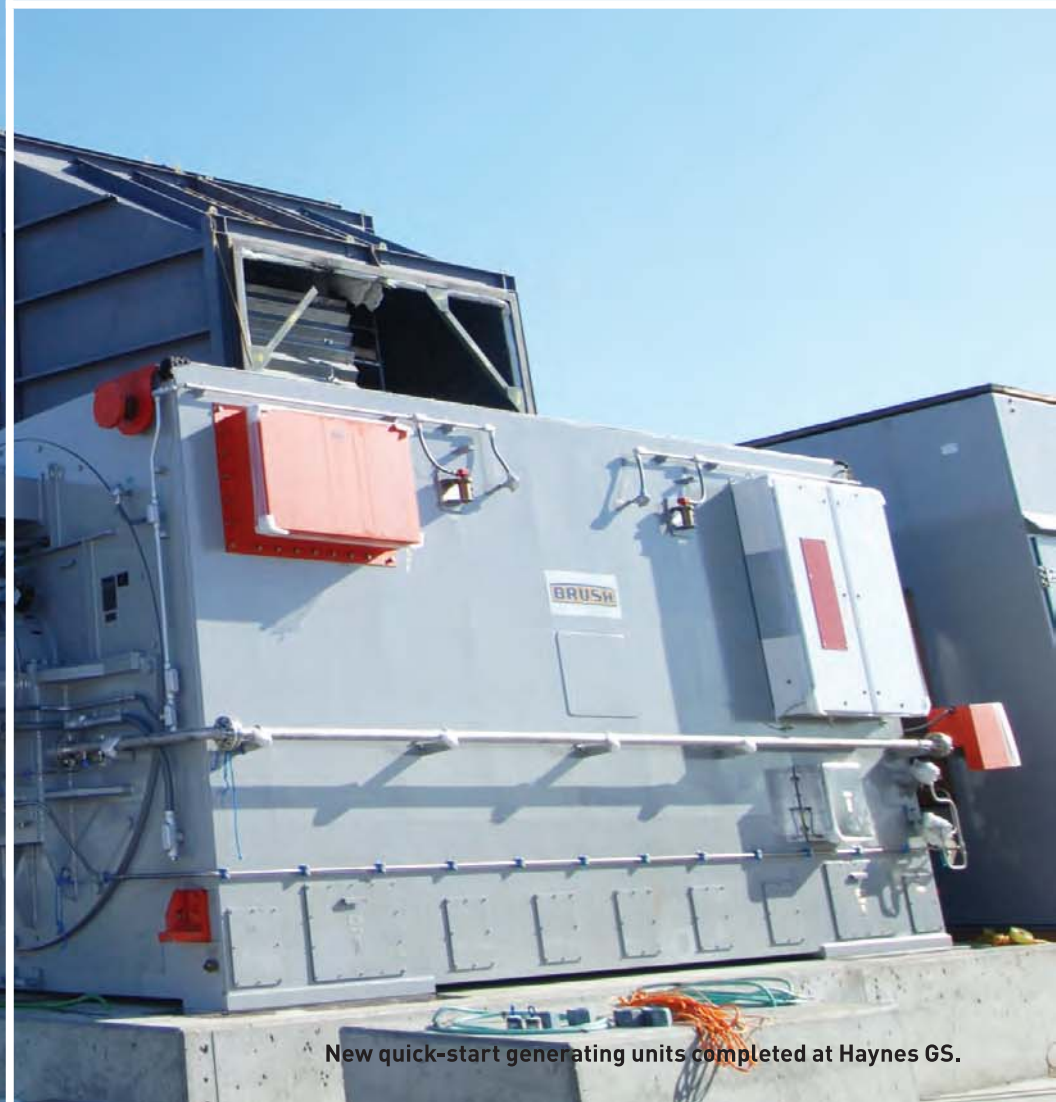




**2013**  
**POWER INTEGRATED  
RESOURCE PLAN**

December 2013



New quick-start generating units completed at Haynes GS.

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## Los Angeles Department of Water & Power

# 2013 Power Integrated Resource Plan

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Integrated Resource Planning

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## **Los Angeles Department of Water & Power**

# **2013 Power Integrated Resource Plan**

**December 12, 2013**

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## Preface

This 2013 Integrated Resource Plan (IRP) document revises and builds upon last year's 2012 IRP using updated assumptions and analysis. Major changes include a new Integrated Human Resources Plan, new energy efficiency program offerings to achieve a 10 percent reduction of sales by 2020, highlights of a new smart grid investment program, the upcoming Power System Reliability Program meant to expand on the successes of the current Power Reliability Program, and updated case analysis of the on-going coal replacement cases and analysis of new case options, introduced last year that considered higher levels of energy efficiency and solar distributed generation.

The current load forecast dated April 25, 2013 is included in this IRP along with numerous updated resource and fuel assumptions. The latest 2014/15 fiscal year budget was used in this IRP to assess overall power system costs and revenue requirements.

Early coal replacement continues to be a key strategy to reduce greenhouse gas emissions. As with last year's IRP, this 2013 IRP recommends divestiture of the Navajo coal plant by 2015, four years ahead of the scheduled 2019 contractual expiration date. LADWP will replace the loss of capacity from Navajo with energy efficiency, renewable energy, and natural gas generation. Plans are now underway to purchase an existing 500 MW combined cycle gas-fired unit, pending approvals from City Council. This unit will assist in integrating the renewables that are required to replace the Navajo Generating Station and lay the final groundwork for the sale of Navajo. An agreement between Intermountain Power Authority and the Intermountain Power Project (IPP) participants was also reached this past year to replace IPP coal-fired generation with new highly efficient gas-fired generators no later than July 1, 2025, two years earlier than recommended in last year's IRP. This agreement must be approved by all 36 participants. To date, 22 participants have approved the purchase, including Los Angeles.

Discussion of integrating more renewable energy, particularly local solar are included in this IRP; however, the implication of incorporating increased local solar for the near term, through 2020, is not fully known. Therefore, consensus from stakeholders and further analysis is required before commitments to higher levels of local solar can be made. This will be one of the major issues to be addressed in next year's 2014 IRP.

The 2013 IRP recommendations include the results of the public outreach effort that was done as part of last year's 2012 IRP. Stakeholder meetings were held last year to solicit input towards the development of strategic case options that were evaluated in this year's IRP. Next year's 2014 IRP will be an opportunity for major revisions and further analysis of additional resource cases incorporating input from recently appointed Board members and City leadership, IRP Advisory Committee members, major stakeholders, and most importantly our customers.

This IRP also includes a general assessment of the revenue requirements and rate impacts that support the recommended resource plan through 2033. While this assessment will not be as detailed and extensive as the financial analysis to be completed for the upcoming rate action for the 2014/15 fiscal year and beyond, it clearly outlines the general requirements.

The recently concluded rate action focusing on the 2012/13 and 2013/14 fiscal years confirmed LADWP's revenue requirements to meet its mandated obligations and responsibilities. As a long-term planning process, the IRP examines a 20-year horizon in order to secure adequate supplies of electricity. In that respect, it is our desire that the IRP contribute towards future rate actions, by presenting and discussing the programs and projects required to fulfill our City Charter mandate of delivering reliable electric power to the City of Los Angeles.

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## 8. Recommendations

### 8.1 Strategic Overview

LADWP's recommended strategy set forth in this IRP for meeting its key objectives can be separated into two areas: (1) Regulatory and Reliability Initiatives, and (2) Strategic Initiatives. Regulatory and Reliability Initiatives are required actions to ensure system reliability and compliance with regulatory and legislative mandates. Strategic Initiatives are policy actions to achieve objectives established by the LADWP Board of Water and Power Commissioners and the Los Angeles City Council, and reflect their vision and leadership. These policies include, for example, energy efficiency targets, social and economic development goals, early compliance with SB 1368, and investing in local solar distributed generation.

#### Regulatory and Reliability Initiatives

- RPS

LADWP must increase its percentage of renewable energy per recently enacted state law, from the current 20 percent, to 33 percent by the end of 2020. SB 2 (1X) also establishes interim targets to ensure progress towards the 33 percent goal. In addressing this mandate, it is important that LADWP expand its renewable portfolio in the most cost-effective manner as possible. As two subsets of the RPS program, SB 1 requires \$313 Million of expenditures towards solar incentives for customer-installed solar (Customer Net Metered), and SB 32 mandates a Feed in Tariff program of 75 MW (although LADWP plans to exceed this mandate and provide 150 MW by 2016).

- Power Reliability Program (PRP) and System Infrastructure Investment

To ensure system reliability, LADWP must continue sustained funding to invest in replacing transmission and distribution infrastructure that are contributing to outages. Past funding shortfalls resulted in an increase in the frequency and duration of system outages. Section 1.6.3 of this IRP discusses the importance of fully funding the Power Reliability Program (PRP) and describes the development process of a more comprehensive Power System Reliability Program (PSRP), which will be more fully described in next year's 2014 IRP. The PSRP will include the establishment of metrics and indices to help prioritize infrastructure replacement and expenditures from all major functions of the electric system, including distribution, transmission, generation, and substations. As discussed in Section 2.4.6, the PRP will also increase the resiliency of the distribution infrastructure to better withstand the higher future wear-and-tear effects that are expected due to climate change.

- Re-powering for Reliability and to Address OTC

LADWP will continue to re-power older, natural gas-fired generating units at its coastal generating station for the reasons discussed in Section 2.4.2. The repowering program is a

long-term series of projects through 2029 that will increase generation reliability and efficiency, reduce NO<sub>x</sub> emissions, and eliminate the need for once-through cooling.

- AB 32 – GHG Cap and Trade

LADWP began purchasing greenhouse cap-and-trade credits on January 1, 2013 for emissions that exceed the administrative allocation of emission allowances granted to LADWP.

- Energy Efficiency (EE)

LADWP will continue to pursue and implement EE programs per AB 2021 standards and as directed by the Board of Water and Power Commissioners, which has adopted a goal of achieving 10 percent EE by 2020, with a target of up to 15% by 2020, pending the results of an upcoming new EE Potential Study expected in March 2014. The Base EE cases evaluated in this 2013 IRP have all incorporated 10% EE by the year 2020, with higher levels of up to 14% by 2033. Next year's IRP will incorporate the findings and recommendations of the potential study as they are finalized and approved.

- SB 1368 Compliance

LADWP's two coal-fired generation sources, the Navajo Generating Station (NGS), and the Intermountain Power Project (IPP), must be compliant with the mandates established in SB 1368 by 2019 and 2027, respectively. IRP modeling determined that these units will be replaced earlier with a combination of renewable energy, demand response, EE, short-term market purchases, and conventional gas-fired generation.

- Energy Storage

Per AB 2514, LADWP is investigating Energy Storage (ES) technologies and will establish targets for implementation by October 1, 2014. LADWP will investigate programs and projects that support its unique electric grid, resource plan, and projects that will facilitate renewable integration, distributed generation, and demand response. As these projects are identified and scoped, they will be incorporated into and analyzed in future IRPs. See Section 2.4.5.2 for more information.

- Castaic FERC Re-licensing Program

On January 31, 2022, the Federal Energy Regulatory Commission's (FERC) license to operate Castaic Pumped-storage Hydroelectric Plant will expire. The license is a co-license between LADWP and the Department of Water Resources and includes a number of hydro power plants along the California Aqueduct. Both parties have initiated the re-licensing process that, on average, requires ten years to complete. Through 2015, LADWP expects to complete preliminary studies, contract negotiations, and prepare a new application strategy. In 2016, LADWP expects to file a notice-of-intent (NOI) and initiate the formal studies and applications.

- Transmission

LADWP's Ten-Year Transmission Plan is prepared each year to ensure that LADWP remains compliant with NERC Transmission Planning Standards. LADWP's 2012 plan identified a number of transmission improvements that are needed to maintain reliability. The planning process involves complex modeling of the LADWP system, and concludes with findings and recommendations to maintain operational flexibility and avoid potential future overload conditions. LADWP will continue to implement the recommended projects, including construction of a new 230 kV transmission line between Scattergood Generating Station and Receiving Station K, and upgrades at various other receiving and switching stations.

Strategic Initiatives

- Early Compliance with SB 1368

Regarding the Navajo Generating Station (NGS), while power imports can legally continue until 2019, LADWP has acted on prior recommendations to divest from NGS four years earlier, in 2015, by making progress on negotiations on the sale of NGS. There are many strategic advantages to early divestiture, including:

1. Better sales terms and conditions than waiting until the 2019 deadline.
2. Avoiding the risk of pending federal regulations that could potentially encumber the plant with expensive mitigation requirements.
3. Better availability and pricing for replacement generation (including existing plants), and lower fuel costs.
4. Reduced CO<sub>2</sub> emissions, alleviating LADWP from subsequently having to purchase emission credits for native load.
5. Transmission network for importing additional solar and geothermal resources becomes available.
6. Low load growth and increased renewable energy place less reliance on the plant for energy.
7. Provides time to handle contingencies, and to ensure that competition for replacement resources is going to benefit our customers.

Regarding the Intermountain Power Project (IPP), LADWP must be compliant with SB 1368 no later than June 30, 2027. LADWP, the Intermountain Power Agency (IPA), and the other 36 participants are working on the contractual approvals to complete the conversion from coal to natural gas no later than July 1, 2025 which is two years earlier than required by SB1368. Strategically, it is important for LADWP to remain a participant at IPP to retain geographic diversity in its resource mix, access the regional fuel supply, and retain the project's transmission lines to access renewable energy from the region.

- Local Solar

Comments received at prior public workshops indicate local solar development should be a priority in LADWP's renewables procurement strategy. LADWP is recommending a policy action to allow 425 MW of its solar resources be sited locally by 2016, through initiatives including the Solar Incentive Program, feed-in tariffs, and installation of solar on City-owned properties.

- Demand Response

LADWP should accelerate its evaluation and implementation of Demand Response programs, which will initially provide 5 MW of new peak demand capacity beginning in 2013 and gradually build to 200 MW and 500 MW by 2020 and 2026, respectively. Ramping the program in this manner will promote the development of in-house expertise, and will also allow time to deploy the supporting information systems necessary to implement these systems successfully.

- Advanced Technologies/Research and Development

LADWP is looking ahead to technologies that will enhance the reliability of its system, including smart grid, energy storage, enhanced information and management systems, automation of system functions, advanced methods of outage management, and weather forecasting. These system enhancements will increase reliability, facilitate the integration of local solar generation and other variable renewable resources into the distribution network before enabling smart charging of electric vehicles and advanced demand-side management technologies. LADWP should continue to pursue grants, cost-sharing opportunities, and joint projects that promote the use and deployment of new technologies that meet its strategic goals.

- Electrification of the Transportation Sector

LADWP is continuing to implement programs to support the electrification of the transportation sector. The Electric Vehicle (EV) Incentive, in which LADWP issued \$2000 rebates for home EV charging systems, resulted in over 500 residential charger installations in Los Angeles. LADWP expanded its EV Program and implemented a \$2 million "Charge Up L.A." rebate program to the first 2,000 approved EV customers for large businesses, small businesses, multi-family buildings, and public use.

- Provide Sufficient Generation

Provide sufficient generation, demand response, and limited short-term purchases in peak season Q3 of each year to cover operating and replacement reserves in accordance to applicable federal and regional reliability requirements.

- Control of Transmission Assets

In addition to the regulatory requirement to remain compliant with NERC Transmission Planning Standards, LADWP will maintain its policy of maintaining control of its transmission assets and continue to augment those assets commensurate with load growth, reliability needs, and renewable energy opportunities.

- Collaborate with Water System

The LADWP Power System will continue to work with the Water System to develop programs that reduce the usage of electricity and conserve water, as well as optimizing hydroelectric energy production.

- Financial Targets

To preserve and maintain LADWP's credit rating, the following financial targets are being utilized:

- Maintain debt service coverage at 2.25 times
- Minimum operating cash target of 170 days
- Debt-to-capitalization ratio less than 68 percent

As part of the ARB's 2008 Climate Change Scoping Plan, a CHP measure was included that calls for 4,000 MW of new CHP capacity that would result in an estimated reduction of 6.7 million metric tons of annual GHG emissions and displace 30,000 GWh of electricity demand by 2020. Governor Brown's Clean Energy Jobs Plan includes a target of 6,500 MW of additional installed CHP capacity over the next 20 years.

The Energy Commission updated its CHP market assessment to update the potential for new CHP and to understand the amount of new CHP the current policy may provide, and the emissions reductions gained from old, retiring CHP and its associated capacity. This information will be used to develop policies and regulations to encourage CHP and support the state's GHG emissions reduction goals. Market penetration estimates of CHP were presented for three market development scenarios—a Base Case reflecting continuation of existing state policies and two additional cases (Medium and High) that show the market impacts of additional CHP policy actions and incentives. The updated 2012 assessment suggests that the LADWP service territory's share of new CHP under the base case market penetration scenario is 15 percent overall. The assessment suggested a range for LADWP's new CHP capacity (MW) starting with the base case at 224 MW by 2020 increasing to 281 MW by 2030, up to the high case of 557 MW by 2020 increasing up to 698 MW.<sup>3</sup>

### **C.3.4 LADWP's Efforts To Address Climate Change**

Since 1998, LADWP has taken steps to move away from dependence on coal-fired generating resources, including the divestiture of its power purchase agreement with Colstrip Generating Station, the shutdown of Mohave Generating Station in December 2005, and the discontinuation of involvement in the development of Unit 3 at Intermountain Generating Station. Table C-1 shows the downward trajectory in LADWP's power generation portfolio CO<sub>2</sub> emissions and CO<sub>2</sub> emissions intensity between 1990 and 2012.

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<sup>3</sup> California Energy Commission, "Consultant Report: Combined Heat and Power: Policy Analysis and 2011-2030 Market Assessment," ICF Consulting, February 2012, Publication No. CEC, 200-2012-002, Appendix D.



**Table C-1. HISTORICAL LADWP POWER GENERATION CO<sub>2</sub> EMISSIONS**

Year	Total CO <sub>2</sub> Emissions from Owned & Purchased Generation (metric tons)	Total CO <sub>2</sub> Emissions from Owned & Purchased Generation minus Wholesale Power Sales (metric tons)	Total Owned & Purchased Generation (MWh)	LADWP System CO <sub>2</sub> Intensity Metric (lbs CO <sub>2</sub> /MWh)
1990	17,925,410	17,764,874	25,481,532	1,551
2000	18,464,480	16,992,238	28,806,750	1,413
2001	18,086,034	16,663,305	28,032,375	1,422
2002	16,873,841	16,237,832	26,808,569	1,388
2003	17,274,623	16,710,232	27,337,694	1,393
2004	17,609,759	16,604,943	28,138,391	1,380
2005	16,928,681	15,854,278	28,301,700	1,319
2006	16,838,147	15,885,136	29,029,883	1,279
2007	16,461,774	15,523,035	29,141,703	1,245
2008	16,232,608	15,650,115	29,394,809	1,217
2009	14,646,410	13,829,395	28,041,998	1,151
2010	13,771,186	12,844,288	27,490,878	1,104
2011	14,169,324	13,631,178	27,025,925	1,156
2012	13,968,172	13,329,797	28,145,679	1,094
Difference between 1990 and 2012	-3,957,239	-4,435,077	2,664,147	-457
% Change from 1990	-22%	-25%	10%	-29%

Notes:

1. Calculated CO<sub>2</sub> emissions for specified sources using fuel data and fuel-specific emission factors from 40 CFR Part 98 Subpart C Table C-1.
2. Calculated CO<sub>2</sub> emissions for unspecified power purchases using MWh purchased x default emission factor (1,100 lbs CO<sub>2</sub>/MWh).

*SF6 Emissions*

In February 2010, CARB adopted a new regulation to reduce SF6 emissions from gas insulated electrical switchgear as part of the AB 32 program. This new regulation imposes a declining limit on a utility's annual average SF6 emissions rate starting at 10 percent in 2011 and decreasing to 1 percent in 2020, as well as new recordkeeping and reporting requirements.

Over the past decade, LADWP has been proactive in reducing SF6 emissions by implementing its own internal program to reduce emissions through equipment replacement, repair, and process improvements. This voluntary effort to reduce SF6 emissions demonstrates LADWP's commitment to environmental stewardship and puts LADWP in a good position to comply with the new emission limits imposed by the SF6 regulation.