A. ALIGNMENT OF MAYOR'S PRIORITY OUTCOMES TO LADWP POWER SYSTEM INITIATIVES AND INVESTMENTS

On September 22, 2014, the Mayor of the City of Los Angeles issued his Fiscal Year 2015-16 Budget Policy and Goals to the General Managers of all City Departments. The Mayor outlined five "Priority Outcomes[1]" that focus on the results that he believes matter most to the residents of Los Angeles. These are:

1. Make Los Angeles the best run big city in America;
2. Promote good jobs for Angelenos all across Los Angeles;
3. Create a more sustainable and livable City;
4. Ensure our communities are the safest in the nation;
5. Partner with citizens and civic groups to build a greater City.

The Department's investments and initiatives outlined in this proposed rate plan were developed with the Mayor's objectives in mind and strongly align with each Priority Outcome. Figure 1 provides examples of how the Power System will align to each Priority Outcome through the proposed five-year rate action.

Figure 1: Alignment of Mayor's Priority Outcomes with Department's Initiatives and Investments

Priority Outcome	LADWP Power Rate Action
1. Make Los Angeles the Best Run Big City in America	**Live within our means** • LADWP's rate action considers the continuation of cost reduction initiatives as well as opportunities for process improvements. The creation of the Corporate Performance group will ensure that these process improvements are sustained. • The new rate design builds in adjustment factors that protect LADWP costumers from being over-charged, as LADWP will only seek to recover costs that are actually incurred. **Provide outstanding customer service to our residents and businesses** • LADWP has invested many resources into improving customer services; the proposed financial plan and rates continue to support this trend. • LADWP provides a comprehensive portfolio of energy efficiency and other customer programs to both residents and businesses which help reduce bills, increase sustainability, and help reduce energy use across the board.

[1] See http://sanpedrocity.org/wp-content/uploads/2014/09/FY15-16-Budget-Policy-Letter.pdf

Priority Outcome	LADWP Power Rate Action
	Deploy innovation and the best technology The Power System seeks to invest in the most cost-effective and innovative technologies that are available in order to provide LA with the most reliable and clean energy possible. For example, LADWP has encouraged the adoption of electric vehicles by installing hundreds of charging stations throughout the City and is actively engaging potential energy reduction techniques to reduce peak demand and to smooth the intermittency of bulk renewables available to California. **Restore pride and excellence in public service** The Power System will continue to work with the Ratepayer Advocate (RPA) on major decisions to increase budgeting transparency.
2. Promote Good Jobs for Angelenos All Across Los Angeles;	• LADWP currently employs over 9,100 citizens of Los Angeles and neighboring areas across the Power and Water Systems. When employing contractors, LADWP has a preference for local businesses. • Based on inductive economic analysis done by the Los Angeles Economic Development Corporation (LAEC), it is estimated that Power System capital spending will generate over $8 billion in indirect induced economic activity[2] and over 30 thousand direct and indirect jobs in the Los Angeles local economy.
3. Create a More Sustainable and Livable City;	• The divestment of coal burning generation and the integration of renewables will transform the City's energy footprint. • Local solar programs and electric vehicle incentives will help the City lead the nation in forging a clean energy future. • Infrastructure projects help ensure that poles, transformers, and cable are well-maintained. Less emergency maintenance will be required, decreasing the need for service disruptions and other disturbances.
4. Ensure Our Communities Are the Safest in the Nation;	• To ensure safe communities, the Power System supplies electricity for street lighting throughout Los Angeles, including public parks and public buildings. Access to reliable electricity raises the standard of living for all the communities of Los Angeles. • Availability of electricity is a high priority for the Power System. The Power System is investing many resources to develop local sources of supply through distributed generation, local solar and Feed-In Tariff programs.
5. Partner with Citizens and Civic Groups to Build a Greater City.	• Several of the Power System's investments are joint projects with local and State organizations and are designed to enlist the support of community organizations. For example, the Department supports the City Plants program which plants trees in Los Angeles to increase shade and water/electric conservation. • The Feed-In Tariff is designed to encourage building of local solar facilities to actively transition to a renewable electric future. • LADWP has partnered with other major California Investor Owned Utilities, like Southern California Edison, SoCal Gas, and PG&E to offer energy efficiency programs to customers and help reduce customer bills.

[2] Extrapolated per the ratios estimated by LAEC for the 2012 Power System Work.

B. LEGAL & REGULATORY

The Department is subject to strict legal requirements. Legal requirements for the Power System mandate specific standards and are set at the Federal, State, and local levels. The proposed rate action is designed to meet those standards.

1.1 RATE DESIGN REQUIREMENTS

In designing its proposed power rates, LADWP must consider applicable legal guidance. Potentially applicable legal guidance for the power system rate structure and rates includes:

- *City Charter Section 676; and*
- *California Proposition 26*

Detailed explanations of these requirements follow.

1.1.1 Charter Section 676

According to this section of the City Charter, "rates shall be of uniform operation for customers of similar circumstances…, as near as may be, and shall be fair and reasonable, taking into consideration, among other things: (1) the nature of the uses; (2) the quantity supplied; and (3) the value of the service." A cost of service study helps to evaluate the reasonableness of rates.

LADWP's rate design is guided by the cost of service study based on marginal cost principles. Specific customer class rates will be developed to ensure the revenues from each major customer class based on the new rates in the Incremental Electric Rate Ordinance match the costs of providing service to the respective customer class. Detailed information on the cost of service study can be found in Chapter 4. Furthermore, rates will be established in order to produce revenue in total equal to the Power System's overall revenue requirement.

1.1.2 Proposition 26

In its report on the last Power System rate action, the Ratepayer Advocate (RPA) proposed that LADWP reevaluate and consider replacing the surcharge-based restructuring approach with fully restructured permanent rates. The City Council made the same recommendation when it approved the 2012 rate action. Consequently, LADWP has evaluated the current approach to the ordinance structure.

While there may be a desire to undertake a modification of the current rate structure to provide a simpler rate framework, several lawsuits have recently been filed asserting that Proposition 26 does not permit LADWP's annual transfer of monies, financial conditions allowing, from the

Power Revenue Fund ultimately to the City's General Fund. The City disputes the merits of those lawsuits. While the transfer is being contested, the City will continue to adopt an electrical rate structure that preserves the rates in effect on November 3, 2010, and layers incremental charges on top of them. Therefore, for purposes of the current rate action, LADWP proposes that the results of the cost of service studies and the impact of the new revenue requirements for power service be applied to only the Incremental Electric Rate Ordinance.

1.1.3 Regulatory Mandates

The Department's programs and operations are also required to comply with many complex regulatory and legislative requirements - State, Federal, and local – which are often outside LADWP's direct control. The mandates with significant impact on the Department's Power System costs include:

- *SB X1-2 – California Renewable Energy Resources Act;*
- *Clean Water Act – Once-Through Cooling (OTC);*
- *California AB 32 – Global Warming Solutions Act;*
- *California SB 32 – Amendment to the Public Utilities Code, Feed-In Tariff (FiT);*
- *California SB 1368 – Power Plant Emissions Performance Standards;*
- *Coal Combustion Residuals (CCR) Regulations (Federal - EPA); and*
- *California AB 2021 – Energy Efficiency (EE)*

Detailed explanations of these mandates follow.

SB X1-2 California Renewable Energy Resources Act

State law has established Renewable Portfolio Standard (RPS) mandates for power utilities, including the Department, requiring costly investments in new sources of generation or purchased power. These mandates require that the power sold to customers is produced by eligible renewable energy resources and must reach the following targets:

- 20% average for 2011 through 2013
- 25% by 12/31/16; and
- 33% by 12/31/20.

LADWP has achieved 20% renewable energy delivered to customers, and is on track to meet its RPS requirements.

Clean Water Act – Once-Through Cooling (OTC)

The elimination of OTC stems from the Federal Clean Water Act Section 316(b) and is administered locally by the State Water Resources Control Board (SWRCB). OTC is the process

of drawing water from a river, lake, or ocean, pumping it through a generating station's cooling system, and discharging it back to the original body of water. The interpretation of rules and development of guidelines for OTC have been several years in the making. However, the rules are a driving factor behind the conversion of LADWP's Harbor, Haynes and Scattergood power stations, representing 2,839MW of generating capacity, to air cooled units.

California AB32 – Global Warming Solutions Act

State law requires utilities to reduce greenhouse gas emissions to 1990 levels by 2020 representing a 25% Statewide reduction. Compliance with this law requires the Department to divest of its ownership share in the Navajo coal plant, representing approximately 477MW of base load generation, and find alternative sources of power. LADWP plans to replace the Navajo capacity and plan for future growth through a combination of energy efficiency, eligible renewable energy resources and the operation of the Apex Natural Gas Combined Cycle generation station with a base load capacity of 549MW.

California SB 32 and SB 1332– Amendment to the Public Utilities Code, Feed-In Tariff

This is a State mandate requiring the Department to develop a 75MW solar Feed-In Tariff (FiT)[1]. While SB 32 did not specify a deadline for implementation, LADWP adopted a FiT Demonstration Program in March of 2012 and the FiT100 in January of 2013. In September 2012, the State adopted SB 1332, which specified that POUs must adopt a FiT program by July 2013 – several months after LADWP had already adopted its program.

California SB 1368 – Power Plant Emissions Performance Standards

The California Greenhouse Gas Emissions Performance Standard Act, enacted in 2006, prohibits California utilities from entering into long-term financial commitments for base load generation unless the utility complies with the greenhouse gas (GHG) emissions performance standard. SB 1368 established a GHG gas emissions performance standard that limits long-term investments in base load generation by the State's utilities to power plants that meet an emissions performance standard, which was jointly established by the California Energy Commission (CEC) and the California Public Utilities Commission (CPUC). Subsequently, the CEC designed regulations that establish a standard for base load generation owned by, or under long-term contract to publicly owned utilities, of 1,100 pounds of CO2 per megawatt-hour.

Coal Combustion Residuals (CCR) Regulations (Federal – EPA)

In addition to the requirements of SB 1368 above, California's Executive Order S-3-05 signed on June 1, 2005 established the following GHG targets:

[1] The Feed-In Tariff (FiT) is a program to encourage customers to invest in customer-owned solar facilities; it provides producers with a market for solar power at rates which compensate the producers for the costs of installing and operating small scale solar power generating facilities.

- By 2010, reduce emissions to 2000 levels;
- By 2020, reduce emissions to 1990 levels; and,
- By 2050, reduce emissions to 80 percent below 1990 levels.

California AB 2021 – Energy Efficiency (EE)

This is State legislation requiring publicly-owned utilities such as the Department to identify and develop all potentially achievable, cost-effective EE savings and establish annual targets. It requires the State's electric utilities to achieve cumulative savings of 10% of total energy consumption levels by 2020. In adopting the Department's 8.6% 2020 EE reduction plan in December 2011, the Department's Board of Water and Power Commissioners (Board) acknowledged that the plan was short of the AB 2021 requirement and requested that management further evaluate energy efficiency program investment options to put the Department on a path to reach the required 10% by 2020. The Board reevaluated this plan in 2014 and adopted new targets to achieve 15% EE through 2020, which exceeds the AB 2021 goal. This target was based on the results of the FY 2013-14 EE Potential Study.

1.1.4 Required Expenditures to Meet Regulatory Mandates

Each of the above mandates has its own capital and operations & maintenance expenditure requirements which will be described in detail in this report. The total capital and O&M expenditures related to regulatory and legal mandates forecasted for the five-year rate period as shown in Figure 1 is over $4.4 billion.

Figure 1: Regulatory Expenditures, Capital and O&M, During the Proposed Rate Period

		Proposed Rate Period						
Program Cost ($M)	**Expenditure Type**	**FY 15-16**	**FY 16-17**	**FY 17-18**	**FY 18-19**	**FY 19-20**	**Total**	***FY 20-21***
Coal Divestiture	Capital	$322.1	$240.8	$152.3	$125.9	$307.5	$1,148.6	*$428.0*
	O&M	$25.0	$37.1	$40.6	$42.2	$44.3	$198.2	*$45.0*
RPS	Capital	$391.3	$288.0	$177.5	$149.6	$331.9	$1,338.3	*$453.1*
	O&M	$25.0	$37.1	$40.6	$42.2	$44.3	$189.1	*$45.0*
Once-Through Cooling	Capital	$92.2	$21.1	$138.3	$293.4	$183.7	$728.7	*$79.3*
	O&M	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	*$0.0*
Energy Efficiency	Capital	$145.1	$178.0	$194.1	$190.4	$172.1	$879.7	*$169.5*
	O&M	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	*$0.0*
Total Expenditures		**$1,000.8**	**$802.0**	**$743.4**	**$843.7**	**$1,083.8**	**$4,473.6**	***$746.9***

C. ONCE THROUGH COOLING

Once-Through Cooling (OTC) is the process where water is drawn from the ocean, pumped through a generating station's cooling system, and then discharged back to the receiving water source. The OTC process utilizing ocean water is a major reason why many electrical generating stations were sited along the coastline. Typically, the water used for cooling is not chemically changed in the cooling process; however, the temperature of the water increases before it is returned to the ocean.

OTC is a major regulatory issue, stemming from the Federal Clean Water Act Section 316(b) administered nationally by the Environmental Protection Agency (EPA) and locally by the State Water Resources Control Board (SWRCB). The new Statewide OTC Policy and 316(b) Federal Rule require minimizing and/or reducing the impacts on marine life. The target of this OTC policy is to reduce or eliminate the mortality to marine life due to impingement and entrainment of marine life and organisms. "Impingement" is the term for the effect of lodging fish of a size that cannot pass through screens on a power plant intake up against the intake. "Entrainment" refers to smaller fish and marine organisms, which are smaller than the intake screen, passing into the power plant's cooling system.

The Haynes, Harbor and Scattergood stations all currently employ once-through ocean water cooling. The current combined net capacity of these stations is 2,839MW. Continued use of local generation capacity is important for grid reliability; the Department's local system cannot be reliably operated without generation from local thermal generating plants. The amount of generation required to provide local system reliability is termed Reliability Must Run (RMR) generation.

The interpretation of rules and development of guidelines for OTC by the EPA and SWRCB have been several years in the making, at least partially due to a series of legal challenges and subsequent court rulings ultimately from both the Second Circuit Court of Appeals and the U.S. Supreme Court pertaining to disputes surrounding plants using OTC outside of California. While the various challenges proceeded through the court processes, the EPA remanded the rule and gave the states permission to continue with implementation and enforcement of the Clean Water Act 316(b) requirements using "Best Professional Judgment (BPJ)" when reauthorizing facility National Pollutant Discharge Elimination System (NPDES) permits. However, before the Rule was remanded, the Department completed the required Characterization Study to identify baseline biological impacts in order to determine appropriate impingement mortality (IM) and entrainment (E) reduction methods.

The EPA publicly noticed the new proposed Rule for existing facilities on April 19, 2011; subsequently, EPA published two Notices of Data Availability (NODA), on June 11, 2012, and June 12, 2012. The final Rule was published in the *Federal Register* on August 15, 2014. In the meantime, the California SWRCB moved ahead with the adoption of its OTC Statewide Policy to limit the use of OTC for power plants in California prior to the EPA formulating its OTC rules.

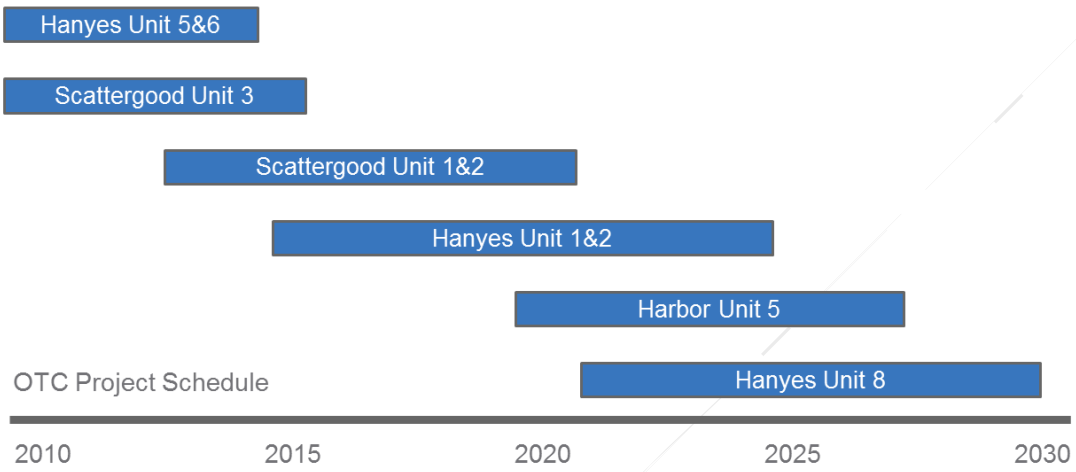
On June 30, 2009, the SWRCB released its draft *Once-Through Cooling Water Policy* for public review and comment, with the accompanying Supplemental Environmental Document released on July 14, 2009. A final Policy version was adopted on May 4, 2010, and became effective on October 1, 2010. The adopted Policy has major implications for the coastal power plants, making it extremely difficult to continue the use of OTC and making the use of cooling towers that use either non-ocean water or air for power plant cooling as the only certain compliance path. The Policy proposes a two-track compliance pathway.

- Track 1 requires OTC flows to be reduced commensurate with wet closed cycle cooling (CCC) or a 93% flow reduction and essentially requires the installation of cooling towers;
- If Track 1 can be demonstrated as "not feasible," a Track 2 compliance option is available. A Track 2 compliance pathway requires the biological impacts to be reduced on a unit by unit basis to a level comparable with (i.e., within 10%) what would exist with CCC.

Until compliance is achieved, interim measures are required, which include flow reductions when there is no unit load and mitigation measures (commencing five years from the effective date of the Policy and continuing until the facility is in full compliance).

To prevent disruption with LADWP's electrical power supply during implementation of the Policy, the SWRCB prepared and adopted an Amendment to the Policy on July 19, 2011. This Amendment modified the Department's compliance schedule on a unit-by-unit basis as shown in Figure 1. The Department's financial plan and proposed rates are developed based on this schedule which has been approved by the SWRCB.

Figure 1: OTC Compliance Timeline[1]



Furthermore, the Department must commit to complete elimination of OTC and, in the interim, conduct a study or studies, singularly or jointly with other facilities, to evaluate new technologies or improve existing technologies to reduce impingement and entrainment. The Department must submit the results of the study and a proposal to minimize entrainment and impingement to the Chief Deputy Director of the SWRCB no later than December 31, 2015, and, upon approval of the proposal by the Chief Deputy Director, complete implementation of the proposal no later than December 31, 2029.

The Department's repowering program to comply with the SWRCB's Policy by eliminating OTC also addresses the Department's prior agreement with the South Coast Air Quality Management District (SCAQMD) related to NOX compliance requirements. In mid-2000, during the Statewide energy crisis, the Department predicted that NOX emissions from the in-basin generating units would exceed the available supply of NOX reclaim trading credits issued by the SCAQMD. Although the Department's NOX emissions ultimately did not exceed its allocation in 2000, on August 29, 2000, the SCAQMD Hearing Board issued a "Stipulated Order for Abatement" to the Department. Under the terms of the Order, the Department was required to perform a series of repowering projects at its in-basin generating stations. The Stipulated Order was later superseded by a Settlement Agreement to accommodate scheduling and other issues. This agreement was revised in September 2011 and addresses the current repowering projects at the Haynes and Scattergood Generating Stations.

The current status (as of January 2015) of each repowering project is summarized in Figure 2.

[1] The last phase of upgrades at the Haynes facility also includes replacement of the aging units 9 and 10 which do not currently use OTC. Upgrades at the Harbor facility also include replacement of the aging units 1 and 2 which do not currently use OTC.

Figure 2: Repowering and OTC Current Status

Generating Unit	Currently Uses OTC?	Project Status
Harbor Unit 1	No	Repowered and does not use OTC.
Harbor Unit 2	No	Repowered and does not use OTC.
Harbor Unit 3	No	Removed from service.
Harbor Unit 4	No	Removed from service.
Harbor Unit 5	Yes	Steam unit in a combined cycle coupled with 2 gas turbines. Repowering scheduled per Figure 1.
Haynes Unit 1	Yes	Planning and preliminary engineering work is scheduled to start first quarter of 2018.
Haynes Unit 2	Yes	Planning and preliminary engineering work is scheduled to start first quarter of 2018.
Haynes Unit 3	No	Repowered and does not use OTC.
Haynes Unit 4	No	Repowered and does not use OTC.
Haynes Unit 5	No	Repowering completed 12/31/2013 and does not use OTC.
Haynes Unit 6	No	Repowering completed 12/31/2013 and does not use OTC.
Haynes Unit 8	Yes	Steam unit in a combined cycle coupled with 2 gas turbines. Repowering scheduled per Figure 1.
Scattergood Unit 1	Yes	Preliminary engineering and environmental permitting is in progress, and a request for proposal for a design-build contract is scheduled to be advertised in the first quarter of 2017.
Scattergood Unit 2	Yes	Preliminary engineering and environmental permitting is in progress, and a request for proposal for a design-build contract is scheduled to be advertised in the first quarter of 2017.
Scattergood Unit 3	Yes	Engineering and procurement of major equipment are substantially completed and delivered to site, and construction is approximately 50% completed with project scheduled for completion at the end of 2015.

D. ENERGY EFFICIENCY PROGRAMS

1.1 INTRODUCTION

Energy efficiency (EE) is a key strategic element in LADWP's resource planning and is one of the most cost-effective resources within LADWP's power supply portfolio. California Assembly Bill (AB) 2021 calls on publicly-owned utilities (including LADWP) to "identify all potentially achievable cost-effective electricity energy savings and establish annual targets for EE savings and demand reduction for the next ten-year period." In 2012, the Board adopted a target to get on a path to a 10% energy consumption reduction through EE by 2020 and committed to exploring ways to achieve 15% by 2020. In August of 2014, based on a 2014 EE potential study performed by Nexant[1], the Board set additional targets to achieve an energy use reduction through EE of 15% for the ten-year period from FY 2010-11 through FY 2019-20.

EE programs have been employed extensively by LADWP for years to reduce customer electricity usage, power supply costs and carbon emissions. Over the four-year period of FY 2010-11 through FY 2013-14, LADWP spent $215 million on EE ($53.8 million/year on average) and achieved 867,600MWh in net energy savings (216,900MWh/year average). LADWP's current EE goal and corresponding EE spending levels are significantly higher than in the past to achieve the 15% reduction by 2020, placing LADWP on par with California's investor-owned utilities (IOUs) and other utilities in the nation aggressively pursuing EE.

This uptake in spending and annual savings targets to reach the 15% EE goal by 2020 places increasing importance and new challenges on LADWP EE efforts. Programs must therefore have a transparent planning process and plan to verify energy savings, be comprehensive and equitable in nature to cover all customer classes, end-uses and efficiency opportunities, and be effectively delivered through marketing, other community organizations and local workforces.

In response to AB 2021 and the challenge of ramping up EE, the Board of Water and Power Commissioners (Board) adopted principles in 2012 to guide LADWP's EE efforts. These guiding principles are contained in Figure 1 on the next page. In addition to these eight guiding principles adopted by the Board, in the action approving the last Power System rate action in 2012, the LA City Council recommended that LADWP implement recommendations of the Independent Third Party Review, including establishing a plan for EE that maintains expenditure levels at an achievable and cost effective level. The language in the Council recommendation is based on a Ratepayer Advocate (RPA) recommendation to set a firm three-year plan for EE,

[1] This study can be found in Chapter 2 - Appendix E – Energy Efficiency Board Letter.

similar to that of large California IOUs that plan expenditure levels at a realistically achievable tempo according to cost-effectiveness measurements and that includes savings verification.

Figure 1: LADWP EE Guiding Principles

- LADWP will aggressively promote and achieve EE across all customer segments and energy end uses as a key part of LADWP's long-term, supply-side energy procurement strategy.
- Residential customers will be assisted in achieving ultra-high levels of EE in and around their homes with proven economical potential for EE, demand response, and clean energy productions routinely realized on a fully integrated, site-specific basis.
- Commercial customers of all sizes will be assisted in achieving ultra-high levels of EE in and around their businesses with proven economical potential for EE, demand response and clean energy production routinely realized on a fully integrated, site-specific basis.
- Industrial customers will be empowered to demonstrate leadership in proven, economical EE and resource management, which will positively impact their operations.
- Eligible low-income customers will receive tangible economic benefits of EE through the mass adoption of proven, economical low-income EE measures.
- The future benefits of the widespread adoption of EE throughout LADWP territory will be leveraged to support the continued development of quality job opportunities for the local workforce including opportunities at LADWP to address future needs for critical skilled craft positions.
- LADWP is committed to transparency in the administration of its overall EE portfolio, and will report semi-annually on progress towards saving energy, serving a broad range of customers throughout the City, as well as on the training and job creation that results from EE investments. LADWP will provide performance measurement and verification of actual realized energy savings.
- LADWP will collaborate with community organizations to provide outreach and education for its diverse customer base, including hard-to-reach customers such as small business, low-income customers and multi-family units.

1.2 ENERGY EFFICIENCY PORTFOLIO

LADWP created an EE Portfolio Business Plan for FY 2014-15 through FY 2019-20 that contained key information associated with individual programs and the EE portfolio as a whole. LADWP's current EE program portfolio is divided between Mass Market programs (residential and small commercial) and Commercial, Industrial and Institutional (CII), and Cross Cutting (facilities, code, and miscellaneous) programs. A portfolio-approach to EE is important because cost effectiveness may vary widely from program to program. The benefits to some of the less cost effective programs are less financially-tangible in nature; for example, they may be targeted towards low-income or hard-to-reach markets, or they are a part of outreach and education programs. Therefore, providing all services in its portfolio ensures that there are equitable EE programs across all customer classes, and that LADWP continues to approach EE from a holistic point of view.

Figure 2 below shows LADWP's FY 2014-15 EE program portfolio budget organized into Mass Market, Commercial Industrial and Institutional (CII), and Cross-Cutting program types, as well as the necessary program support expenses.

Figure 2: Energy Efficiency Capital Budgets by Program Type

($000)	Current Year	Proposed Rate Period					
	FY 14-15	FY 15-16	FY 16-17	FY 17-18	FY 18-19	FY 19-20	Total
Mass Market	$48,175	$76,739	$98,297	$100,814	$97,172	$79,395	$452,418
CII	$35,619	$48,456	$56,962	$67,495	$63,094	$58,720	$294,728
Cross-Cutting	$10,187	$9,653	$10,519	$11,482	$12,556	$13,756	$57,965
General Program Support	$7,512	$10,000	$12,000	$14,000	$17,000	$20,000	$73,000
Total	**$101,493**	**$144,848**	**$177,779**	**$193,792**	**$189,822**	**$171,871**	**$878,113**

As shown in Figure 2 above, during the proposed five-year rate period the difference between the combined Mass Market and CII programs budgets (approximately $747 million), and the total EE portfolio budget of close to $878 million, consists of a Cross-Cutting programs budget and a General Program support budget summing to about $131 million. Mass Market programs represent 47% of LADWP FY 2014-15 EE program budget and 36% of overall EE program energy savings. CII programs represent 35% of the budget and 37% of overall EE program savings.

This EE program portfolio budget will prepare LADWP to meet its aggressive 15% goal by 2020. Figure 3 shows the projected EE savings by each program type in the portfolio through the duration of the proposed rate action. Proportionate to the program's budget, the Mass Market programs produce the largest amount of energy savings. In total, the Department estimates achieving an impressive 2,799GWh total of EE savings during the proposed five-year rate period.

Figure 3: Projected Energy Efficiency Savings by Program Type

(GWh)	Current Year	Proposed Rate Period					
	FY 14-15	FY 15-16	FY 16-17	FY 17-18	FY 18-19	FY 19-20	Total
Mass Market	112.9	202.0	248.9	264.5	274.0	243.8	1,346.1
CII	113.5	148.8	181.0	207.3	188.8	175.0	1,014.4
Cross-Cutting	83.6	91.2	85.2	69.2	57.2	52.2	438.5
Total	**310.0**	**442.0**	**515.0**	**541.0**	**520.0**	**471.0**	**2,799.0**

LADWP's EE Potential Study identifies the commercial sector as yielding the most cost effective energy savings, with over twice the savings potential as the other sectors combined, followed by the residential sector, then the industrial sector. Commercial sector energy savings are found mainly in lighting, cooling and ventilation, and office equipment, with refrigeration and food preparation worth noting. Residential sector savings are found mainly in lighting, electronics and appliances, with cooling and water heating worth noting. Industrial sector savings are mainly associated with machine drives (industrial processes), with lighting and cooling and ventilation worth noting.

LADWP Mass Market programs target difficult to reach low-income, multi-family and small business customers, while CII programs target larger commercial and institutional customers that have a greater array of EE opportunities and economies of scale. As articulated in LADWP's EE Guiding Principles, comprehensiveness and equity considerations compel LADWP to offer EE services to all customer classes. Based on these principles, LADWP has a balanced approach to funding Mass Market and CII programs.

A good portion of LADWP Mass Market program costs pertain to direct install delivery approaches, proven to be effective in reaching low-income, multi-family and small business customers. While less costly financial incentive delivery mechanisms have been tried, none other than direct install has been proven to achieve significant customer participation in these hard to reach markets. Given this situation, and LADWP's desire to address customer needs in these markets for comprehensiveness and equity purposes, delivery efficiencies are particularly important for LADWP to effectively manage costs.

LADWP is aggressively pursuing delivery cost efficiencies, and is forging a relationship with Southern California Gas (SoCalGas) as a significant step forward in doing so. Comprehensiveness and depth of program offerings are enhanced by teaming up with SoCalGas to provide customers with efficiency solutions that cover electricity, water and natural gas. This "one stop shop" concept is a market-oriented approach to program delivery and exemplifies LADWP's interest in comprehensively addressing customer needs. Within LADWP's EE Portfolio Business Plan, there are program strategy tables that summarize the delivery approaches, SoCalGas partnership aspects, and relationship to its guiding principles associated with each program contained in LADWP's overall EE program portfolio.

Figure 4: LADWP Energy Efficiency Program Portfolio

Mass Market Programs	CII Programs	Cross-Cutting Programs
Small Business Direct Install Program	Custom Performance Program (CPP)/CEP	Title 24 and Title 20 Codes and Standards
LAUSD Direct Install	CLIP/CLEO	City Plants Plan
Refrigerator Exchange (LIREP)	Savings By Design (SBD)	LADWP Facilities
Refrigerator Recycling (RETIRE)	Retrocommissioning (RCx)	Program Outreach and Community Partnerships
Home Energy Improvement Program	Refrigeration/Food Service	Emerging Technologies
CA Advanced Homes	Upstream HVAC	
Home Energy Upgrade CA	Energy Efficiency Technical Assistance Program (EETAP)	
Consumer Rebate Program (CRP)		
Energy Service Assistance Program (ESAP) Low Income Multi-Family		
Residential Lighting		
Behavioral-Based		
Consumer Electronics		

1.2.1 Mass Market Programs

Small Business Direct Install Program

The Small Business Direct Install Program (SBDI) is a free direct install program in which the LADWP targets small and medium businesses, offering upgrades to targeted systems, including lights, water and natural gas. The electricity side of the program, which deals with the lighting measures, has been up and running since the first half of 2013 and is currently fully ramped-up.

SBDI is an important program in LADWP's EE program portfolio, currently budgeted for nearly one third of the total EE program budget. It creates a large amount of energy savings and is also a strong job creator, both directly and induced.

LAUSD Direct Install Program

The LAUSD Direct Install Program is a free direct installation program jointly run by LADWP and the Los Angeles Unified School District (LAUSD) and in partnership with SoCalGas. It targets schools in the district in need of energy and water efficiency upgrades, addressing lighting systems, including switches and controls, as well as water efficiency measures.

This program combines the efforts of the LADWP ISS department and LAUSD's maintenance and facilities crew. LADWP provides design assistance and project management experience along with actually doing retrofits for certain types of interventions. LAUSD is LADWP's largest

electric customer. Given this relationship, a cost and energy saving partnership between the school district and utility has the potential to greatly benefit both parties.

The program started in the last quarter of 2012 and ramped-up significantly in 2013. The projects included in this program can be complex from logistical and technical standpoints and can take three to six months or more to complete. The LAUSD Direct Install Program is important in LADWP's EE program portfolio, currently budgeted at around 10% of the total EE program budget.

Low Income Refrigerator Exchange Program

The Low Income Refrigerator Exchange Program (LIREP) is a program that delivers free new EE refrigerators to low-income and senior/lifeline LADWP customers who have refrigerators meeting a certain criteria, including being at least ten years old, 14 cubic feet or greater and in working condition. These older, inefficient refrigerators are a major source of electricity consumption as they run all day, every day and are not built to current Energy Star standards. The program ensures that the old refrigerators stay offline and cannot burden the grid by picking them up and recycling them when a new one is delivered.

As part of the effort to promote EE, customers receive four free CFL light bulbs as well when they receive their new refrigerator. This is not considered an added cost to the program because LADWP purchased these bulbs several years ago through another program and they remain available to be provided. As with all of the programs in LADWP's EE portfolio, this program has the dual benefit of lowering demand on the grid while also lowering the customers' bills.

The LIREP is run through a third party contractor, Appliance Recycling Centers of America (ARCA) with just a couple of LADWP employees needed to administer the program for LADWP. ARCA handles the pickup and delivery of the refrigerators, the recycling of the old refrigerators, the program intake and call center, marketing and customer service. This is a mature program that has been around since 2007, but has seen notable variations in the number of annual refrigerator deliveries over the years.

Despite the eponymous implications of its name, the program will start expanding beyond low-income and lifeline customers into other customer segments, including multi-family buildings, schools, congregational institutes, civic and community buildings. While it is a capital-intensive program, with the cost of the refrigerators making up the majority of program costs, the reduction to grid demand is very high and of significant benefit to LADWP.

Refrigerator Recycling (RETIRE)

LADWP offers the REfrigerator Turn-In and REcycle (RETIRE) Program to its residential customers to encourage safe and environmentally friendly recycling of old, energy inefficient refrigerators and freezers. Recycling an old refrigerator/freezer can help customers reduce their

energy bill by up to $192 per year. Pick-up and recycling services are offered at no cost to customers, and they receive a $50 rebate.

Home Energy Improvement Program

The Home Energy Improvement Program (HEIP) is a free direct install program which targets residential customers. It offers a full suite of free products and services to improve energy and water efficiency in the home by upgrading or retrofitting a home's envelope and core systems. Targeted systems include lights, water and natural gas. This program is not specifically limited to low-income customers; however, its priority is to serve low, moderate and fixed income customers most in need first.

This program is run directly by LADWP, with the Integrated Support Services (ISS) department handling the assessments and installations and the EE team responsible for program design, management and billing.

CA Advanced Homes[2]

The California Advanced Homes Program (CAHP) was created to help the building industry design and develop more environmentally friendly communities. It highlights best practices in EE, green building and sustainability, and offers generous financial incentives to help builders and architects create environmentally friendly, energy-efficient communities for potential new home buyers. The CAHP is a comprehensive residential new construction concept with a focus on sustainable design and construction. Through a combination of education, design assistance, and financial support, the CAHP works with building and related industries to exceed compliance with the California Code of Regulations, Title 24, 2013 Building Energy Efficiency Standards for Residential and Nonresidential Buildings (Standards), to prepare builders for changes to the Standards and to create future pathways beyond compliance and traditional energy savings objectives. For projects within the City of Los Angeles, the maximum incentive per project is $250,000 (includes incentives and "bonus kickers").

Home Energy Upgrade CA

Through Energy Upgrade California, incentives of up to $6,500 are available to LADWP residential customers with detached single-family units who complete qualifying energy-saving home upgrade projects, including upgrades to air sealing, insulation, windows, cool roofs, and upgrades to heating and cooling systems.

Consumer Rebate Program

The Consumer Rebate Program (CRP) is an incentive based program which pays LADWP customers a fixed amount of money for a short menu of items. This program is intended for residential customers, with the goal of helping consumers choose a more energy efficient option when purchasing certain items. CRP is a mature program with a steady annual amount of

[2] For additional information, see http://californiaadvancedhomes.com/

participation that does not vary greatly except when LADWP makes extra marketing outreach efforts.

Energy Service Assistance Program (ESAP) Low-Income Multi-Family

The Energy Savings Assistance Program provides no-cost weatherization services to low-income households who meet the CARE income guidelines. Services provided include attic insulation, energy efficient refrigerators, energy efficient furnaces, weather-stripping, caulking, low-flow showerheads, water heater blankets, and door and building envelope repairs which reduce air infiltration.

Residential Lighting

The Residential Lighting Efficiency Program (RLEP) will provide light-emitting diode (LED) lamps to customers to assist in reducing their home electrical use. Distribution of the LED lamps will be via two channels: Point-of-Sale (POS) transactions at home improvement stores within LADWP's service territory and through targeted regional distribution, where the lamps will be dispersed door-to-door. The lamps will be dispersed over several years in order to reach the entire targeted audience. This program is currently under development; the anticipated implementation date is June 2015.

Behavioral-Based

The Behavior-Based Efficiency Program (BEP) focuses upon influencing customers to reduce residential electricity usage through changes in behavior. Customers who elect to participate in this program are provided with a Home Energy Saver (HES) report at regular intervals, which is customized for the customer's usage profile. The report also provides energy consumption comparisons to other customers, tips for reducing electric use and referrals to other LADWP energy-saving programs. This program is currently under development; the anticipated implementation date is June 2015.

Consumer Electronics

The Consumer Electronics (CE) Program is a new incentive program that will offer rebates for high efficiency consumer electronics such as televisions, computers, and monitors. This program is currently under development; the anticipated implementation date is June 2015.

1.2.2 Commercial, Industrial, and Institutional Programs

Custom Performance Program

The Custom Performance Program (CPP) is an incentive based program which pays LADWP commercial customers a fixed amount of money for energy savings attained through a range of measures. This program is custom because it focuses on measures not covered by other existing prescriptive programs, often including those measures that go beyond basic turn-key efforts. Retrofits should help buildings go beyond Title 24 requirements or industry standards,

and may include measures such as equipment controls, CO monitoring systems, hotel guest room controls, variable frequency drives, cutting edge high-efficiency lighting technologies and other innovative interventions.

Customers' applications include an energy assessment for their building, which helps to guide and inform what measures will be undertaken in the custom retrofit. The assessment estimates the amount of kWh savings achievable through various proposed interventions, and incentive rates are based on a fixed price per saved kWh. LADWP pays out the incentive to customers only after a post-retrofit on-site inspection is made to verify the work. Figure 5 shows the rates paid for the different types of incentives.

Figure 5: Custom Performance Program Incentive Payments

Measure	Incentive Level
Controls/RCx	$0.15/kWh
Plug/Process/Other	$0.15/kWh
Air conditioning and refrigeration	$0.25/kWh
Envelope	$0.25/kWh
Lighting (including LED)	$0.15/kWh
Lighting Controls	$0.10/kWh
Lighting (Lamp Only)	$0.05/kWh
Thermal Energy Storage	Up to $750/kWh

CPP is a mature program generally focused for the most part on larger structures where deep custom retrofits and other installations can help realize substantial energy savings. The program is not limited to these customers; however, the smaller commercial customers have more barriers to entry in terms of project financing and getting over the hurdle of an initial assessment. The program mainly attracts customers through targeted outreach by executive account managers at LADWP. At 18.1% of the overall EE budget, CPP represents an important part of LADWP's EE portfolio, and it plays an even bigger role in terms of its share of energy savings generated in the portfolio.

Commercial Lighting Efficiency Offer

The Commercial Lighting Efficiency Offer (CLEO) is an incentive based program that pays LADWP commercial customers a fixed amount of money to upgrade their lighting to more efficient options. It has historically been one of the most popular and robust commercial EE rebate programs in LADWP's EE portfolio. The incentivized measures in this program each have a set incentive price that was arrived at with consideration for energy savings over a standard time period and the average cost of the measure (material and install).

The menu of items in the program contains a wide variety of high performance lighting measures, including high efficiency fluorescents, CFLs, LEDs and other outdoor pole mounted fixtures. In practice, a large portion of the retrofits consist of some variation of a T12 fluorescent fixture and lamp getting converted to a higher efficiency T8 fluorescent (some variation on a 4 foot fixture). This is attributable to a number of factors. 4-foot and 8-foot T12 fluorescent fixtures were standard in office buildings, warehouses, factories and other commercial structures, so they make up a lot of the stock that needs retrofitting. Additionally, retrofitting one of these fixtures can be simple and cheap, making it a very cost effective intervention. Finally, many of the customers utilizing this program need to get into compliance with California Title 24 standards. Presumably, this pattern will change as the old T12 stock diminishes, new Title 24 standards come along and different interventions become more cost effective (such as LED lamps).

This is a mature program that is seeing some changes in the profile of the typical applicant. In past years of the program, bigger jobs that took longer and had more of a profit margin for a contractor made up the majority of projects in the program. Large office buildings or hospitals would do a complete lighting retrofit. Now, with many larger customers already having performed the retrofits to reach Title 24 compliance, the program is starting to see a change in the model, according to interviews with the program manager. It is now common to see a contractor bundle many smaller retrofits that can be done quickly. Each business will have to apply individually, but generally the contractor will handle all this paperwork and take the incentive money as payment while the business receives the benefit of the energy savings. The contractor in these cases will earn less on each job, making their profit on volume.

Savings by Design (SBD)[3]

Savings by Design encourages high-performance, non-residential building design and construction, and offers a variety of solutions to building owners and design teams including, but not limited to:

- Owner Incentives help offset any additional costs of energy efficient buildings;
- Design Team Incentives reward designers who meet ambitious EE targets;
- Design Assistance supports integration of innovative design technologies into new construction projects; and
- Energy Design Resources offers analysis tools, training, and in-depth information on efficient technologies and strategies.

Retrocommissioning (RCx)

Customers of the Department who own a business, or are a non-residential customer, can qualify for the the RCx program and reduce their electricity and gas usage as well as reduce the cost of building operations. By implementing one or more of the program's 13

[3] For additional information, see http://www.savingsbydesign.com/faqs

retrocommissioning (RCx) measures, customers can save on energy costs and improve building operations. This is a simplified program that requires minimal system data and uses "prescribed" savings calculations, which makes the process much easier. The RCx offers:

- Varying cash incentives per kilowatt hour (kWh) saved (annualized);
- Varying cash incentives per therm saved (annualized);
- Lower energy bills;
- A more productive facility;
- More efficient building operations;
- Longer equipment life;
- A building assessment by qualified engineering professionals; and
- Support throughout the process.

The RCx program has 13 common controls and schedule based commercial building optimization measures divided into three categories.

HVAC Airside Measures

- Reduce supply fan operating schedule
- Adjust airside economizers
- Adjust zone temperature deadband
- Add supply air temperature setpoint reset strategy
- Reduce supply duct static pressure setpoint
- Add supply duct static pressure setpoint reset strategy
- Add/restore supply fan VFD (Requires malfunctioning inlet guide vanes, or malfunctioning VFDs)

HVAC Waterside Measures

- Add/optimize boiler lockout
- Add chilled water supply temperature setpoint reset strategy
- Add condenser water supply temperature setpoint reset strategy
- Restore chilled water pump VFD

Lighting Measures

- Reduce lighting operating schedule
- Restore lighting occupancy sensors

Refrigeration / Food Service

LADWP's Food Service Program helps reduce customers' electricity bills and the cost of new refrigeration equipment by replacing or retrofitting existing refrigeration equipment with state-of-the-art, EE refrigeration technologies. Rebate measures include ice machines, solid and glass refrigerator doors, door gaskets, night covers, strip curtains, vending machine controllers, and other energy efficient measures.

Upstream HVAC

The nonresidential Upstream Heating, Ventilation and Air Conditioning (HVAC) Program is a market transformation oriented program. This program offers incentives to upstream market players who sell qualifying high efficiency HVAC equipment. The logic that underscores this program's design is that a small number of upstream market participants are in a position to impact thousands of customers and influence their choice of equipment by increasing the stocking and promotion of high efficiency HVAC equipment. The upstream model cost effectively leverages this market structure and existing relationships. The upstream program is designed to adapt to market changes, and therefore LADWP will continue working with relevant industry players to continually enhance the program to include new beyond-code upstream incentives.

Energy Efficiency Technical Assistance Program

The EE Technical Assistance Program (EETAP) is an incentive based program which pays LADWP commercial customers to perform an energy audit on their building. The incentive that LADWP pays is based on the projected kWh savings the audit finds. As the name suggests, this program is strictly for technical assistance at the outset of a project, and is a feeder program to the Custom Performance Program (CPP), which incentivizes the actual retrofit. These types of projects are typically very unique, are not necessarily scalable to the average customer, and have savings that are a tremendous benefit to these LADWP customers.

The goal of the program is to help customers get over the initial barrier to entry of doing a deep retrofit. The payment of the incentive depends on the level of energy audit. Fifty percent of the incentive for an American Society of Heating Refrigeration and Air-Conditioning Engineers (ASHRAE) Level 1 Assessment will be paid out after the audit is completed and the rest after the actual retrofit is performed. One hundred percent of the incentive will be paid out after the actual retrofit is performed for an ASHRAE Level 2 or 3 Assessment.

EETAP is a new program, launched at the beginning of February 2014. As of the beginning of May 2014, LADWP had received a limited number of applications and approved the energy audits, but no customers had actually had the audits performed yet. Thus far, the applicants to the program have all opted for an ASHRAE Level 2 or 3 Assessment.

1.2.3 Cross-Cutting Programs

Title 24 and Title 20 Codes and Standards

The Codes, Standards and Ordinances (CSO) Program conducts advocacy activities to improve building, appliance and water use efficiency regulations. These activities include monitoring and active participation in code and standard development, legislative review, sponsorship of local ordinances, and participation in policy efforts with other City departments, State agencies, and utilities. The goal of this program is to promote sustainability with regard to water and energy use. The principal audience includes the LA City Department of Building and Safety, LA City Planning, LA City Department of Public Works, and the LA City Council, who together develop and adopt codes and standards specific to Los Angeles that go beyond State and Federal regulation. Other audiences include State agencies, which conduct periodic rulemakings to update EE and water conservation regulations and standards, and industry groups that conduct research and develop industry specific standards.

City Plants Program

The City Plants program, formerly called Million Trees LA, provides free shade trees for residential customers and property owners and plants street trees around the City of Los Angeles. The program is a public-private partnership between the City of Los Angeles, local non-profit organizations, community groups, residents and businesses. LADWP is City Plants' largest sponsor, and with this partnership, City Plants is able to provide, in addition to the trees, important information on where to plant the trees to maximize EE of buildings.

The program encourages the planting of California Friendly Landscapes trees that are adapted to the region's semi-arid climate and that use less water. Native trees and drought tolerant trees that maximize sustainability are recommended. City residents and property owners are eligible to receive up to seven shade trees to plant on their property. Trees must be maintained by the property owner.

Customers are encouraged to plant the trees on the south or west side of their building if possible. Planting trees on these two sides provides shade during the hottest parts of the day. This cooling effect on the building reduces the need for air conditioning in the home, creating instant energy and cost savings.

This program is primarily run by and is principally handled by the LADWP contractor, the Los Angeles Conservation Corps (LACC). LACC procures the trees and related materials, maintains the trees before they are given away and delivers trees. LACC has several sub-contractors that also handle some of the tree requests/giveaways and delivery. Monthly reports on requests, tree purchases, giveaways and other programmatic details are sent to LADWP.

City Plants is a unique program within LADWP's EE portfolio. While most of the other programs focus on improving the efficiency of a system within a building (i.e. HVAC, lighting) or the actual

performance of a building, City Plants improves building efficiency through an external intervention that never touches a building.

LADWP Facilities Upgrade Program

The LADWP Facilities Upgrade Program, as the name indicates, is a program designed to improve the energy and water consumption performance of LADWP facilities. The program was established in 2009 in response to the City of Los Angeles Green LA Directive. Twenty-seven targeted systems include HVAC equipment, lighting fixtures, plumbing fixtures and irrigation equipment.

The three targeted systems in the program — HVAC, lighting and water — are each managed separately. HVAC and lighting projects are administered by the EE department, but the water upgrades are performed by the water side of LADWP and accounted for separately. This program is run directly by LADWP, with projects identified and prioritized and subsequently performed by ISS construction personnel.

In addition to setting a good example and precedent of EE for other City of Los Angeles departments, this program results in reduced electricity and water expenses for LADWP. This ultimately benefits the ratepayer in the form of mitigated costs that otherwise would have been passed along.

Program Outreach and Community Partnerships

The Program Outreach and Community Partnerships Program (Program) is an advocacy program that strives to improve customer awareness among LADWP's "hard-to-reach" customers of electric and natural gas efficiency and water conservation programs through the activities of community-based organizations. In FY 2014-15, this program offers grants to local non-profit organizations that are awarded through a competitive selection process to work in one of the fifteen Los Angeles City Council Districts or on an at-large/city-wide basis to improve community and customer awareness of LADWP's core EE and water conservation programs and free steps they can take to reduce energy and water use.

Emerging Technologies

The LADWP Emerging Technologies Program (ETP) is designed to accelerate the introduction of innovative energy and water efficient technologies, applications, and analytical tools that are not yet widely adopted in California. By reducing both the performance uncertainties associated with new products, as well as institutional barriers, the ultimate goal of this Program is to increase the probability that promising energy and water efficiency technologies will be commercialized and adopted throughout Los Angeles. Activities include supporting the development of the energy and water efficiency technology demonstration features of the La Kretz Innovation Center and partnering with SoCalGas and the Emerging Tech Coordinating Council to assess and introduce new technologies.

1.3 COST EFFECTIVENESS REVIEW

The Department uses a series of industry accepted and CPUC mandated tests called the California Standard Practice Manual (SPM) tests to determine the cost-effectiveness of EE programs. The four tests are:

- Total Resource Test (TRC);
- Program Administrator Cost (PAC);
- Ratepayer Impact Measure (RIM); and
- Participant Cost Test (PCT).

The TRC test is considered as the measurement of the net benefits and costs that accrue to society, which is defined as a program administrator (usually a utility) and all of its customers. It compares the benefits, which are the avoided cost of generating electricity and supplying natural gas, with the total costs, which include program administration and customer costs. The TRC does not include the costs of incentives.

On the other hand, the PAC test does not include the costs incurred by participating customers but does include incentives paid to participating customers. The PAC test measures the benefits and costs that accrue to the program administrator, which is usually, but not always, the utility.[4] Although the TRC has traditionally been the "standardized" metric on which EE programs are evaluated, the Department advocates that the PAC test may give a more accurate view of the levelized energy value of an EE program during its time period of operation.

LADWP EE uses the "E3 Calculator" for examining program cost effectiveness. The E3 Calculator is an Excel-based tool provided by the CPUC and CEC and is used by California IOUs and others to compute the cost effectiveness of EE and other demand-side programs. Inputs to the calculator include the energy savings and costs of each measure proposed in a program, the anticipated installation rate, and costs related to program administration and implementation. The E3 Calculator relies on the CPUC Database for Energy Efficient Resources (DEER) for information on EE technologies and measures. IOU avoided cost models are built into the E3 Calculator to calculate TRC, PAC, and RIM test results. In using the E3 Calculator LADWP EE relies on the Southern California Edison (SCE) avoided cost model to represent LADWP marginal costs.

Recent calculations by LADWP EE show an overall EE portfolio TRC benefit cost ratio of 2.4, indicating that the LADWP EE program portfolio is easily cost effective, with almost two and a half times the avoided cost savings compared to LADWP and participant program costs. LADWP EE programs with the best TRC benefit to cost (B/C) ratios are mainly CII programs, including:

- Custom Performance (3.4 TRC B/C ratio); and
- Commercial Lighting Efficiency (2.56 TRC B/C ratio).

[4]For further information on the SPM tests please see http://www.cpuc.ca.gov/PUC/energy/Energy+Efficiency/Cost-effectiveness.htm

The Mass Market program with the most compelling benefit to cost ratio is Refrigerator Turn In and Recycle (7.1 TRC B/C ratio); however, most programs are cost effective (B/C ratio greater than 1). Programs with lower benefit cost ratios tend to be low-income programs that LADWP will continue for comprehensiveness and equity purposes.

Historically and into FY 2014-15, LADWP's biggest program budget has been for Small Business Direct Install, which is easily considered cost-effective based on total cost (2.7 TRC B/C ratio).

LADWP is currently examining the appropriateness of the ratepayer impact measure (RIM) test given the utility's configuration. The IRP models the net revenue loss from EE by subtracting the avoided supply costs and the fixed billing charges from the gross revenue loss. The IRP indicates demand side programs such as EE primarily reduce the fuel and variable costs of marginal gas fired generation. In addition, this calculation shows that EE is a vital part of the Department's resource portfolio, reducing the energy demand LADWP would otherwise have to meet with additional thermal or renewable generation. Also, EE reduces net customer sales, which in turn means that less renewable energy must be procured by the Department to meet RPS targets.

Within the IRP, net present value (levelized cost) of energy produced by a new combined cycle gas turbine is estimated to be $80/MWh, or 8 cents per kWh. Within LADWP's EE Portfolio Business Plan, the current EE program portfolio is calculated to cost approximately 4 cents per kWh. Therefore, there is a significant positive difference in the cost per kWh between the current EE program portfolio and viable generation resources.

1.4 GHG EMISSIONS

EE is one of the most sustainable and cost effective ways to decrease the Department's greenhouse gas (GHG) emissions. The Department expects to attain significant CO_2 reductions through the expansion of its EE programs. This leads to improving the air quality of the Los Angeles region and contributes to the public health of its residents. As shown in Figure 6, the Department projects a 1,133,504 metric ton CO_2 reduction over the proposed five-year rate period.

Figure 6: Projected CO_2 Reductions from EE (metric tons)

	Current Year	Proposed Rate Period					
	FY 14-15	**FY 15-16**	**FY 16-17**	**FY 17-18**	**FY 18-19**	**FY 19-20**	**Total**
Mass Market	60,164	107,296	111,763	117,218	119,437	104,080	559,794
CII Programs	60,489	79,039	81,258	91,882	82,315	74,709	409,203
Cross Cutting	44,581	48,425	38,245	30,652	24,920	22,267	164,509
Total	**165,233**	**234,759**	**231,266**	**239,752**	**226,672**	**201,055**	**1,133,504**

E. ENERGY EFFICIENCY BOARD LETTER

This appendix includes the letter that the Department provided to the Board in August 2014 with the new energy efficiency targets of 15% by FY 2020 for approval. It also includes the Nexant Energy Efficiency Territorial Potential studies performed to support this goal.

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Los Angeles Department of Water & Power

RESOLUTION NO. 015 007

AUG 05 2014

BOARD LETTER APPROVAL

1- COPY RESO TO PDF- PWR. Chief Sustain. 8/5/14

NANCY H. SUTLEY
Chief Sustainability and Economic Development Officer

RANDY S. HOWARD
Senior Assistant General Manager - Power System

MARCIE L. EDWARDS
General Manager

DATE: July 18, 2014

SUBJECT: LADWP Energy Efficiency Goals for Submission to the California Energy Commission (CEC) as Required by Assembly Bill 2021

SUMMARY

The attached Resolution recommends approval of the Los Angeles Department of Water and Power's (LADWP) annual targets for energy efficiency savings and demand reduction over ten years ending in FY 2022-23, which will be submitted to the California Energy Commission (CEC) pursuant to the requirements of Assembly Bill (AB) 2021 (2006), Sections 2 and 3 (added Section 25310 to Public Resources Code and amended Section 9615 of the Public Utilities Code).

The proposed AB 2021 targets represent a total goal of 3,596 GWh in energy use reduction compared to the baseline forecast over the ten-year period from FY 2013-14 through FY 2022-23, which would result in total cumulative energy savings over the same period of 13.7 percent. This exceeds the minimum AB 2021-required cumulative energy savings goal of 10 percent over the ten-year period by 37 percent. The proposed targets also upwardly revise the most recent set of prior energy efficiency targets, adopted in 2012.

In addition to exceeding state requirements, LADWP also seeks to accelerate program efforts such that the majority of the total savings will be achieved by 2020. Using FY 2010-11 as the starting year, LADWP seeks to build on the actual energy efficiency results of FYs 2010-11, 2011-12, and 2012-13 to achieve cumulative energy savings of

15 percent versus baseline sales projections across the ten-year period from FY 2010-11 through FY 2019-20. This acceleration of savings will result in more customers participating in energy efficiency programs sooner, and thus realizing more energy and bill savings. This will also accelerate delivery of the other benefits of LADWP's energy efficiency programs as specified in the Guiding Principles for the Energy Efficiency Portfolio, adopted by the LADWP (Adopted Board Resolution 013 028, August 7, 2012).

While these targets are aggressive, LADWP expects to achieve them at a levelized cost of $0.042/kWh, which is in line with the energy efficiency portfolios of other large utilities in California, and is also favorably comparable to new generation resources. However, adopting these targets is not without trade-offs or risks. The new energy efficiency targets would require 1.3 percent per year in additional rate adjustments versus a plan that would achieve the 10 percent by 2020 savings required by AB2021. The proposed energy efficiency target will require an additional 0.6 percent per year rate impact above the less aggressive target that was contemplated in the adopted FY14/15 budget, which would have achieved about 12.5 percent energy savings by 2020. These are the net system average rate impacts from factors including reduced power revenue to cover LADWP fixed costs, the cost of the incentives, offset by reduced fuel costs. Individual customers who take advantage of the energy efficiency programs to reduce their consumption can lower their bills despite the slightly higher rates.

Additionally, many external factors may affect LADWP's ability to achieve these targets, such as hiring and staffing limitations; market saturation or customer non-responsiveness to energy efficiency messaging and incentives; uncertainty around future rate increases; etc. Failure to achieve the targets could lead to increased costs as LADWP may need to seek additional generation resources to cover any shortfall or meet state requirements around renewables. LADWP staff will mitigate these risks by constantly monitoring such factors and taking proactive actions to avoid or correct them.

RECOMMENDATION

It is recommended that the Board of Water and Power Commissioners adopt the attached Resolution approving the energy savings shown herein.

BACKGROUND

In accordance with AB 2021, the State Legislature intended that load-serving entities procure all cost-effective energy efficiency savings and specified that each local publicly owned electric utility first acquire all energy efficiency and demand reduction resources that are cost-effective, reliable, and feasible.

Pursuant to AB 2021, each publicly owned utility is instructed to identify all presently achievable, cost-effective efficiency potential on a periodic basis and establish annual

targets for the ensuing ten-year period, such that these targets result in cumulative energy savings of at least 10 percent versus baseline sales projections. Originally the periodic basis for identifying energy efficiency potential and setting ten year targets under AB 2021 was every three years; pursuant to AB 2227 (2013) this was extended to every four years, starting in 2017.

Publicly owned utilities are the required to submit the ten-year energy savings and demand reduction targets to the CEC. LADWP presents the targets proposed here for Board adoption for submission to the CEC in satisfaction of the requirements of AB 2021.

ALTERNATIVES CONSIDERED

Summary of Process to Develop Recommended AB 2021 Energy Efficiency Targets. The LADWP hired Nexant, Inc. (Nexant) to conduct an Energy Efficiency Potential Study (Study) for LADWP's service territory to determine the potential energy savings over a 10-year period. The Study was completed in June 2014.

The Study presents a number of energy savings scenarios compliant with AB 2021 requirements and estimates the annual program expenditures levels necessary for achieving the cumulative targets for energy savings and peak demand reduction potential for each investigated scenario. LADWP sought a scenario yielding a high level of total savings across the ten-year planning period while keeping estimated annual expenditures reasonably in line with previous projections.

The Study initially analyzed program potential scenarios that represent a broad-brush approach to estimating potential based on assumed incentive and administration/marketing costs. The Study then analyzed, in more detail, ten program planning scenarios to demonstrate how changing assumptions on program delivery, including incentives, administration/marketing, benefit-cost thresholds, and market participation rates can create a range of projected expenditures required to reach the annual savings targets. The energy efficiency savings targets for the ten-year period from FY 2013-14 through FY 2022-23 proposed for submittal to the CEC are based on the Detailed Program Planning Scenario 10 in the Study.

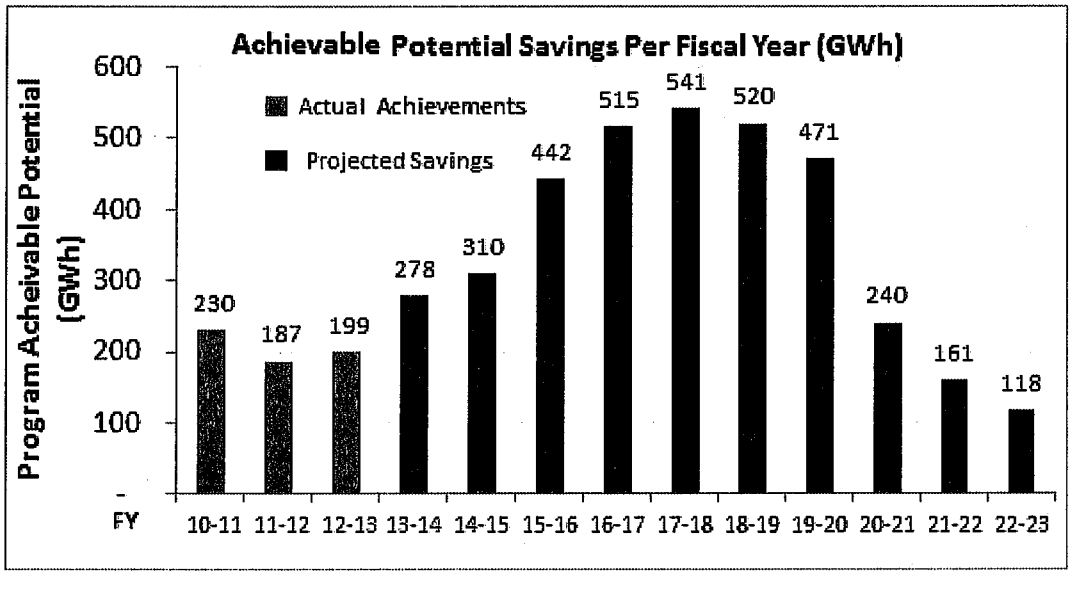
The proposed AB 2021 targets represent a total goal of 3,596 GWh in energy use reduction compared to the baseline forecast over the ten-year period from FY 2013-14 through FY 2022-23, which would result in total cumulative energy savings over the same period of 13.7 percent. This exceeds the minimum AB 2021-required cumulative energy savings goal of 10 percent over the ten-year period by 37 percent.

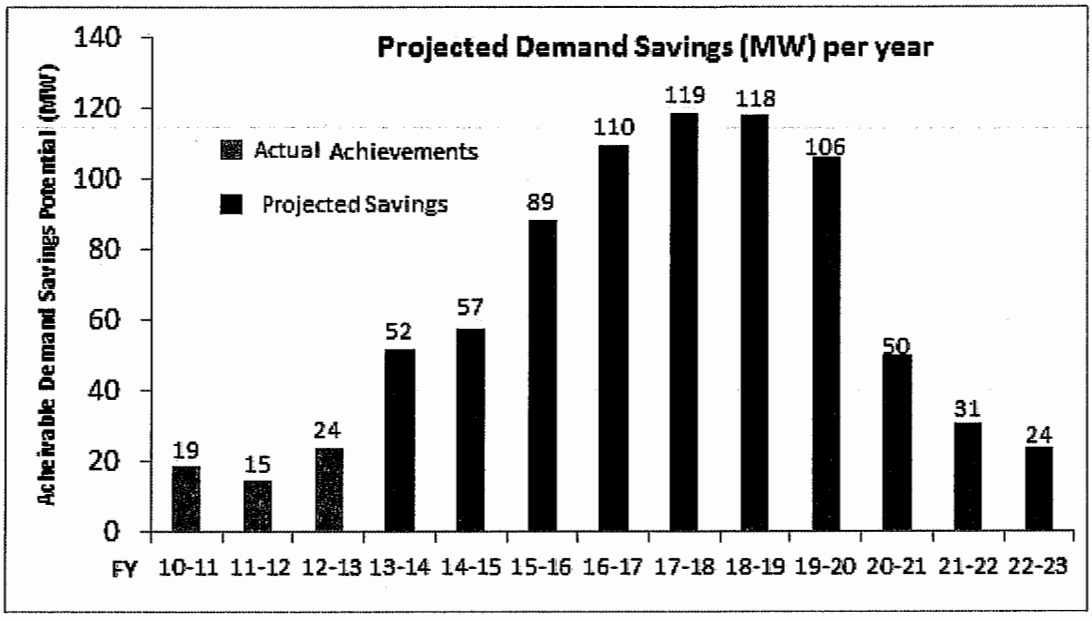
In addition to exceeding state requirements by setting annual targets that would achieve 13.7 percent across the AB 2021 timeframe of FY 2013-14 through FY 2022-23, LADWP also seeks to accelerate program efforts such that the majority of the total savings will be achieved by 2020. Using FY 2010-11 as the starting year, LADWP seeks to build on the actual energy efficiency results of FYs 2010-11, 2011-12, and 2012-13

to achieve cumulative energy savings of 15% versus baseline sales projections across the ten-year period from FY 2010-11 through FY 2019-20. This acceleration of savings will result in more customers participating in energy efficiency programs sooner, and thus realizing more energy and bill savings. This will also accelerate delivery of the other benefits of LADWP's energy efficiency programs as specified in the Guiding Principles for the Energy Efficiency Portfolio, adopted by the LADWP (Adopted Board Resolution 013 028, August 7, 2012).

Scenario 10 of the Study exceeds the AB 2021 minimum ten-year goal, as well as satisfies LADWP's intent to accelerate savings results by 2020.

LADWP Recommended AB 2021 Energy Efficiency Targets. The charts below shows the energy and demand savings for FY 2013-14 through FY 2022-23 targets for the recommended Scenario 10 from the Study. For reference, actual savings are included on each graph for FY 2010-11 through FY 2012-13. While these targets are aggressive, LADWP expects to achieve them at a levelized cost of $0.042/kWh, which is in line with the energy efficiency portfolios of other large utilities in California, and is also favorably comparable to new generation resources.

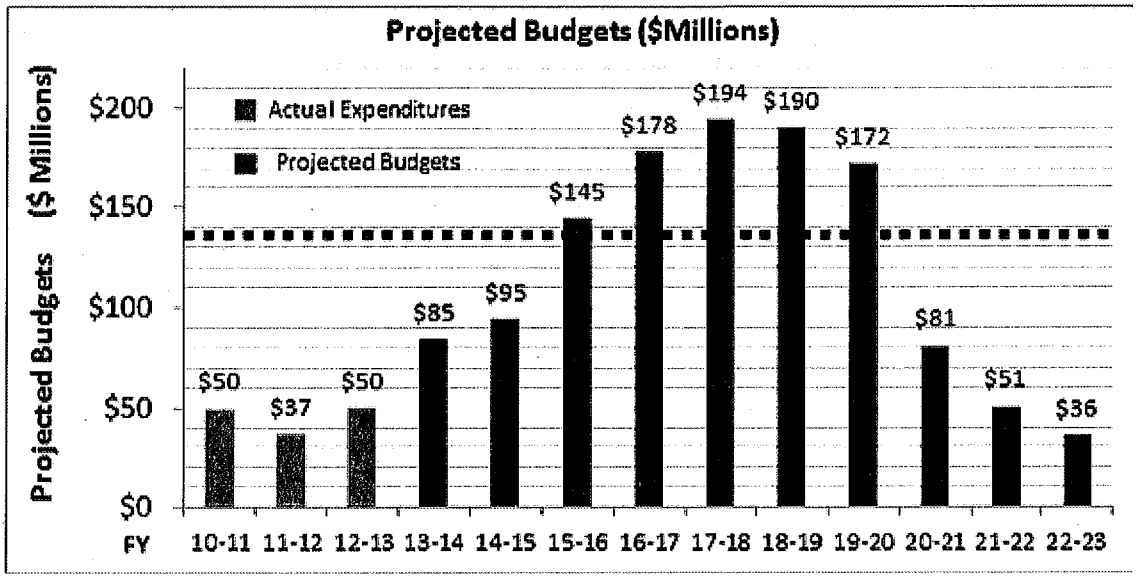




FINANCIAL INFORMATION

The energy efficiency programs required to meet the proposed savings targets totaling 3,596 GWh for the ten-year period between FY 2013-14 and FY 2022-23 will require a substantial investment currently estimated at $1.225 billion over the ten-year period. However, LADWP is not seeking the approval of any additional funding at this time. Annual funding levels allocated for energy efficiency as part of the Power rate increase (Adopted Board Resolution 013 053, September 12, 2012) are expected to be sufficient for at least the first three years of the ten year period. Funding for energy efficiency programs assumes the ability of LADWP to recover revenue losses and other costs for the programs through the Energy Cost Adjustment Factor or other revenue stability means. The new energy efficiency targets would require 1.3 percent per year in additional rate adjustments versus a plan that would achieve the 10 percent by 2020 savings required by AB2021. The proposed energy efficiency target will require an additional 0.6 percent per year rate impact above the less aggressive target that was contemplated in the adopted FY14/15 budget, which would have achieved about 12.5 percent energy savings by 2020. These are the net system average rate impacts from factors including reduced power revenue to cover LADWP fixed costs, the cost of the incentives, offset by reduced fuel costs. Individual customers who take advantage of the energy efficiency programs to reduce their consumption can lower their bills despite the slightly higher rates. Individual customers who take advantage of the energy efficiency programs to reduce their consumption can lower their bills despite the slightly higher rates.

The chart below shows the estimated annual expenditures for FY 2013-14 through FY 2022-23 for the recommended Scenario 10 from the Study. For reference, actual expenditures are included for FY 2010-11 through FY 2012-13. The dotted line represents level to which energy efficiency is currently funded annually as a result of the Power rate increase (Adopted Board Resolution 013 053, September 12, 2012). This level corresponds to an annual funding level of $138 million, and demonstrates that substantive additional funding for energy efficiency is not expected to be needed until FY 2016-17.



RISKS & MITIGATION

The recommended targets are aggressive by the standards of typical utility-administered energy efficiency programs, but are not unprecedented. Several categories of risk accompany the targets. The primary risk to LADWP in adopting these targets is that since they are factored into the Integrated Resource Plan (IRP) as a supply-side resource, if the targets are ultimately not met, LADWP could have to find incremental generating resources to make up for any shortfall. Also, since energy efficiency is a cost-effective strategy to reduce the amount of renewable resources that have to be procured to meet California's Renewable Resource Standard, a shortfall in energy efficiency results could increase the amount of renewables required. LADWP will mitigate both of these risks by assessing energy efficiency program performance versus the targets throughout each year, and adjusting the IRP accordingly on an annual basis. Therefore, any failure to meet an annual energy efficiency target will be identified and incorporated into the IRP immediately, preventing any accumulation of shortfalls that are only identified when it is too late to adjust generation and renewable resources to address them. Nevertheless, as many power resources decisions are made several years into the future, identified shortfalls may need to be addressed through less preferable power supply options such as spot market purchases, which often carry additional costs.

The other category of risk for LADWP in adopting these aggressive targets is that external factors beyond LADWP's control may intercede and preclude achievement of the targets in any given year. Such factors may include, but are not limited to, hiring and staffing limitations; market saturation or customer non-responsiveness to energy efficiency messaging and incentives; uncertainty around future rate increases; regional, state, national or global economic conditions and the financing/investment environment; unforeseen circumstances that necessitate the redeployment of energy efficiency resources to other higher-priority areas; etc. LADWP staff will mitigate these risks by monitoring such factors and taking proactive actions to avoid or correct them. In any year that LADWP does not achieve the energy efficiency target, staff will, in addition to working with the Power System to address the shortfall in the annual IRP, conduct a root-cause analysis of the external factor(s) contributing to the failure to meet the target and propose corrective action(s) to prevent recurrence.

ENVIRONMENTAL DETERMINATION

In accordance with the California Environmental Quality Act (CEQA), it has been determined that Resolution is exempt pursuant to the General Exemption described in CEQA Guidelines Section 15061 (b)(3). General Exemptions apply in situations where it can be seen with certainty that there is no potential that the activity in question may have a significant effect on the environment.

CITY ATTORNEY

The Office of the City Attorney reviewed and approved the Resolution as to form and legality.

ATTACHMENTS

- Resolution
- Energy Efficiency Potential Study (Volume I)
- Resolution 013 028 (Guiding Principles for the Energy Efficiency Portfolio)

LADWP Territorial Potential
Draft Report
Volume I

Submitted to Los Angeles Department of Water and Power
Submitted by Nexant
In partnership with Cadmus and RetroCom Energy Strategies
June 24, 2014

Nexant

CONTENTS

VOLUME I

VOLUME II

1 EXECUTIVE SUMMARY

1.1 PROJECT OVERVIEW AND OBJECTIVES

This report summarizes the results of a comprehensive assessment of the long-run electric energy efficiency potential study for the Los Angeles Department of Water and Power (LADWP) territory from 2014-2033[1]. LADWP commissioned this study to support its business plan and energy efficiency goals for 2020. LADWP retained Nexant, in collaboration with its subcontractors Cadmus and RetroCom Energy (the Nexant team), to perform this work. This study encompasses the residential, commercial, institutional (City of Los Angeles buildings and facilities), and industrial sectors.

The results of the study take into account annual program expenditure levels necessary for achieving the cumulative targets for energy savings and peak demand reduction potential, but exclude demand response potential.

Although the timeframe of the study is 20-years, the focus was to estimate cumulative savings potential achievable by 2020 and 2023. LADWP recently adopted a goal of 10% cumulative savings of the load forecast between 2010 and 2020, with an aspirational target of 15%. This study includes an assessment of the feasibility and cost-effectiveness of achieving these savings targets, as well as three additional scenarios, provided below. In addition, the study develops a range of program-level planning scenarios with varying cost and delivery assumptions to identify the range of budgetary requirements to achieve the 15% savings target.

This report presents the results for the study prior to the completion of the potential for energy and demand savings in the City of Los Angeles buildings and facilities, involving 68 site visits to these facilities. The impact of that assessment will be completed in June 2014.

1.2 DEFINITIONS OF ENERGY EFFICIENCY POTENTIAL

The following are the definitions of the types of potentials available in a utility's territory:

- **Technical potential:** The quantification of savings that can be realized if energy efficiency measures passing the qualitative screening are applied in all feasible instances, regardless of cost.
- **Economic potential:** A subset of technical potential, where measures are cost-effective from the Total Resource Cost ("TRC") perspective, without regard to cross-subsidies.

[1] Representing LADWP's fiscal years(FY) 2013-14 to 2032-33

- **Maximum achievable potential:** The energy savings that can possibly be achieved through assuming maximum market penetration of all measures. Individual measures are not necessarily cost-effective in this scenario, though measures with a low TRC benefit-cost ratio are excluded.

- **Program potential:** The energy savings that can possibly be achieved through utility programs or codes and standards. Individual measures are not necessarily cost-effective in this scenario, though measures with a low benefit-cost ratio, as determined through the Total Resource Cost (TRC) test, are excluded.

This study estimated program potential for five top-down policy intervention scenarios, corresponding to varying incentive levels provided to end-use consumers and an acquisition rate of 10 years for retrofit measures, as well as two additional scenarios that considered accelerated acquisition rates under the advanced and extreme scenarios:

  - ***Low scenario***: Monetary incentives to customers equaling 25% of incremental costs of energy efficiency improvements[2], and administration and marketing costs equaling 20% of incremental costs. This scenario assumes retrofit opportunities are acquired within 10 years.

  - ***Moderate scenario***: Monetary incentives to customers equaling 50% of incremental costs of energy efficiency improvements, and administration and marketing costs equaling 35% of incremental costs. This scenario assumes retrofit opportunities are acquired within 10 years.

  - ***High scenario***: Monetary incentives to customers equaling 75% of incremental costs of energy efficiency improvements, and administration and marketing costs equaling 40% of incremental costs. This scenario assumes retrofit opportunities are acquired within 10 years.

  - ***Advanced scenario***: Monetary incentives to customers equaling 90% of incremental costs of energy efficiency improvements and administration and marketing costs equaling 65% of incremental costs. This scenario assumes retrofit opportunities are acquired within 10 years.

  - ***Advanced accelerated scenario:*** Same incentives and administration and marketing costs as the "advanced scenario", but retrofit opportunities are assumed to be acquired in 8 years.

[2] Incremental costs are either based on the difference between a standard and efficient unit or the total cost to install a measure compared to existing conditions.

- ***Extreme scenario***: Monetary incentives to customers, equaling 100% of incremental costs of energy efficiency improvements, and administration and marketing costs equaling 75% of incremental costs. This scenario assumes retrofit opportunities are acquired within 10 years.

- ***Extreme accelerated scenario:*** Same incentives and administration and marketing costs as the "extreme scenario", but retrofit opportunities are assumed to be acquired in 7 years.

1.3 SUMMARY OF RESULTS

The technical and economic potentials in FY 2032-33 are provided in Table 1-1.

Table 1-1. Technical and Economic Potential

Sector	Baseline Sales (GWh)	Technical Potential			Economic Potential				
		GWh	% of Base Sales	MW	GWh	% of Base Sales	MW	Percent of Technical Potential - Energy	Percent of Technical Potential - Demand
Residential	9,985	3,334	33%	1,940	1,625	16%	471	49%	24%
Commercial	14,798	3,332	23%	851	2,188	15%	505	66%	59%
Institutional	756	143	19%	37	110	15%	27	77%	72%
Industrial	2,195	314	14%	66	265	12%	56	84%	85%
Codes and Standards[a]	N/A	1,690	N/A	312	1,690	N/A	312	100%	N/A
Other[b]	838	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	28,571	8,813	31%	3,205	5,877	21%	1,371	67%	43%

[a]Includes savings from Huffman Bill, Title 24 codes, and Title 20 standards, as well as federal standards not covered by California standards.

[b]Other includes components for which energy efficiency potential was not considered, such as port electrification and rooftop solar. Plug-in electric vehicles were excluded from baseline forecasts

Study results indicate 8,813 GWh of technically feasible energy efficiency potential by FY 2032-33, the end of the 20-year planning horizon, with approximately 5,877 GWh of these resources proving cost-effective. Technical potential amounts to 31% of forecasted load with codes and standards, and 25% of forecasted load without codes and standards. Economic potential represents savings from measures that have a B/C ratio that is greater than or equal to 1.0. By FY 2032-33, savings from these measures can account for 21% of baseline sales with codes and standards and 15% of baseline sales without codes and standards.

The maximum achievable potential, which assumes aspirational levels of market adoption with no infrastructure or resource constraints, is provided is Table 1-2.

Table 1-2. Maximum Achievable Potential

Sector	Baseline Sales - GWh	Maximum Achievable - GWh	% of Base Sales	Maximum Achievable – MW
Residential	9,985	1,830	18%	591
Commercial	14,798	2,998	20%	771
Institutional	756	134	18%	35
Industrial	2,195	306	14%	64
Codes and Standards	NA	1,690	NA	312
Other	838	NA	NA	NA
Total	28,571	6,958	24%	1,773

Finally, Table 1-3 provides the program potentials for FY 2019-20 and FY 2022-23. In addition to the potential, this table also provides the overall benefit-to-cost (B/C) ratio and net benefits, based on a TRC perspective, as well as the portfolio utility levelized cost.

Table 1-3. Program Potential Scenarios

	Low	Moderate	High	Advanced		Extreme	
				Normal	Accelerated	Normal	Accelerated
Target Year 2020: Inclusive of 2010-2011 to 2012-2013 Accomplishments							
Baseline Sales (FY2019-20)	25,388	25,388	25,388	25,388	25,388	25,388	25,388
Cumulative Potential (GWh) FY2019-20	1,947	2,485	2,737	2,933	3,383	3,014	3,825
2010-2011 to 2012-2013 Program Accomplishments	615.6	615.6	615.6	615.6	615.6	615.6	615.6
Potential as % of Baseline Sales without Accomplishments	7.7%	9.8%	10.8%	11.6%	13.3%	11.9%	15.1%
Average Annual Savings as a % of Baseline Sales (2014-2020)*	1.1%	1.4%	1.5%	1.7%	1.9%	1.7%	2.2%
Potential as % of Baseline Sales with Accomplishments	10.1%	12.2%	13.2%	14.0%	15.8%	14.3%	17.5%
Target Year 2023: Excludes 2010-2011 to 2012-2013 Accomplishments							
Baseline Sales (FY2022-23)	26,220	26,220	26,220	26,220	26,220	26,220	26,220
Cumulative Potential (MWh) FY2022-23	2,943	3,714	4,075	4,356	4,357	4,475	4,496
2010-2011 to 2012-2013 Program Accomplishments	615.6	615.6	615.6	615.6	615.6	615.6	615.6
Potential as % of Baseline Sales without Accomplishments	11.2%	14.2%	15.5%	16.6%	16.6%	17.1%	17.1%
Average Annual Savings as a % of Baseline Sales (2014-2023)*	1.1%	1.4%	1.6%	1.7%	1.7%	1.7%	1.7%
Potential as % of Baseline Sales with Accomplishments	13.6%	16.5%	17.9%	19.0%	19.0%	19.4%	19.5%
Scenario Economics (Over 20-Year Study Horizon)							
TRC Benefit Cost Ratio	1.55	1.38	1.33	1.13	1.13	0.90	0.90
Net TRC Benefits ($000s)	$912,082	$978,192	$997,745	$497,037	$497,508	-$517,094	-$535,621
Utility Levelized Cost ($/kWh)	$0.024	$0.046	$0.063	$0.085	$0.085	$0.115	$0.115

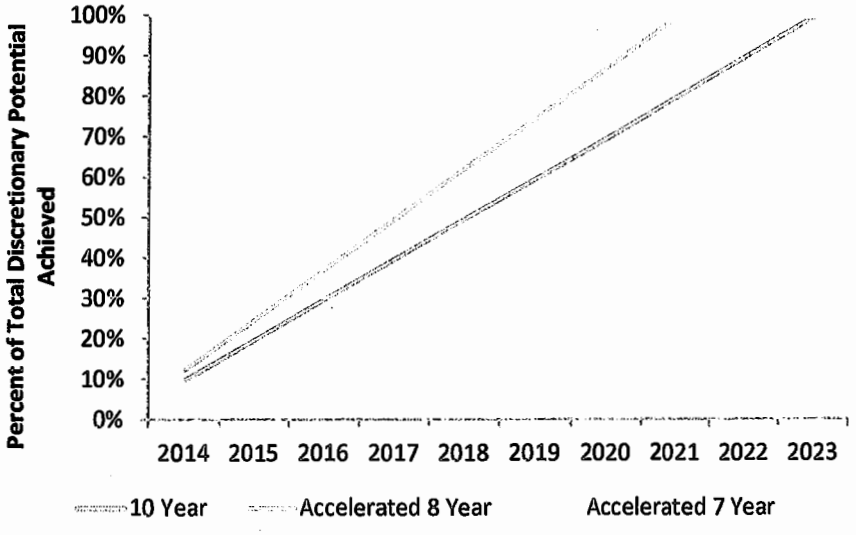
* These values represent the average annual level of savings required through programs to achieve the potential by the target year.

1.3.1 Acquisition of Conservation Resources

An assumption of the rate of acquisition for these resources is implicit in the program potential. For equipment measures, the assumption is that they will be adopted when the existing equipment burns out (replace-on-burnout). As such, the acquisition is dictated by the assumed measure life. This is also true for new construction, when the savings can only be realized when the new building is completed. Although retrofit or discretionary measures can theoretically be installed in year one, in reality the adoption of these measures is limited by the existing infrastructure and available resources. Thus the assumed ramp rate for these measures depends on whether the measure is part of a current program, whether it is an emerging technology, and the aggressiveness of the scenario.

Figure 1-1 illustrates the ramp rates for the retrofit measures. The low and moderate scenarios have the same ramp rates where retrofit measures are adopted within 10 years (2023); in order to achieve the advanced and extreme targets, the ramp rate needed to be accelerated to eight and seven years, respectively, for adoption of retrofit measures.

Figure 1-1. Ramp Rates for Discretionary (Retrofit) Measures



1.4 PLANNING IMPLICATIONS

As illustrated in Table 1-3 above, the range of cumulative savings from FY 2013-14 through FY 2019-20 varies from 7.7% to 15.1% of baseline sales depending on the level of program intervention, and identifies that LADWP's aspirational goal of 15% savings as a percentage of FY 2019-20 baseline sales[1] is achievable and cost-effective from the TRC perspective. However, as LADWP develops its program plans, it will not use a single set of incentive rates for all measures, each program will have

[1] 15% savings represents cumulative savings through FY 2019-20 inclusive of program accomplishments from 2010-2013.

unique administration and marketing costs, and the programs may not include all identified measures. To provide some context to the budgetary requirements of actually achieving these savings, the Nexant team explored several scenarios to reach 15% of baseline energy sales by 2020, based on a more granular approach to the assumptions.

With LADWP's guidance, the Nexant team produced ten program planning scenarios to demonstrate how changing assumptions on program delivery, including incentives, admin/marketing, benefit-cost thresholds, and ramp rates can create a range of budgets required to reach roughly 15% savings by 2020. Table 1-4 shows the detailed results for each of these scenarios in FY 2019-20 and FY2022-23, including energy savings, demand savings, average annual budget, benefit cost ratios, and levelized costs.

Table 1-4: Detailed Program Planning Scenario Results (2020 and 2023)

	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6	Scenario 7	Scenario 8	Scenario 9	Scenario 10
Target Year 2019-2020										
Baseline Sales (GWh) FY2019-20	25,388	25,388	25,388	25,388	25,388	25,388	25,388	25,388	25,388	25,388
Cumulative Potential (GWh) FY2019-20	3,094	2,962	2,726	2,859	2,596	2,593	2,601	2,614	2,583	2,610
Cumulative C&S Savings (GWh) FY2019-20	466	466	466	466	466	466	466	466	466	466
2010-2011 to 2012-2013 Program Accomplishments	616	616	616	616	616	616	616	616	616	616
Potential as % of Baseline Sales without Accomplishments	14.0%	13.5%	12.6%	13.1%	12.1%	12.0%	12.1%	12.1%	12.0%	12.1%
Average Annual Savings as a % of Baseline Sales (2014-2020)	2.0%	1.9%	1.8%	1.9%	1.7%	1.7%	1.7%	1.7%	1.7%	1.7%
Potential as % of Baseline Sales with Accomplishments	16.4%	15.9%	15.0%	15.5%	14.5%	14.5%	14.5%	14.6%	14.4%	14.5%
Cumulative Acquisition Budget ($Million) in FY2019-20	$2,723	$2,280	$1,342	$1,695	$1,250	$1,129	$1,727	$1,567	$1,100	$1,057
Average Annual Acquisition Budget ($Million)	$389	$326	$192	$242	$179	$161	$247	$224	$157	$151
Target Year 2023										
Baseline Sales (GWh) FY2022-23	26,220	26,220	26,220	26,220	26,220	26,220	26,220	26,220	26,220	26,220
Cumulative Potential (GWh) FY2022-23	3,592	3,441	3,166	3,323	3,021	3,015	3,390	3,406	3,038	3,029
Cumulative C&S Savings (GWh) FY2022-23	566	566	566	566	566	566	566	566	566	566
2010-2011 to 2012-2013 Program Accomplishments	615.6	615.6	615.6	615.6	615.6	615.6	615.6	615.6	615.6	615.6
Potential as % of Baseline Sales without Accomplishments	15.9%	15.3%	14.2%	14.8%	13.7%	13.7%	15.1%	15.2%	13.7%	13.7%
Average Annual Savings as a % of Baseline Sales (2014-2023)	1.6%	1.5%	1.4%	1.5%	1.4%	1.4%	1.5%	1.5%	1.4%	1.4%
Potential as % of Baseline Sales with Accomplishments	18.2%	17.6%	16.6%	17.2%	16.0%	16.0%	17.4%	17.5%	16.1%	16.1%
Cumulative Acquisition Budget ($Million) in FY2022-23	$3,165	$2,661	$1,570	$1,990	$1,474	$1,327	$2,261	$2,050	$1,306	$1,225
Average Annual Acquisition Budget ($Million)	$316	$266	$157	$199	$147	$133	$226	$205	$131	$122
Scenario Economics (Over 20-year Study Horizon)										
TRC Benefit Cost Ratio	1.11	1.26	1.20	1.30	1.46	1.35	1.27	1.17	1.37	1.28
Net TRC Benefits ($Million)	$448	$867	$637	$932	$1,129	$930	$869	$599	$958	$775
Utility Levelized Cost ($/kWh)	$0.085	$0.074	$0.050	$0.058	$0.048	$0.043	$0.064	$0.060	$0.042	$0.039

1.5 ORGANIZATION OF REPORT

The report presents the study's findings in two volumes. Volume I (this document), presents methodologies and findings and includes the following sections:

1. **Executive Summary**
2. **General Approach and Methodology**
3. **Technical and Economic Potential**
4. **Achievable and Program Potential**
5. **Planning Considerations**

Volume II presents supplemental technical information, assumptions, data, and other relevant details as the following appendices:

- **Appendix A: Glossary of Terms**
- **Appendix B: Detailed Technical and Economic Potential Methodology Appendix C: Detailed Methodology**
- **Appendix C: Assessment of Previous Study**
- **Appendix D: Detailed Results by Sector, Segment, and End Use**
- **Appendix E: Detailed Results for Program Potential Scenarios**
- **Appendix F: Detailed Results for 15% Program Planning Scenarios**
- **Appendix G: Measure Performance Data and Costs**

2 General Approach and Methodology

2.1 General Approach

2.1.1 Introduction

This report presents findings from the electric energy efficiency technical, economic, maximum achievable, and program potentials study, intended to support LADWPs long-term planning. The study's horizon covers 2014–2033[1], encompassing the residential, commercial, institutional (City of Los Angeles) and industrial sectors.

2.1.2 Objectives

This study includes the following key objectives:

- Estimate cumulative savings potential achievable by 2020, through five scenarios based on utility expenditures through incentives, marketing, and other administrative activities. We also estimated budgets to acquire these resources.
- Estimate cumulative savings potential achievable by 2023, through five scenarios based on utility expenditures through incentives, marketing, and other administrative activities. We also estimated budgets to acquire these resources.

2.1.3 Definitions of Energy-Efficiency Potential

The following are the definitions of the types of potentials available in a utility's territory:

- **Technical potential:** The quantification of savings that can be realized if energy efficiency measures passing the qualitative screening are applied in all feasible instances, regardless of cost.
- **Economic potential:** A subset of technical potential, where measures are cost-effective from the Total Resource Cost ("TRC") perspective, without regard to cross-subsidies.
- **Maximum achievable potential:** The energy savings that can possibly be achieved through assuming maximum market penetration of all measures. Individual measures are not necessarily cost-effective in this scenario, though measures with a low TRC benefit-cost ratio are excluded.
- **Program potential:** The energy savings that can possibly be achieved through utility programs or codes and standards. Individual measures are not necessarily cost-effective in this scenario, though measures with a low TRC benefit-cost ratio are excluded.

[1] Representing LADWP's FY 2013-14 to 2032-33

This study estimated program potential for five policy intervention scenarios, corresponding to varying incentive levels provided to end-use consumers and an acquisition rate of 10 years for retrofit measures, and two additional accelerated acquisition rates under the advanced and extreme scenarios:

- ***Low scenario***: Monetary incentives to customers equaling 25% of incremental costs of energy efficiency improvements[1], and administration and marketing costs equaling 20% of incremental costs. This scenario assumes retrofit opportunities are acquired within 10 years.
- ***Moderate scenario***: Monetary incentives to customers equaling 50% of incremental costs of energy efficiency improvements, and administration and marketing costs equaling 35% of incremental costs. This scenario assumes retrofit opportunities are acquired within 10 years.
- ***High scenario***: Monetary incentives to customers equaling 75% of incremental costs of energy efficiency improvements, and administration and marketing costs equaling 40% of incremental costs. This scenario assumes retrofit opportunities are acquired within 10 years.
- ***Advanced scenario***: Monetary incentives to customers equaling 90% of incremental costs of energy efficiency improvements and administration and marketing costs equaling 65% of incremental costs. This scenario assumes retrofit opportunities are acquired within 10 years.
- ***Advanced accelerated scenario:*** Same incentives and administration and marketing costs as the "advanced scenario", but retrofit opportunities are assumed to be acquired in 8 years.
- ***Extreme scenario***: Monetary incentives to customers, equaling 100% of incremental costs of energy efficiency improvements, and administration and marketing costs equaling 75% of incremental costs. This scenario assumes retrofit opportunities are acquired within 10 years.
- ***Extreme accelerated scenario:*** Same incentives and administration and marketing costs as the "extreme scenario", but retrofit opportunities are assumed to be acquired in 7 years.

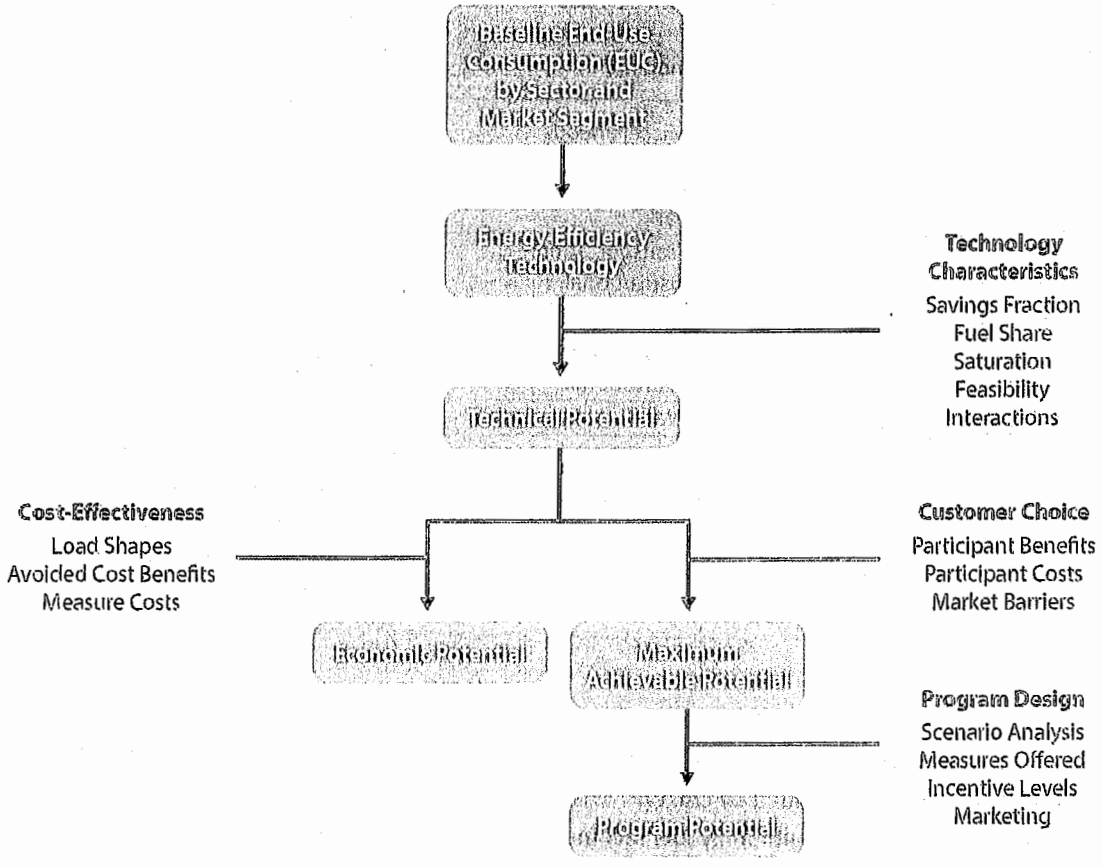
2.2 OVERVIEW

The general methodology is described here, further details are provided in Appendix C. The methodology used can best be described as a hybrid "top-down/bottom-up" approach. As

[1] For this study incremental costs represent the difference in costs between the baseline technology and efficient technology. For equipment replacement measures that are assumed to occur at burnout, when the equipment would naturally be replaced, the incremental costs include the difference between the efficient replacement option and the standard replacement option. For non-equipment measures (such as additional attic insulation) or early retirement equipment measures, incremental costs include the total cost to install a measure compared to existing conditions.

illustrated in Figure 2-1, we began by examining the current energy forecast, and then breaking down the forecast into its constituent customer-class and end-use components. The team then examined the effects for a range of energy efficiency approaches and practices for end use, while accounting for fuel shares, current market saturations, technical feasibility, and costs. We then aggregated these unique impacts to produce resource potentials, estimates at end use, customer class, and system levels.

Figure 2-1. Methodology for Estimating Technical, Economic, Maximum Achievable and Program Potential



2.2.1 Develop Baseline Forecasts

2.2.1.1 Segmenting the Market

The Nexant team's first key activity in assessing the territorial energy efficiency potential was to identify the appropriate level of granularity for the analysis. For this, we utilized the following steps:

1. **Create a model for each sector (residential, commercial, institutional [City of Los Angeles Facilities], and industrial).**

2. **Disaggregate the analysis to specific market segments within each sector (dwelling, business, or industry type).**

Table 2-1 provides the segments by sector.

Table 2-1. Market Segments Included

Residential	Commercial	Institutional	Industrial
Multifamily	Assembly	Assembly	Agriculture
Multifamily Low Income	Education College	Civil Services	Chemical Manufacturing
Single Family	Education Primary (K-12)	Industry	Electronic Equipment Manufacturing
Single Family Low Income	Grocery	Miscellaneous	Food Manufacturing
	Health	Office Space	Industrial Machinery
	Lodging	Park	Lumber Wood Products
	Miscellaneous	Transportation - Institutional	Mining
	Office Large	Utilities	Miscellaneous Manufacturing
	Office Small	Wastewater - Institutional	Paper Manufacturing
	Restaurant	Water - Institutional	Petroleum Refining
	Retail Large		Primary Metal Manufacturing
	Retail Small		Stone Clay Glass Products
	Storage		Street Lighting
	Warehouse		Transportation Equipment Manufacturing
			Wastewater
			Water

The Nexant team relied on housing stock forecasts of residential single family and multifamily units for the City of Los Angeles, provided by LADWP. We disaggregated housing stock forecasts into single family low income and multifamily low income segments by identifying the share of households that fall below the eligibility threshold for LADWP's Low Income Discount Program.[1]

Segmentation of the commercial, institutional, and industrial sectors relied on an analysis of LADWP's customer information system (CIS) data. LADWP provided 2012 sales and customer information for nonresidential customers. The Team first worked with LADWP to identify institutional customers, so we could determine the share of non-residential forecasted sales that institutional customers account for. The Nexant team then identified the appropriate market

[1] U.S. Census Bureau American Community Survey housing microdata for California: http://www2.census.gov/acs2012_5yr/pums/csv_hca.zip

segment for each non-residential customer based on the customers' standard industrial classification (SIC) code.

The Nexant team further segmented each of the identified markets into major end uses, such as lighting, cooling, ventilation, plug load, and other applications expected to be relevant to the estimation of potential. The Nexant team model relied on the following end use data:

- ***Saturations***: For the residential sector, saturations reflect the average number of units in a household. For commercial and institutional sectors, saturations reflect the percent of floor space to which the end use applies (for lighting, this is percent of floor space lit; for heating, this is percent of floor space heated, etc.). The Nexant team relied on the 2009 California Residential Appliance Saturation Survey (RASS) and the California Commercial End Use Survey (CEUS) to calculate residential and commercial/institutional saturations, respectively. For end uses where these sources could not provide saturations, the Nexant team relied on other secondary sources such as Energy Information Agency's (EIA's) Residential Energy Consumption Survey (RECS) and Commercial Building Energy Consumption Survey (CBECS).
- ***Efficiency Shares***: Efficiency shares reflect the current saturation of efficient equipment. The Nexant team consulted a variety of secondary sources, including the California RASS, California CEUS, EIA RECS, EIA CBECS, and the California Statewide IOU[1] Goals and Potential Study. The Team made additional adjustment to the efficiency shares from these sources to account for LADWP's program accomplishments over the last decade.
- ***End Use Consumption***: Residential per-unit end use consumption is expressed in annual kWh per unit. Also referred to as unit energy consumption (UEC), these reflect average annual kWh consumption by end use. The Nexant team relied on the 2009 California RASS and the 2013 California Goals and Potential Study for residential end use consumption. Commercial and institutional end use consumption is expressed as end use intensities (EUIs) which reflect energy consumption per square foot for a given end use. The Team used the 2006 California CEUS, as well as other secondary sources such as the statewide Goals and Potential Study and EIA's CBECS.

[1] Investor-owned utilities

Table 2-2 summarizes the data sources the Nexant team used to disaggregate LADWP's sales.

Table 2-2 Data Sources

Data	Residential	Commercial	Industrial	Institutional
Sales Forecast	LADWP Official	LADWP Official (institutional removed)	LADWP Official (institutional removed)	LADWP Official; Disaggregated from commercial and industrial
Customer Forecasts	LADWP Housing Stock Forecast; U.S. Census Bureau American Community Survey (ACS)	LADWP Floor Space Forecast	N/A	LADWP Floor Space Forecast
Saturations	California Residential Appliance Saturation Survey RASS; EIA RECS	California Commercial End Use Survey (CEUS); EIA CBECS	N/A	California Commercial End Use Survey (CEUS); EIA CBECS
End Use Consumption	California Statewide IOU 2013 Potential and Goals Study; Secondary Sources	California CEUS; California Statewide IOU 2013 Potential and Goals Study; Secondary Sources	EIA Manufacturing Energy Consumption Survey (MECS); Secondary Sources	California CEUS; California Statewide IOU 2013 Potential and Goals Study; Secondary Sources
Efficiency Shares	California Statewide IOU 2013 Potential and Goals Study; California RASS; Adjusted for LADWP Program Accomplishments	California Statewide IOU 2013 Potential and Goals Study; California CEUS; Adjusted for LADWP Program Accomplishments	N/A	California Statewide IOU 2013 Potential and Goals Study; California CEUS; Adjusted for LADWP Program Accomplishments

2.2.1.2 Forecast Baseline Consumption

The Nexant team created the baseline forecast by combining the inputs compiled above to obtain average consumption estimates (by customer segment, construction vintage, and end use) summed up to the sector level. Using the bottom-up forecast, we assumed no future energy efficiency program activity. The Nexant team also used this approach for estimating technical potential for each sector, market segment, construction vintage, and end use, based on the following:

- **Current customer counts by sector**
- **Base-year conditions (equipment and measure saturations, fuel shares, etc.)**
- **New construction forecasts**
- **Natural equipment turnover rates**

- **Future codes and standards[1]**

The Nexant team calibrated baseline forecasts to LADWP's gross load forecasts. Future programmatic energy efficiency savings were excluded from baseline forecasts to avoid under-estimating potential.

2.2.1.3 Future Codes and Standards

The Nexant team's study will quantify effects of the changes already in place and the changes that have been enacted but have not yet taken effect in their entirety. The most significant changes are these:

- **General service lighting requirements established by the Huffman bill[2]**
- **Commercial lighting efficiency standards set in a 2009 Department of Energy rulemaking**
- **Federal electric water heating standards**
- **Federal standards for appliances, central air conditioners, and heat pumps**

2.2.1.4 Define Efficiency Measures and Technologies

The Nexant team's process begins with compiling a comprehensive database of technical and market data on all energy efficiency measures applicable to all end uses in various market segments, including emerging technologies. We began with the measure list used in the 2013 California Energy Efficiency Potential and Goals Study completed for the California Public Utilities Commission.[3] We supplemented this list with our own measure databases and input from LADWP staff. The final measure list included 560 unique measures and 6,608 permutations across segments. For this study, we assumed that the 2013 Title 24 standards are in effect from the beginning of the study horizon. As such, any affected measure will assume this standard as the baseline for new construction or replace-on-burnout.

2.2.1.5 Compile Measure Data and Populate Model

For each end use, the Nexant team populated the database with the following information:

- **Costs (full or incremental, depending on the measure)**
- **Energy and capacity savings as a fraction of end-use consumption (UEC)**

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[1] The base-case forecast will include codes and standards already established, even if they do not take effect until future years. It will not, however, attempt to predict how codes and standards may change in the future.

[2] California Assembly Bill 1109 (enacted October, 2007): http://www.leginfo.ca.gov/pub/07-08/bill/asm/ab_1101-1150/ab_1109_bill_20071012_chaptered.pdf

[3] http://www.cpuc.ca.gov/NR/rdonlyres/29ADACC9-0F6D-43B3-B7AA-C25D0E1F8A3C/0/2013CaliforniaEnergyEfficiencyPotentialandGoalsStudyNovember262013.pdf

- Expected useful life (EUL)
- Applicability (such as technical feasibility and current saturation)
- Adjustments for interactions with other end uses (including lighting and HVAC)
- Competition with other measures (to avoid double-counting of savings)
- Non-energy benefits (such as water savings), if applicable

2.3 ESTIMATING POTENTIAL

2.3.1 Estimating Technical Potential

Technical potential is the theoretical maximum amount of energy and capacity that could be displaced by efficiency, regardless of cost and other barriers that may prevent the installation or adoption of an energy efficiency measure. Technical potential is constrained only by technical factors such as technical feasibility and applicability of measures. In theory, this potential (with the exception of the new construction market) could be acquired immediately by including the early replacement of functioning equipment.

The Nexant team utilizes an industry-standard bottom-up approach for estimating phase-in technical potential. We estimated the phase-in technical potential by introducing all technically feasible measures into the baseline forecast and calculating the resulting impacts. For the purpose of modeling, we will separate measures into two distinct classes:

- **Equipment measures** save energy by upgrading the efficiency of end-use equipment at the time the equipment would naturally be replaced. The technical potential assumes that all customers will install the most efficient, technically feasible option at the time the equipment needs to be replaced.
- **Retrofit measures** save energy by reducing end-use consumption without affecting equipment efficiency. Examples of such measures are insulation, faucet aerators, and lighting controls. For measures that compete for the same savings (e.g., different levels of insulation), the technical potential assumes the most-efficient option is installed, wherever technically feasible to do so.

In developing the end-use level savings, the Nexant team captured the interactive effects associated with installation of multiple measures, both between and within the measure classes described above.

- **The equipment measure analysis accounts for the exclusivity of high-efficiency measure installations.** For example, a residential customer cannot replace a single air conditioner with two air conditioners at different efficiency levels or else potential will be double-counted. The analysis also takes into account the effects that retrofit measures will have on the potential of equipment measures.

- **The retrofit analysis accounts for the reduction in consumption due to high-efficiency equipment installation,** while accounting for the interactive effects and competition between different retrofit measures applied to the same end use.

2.3.2 Estimating Economic Potential

The economic potential is a subset of the technical potential, but only includes measures that have a TRC B/C ratio greater than 1.0. The economic potential assumes that all customers will install the most efficient technically feasible measure available that is also *cost-effective*. For example, the technical potential may assume all customers install a SEER 18 air conditioner, but if that measure is not cost effective and the SEER 16 unit is, the economic potential will assume all customers will install that lower efficiency SEER 16 unit.

2.3.3 Estimating Maximum Achievable and Program Potentials

The maximum achievable potential is also a subset of the technical potential. This potential represents the total potential available when taking market impacts into account. Similar to the approach used in the 2013 California Energy Efficiency Potential and Goals Study of the state's IOUs,[1] this study relaxes the measure-level cost-effectiveness thresholds and focuses on the sector and portfolio level cost effectiveness in determining achievable and program potentials. In order to continue targeting sector and portfolio level cost-effectiveness for the majority of scenarios, applicability adjustments are made to the non-cost effective measures based on their TRC (B/C) ratio. For all except the extreme scenario, measures with a ratio less than 0.3 are excluded. In order to reach the targets of the extreme scenario, this applicability was relaxed to include measures down to a B/C of 0.15 in the commercial, institutional, and industrial sectors. For the residential sector across all scenarios, additional caps were applied so that the sector-level B/C is greater than 1.0. These caps are provided in Table 2-3. In other words, a measure that has a B/C between 0.3 and 0.5 would at most achieve 5% market penetration. These thresholds were developed for this study through an iterative process to ensure the sector-level B/C was greater than 1.0.

[1] http://www.cpuc.ca.gov/NR/rdonlyres/29ADACC9-0F6D-43B3-B7AA-C25D0E1F8A3C/0/2013CaliforniaEnergyEfficiencyPotentialandGoalsStudyNovember262013.pdf

Table 2-3. Applicability adjustments for the residential sector

Benefit-to-Cost Ratio	Applicability Adjustment
Up to 0.3	0%
0.3 to 0.5	5%
0.5 to 0.8	15%
0.8 to 1.0	30%
1.0 and above	100%

The program potential for energy efficiency measures is often analyzed deterministically, ignoring several sources of uncertainty in market conditions that affect utility customers' willingness—and ability—to participate in utility-sponsored energy efficiency programs. One important area of uncertainty concerns the amount of technical or economic potential that may be expected to be achievable, given barriers that may prevent consumers from adopting energy efficiency measures.

Like many studies of energy efficiency potential, achievable potential is based on somewhat arbitrary, fixed values.[1] In this study, we consider the levels of program potential as following a normal market diffusion curve, first introduced in 1963 by Frank Bass. The Bass market diffusion model is one of the most widely used methods for predicting market adoption and diffusion of new products.[2] It provides a framework for estimating future trends in the adoption of innovations, which is also applicable to the adoption of energy-efficient technologies. According to this approach, participation in energy efficiency programs and the adoption of energy efficiency measures and practices are characterized by a logistic (S-shaped) function with the following analytic form:

$$N_t = N_{t-1} + p(m - N_{t-1}) + q\frac{N_{t-1}}{m}(m - N_{t-1})$$

[1] In the Northwest, for example, the Northwest Power and Conservation Council assumes that 85% of economic potential is achievable. Other utilities have used similar static point estimates of about 50% to 70%, depending on incentives and other expenditures.

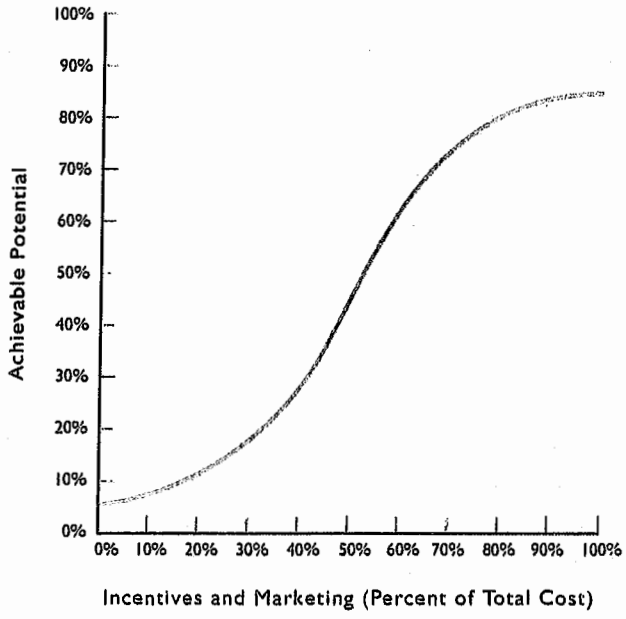
[2] The Bass diffusion curve is historically presented as adoption as a function of time; however, this curve more generally represents a logistic function for adoption.

In this formula, N_t indicates the percent of the market adopting the energy efficiency measures. The three critical parameters that define the functional form of this model are:

- m = maximum market potential; the total number of people who will eventually participate in a program – in this study this value is set at 85%, indicating the maximum fraction of the market likely to participate in a program and the starting point of the curve is set at 20%, indicating the current saturation and natural adoption for most measures.
- p= the coefficient of external influence; the likelihood that customers who are not participating in a program will begin to adopt measures due to information and education campaigns sponsored by the utility or other external factors.
- q= the coefficient of internal influence; the likelihood that customers who have not participated in a program will participate due to the influences from those already participating in the program.

The standard market diffusion curve follows a logistic (S-shaped) curve illustrated in Figure 2-2. In this study, it is assumed that the parameters of the model are essentially a function of the utility's marketing efforts (with the effect of raising awareness and providing education) and financial incentives (with the effect of mitigating the importance of upfront cost as a barrier to participation in an energy efficiency program).

Figure 2-2. Typical Market Diffusion Curve



As this graphic illustrates, increases in marketing and incentives will increase adoption, though the relationship is non-linear. That is, above a certain level, increases in expenditures will result in diminishing returns on adoption. This is based on market theory and supported by surveys of willingness to pay.

Note that although marketing plus incentives may be greater than 100%, the scale on the y-axis is indexed to 100%, where the model assumes equal weighting of the two factors.

The program potential scenarios are outlined in Table 2-4.

In this table, the administration/marketing and incentives as a percent of incremental cost scenarios are chosen to represent a spread of expenditures used by utilities around the country. The "high" scenario most closely represents LADWP's current expenditure amounts. It should be noted that at the extremes of expenditure levels, minimal data are available against which to benchmark the adoption.

Table 2-4. Program potential scenarios

Assumption/Scenario	Definition	Low	Medium	High	Advanced	Extreme
Minimum TRC B/C Threshold	Measures below this benefit-cost ratio threshold are excluded from program potential.	0.3	0.3	0.3	0.3	0.15
Incentive as a percent of incremental cost	Measure incentive expressed as a fraction of incremental cost	25%	50%	75%	90%	100%
Administration/Marketing as a percent of incremental cost	Utility marketing and administrative expenditures expressed as a fraction of incremental cost	20%	35%	40%	65%	75%
Program potential as a percent of maximum achievable potential	Program potential, expressed as a fraction of maximum achievable potential. Accounts for market barriers to adoption.	54%	64%	72%	79%	81%
Discretionary ramp rate	Time period over which all retrofit (discretionary) savings are acquired	10 Year	10 Year	10 Year	•2020: 8 Year •2023: 10 Year	•2020: 7 Year •2023: 10 Year

3 TECHNICAL AND ECONOMIC POTENTIAL

3.1 SCOPE OF ANALYSIS

This study separately assessed technical, economic, maximum achievable, and achievable program potential for the residential, commercial, industrial, and institutional sectors. The study further distinguished between applicable end uses within each segment. Analysis began by assessing the technical potential for unique energy efficiency measures, representing a comprehensive set of electric energy efficiency measures applicable to local climate and customer characteristics. Table 3-1 shows counts of the number of unique measures and measure permutations for each sector.

Table 3-1. Counts of Unique Measures and Measure Permutations

Sector	Unique Measures*	Permutations Across Market Segments and Vintages
Residential	88	834
Commercial	121	2,759
Institutional	202	1,574
Industrial	149	1,441
Total	560	6,608

*Represents unique measures within a sector. Institutional sector measures are identical to measures considered in the commercial and industrial sectors.

Consideration of all permutations of these measures, across applicable customer sectors, market segments, fuels, and end uses, resulted in customized data, compiled and analyzed for over 6,600 measures. Appendix G describes all measures analyzed.

3.2 TECHNICAL AND ECONOMIC POTENTIAL RESULTS

Table 3-2 shows technical and economic potential for each sector.

Table 3-2. Technical and Economic Energy Efficiency Potential (Cumulative 2033) by Sector

Sector	Baseline Sales (GWh)	Technical Potential			Economic Potential				
		GWh	% of Base Sales	MW	GWh	% of Base Sales	MW	Percent of Technical Potential - Energy	Percent of Technical Potential - Demand
Residential	9,985	3,334	33%	1,940	1,625	16%	471	49%	24%
Commercial	14,798	3,332	23%	851	2,188	15%	505	66%	59%
Institutional	756	143	19%	37	110	15%	27	77%	72%
Industrial	2,195	314	14%	66	265	12%	56	84%	85%
Codes and Standards	N/A	1,690	N/A	312	1,690	N/A	312	100%	N/A
Other	838	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	28,571	8,813	31%	3,205	5,877	21%	1,371	67%	43%

Study results indicate 8,813 GWh of technically feasible energy efficiency potential by FY2032-33, the end of the 20-year planning horizon, with approximately 5,877 GWh of these resources proving cost-effective. Technical potential amounts to 31% of forecasted load with Codes and Standards, and 25% of forecasted load without codes and standards. Economic potential represents savings from measures that have a B/C ratio that is greater than or equal to 1. By FY2032-33, savings from these measures can account for 21% of baseline sales with codes and standards and 15% of baseline sales without codes and standards.

Overall, economic potential is roughly 67% of technical potential. A larger share of technical potential is cost-effective in the industrial and institutional sectors than the commercial and residential sectors. Economic potential accounts for 84% of technical potential in the industrial sector and 77% of technical potential in the institutional sector.

When codes and standards are excluded, the commercial sector makes up 47% of technical potential and 52% of economic potential. Commercial's large share of total potential is largely a function of LADWP's sales. The sector accounts for 51% of total baseline sales, and 53% of baseline sales considered for modeling. The residential sector also accounts for roughly 47% of technical potential, but only 39% of economic potential. This difference is due to lower overall cost-effectiveness in the residential sector.

Appendix D provides detailed summaries of technical potential findings, by sector and end-use.

4 ACHIEVABLE AND PROGRAM POTENTIAL

4.1 SCOPE OF ANALYSIS

This study considers one maximum achievable scenario and seven program potential scenarios. Maximum achievable potential represents a scenario where the standard measure-level economic screen is relaxed, and only sector level cost-effectiveness is considered. The installation of measures with benefit-cost ratios below one are restricted until each sector's aggregate benefit-cost ratio exceeds one. Section 2.3.3 provides a detailed summary of how the Nexant team applied this approach. Maximum achievable potential provides an upper bound on long-term energy efficiency potential, if LADWP acquired all technically feasible savings, while preserving sector cost-effectiveness.

However, maximum achievable potential does not provide a realistic estimate for planning. Other constraints, such as customers' willingness-to-adopt energy efficiency measures and the maturity of the market for a measure can limit the amount of savings that can be achieved. The Nexant team constructed five program potential scenarios that account for market barriers, and the impact of steps LADWP can take to overcome them, such us spending on incentives on marketing. The five program potential scenarios include:

- **Technical potential:** The quantification of savings that can be realized if energy efficiency measures passing the qualitative screening are applied in all feasible instances, regardless of cost.

- **Economic potential:** A subset of technical potential, where measures are cost-effective from the Total Resource Cost ("TRC") perspective, without regard to cross-subsidies.

- **Maximum achievable potential:** The energy savings that can possibly be achieved through assuming maximum market penetration of all measures. Measures are not necessarily cost-effective in this scenario, though measures with a low TRC benefit-cost ratio are excluded.

- **Program potential:** The energy savings that can possibly be achieved through utility programs or codes and standards. Measures are not necessarily cost-effective in this scenario, though measures with a low TRC benefit-cost ratio are excluded. This study estimated program potential for five policy intervention scenarios, corresponding to varying incentive levels provided to end-use consumers and an acquisition rate of 10 years for retrofit measures, and two additional accelerated acquisition rates under the advanced and extreme scenarios:

- ***Low scenario***: Monetary incentives to customers equaling 25% of incremental costs of energy efficiency improvements[1], and administration and marketing costs equaling 20% of incremental costs. This scenario assumes retrofit opportunities are acquired within 10 years.

- ***Moderate scenario***: Monetary incentives to customers equaling 50% of incremental costs of energy efficiency improvements, and administration and marketing costs equaling 35% of incremental costs. This scenario assumes retrofit opportunities are acquired within 10 years.

- ***High scenario***: Monetary incentives to customers equaling 75% of incremental costs of energy efficiency improvements, and administration and marketing costs equaling 40% of incremental costs. This scenario assumes retrofit opportunities are acquired within 10 years.

- ***Advanced scenario***: Monetary incentives to customers equaling 90% of incremental costs of energy efficiency improvements and administration and marketing costs equaling 65% of incremental costs. This scenario assumes retrofit opportunities are acquired within 10 years.

- ***Advanced accelerated scenario:*** Same incentives and administration and marketing costs as the "advanced scenario", but retrofit opportunities are assumed to be acquired in 8 years.

- ***Extreme scenario***: Monetary incentives to customers, equaling 100% of incremental costs of energy efficiency improvements, and administration and marketing costs equaling 75% of incremental costs. This scenario assumes retrofit opportunities are acquired within 10 years.

- ***Extreme accelerated scenario:*** Same incentives and administration and marketing costs as the "extreme scenario", but retrofit opportunities are assumed to be acquired in 7 years.

Table 4-1 shows maximum achievable potential and program potential for each scenario, by sector. Technical and economic potential are also included, for reference.

[1] For this study, incremental costs represent the difference in costs between the baseline technology and efficient technology. For equipment replacement measures that are assumed to occur at burnout, when the equipment would naturally be replaced, the incremental costs include the difference between the efficient replacement option and the standard replacement option. For non-equipment measures (such as additional attic insulation) or early retirement equipment measures, incremental costs include the total cost to install a measure compared to existing conditions.

Table 4-1. Technical, Economic, Maximum Achievable, and Program Potential by Sector, Cumulative FY2032-33*

Potential Type	Residential	Commercial	Institutional	Industrial	Codes and Standards	Total
Baseline Sales (GWh)	9,985	14,798	756	2,195	-	27,734
Energy Savings (GWh)						
Technical Potential	3,334	3,332	143	314	1,690	8,813
Economic Potential	1,625	2,188	110	265	1,690	5,877
Max Achievable	1,830	2,998	134	306	1,690	6,958
Achievable Low	829	1,351	14	125	1,690	4,009
Achievable Medium	1,150	1,875	36	174	1,690	4,925
Achievable High	1,300	2,121	50	197	1,690	5,358
Achievable Advanced	1,417	2,311	81	214	1,690	5,714
Achievable Extreme	1,541	2,368	96	219	1,690	5,914
Percent of Baseline Sales						
Technical Potential	33%	23%	19%	14%	-	32%
Economic Potential	16%	15%	15%	12%	-	21%
Max Achievable	18%	20%	18%	14%	-	25%
Achievable Low	8%	9%	2%	6%	-	14%
Achievable Medium	12%	13%	5%	8%	-	18%
Achievable High	13%	14%	7%	9%	-	19%
Achievable Advanced	14%	16%	11%	10%	-	21%
Achievable Extreme	15%	16%	13%	10%	-	21%

*Excludes LADWP program accomplishments from 2010-2011 to 2012-2013

For each program potential scenario, the Nexant team considered the following two target years:

1. ***2020 Target Year Scenarios***, which include LADWP's 2010-2011 to 2012-2013 program accomplishments, as well as codes and standards accomplishments in these years.

2. ***2023 Target Year Scenarios***, which *exclude* historic program accomplishments and codes and standards

Table 4-2 summarizes results from these two groups of scenarios. All numbers reflect the target year for which each scenario is based. Benefit-cost ratios reflect the portfolio TRC benefit-cost ratio. The acquisition budgets reflect cumulative spending for FY2013-14 to the target year for the scenario. These were calculated by multiplying program potential in each year by assumed dollar per kWh spending. Dollar per kWh spending changes with each scenario due to changes in assumed administrative and incentive costs. Levelized costs are UCT levelized costs, meaning only utility incentive and administrative costs are considered.

Table 4-2. Program Potential Scenario Summary

	Low	Moderate	High	Advanced		Extreme	
				Normal	Accelerated	Normal	Accelerated
Target Year 2020							
Baseline Sales (GWh) FY2019-20	25,388	25,388	25,388	25,388	25,388	25,388	25,388
Cumulative Potential (GWh) FY2019-20	1,947	2,485	2,737	2,933	3,383	3,014	3,825
2010-2011 to 2012-2013 Program Accomplishments	615.6	615.6	615.6	615.6	615.6	615.6	615.6
Potential as % of Baseline Sales without Accomplishments	7.7%	9.8%	10.8%	11.6%	13.3%	11.9%	15.1%
Average Annual Savings as a % of Baseline Sales (2014-2020)*	1.1%	1.4%	1.5%	1.7%	1.9%	1.7%	2.2%
Potential as % of Baseline Sales with Accomplishments	10.1%	12.2%	13.2%	14.0%	15.8%	14.3%	17.5%
Target Year 2023							
Baseline Sales (GWh) FY2022-23	26,220	26,220	26,220	26,220	26,220	26,220	26,220
Cumulative Potential (GWh) FY2022-23	2,943	3,714	4,075	4,356	4,357	4,475	4,496
2010-2011 to 2012-2013 Program Accomplishments	615.6	615.6	615.6	615.6	615.6	615.6	615.6
Potential as % of Baseline Sales without Accomplishments	11.2%	14.2%	15.5%	16.6%	16.6%	17.1%	17.1%
Average Annual Savings as a % of Baseline Sales (2014-2023)*	1.1%	1.4%	1.6%	1.7%	1.7%	1.7%	1.7%
Potential as % of Baseline Sales with Accomplishments	13.6%	16.5%	17.9%	19.0%	19.0%	19.4%	19.5%
Scenario Economics (Over 20-Year Study Horizon)							
TRC Benefit Cost Ratio	1.55	1.38	1.33	1.13	1.13	0.90	0.90
Net TRC Benefits ($000s)	$912,082	$978,192	$997,745	$497,037	$497,508	-$517,094	-$535,621
Utility Levelized Cost ($/kWh)	$0.024	$0.046	$0.063	$0.085	$0.085	$0.115	$0.115

* These values represent the average annual level of savings required through programs to achieve the potential by the target year.

4.2 DETAILED MAXIMUM ACHIEVABLE POTENTIAL

This section provides the maximum achievable potentials by sector with segment and end-use granularity.

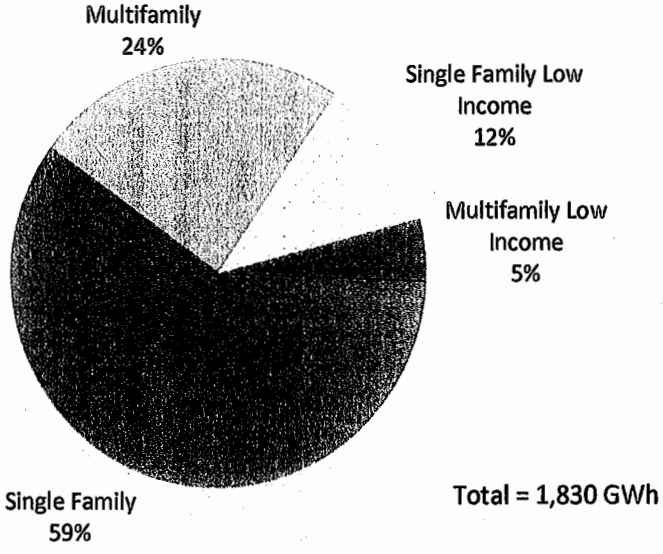
4.2.1 Residential Sector

Study results indicate residential customers account for about 35% of forecasted electricity sales. The Nexant team disaggregated residential sales across four segments: single family, multifamily, low-income single family, and low-income multifamily. Table 4-3 and Figure 4-1 summarize residential maximum achievable potential by segment.

Table 4-3. Residential Maximum Achievable Potential By Segment, Cumulative FY 2032-33

Segment	Baseline Sales (GWh)	Maximum Achievable Potential		
		GWh	% of Base Sales	MW
Single Family	4,820	1,087	23%	336
Multifamily	3,496	445	13%	159
Single Family Low Income	935	211	23%	65
Multifamily Low Income	734	87	12%	31
Total	9,985	1,830	18%	591

Figure 4-1. Residential Maximum Achievable Potential by Segment



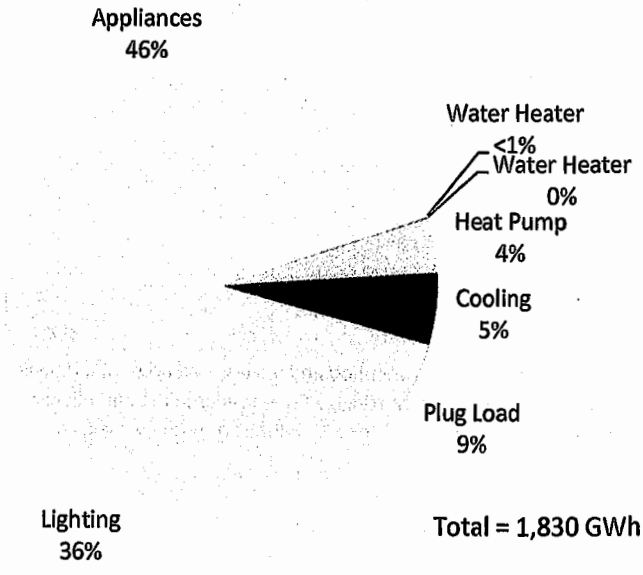
Residential maximum achievable potential amounts to 18% of forecasted FY 2032-33 sales. Single-family homes comprise the majority of the potential (59%), followed by multifamily (24%), with low-income single family and multifamily making up the remainder.

Table 4-4 and Figure 4-2 summarize residential technical and economic potential by end use group.

Table 4-4. Residential Maximum Achievable Potential by End Use

End Use Goup	Baseline Sales (GWh)	Maximum Achievable Potential		
		GWh	% of Base Sales	MW
Appliances	1,997	834	42%	176
Plug Load	2,033	162	8%	19
Cooking	329	0	0%	0
Cooling	2,197	97	4%	182
Heat Pump	222	71	32%	134
Heating	263	0	0%	0
Lighting	1,839	663	36%	79
Other	569	0	0%	0
Water Heater	272	3	1%	0
Pool Pump	264	0	0%	0
Total	9,985	1,830	18%	591

Figure 4-2. Residential Maximum Achievable Potential by End Use



Nearly 82% of maximum achievable potential comes from two end use groups—appliances (46%), lighting (36%). LED lighting across a number of applications (interior, exterior, specialty, pool

lighting, and holiday lights) makes up the majority of lighting savings. High performance T8s make up a smaller share of residential lighting potential, due to the low relative saturation of linear fluorescents. Refrigerator recycling accounts for roughly 82% of total savings in the appliance end use group. Other appliance measures have limited savings for a variety of reasons. For example, emerging refrigerators have reduced savings because of upcoming standards, and efficient clothes washers have limited savings due to the low saturation of electric water heaters.

4.2.2 Commercial Sector

Commercial customers, excluding Los Angeles city facilities, account for 52% of total forecasted FY 2032-33 sales.[1] These customers span multiple broad segments including education, office, storage, and retail, among others. Table 4-5 presents a comprehensive list of the commercial segments the Nexant team considered, and summarizing baseline sales, and maximum achievable potential by segment. Figure 4-3 shows the distribution of commercial technical potential by segment.

Table 4-5. Commercial Maximum Achievable Potential by Segment, Cumulative FY 2032-33

Segment	Baseline Sales (GWh)	Maximum Achievable Potential		
		GWh	% of Base Sales	MW
Assembly	361	61	17%	16
Education College	317	56	18%	13
Education Primary	359	81	23%	19
Grocery	824	262	32%	48
Health	714	86	12%	20
Lodging	333	48	14%	11
Miscellaneous*	5,325	884	17%	244
Office Large	3,106	668	22%	195
Office Small	571	126	22%	37
Restaurant	846	253	30%	46
Retail Large	1,305	316	24%	86
Retail Small	309	80	26%	21
Storage	346	72	21%	16
Warehouse	83	4	5%	1
Total	14,798	2,998	20%	771

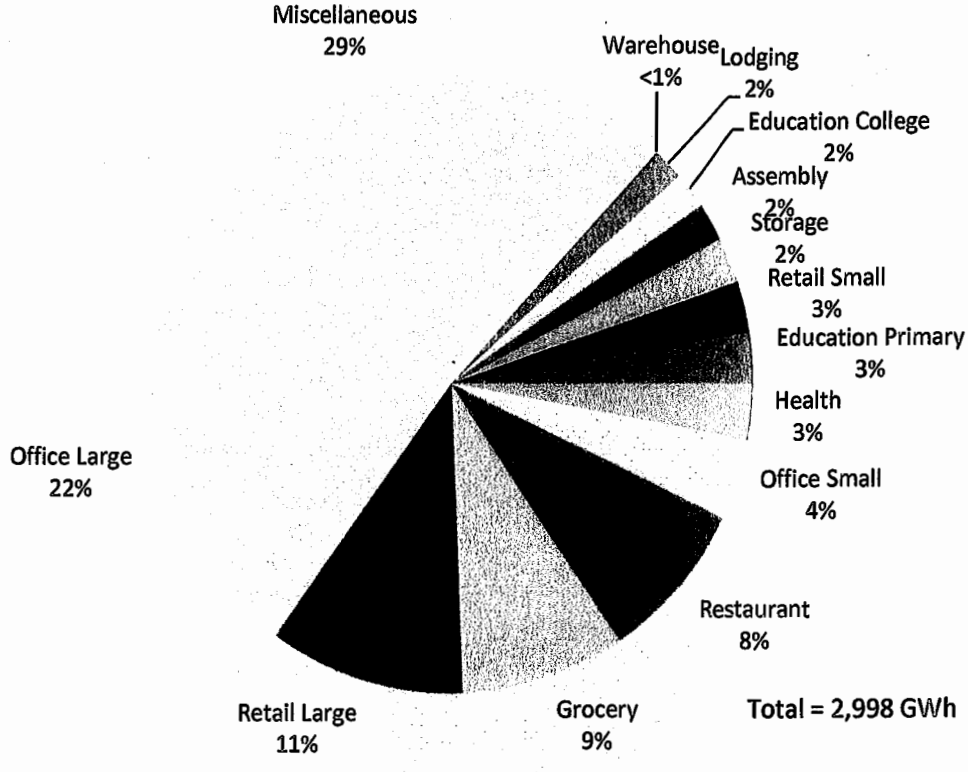
* The miscellaneous sector is composed of both other classified and unclassified accounts. Unclassified accounts did not have a SIC code in LADWP's customer database and represent roughly 60% of sales in the miscellaneous sector. The remaining 40% of the miscellaneous sector are distributed across more than 100 different business types that do not map to a broad segment.

Study results indicate maximum achievable potential can meet 20% of forecasted baseline sales in FY 2032-33. Much of the savings is in the miscellaneous (29% of total), large office (22% of total),

[1] LA facilities are included in the institutional sector.

large retail (11% of total), and grocery (9% of total) segments. This distribution of savings reflects the distribution of baseline sales across the segments. These four segments account for both 71% of baseline sales and 71% of technical potential in FY2032-33. As noted above, the miscellaneous sector is approximately 60% unclassified accounts.[1] The remaining 40% of the miscellaneous sector are distributed across more than 100 different business types that do not map to a broad segment.

Figure 4-3. Commercial Maximum Achievable by Market Segment



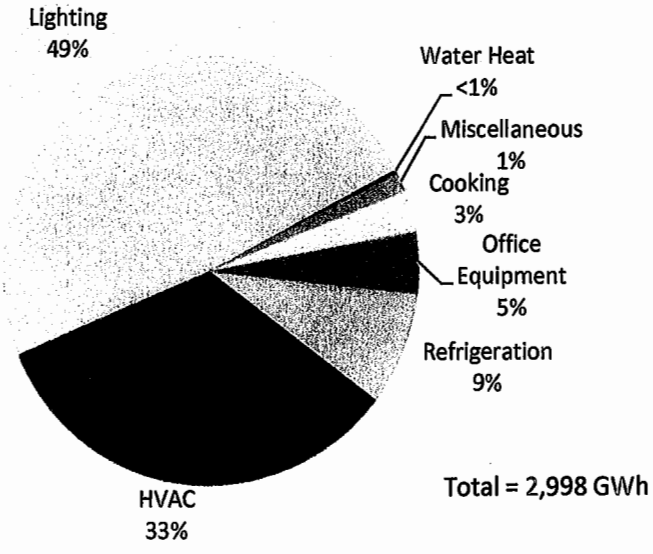
[1] The miscellaneous sector is composed of both other classified and unclassified accounts. Unclassified accounts did not have a SIC code in LADWP's customer data and represent roughly 60% of sales in the miscellaneous sector. The remaining 40% of the miscellaneous sector are distributed across more than 100 different business types that do not map to a broad segment.

Table 4-6 and Figure 4-4 show commercial achievable technical potential by end use group.

Table 4-6. Commercial Maximum Achievable Potential by End Use Group, Cumulative FY 2032-33

Segment	Baseline Sales (GWh)	Maximum Achievable Potential		
		GWh	% of Base Sales	MW
Cooking	474	91	19%	0
HVAC	4,614	1,000	22%	408
Lighting	4,457	1,456	33%	288
Miscellaneous	2,457	43	2%	9
Office Equipment	1,284	139	11%	28
Refrigeration	1,347	256	19%	36
Water Heat	166	11	7%	2
Total	14,798	2,998	20%	771

Figure 4-4. Commercial Maximum Achievable by End Use Group



Savings from lighting measures account for nearly half (49%) of maximum achievable potential in FY2032-33. More than half of lighting savings (55%) comes from the linear fluorescent end use, while high intensity discharge fixtures account for 25% of total lighting savings, interior screw-base fixtures account for 14%, and exterior/other fixtures account for 6%. While the majority of lighting savings comes from the installation of more efficient equipment (80%), a significant share of savings comes from occupancy sensors and improved controls (20%).

4.2.3 Institutional Sector

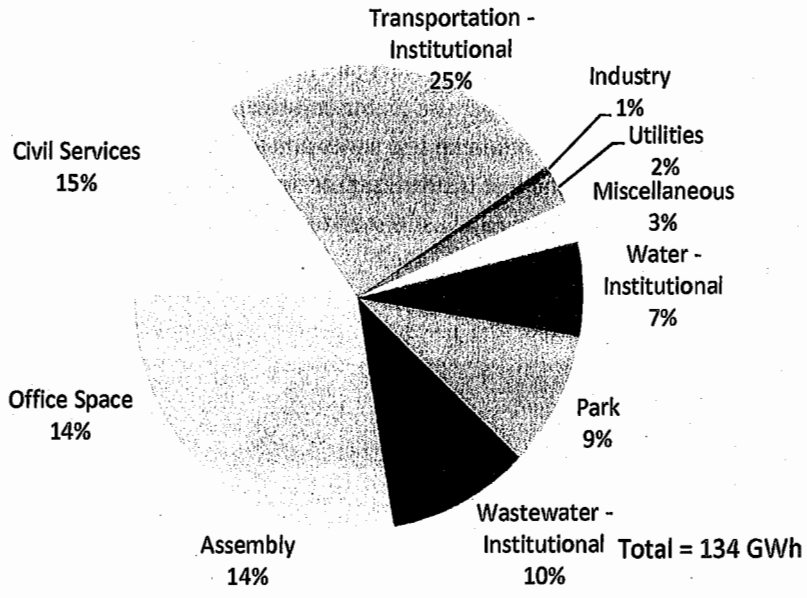
The Nexant team identified LADWP's institutional customers and developed a separate sector for modeling. Institutional buildings have characteristics similar to commercial segments (e.g., office and assembly) and industrial segments (e.g., water and wastewater). The Nexant team employed a bottom-up modeling approach for commercial-like segments and a top-down modeling approach for larger industrial-like accounts. Overall, the institutional sector accounts for nearly 3% of total forecasted baseline sales. Table 4-7 and Figure 4-5 summarize institutional sector maximum achievable potential by segment.

Table 4-7. Institutional Maximum Achievable Potential by Segment, Cumulative FY 2032-33

Segment	Baseline Sales (GWh)	Maximum Achievable Potential		
		GWh	% of Base Sales	MW
Assembly	115	19	16%	5
Civil Services	96	20	21%	6
Industry	5	1	18%	0
Miscellaneous	21	4	18%	1
Office Space	91	19	21%	6
Park	71	13	18%	4
Transportation*	194	34	18%	10
Utilities	17	3	18%	1
Wastewater*	69	14	20%	2
Water*	77	9	11%	2
Total	756	134	18%	35

*Modeled using a top-down approach

Figure 4-5. Institutional Maximum Achievable Potential by Segment



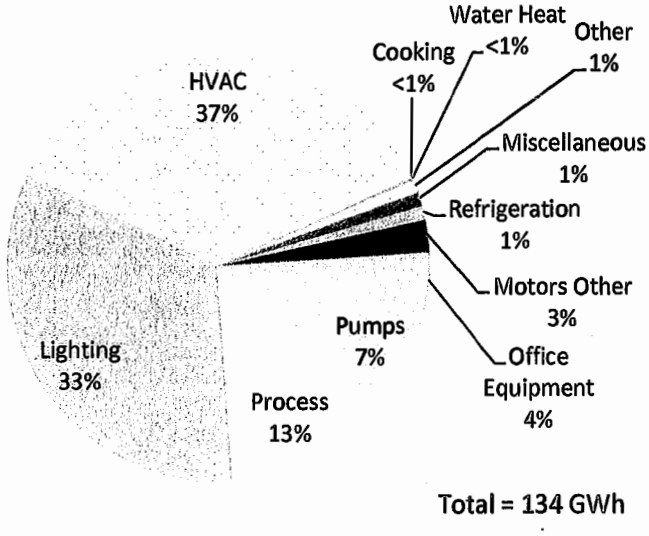
Nearly one-quarter of maximum achievable potential in the institutional sector comes from the transportation segment. This segment includes both the Port of Los Angeles and Los Angeles International Airport; this segment also accounts for roughly one-quarter of baseline institutional sales. Other segments that represent a significant share of savings in the institutional sector include assembly (14%), civil services (15%), and office space (14%).

Table 4-8 and Figure 4-6 show maximum achievable potential by end use group.

Table 4-8. Institutional Maximum Achievable Potential by End Use, Cumulative FY 2032-33

End Use Group	Baseline Sales (GWh)	Maximum Achievable Potential		
		GWh	% of Base Sales	MW
Cooking	7	0	1%	0
HVAC	198	49	25%	20
Indirect Boiler	5	0	0%	0
Lighting	149	45	30%	9
Miscellaneous	72	1	2%	0
Motors Other	64	3	5%	0
Office Equipment	50	6	11%	1
Other	15	1	8%	0
Process	86	18	21%	3
Pumps	85	10	11%	1
Refrigeration	21	1	7%	0
Water Heat	5	0	6%	0
Total	756	134	18%	35

Figure 4-6. Institutional Maximum Achievable Potential by End Use



Lighting and HVAC collectively account for 70% of institutional sector savings. Process, an end use that only applies to the transportation, water, and wastewater segments, accounts for 13% of total institutional maximum achievable potential. Other miscellaneous end uses such as pumps, office equipment, and motors account for the remaining 17% of maximum achievable potential.

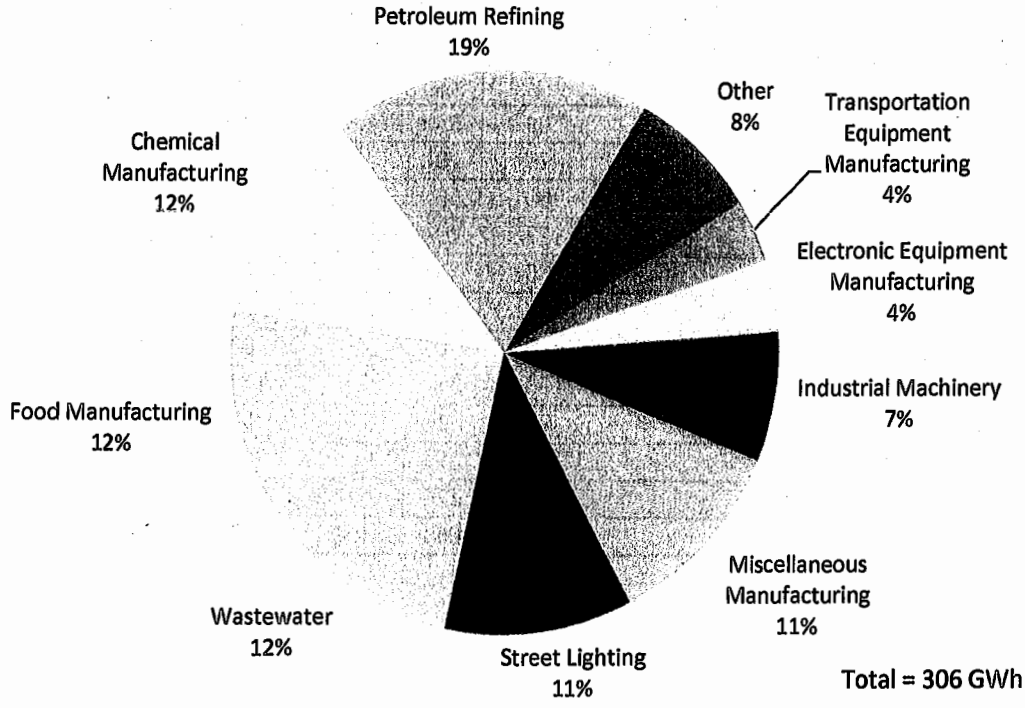
4.2.4 Industrial Sector

Modeling industrial energy efficiency potential presents a unique challenge, due to variability within industrial segments. While a prototypical commercial office, for example, can easily be characterized, it is more difficult to do so for a prototypical industrial segment. For this reason, the Nexant team employed a top-down model to estimate industrial potential, covering a total of 17 industrial segments. Table 4-9 and Figure 4-7 present maximum achievable potential by industrial segment.

Table 4-9. Industrial Maximum Achievable Potential by Segment, Cumulative FY 2032-33

Segment	Baseline Sales (GWh)	Maximum Achievable Potential		
		GWh	% of Base Sales	MW
Agriculture	0	3%	0	0
Chemical Manufacturing	37	14%	7	7
Electronic Equipment Manufacturing	13	20%	3	3
Food Manufacturing	37	18%	7	7
Industrial Machinery	23	17%	7	6
Lumber Wood Products	5	22%	1	1
Mining	1	2%	0	0
Miscellaneous	0	0%	0	0
Miscellaneous Manufacturing	34	18%	10	10
Paper Manufacturing	10	17%	2	2
Petroleum Refining	57	17%	13	12
Primary Metal Manufacturing	1	11%	0	0
Stone Clay Glass Products	2	15%	0	0
Street Lighting	34	20%	7	7
Transportation Equipment Manufacturing	11	18%	3	3
Wastewater	36	20%	5	5
Water	5	11%	1	1
Total	306	14%	66	64

Figure 4-7. Industrial Maximum Achievable Potential by Segment



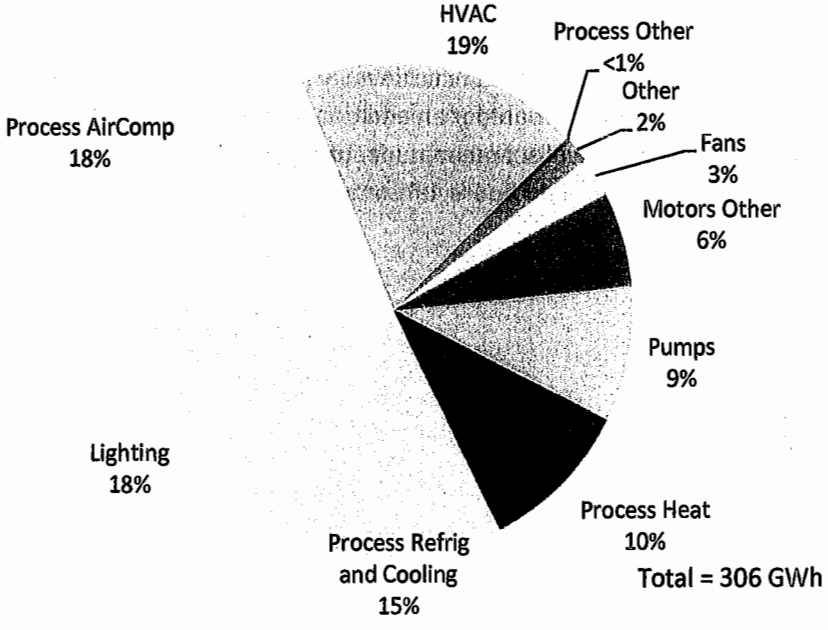
In the figure above, "Other" includes: Miscellaneous, Agriculture, Primary Metal Manufacturing, Mining, Stone Clay Glass Products, Water, Lumber Wood Products, Paper Manufacturing

Petroleum refining makes up nearly 19% of maximum achievable potential. Food manufacturing, chemical manufacturing, and wastewater account for an additional 36% of maximum achievable potential (12% each), and wastewater miscellaneous manufacturing and street lighting each represent 11% of the potential. Table 4-10 and Figure 4-8 summarize maximum achievable potential by industrial end use.

Table 4-10. Industrial Maximum Achievable Potential by End Use, Cumulative FY 2032-33

End Use	Baseline Sales (GWh)	Maximum Achievable Potential		
		GWh	% of Base Sales	MW
Fans	104	8	8%	3
HVAC	264	58	22%	24
Indirect Boiler	29	0	0%	0
Lighting	360	56	15%	11
Motors Other	397	19	5%	3
Other	80	5	6%	1
Process AirComp	277	56	20%	8
Process Electro Chemical	30	0	0%	0
Process Heat	180	31	17%	4
Process Other	21	1	5%	0
Process Refrig and Cooling	217	45	21%	6
Pumps	236	27	12%	4
Total	2,195	306	14%	64

Figure 4-8. Industrial Maximum Achievable Potential by End Use Group



Approximately 37% of industrial savings are in lighting and HVAC end uses. Process end uses represent an additional 43% of total maximum achievable potential (such as process air compression, process refrigeration and cooling, and process heat). The remaining maximum

achievable potential comes from other measures that go to miscellaneous end uses such as pumps, motors, and fans.

4.3 PROGRAM POTENTIAL SCENARIOS

This section provides tabular summaries of each of the seven program potential scenarios. Tables correspond to the scenarios shown in Table 4-11.

Table 4-11. Tables for Program Potential Scenarios

Scenario	Table
Low	Table 4-12
Moderate	Table 4-13
High	Table 4-14
Advanced	Table 4-15
Extreme	Table 4-16
Advanced Accelerated	Table 4-17
Extreme Accelerated	Table 4-18

Table 4-12. Low Program Potential Summary

Category	FY2013-14	FY2014-15	FY2015-16	FY2016-17	FY2017-18	FY2018-19	FY2019-20	FY2020-21	FY2021-22	FY2022-23
Incremental Program Potential (MWh)	186,872	185,834	197,314	198,210	208,202	201,640	210,072	200,330	204,985	196,215
Cumulative Program Potential (MWh)	186,872	372,707	570,021	768,231	976,433	1,178,073	1,388,145	1,588,476	1,793,461	1,989,676
Cumulative Program Potential (MWh) w/ 2011-2013	623,072	808,907	1,006,221	1,204,431	1,412,633	1,614,273	1,824,345	2,024,676	2,229,661	2,425,876
Cumulative Savings from Codes and Standards	195,645	252,234	314,394	374,362	432,266	583,116	738,243	881,024	1,011,821	1,132,324
Baseline Sales (LADWP Gross)	23,969,813	24,109,873	24,301,748	24,552,888	24,837,064	25,113,801	25,387,855	25,746,348	25,985,817	26,219,677
Savings as % of Baseline Sales (no standards)	2.6%	3.4%	4.1%	4.9%	5.7%	6.4%	7.2%	7.9%	8.6%	9.3%
Savings as % of Baseline (with Standards)	3.4%	4.4%	5.4%	6.4%	7.4%	8.7%	10.1%	11.3%	12.5%	13.6%
Savings as % of Baseline Sales Rolling 10-year[1]	3.4%	4.4%	5.4%	6.4%	7.4%	8.7%	10.1%	10.4%	10.9%	11.2%
Incremental Demand Savings (MW)	51	49	52	52	54	53	55	54	54	54
Cumulative Demand Savings (MW)	51	100	152	204	258	311	366	419	473	527
TRC Levelized Cost ($/kWh)	$0.0631	$0.0631	$0.0631	$0.0631	$0.0631	$0.0631	$0.0631	$0.0631	$0.0631	$0.0631
UCT Levelized Cost ($/kWh)	$0.0235	$0.0235	$0.0235	$0.0235	$0.0235	$0.0235	$0.0235	$0.0235	$0.0235	$0.0235

[1] Rolling 10-year savings include the impacts of savings achieved (program accomplishments + codes & standards) starting with the 2010-2011 program year.

Table 4-13. Moderate Program Potential Summary

Category	FY2013-14	FY2014-15	FY2015-16	FY2016-17	FY2017-18	FY2018-19	FY2019-20	FY2020-21	FY2021-22	FY2022-23
Incremental Program Potential (MWh)	259,315	257,874	273,804	275,047	288,913	279,807	291,508	277,989	284,449	272,279
Cumulative Program Potential (MWh)	259,315	517,188	790,992	1,066,039	1,354,952	1,634,759	1,926,266	2,204,256	2,488,705	2,760,984
Cumulative Program Potential (MWh) w/ 2011-2013	695,515	953,388	1,227,192	1,502,239	1,791,152	2,070,959	2,362,466	2,640,456	2,924,905	3,197,184
Cumulative Savings from Codes and Standards	195,645	252,234	314,394	374,362	432,266	583,116	738,243	881,024	1,011,821	1,132,324
Baseline Sales (LADWP Gross)	23,969,813	24,109,873	24,301,748	24,552,888	24,837,064	25,113,801	25,387,855	25,746,348	25,985,817	26,219,677
Savings as % of Baseline Sales (no standards)	2.9%	4.0%	5.0%	6.1%	7.2%	8.2%	9.3%	10.3%	11.3%	12.2%
Savings as % of Baseline (with Standards)	3.7%	5.0%	6.3%	7.6%	9.0%	10.6%	12.2%	13.7%	15.1%	16.5%
Savings as % of Baseline Sales Rolling 10-year[1]	3.7%	5.0%	6.3%	7.6%	9.0%	10.6%	12.2%	12.8%	13.5%	14.2%
Incremental Demand Savings (MW)	71	68	72	73	75	74	76	74	75	75
Cumulative Demand Savings (MW)	71	138	210	283	358	432	508	582	657	732
TRC Levelized Cost ($/kWh)	$0.0732	$0.0732	$0.0732	$0.0732	$0.0732	$0.0732	$0.0732	$0.0732	$0.0732	$0.0732
UCT Levelized Cost ($/kWh)	$0.0459	$0.0459	$0.0459	$0.0459	$0.0459	$0.0459	$0.0459	$0.0459	$0.0459	$0.0459

[1] Rolling 10-year savings include the impacts of savings achieved (program accomplishments + codes & standards) starting with the 2010-2011 program year.

Table 4-14. High Program Potential Summary

Category	FY2013-14	FY2014-15	FY2015-16	FY2016-17	FY2017-18	FY2018-19	FY2019-20	FY2020-21	FY2021-22	FY2022-23
Incremental Program Potential (MWh)	293,221	291,592	309,605	311,011	326,690	316,393	329,624	314,338	321,642	307,881
Cumulative Program Potential (MWh)	293,221	584,813	894,419	1,205,429	1,532,119	1,848,511	2,178,135	2,492,473	2,814,115	3,121,996
Cumulative Program Potential (MWh) w/ 2011-2013	729,421	1,021,013	1,330,619	1,641,629	1,968,319	2,284,711	2,614,335	2,928,673	3,250,315	3,558,196
Cumulative Savings from Codes and Standards	195,645	252,234	314,394	374,362	432,266	583,116	738,243	881,024	1,011,821	1,132,324
Baseline Sales (LADWP Gross)	23,969,813	24,109,873	24,301,748	24,552,888	24,837,064	25,113,801	25,387,855	25,746,348	25,985,817	26,219,677
Savings as % of Baseline Sales (no standards)	3.0%	4.2%	5.5%	6.7%	7.9%	9.1%	10.3%	11.4%	12.5%	13.6%
Savings as % of Baseline (with Standards)	3.9%	5.3%	6.8%	8.2%	9.7%	11.4%	13.2%	14.8%	16.4%	17.9%
Savings as % of Baseline Sales Rolling 10-year[1]	3.9%	5.3%	6.8%	8.2%	9.7%	11.4%	13.2%	13.9%	14.8%	15.5%
Incremental Demand Savings (MW)	80	76	82	82	85	84	86	84	85	84
Cumulative Demand Savings (MW)	80	156	238	320	405	488	574	658	743	827
TRC Levelized Cost ($/kWh)	$0.0766	$0.0766	$0.0766	$0.0766	$0.0766	$0.0766	$0.0766	$0.0766	$0.0766	$0.0766
UCT Levelized Cost ($/kWh)	$0.0627	$0.0627	$0.0627	$0.0627	$0.0627	$0.0627	$0.0627	$0.0627	$0.0627	$0.0627

[1] Rolling 10-year savings include the impacts of savings achieved (program accomplishments + codes & standards) starting with the 2010-2011 program year.

Table 4-15. Advanced Program Potential Summary

Category	FY2013-14	FY2014-15	FY2015-16	FY2016-17	FY2017-18	FY2018-19	FY2019-20	FY2020-21	FY2021-22	FY2022-23
Incremental Program Potential (MWh)	319,613	317,838	337,472	339,004	356,094	344,870	359,293	342,631	350,592	335,592
Cumulative Program Potential (MWh)	319,613	637,451	974,923	1,313,927	1,670,021	2,014,892	2,374,184	2,716,815	3,067,407	3,403,000
Cumulative Program Potential (MWh) w/ 2011-2013	755,813	1,073,651	1,411,123	1,750,127	2,106,221	2,451,092	2,810,384	3,153,015	3,503,607	3,839,200
Cumulative Savings from Codes and Standards	195,645	252,234	314,394	374,362	432,266	583,116	738,243	881,024	1,011,821	1,132,324
Baseline Sales (LADWP Gross)	23,969,813	24,109,873	24,301,748	24,552,888	24,837,064	25,113,801	25,387,855	25,746,348	25,985,817	26,219,677
Savings as % of Baseline Sales (no standards)	3.2%	4.5%	5.8%	7.1%	8.5%	9.8%	11.1%	12.2%	13.5%	14.6%
Savings as % of Baseline (with Standards)	4.0%	5.5%	7.1%	8.7%	10.2%	12.1%	14.0%	15.7%	17.4%	19.0%
Savings as % of Baseline Sales Rolling 10-year[1]	4.0%	5.5%	7.1%	8.7%	10.2%	12.1%	14.0%	14.8%	15.8%	16.6%
Incremental Demand Savings (MW)	87	83	89	90	92	91	93	92	93	92
Cumulative Demand Savings (MW)	87	170	259	349	441	532	626	717	810	902
TRC Levelized Cost ($/kWh)	$0.0908	$0.0908	$0.0908	$0.0908	$0.0908	$0.0908	$0.0908	$0.0908	$0.0908	$0.0908
UCT Levelized Cost ($/kWh)	$0.0850	$0.0850	$0.0850	$0.0850	$0.0850	$0.0850	$0.0850	$0.0850	$0.0850	$0.0850

[1] Rolling 10-year savings include the impacts of savings achieved (program accomplishments + codes & standards) starting with the 2010-2011 program year.

Table 4-16. Extreme Program Potential Summary

Category	FY2013-14	FY2014-15	FY2015-16	FY2016-17	FY2017-18	FY2018-19	FY2019-20	FY2020-21	FY2021-22	FY2022-23
Incremental Program Potential (MWh)	330,360	327,857	348,469	350,474	368,350	357,211	372,291	355,489	363,655	348,074
Cumulative Program Potential (MWh)	330,360	658,217	1,006,686	1,357,159	1,725,509	2,082,720	2,455,011	2,810,501	3,174,155	3,522,230
Cumulative Program Potential (MWh) w/ 2011-2013	766,560	1,094,417	1,442,886	1,793,359	2,161,709	2,518,920	2,891,211	3,246,701	3,610,355	3,958,430
Cumulative Savings from Codes and Standards	195,645	252,234	314,394	374,362	432,266	583,116	738,243	881,024	1,011,821	1,132,324
Baseline Sales (LADWP Gross)	23,969,813	24,109,873	24,301,748	24,552,888	24,837,064	25,113,801	25,387,855	25,746,348	25,985,817	26,219,677
Savings as % of Baseline Sales (no standards)	3.2%	4.5%	5.9%	7.3%	8.7%	10.0%	11.4%	12.6%	13.9%	15.1%
Savings as % of Baseline (with Standards)	4.0%	5.6%	7.2%	8.8%	10.4%	12.4%	14.3%	16.0%	17.8%	19.4%
Savings as % of Baseline Sales Rolling 10-year[1]	4.0%	5.6%	7.2%	8.8%	10.4%	12.4%	14.3%	15.1%	16.2%	17.1%
Incremental Demand Savings (MW)	89	86	91	92	95	94	96	94	95	95
Cumulative Demand Savings (MW)	89	175	266	359	454	547	644	738	833	928
TRC Levelized Cost ($/kWh)	$0.1151	$0.1151	$0.1151	$0.1151	$0.1151	$0.1151	$0.1151	$0.1151	$0.1151	$0.1151
UCT Levelized Cost ($/kWh)	$0.1147	$0.1147	$0.1147	$0.1147	$0.1147	$0.1147	$0.1147	$0.1147	$0.1147	$0.1147

[1] Rolling 10-year savings include the impacts of savings achieved (program accomplishments + codes & standards) starting with the 2010-2011 program year.

Table 4-17. Advanced Accelerated Program Potential Summary

Category	FY2013-14	FY2014-15	FY2015-16	FY2016-17	FY2017-18	FY2018-19	FY2019-20	FY2020-21	FY2021-22	FY2022-23
Incremental Program Potential (MWh)	379,265	378,333	398,353	400,207	417,532	406,769	421,171	404,553	106,303	91,276
Cumulative Program Potential (MWh)	379,265	757,598	1,155,951	1,556,158	1,973,690	2,380,459	2,801,630	3,206,184	3,312,487	3,403,762
Cumulative Program Potential (MWh) w/ 2011-2013	815,465	1,193,798	1,592,151	1,992,358	2,409,890	2,816,659	3,237,830	3,642,384	3,748,687	3,839,962
Cumulative Savings from Codes and Standards	198,577	258,228	323,577	386,861	448,188	602,550	761,266	907,752	1,025,544	1,133,041
Baseline Sales (LADWP Gross)	23,969,813	24,109,873	24,301,748	24,552,888	24,837,064	25,113,801	25,387,855	25,746,348	25,985,817	26,219,677
Savings as % of Baseline Sales (no standards)	3.4%	5.0%	6.6%	8.1%	9.7%	11.2%	12.8%	14.1%	14.4%	14.6%
Savings as % of Baseline (with Standards)	4.2%	6.0%	7.9%	9.7%	11.5%	13.6%	15.8%	17.7%	18.4%	19.0%
Savings as % of Baseline Sales Rolling 10-year[1]	4.2%	6.0%	7.9%	9.7%	11.5%	13.6%	15.8%	16.8%	16.8%	16.6%
Incremental Demand Savings (MW)	102	99	104	105	108	107	109	107	31	31
Cumulative Demand Savings (MW)	102	200	304	409	517	624	733	840	871	902
TRC Levelized Cost ($/kWh)	$0.0908	$0.0908	$0.0908	$0.0908	$0.0908	$0.0908	$0.0908	$0.0908	$0.0908	$0.0908
UCT Levelized Cost ($/kWh)	$0.0850	$0.0850	$0.0850	$0.0850	$0.0850	$0.0850	$0.0850	$0.0850	$0.0850	$0.0850

[1] Rolling 10-year savings include the impacts of savings achieved (program accomplishments + codes & standards) starting with the 2010-2011 program year.

Table 4-18. Extreme Accelerated Program Potential Summary

Category	FY2013-14	FY2014-15	FY2015-16	FY2016-17	FY2017-18	FY2018-19	FY2019-20	FY2020-21	FY2021-22	FY2022-23
Incremental Program Potential (MWh)	437,567	436,179	457,783	460,339	478,590	468,160	482,959	105,855	112,768	97,276
Cumulative Program Potential (MWh)	437,567	873,746	1,331,530	1,791,869	2,270,460	2,738,619	3,221,579	3,327,434	3,440,202	3,537,478
Cumulative Program Potential (MWh) w/ 2011-2013	873,767	1,309,946	1,767,730	2,228,069	2,706,660	3,174,819	3,657,779	3,763,634	3,876,402	3,973,678
Cumulative Savings from Codes and Standards	201,225	263,715	332,110	398,580	463,183	620,890	783,006	913,195	1,030,940	1,138,353
Baseline Sales (LADWP Gross)	23,969,813	24,109,873	24,301,748	24,552,888	24,837,064	25,113,801	25,387,855	25,746,348	25,985,817	26,219,677
Savings as % of Baseline Sales (no standards)	3.6%	5.4%	7.3%	9.1%	10.9%	12.6%	14.4%	14.6%	14.9%	15.2%
Savings as % of Baseline (with Standards)	4.5%	6.5%	8.6%	10.7%	12.8%	15.1%	17.5%	18.2%	18.9%	19.5%
Savings as % of Baseline Sales Rolling 10-year[1]	4.5%	6.5%	8.6%	10.7%	12.8%	15.1%	17.5%	17.3%	17.3%	17.1%
Incremental Demand Savings (MW)	116	113	119	120	123	122	125	32	32	32
Cumulative Demand Savings (MW)	116	229	348	468	591	713	838	870	903	934
TRC Levelized Cost ($/kWh)	$0.1155	$0.1155	$0.1155	$0.1155	$0.1155	$0.1155	$0.1155	$0.1155	$0.1155	$0.1155
UCT Levelized Cost ($/kWh)	$0.1151	$0.1151	$0.1151	$0.1151	$0.1151	$0.1151	$0.1151	$0.1151	$0.1151	$0.1151

[1] Rolling 10-year savings include the impacts of savings achieved (program accomplishments + codes & standards) starting with the 2010-2011 program year.

5 PLANNING CONSIDERATIONS

5.1 SCOPE OF ANALYSIS

The program potential scenarios detailed in Section 4 represent a broad-brush approach to estimating potential based on assumed incentive and administration/marketing costs, and identified that LADWP's aspirational goal of 15% savings as a percentage of 2020 baseline sales[1] is achievable and cost-effective from the TRC perspective. However, as LADWP develops its program plans, it will not use a single set of incentive rates for all measures, and each program will have unique administration and marketing costs. In addition, although all measures with a TRC B/C ratio greater than 0.30 were included in this scenario, not all measures are likely to be included in the programs. To provide some context to the budgetary requirements of actually achieving these savings, the Nexant team explored several scenarios to reach 15% of baseline energy sales by 2020, based on a more granular approach to the assumptions.

LADWP provided the Nexant team with program categories and assigned all measures to these program categories. Example program categories include: Residential Lighting, Residential Envelope, Commercial Refrigeration, and Direct Install (DI). The Nexant team then applied program-specific adoption assumptions to each category. The drivers of the adoption are:

1. Incentive expenditures –varies between 30% to 100% of incremental measure cost
2. Administrative and marketing expenditures – varies between 20% to 60% of incremental measure cost
3. Ramp rates – accounts for program maturity. The ramp rates were designed to accelerate sufficient adoption to reach 15% in 2020 and assume more aggressive market and outreach to reach market saturation of some measures within 7 or 8 years. As such, the majority of the discretionary savings will be captured by 2020, resulting in a drop-off in annual acquisition in later years.

In addition, the codes and standards savings assumptions found through the potential model presented in the prior analysis represent high-level market results that quantify the overall impacts of identified codes and standards that take effect during the planning horizon of this study. However, LADWP programs target specific C&S improvements. For these planning scenarios, the Nexant team used the LADWP expected savings for C&S programs based on LADWP's share of the identified C&S attributable savings for the state.

[1] 15% savings represents cumulative savings through 2020 inclusive of program accomplishments from 2010-2013.

Table 5-1. LADWP Projected Savings from Codes and Standards

Year	GWh	MW
2014-15	76.48	11.6
2015-16	84.41	13.7
2016-17	77.89	13.0
2017-18	62.28	11.3
2018-19	50.18	9.9
2019-20	44.65	9.1
2020-21	38.81	8.3
2021-22	33.34	7.7
2022-23	28.60	7.2

With LADWP's guidance, the Nexant team produced ten program planning scenarios to demonstrate how changing assumptions on program delivery, including incentives, admin/marketing, benefit-cost thresholds, and ramp rates can create a range of budgets required to reach roughly 15% savings by 2020. These scenarios are intended to provide preliminary guidance for LADWP's program planning process but do not represent all possible program delivery options, and input assumptions may be further refined to reflect LADWP's delivery strategy for each program offering. Table 5-2 shows the assumptions, average annual budget, and the cumulative savings as a percent of forecasted baseline sales for each scenario. Table 5-3 shows additional detail for each of these scenarios in FY2019-20 and FY2022-23, including energy savings, demand savings, benefit cost ratios, and levelized costs.

Table 5-2. Program Planning Scenario Assumptions

Scenario	Incentive/Admin Assumption	Minimum B/C Threshold	Ramp Assumption	Average Annual Budget (Million $)	Cumulative Savings as a Percent of Baseline Sales*									
					2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023
1	Incentive 90% of incremental cost; 60% admin – all programs	0.3	Logistic ramp	$389	3.9%	5.3%	7.4%	9.7%	12.2%	14.4%	16.4%	17.3%	17.8%	18.2%
2	Incentive 90% of incremental cost; 60% admin – all programs	0.5	Logistic ramp	$326	3.8%	5.2%	7.2%	9.5%	11.8%	14.0%	15.9%	16.7%	17.3%	17.6%
3	Incentives range from 30% to 100% of incremental cost by program; Admin ranges from 20% to 60% by program	0.3	Logistic ramp	$192	3.8%	5.1%	6.9%	9.0%	11.2%	13.2%	15.0%	15.8%	16.3%	16.6%
4	Incentives Range from 50% to 90% of incremental cost by program; Admin ranges from 40% to 60% by program	0.5	Logistic ramp	$242	3.8%	5.2%	7.1%	9.3%	11.5%	13.6%	15.5%	16.3%	16.8%	17.2%
5	Incentives range from 50% to 100% of incremental cost by program; Admin fixed at 40% for all programs	0.5	Logistic ramp	$179	3.7%	5.0%	6.7%	8.8%	10.8%	12.8%	14.5%	15.2%	15.7%	16.0%
6	Incentives range from 30% to 100% of incremental cost by program; Admin ranges from 20% to 40% by program	0.5	Logistic ramp	$161	3.7%	5.0%	6.7%	8.8%	10.8%	12.8%	14.5%	15.2%	15.7%	16.0%
7	Incentives 100% of incremental cost for all programs; Admin ranges from 20% to 60% by program	0.5	9 Year Linear Ramp	$247	4.3%	6.1%	7.9%	9.7%	11.4%	12.9%	14.5%	15.9%	17.3%	17.4%
8	Incentives range from 50% to 100% of incremental cost by program; Admin ranges from 20% to 40% by program	0.3	9 Year Linear Ramp	$224	4.3%	6.1%	7.9%	9.7%	11.4%	13.0%	14.6%	15.9%	17.4%	17.5%
9	Incentives range from 30% to 100% of incremental cost by program; Admin ranges from 20% to 40% by program;	0.5	8 Year Linear Ramp	$157	4.3%	6.1%	7.9%	9.6%	11.3%	12.9%	14.4%	15.8%	16.0%	16.1%
10	Incentives defined by target incentive rates for program groups	0.5 for direct install; 0 for all other program groups	Logistic ramp	$151	3.7%	5.0%	6.8%	8.8%	10.9%	12.8%	14.5%	15.3%	15.8%	16.1%

*Includes accomplishments from 2010-2013 programs

Table 5-3. Detailed Program Planning Scenario Results (2020 and 2023)

	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6	Scenario 7	Scenario 8	Scenario 9	Scenario 10
Target Year 2020										
Baseline Sales (GWh) FY2019-20	25,388	25,388	25,388	25,388	25,388	25,388	25,388	25,388	25,388	25,388
Cumulative Potential (GWh) FY2019-20	3,094	2,962	2,726	2,859	2,596	2,593	2,601	2,614	2,583	2,610
Cumulative C&S Savings (GWh) FY2019-20	466	466	466	466	466	466	466	466	466	466
2010-2011 to 2012-2013 Program Accomplishments	616	616	616	616	616	616	616	616	616	616
Potential as % of Baseline Sales without Accomplishments	14.0%	13.5%	12.6%	13.1%	12.1%	12.0%	12.1%	12.1%	12.0%	12.1%
Average Annual Savings as a % of Baseline Sales (2014-2020)	2.0%	1.9%	1.8%	1.9%	1.7%	1.7%	1.7%	1.7%	1.7%	1.7%
Potential as % of Baseline Sales with Accomplishments	16.4%	15.9%	15.0%	15.5%	14.5%	14.5%	14.5%	14.6%	14.4%	14.5%
Cumulative Acquisition Budget ($Million) in FY2019-20	$2,723	$2,280	$1,342	$1,695	$1,250	$1,129	$1,727	$1,567	$1,100	$1,057
Average Annual Acquisition Budget ($Million)	$389	$326	$192	$242	$179	$161	$247	$224	$157	$151
Target Year 2023										
Baseline Sales (GWh) FY2022-23	26,220	26,220	26,220	26,220	26,220	26,220	26,220	26,220	26,220	26,220
Cumulative Potential (GWh) FY2022-23	3,592	3,441	3,166	3,323	3,021	3,015	3,390	3,406	3,038	3,029
Cumulative C&S Savings (GWh) FY2022-23	566	566	566	566	566	566	566	566	566	566
2010-2011 to 2012-2013 Program Accomplishments	615.6	615.6	615.6	615.6	615.6	615.6	615.6	615.6	615.6	615.6
Potential as % of Baseline Sales without Accomplishments	15.9%	15.3%	14.2%	14.8%	13.7%	13.7%	15.1%	15.2%	13.7%	13.7%
Average Annual Savings as a % of Baseline Sales (2014-2023)	1.6%	1.5%	1.4%	1.5%	1.4%	1.4%	1.5%	1.5%	1.4%	1.4%
Potential as % of Baseline Sales with Accomplishments	18.2%	17.6%	16.6%	17.2%	16.0%	16.0%	17.4%	17.5%	16.1%	16.1%
Cumulative Acquisition Budget ($Million) in FY2022-23	$3,165	$2,661	$1,570	$1,990	$1,474	$1,327	$2,261	$2,050	$1,306	$1,225
Average Annual Acquisition Budget ($Million)	$316	$266	$157	$199	$147	$133	$226	$205	$131	$122
Scenario Economics (Over 20-year Study Horizon)										
TRC Benefit Cost Ratio	1.11	1.26	1.20	1.30	1.46	1.35	1.27	1.17	1.37	1.28
Net TRC Benefits ($Million)	$448	$867	$637	$932	$1,129	$930	$869	$599	$958	$775
Utility Levelized Cost ($/kWh)	$0.085	$0.074	$0.050	$0.058	$0.048	$0.043	$0.064	$0.060	$0.042	$0.039

5.2 PROGRAM PLANNING SCENARIOS

This section provides tabular summaries of each of the ten planning scenario summaries. Tables correspond to the scenarios shown in Table 5-4.

Table 5-4. Tables for Program Potential Scenarios

Scenario	Table
1	Table 5-5
2	Table 5-6
3	Table 5-7
4	Table 5-8
5	Table 5-9
6	Table 5-10
7	Table 5-11
8	Table 5-12
9	Table 5-13
10	Table 5-14

See the tables in Appendix F for additional details on methodology, assumptions, and results for each scenario.

Table 5-5. Detailed Results - Scenario 1

Row #	Category	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
1	Incremental Program Potential (GWh)	245	275	423	519	568	556	506	239	152	107
2	Cumulative Program Potential (GWh)	245	521	944	1,463	2,032	2,588	3,094	3,333	3,485	3,592
3	Cumulative Program Potential (GWh) w/ 2011-2013	682	957	1,381	1,900	2,468	3,024	3,530	3,770	3,921	4,028
4	Incremental Savings from Codes and Standards	71	76	84	78	62	50	45	39	33	29
5	Cumulative Savings from Codes and Standards (w/ 2011-2013)	249	326	410	488	550	600	645	684	717	746
6	Annual Savings Target (Program + Codes & Standards)	**317**	**352**	**508**	**597**	**631**	**607**	**550**	**278**	**185**	**136**
7	Baseline Sales (LADWP Gross)	23,970	24,110	24,302	24,553	24,837	25,114	25,388	25,746	25,986	26,220
8	Savings as % of Baseline Sales (no standards)	2.8%	4.0%	5.7%	7.7%	9.9%	12.0%	13.9%	14.6%	15.1%	15.4%
9	Savings as % of Baseline (with Standards)	**3.9%**	**5.3%**	**7.4%**	**9.7%**	**12.2%**	**14.4%**	**16.4%**	**17.3%**	**17.8%**	**18.2%**
10	Savings as % of Baseline Sales Rolling 10-Year (excludes 2011-2013)	3.9%	5.3%	7.4%	9.7%	12.2%	14.4%	16.4%	16.4%	16.2%	15.9%
11	Incremental Demand Savings (MW)	67	74	115	142	154	154	138	66	40	31
12	Cumulative Demand Savings (MW)	67	141	256	398	553	706	844	910	950	981
13	Total Budget ($000)	$216,585	$239,542	$372,542	$459,489	$502,774	$486,825	$444,874	$210,642	$135,144	$96,516
14	TRC Levelized Cost ($/kWh)	$0.0916	$0.0916	$0.0916	$0.0916	$0.0916	$0.0916	$0.0916	$0.0916	$0.0916	$0.0916
15	UCT Levelized Cost ($/kWh)	$0.0855	$0.0855	$0.0855	$0.0855	$0.0855	$0.0855	$0.0855	$0.0855	$0.0855	$0.0855

Table 5-6. Detailed Results - Scenario 2

Row #	Category	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
1	Incremental Program Potential (GWh)	235	264	406	497	545	532	484	229	146	103
2	Cumulative Program Potential (GWh)	235	499	904	1,401	1,946	2,478	2,962	3,191	3,337	3,441
3	Cumulative Program Potential (GWh) w/ 2011-2013	671	935	1,341	1,837	2,382	2,914	3,398	3,627	3,774	3,877
4	Incremental Savings from Codes and Standards	71	76	84	78	62	50	45	39	33	29
5	Cumulative Savings from Codes and Standards (w/ 2011-2013)	249	326	410	488	550	600	645	684	717	746
6	Annual Savings Target (Program + Codes & Standards)	**306**	**340**	**490**	**575**	**607**	**582**	**529**	**268**	**180**	**132**
7	Baseline Sales (LADWP Gross)	23,970	24,110	24,302	24,553	24,837	25,114	25,388	25,746	25,986	26,220
8	Savings as % of Baseline Sales (no standards)	2.8%	3.9%	5.5%	7.5%	9.6%	11.6%	13.4%	14.1%	14.5%	14.8%
9	Savings as % of Baseline (with Standards)	**3.8%**	**5.2%**	**7.2%**	**9.5%**	**11.8%**	**14.0%**	**15.9%**	**16.7%**	**17.3%**	**17.6%**
10	Savings as % of Baseline Sales Rolling 10-Year (excludes 2011-2013)	3.8%	5.2%	7.2%	9.5%	11.8%	14.0%	15.9%	15.9%	15.7%	15.3%
11	Incremental Demand Savings (MW)	64	70	109	136	147	146	131	63	39	30
12	Cumulative Demand Savings (MW)	64	134	244	379	526	672	804	867	905	935
13	Total Budget ($000)	$181,811	$199,519	$312,399	$384,336	$422,577	$405,371	$373,611	$178,742	$118,003	$84,357
14	TRC Levelized Cost ($/kWh)	$0.0792	$0.0792	$0.0792	$0.0792	$0.0792	$0.0792	$0.0792	$0.0792	$0.0792	$0.0792
15	UCT Levelized Cost ($/kWh)	$0.0739	$0.0739	$0.0739	$0.0739	$0.0739	$0.0739	$0.0739	$0.0739	$0.0739	$0.0739

Table 5-7. Detailed Results - Scenario 3

Row #	Category	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
1	Incremental Program Potential (GWh)	216	243	373	457	501	490	446	211	135	94
2	Cumulative Program Potential (GWh)	216	459	832	1,289	1,790	2,280	2,726	2,937	3,072	3,166
3	Cumulative Program Potential (GWh) w/ 2011-2013	652	895	1,268	1,725	2,226	2,716	3,162	3,373	3,508	3,603
4	Incremental Savings from Codes and Standards	71	76	84	78	62	50	45	39	33	29
5	Cumulative Savings from Codes and Standards (w/ 2011-2013)	249	326	410	488	550	600	645	684	717	746
6	Annual Savings Target (Program + Codes & Standards)	**287**	**319**	**458**	**535**	**563**	**540**	**491**	**250**	**168**	**123**
7	Baseline Sales (LADWP Gross)	23,970	24,110	24,302	24,553	24,837	25,114	25,388	25,746	25,986	26,220
8	Savings as % of Baseline Sales (no standards)	2.7%	3.7%	5.2%	7.0%	9.0%	10.8%	12.5%	13.1%	13.5%	13.7%
9	Savings as % of Baseline (with Standards)	**3.8%**	**5.1%**	**6.9%**	**9.0%**	**11.2%**	**13.2%**	**15.0%**	**15.8%**	**16.3%**	**16.6%**
10	Savings as % of Baseline Sales Rolling 10-Year (excludes 2011-2013)	3.8%	5.1%	6.9%	9.0%	11.2%	13.2%	15.0%	14.9%	14.7%	14.2%
11	Incremental Demand Savings (MW)	54	60	93	115	125	124	111	53	32	24
12	Cumulative Demand Savings (MW)	54	114	207	323	447	571	683	736	768	792
13	Total Budget ($000)	$107,197	$117,459	$183,961	$225,142	$249,045	$237,734	$221,345	$105,942	$71,921	$50,300
14	TRC Levelized Cost ($/kWh)	$0.0684	$0.0684	$0.0684	$0.0684	$0.0684	$0.0684	$0.0684	$0.0684	$0.0684	$0.0684
15	UCT Levelized Cost ($/kWh)	$0.0495	$0.0495	$0.0495	$0.0495	$0.0495	$0.0495	$0.0495	$0.0495	$0.0495	$0.0495

Table 5-8. Detailed Results - Scenario 4

Row #	Category	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
1	Incremental Program Potential (GWh)	227	254	391	479	526	513	468	222	142	100
2	Cumulative Program Potential (GWh)	227	481	873	1,352	1,878	2,391	2,859	3,081	3,223	3,323
3	Cumulative Program Potential (GWh) w/ 2011-2013	663	917	1,309	1,788	2,314	2,827	3,295	3,517	3,659	3,759
4	Incremental Savings from Codes and Standards	71	76	84	78	62	50	45	39	33	29
5	Cumulative Savings from Codes and Standards (w/ 2011-2013)	249	326	410	488	550	600	645	684	717	746
6	Annual Savings Target (Program + Codes & Standards)	298	331	476	557	588	563	512	261	176	129
7	Baseline Sales (LADWP Gross)	23,970	24,110	24,302	24,553	24,837	25,114	25,388	25,746	25,986	26,220
8	Savings as % of Baseline Sales (no standards)	2.8%	3.8%	5.4%	7.3%	9.3%	11.3%	13.0%	13.7%	14.1%	14.3%
9	Savings as % of Baseline (with Standards)	3.8%	5.2%	7.1%	9.3%	11.5%	13.6%	15.5%	16.3%	16.8%	17.2%
10	Savings as % of Baseline Sales Rolling 10-Year (excludes 2011-2013)	3.8%	5.2%	7.1%	9.3%	11.5%	13.6%	15.5%	15.4%	15.2%	14.8%
11	Incremental Demand Savings (MW)	59	65	101	126	136	135	122	58	36	28
12	Cumulative Demand Savings (MW)	59	125	226	352	488	624	745	803	839	867
13	Total Budget ($000)	$135,544	$147,384	$232,327	$284,169	$315,217	$299,580	$280,332	$135,482	$93,530	$65,972
14	TRC Levelized Cost ($/kWh)	$0.0714	$0.0714	$0.0714	$0.0714	$0.0714	$0.0714	$0.0714	$0.0714	$0.0714	$0.0714
15	UCT Levelized Cost ($/kWh)	$0.0582	$0.0582	$0.0582	$0.0582	$0.0582	$0.0582	$0.0582	$0.0582	$0.0582	$0.0582

Table 5-9. Detailed Results - Scenario 5

Row #	Category	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
1	**Incremental Program Potential (GWh)**	206	231	356	435	478	465	425	202	131	92
2	**Cumulative Program Potential (GWh)**	206	437	793	1,227	1,705	2,170	2,596	2,798	2,929	3,021
3	**Cumulative Program Potential (GWh) w/ 2011-2013**	642	873	1,229	1,664	2,141	2,607	3,032	3,234	3,365	3,457
4	**Incremental Savings from Codes and Standards**	71	76	84	78	62	50	45	39	33	29
5	**Cumulative Savings from Codes and Standards (w/ 2011-2013)**	249	326	410	488	550	600	645	684	717	746
6	**Annual Savings Target (Program + Codes & Standards)**	**277**	**307**	**440**	**513**	**540**	**516**	**470**	**241**	**164**	**121**
7	**Baseline Sales (LADWP Gross)**	23,970	24,110	24,302	24,553	24,837	25,114	25,388	25,746	25,986	26,220
8	**Savings as % of Baseline Sales (no standards)**	2.7%	3.6%	5.1%	6.8%	8.6%	10.4%	11.9%	12.6%	13.0%	13.2%
9	**Savings as % of Baseline (with Standards)**	**3.7%**	**5.0%**	**6.7%**	**8.8%**	**10.8%**	**12.8%**	**14.5%**	**15.2%**	**15.7%**	**16.0%**
10	**Savings as % of Baseline Sales Rolling 10-Year (excludes 2011-2013)**	3.7%	5.0%	6.7%	8.8%	10.8%	12.8%	14.5%	14.3%	14.1%	13.7%
11	**Incremental Demand Savings (MW)**	52	56	88	109	118	117	105	51	32	25
12	**Cumulative Demand Savings (MW)**	52	108	196	305	423	540	645	696	728	752
13	**Total Budget ($000)**	$100,337	$108,181	$171,649	$209,267	$233,237	$219,810	$207,410	$101,272	$71,735	$50,607
14	**TRC Levelized Cost ($/kWh)**	$0.0582	$0.0582	$0.0582	$0.0582	$0.0582	$0.0582	$0.0582	$0.0582	$0.0582	$0.0582
15	**UCT Levelized Cost ($/kWh)**	$0.0476	$0.0476	$0.0476	$0.0476	$0.0476	$0.0476	$0.0476	$0.0476	$0.0476	$0.0476

Table 5-10. Detailed Results - Scenario 6

Row #	Category	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
1	Incremental Program Potential (GWh)	206	231	355	434	477	465	424	202	130	91
2	Cumulative Program Potential (GWh)	206	437	792	1,226	1,703	2,168	2,593	2,794	2,924	3,015
3	Cumulative Program Potential (GWh) w/ 2011-2013	642	873	1,228	1,663	2,140	2,605	3,029	3,231	3,360	3,451
4	Incremental Savings from Codes and Standards	71	76	84	78	62	50	45	39	33	29
5	Cumulative Savings from Codes and Standards (w/ 2011-2013)	249	326	410	488	550	600	645	684	717	746
6	Annual Savings Target (Program + Codes & Standards)	277	307	440	512	539	515	469	240	163	119
7	Baseline Sales (LADWP Gross)	23,970	24,110	24,302	24,553	24,837	25,114	25,388	25,746	25,986	26,220
8	Savings as % of Baseline Sales (no standards)	2.7%	3.6%	5.1%	6.8%	8.6%	10.4%	11.9%	12.5%	12.9%	13.2%
9	Savings as % of Baseline (with Standards)	3.7%	5.0%	6.7%	8.8%	10.8%	12.8%	14.5%	15.2%	15.7%	16.0%
10	Savings as % of Baseline Sales Rolling 10-Year (excludes 2011-2013)	3.7%	5.0%	6.7%	8.8%	10.8%	12.8%	14.5%	14.3%	14.1%	13.7%
11	Incremental Demand Savings (MW)	52	57	89	110	119	118	106	51	31	24
12	Cumulative Demand Savings (MW)	52	109	198	308	427	545	651	702	733	756
13	Total Budget ($000)	$90,485	$98,216	$155,067	$189,060	$210,565	$198,339	$186,951	$90,571	$63,706	$44,528
14	TRC Levelized Cost ($/kWh)	$0.0594	$0.0594	$0.0594	$0.0594	$0.0594	$0.0594	$0.0594	$0.0594	$0.0594	$0.0594
15	UCT Levelized Cost ($/kWh)	$0.0426	$0.0426	$0.0426	$0.0426	$0.0426	$0.0426	$0.0426	$0.0426	$0.0426	$0.0426

Table 5-11. Detailed Results - Scenario 7

Row #	Category	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
1	Incremental Program Potential (GWh)	355	351	372	373	389	374	387	370	375	43
2	Cumulative Program Potential (GWh)	355	706	1,078	1,451	1,840	2,214	2,601	2,972	3,347	3,390
3	Cumulative Program Potential (GWh) w/ 2011-2013	791	1,142	1,514	1,887	2,276	2,651	3,037	3,408	3,783	3,826
4	Incremental Savings from Codes and Standards	71	76	84	78	62	50	45	39	33	29
5	Cumulative Savings from Codes and Standards (w/ 2011-2013)	249	326	410	488	550	600	645	684	717	746
6	Annual Savings Target (Program + Codes & Standards)	426	427	457	451	451	424	432	409	409	72
7	Baseline Sales (LADWP Gross)	23,970	24,110	24,302	24,553	24,837	25,114	25,388	25,746	25,986	26,220
8	Savings as % of Baseline Sales (no standards)	3.3%	4.7%	6.2%	7.7%	9.2%	10.6%	12.0%	13.2%	14.6%	14.6%
9	Savings as % of Baseline (with Standards)	4.3%	6.1%	7.9%	9.7%	11.4%	12.9%	14.5%	15.9%	17.3%	17.4%
10	Savings as % of Baseline Sales Rolling 10-Year (excludes 2011-2013)	4.3%	6.1%	7.9%	9.7%	11.4%	12.9%	14.5%	15.0%	15.7%	15.1%
11	Incremental Demand Savings (MW)	98	93	100	100	103	101	103	101	101	13
12	Cumulative Demand Savings (MW)	98	191	291	391	493	595	698	799	900	913
13	Total Budget ($000)	$235,148	$227,949	$247,314	$249,357	$262,298	$246,259	$259,065	$246,745	$252,958	$33,979
14	TRC Levelized Cost ($/kWh)	$0.0644	$0.0644	$0.0644	$0.0644	$0.0644	$0.0644	$0.0644	$0.0644	$0.0644	$0.0644
15	UCT Levelized Cost ($/kWh)	$0.0640	$0.0640	$0.0640	$0.0640	$0.0640	$0.0640	$0.0640	$0.0640	$0.0640	$0.0640

Table 5-12. Detailed Results - Scenario 8

Row #	Category	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
1	Incremental Program Potential (GWh)	357	353	374	375	391	377	389	372	377	43
2	Cumulative Program Potential (GWh)	357	709	1,083	1,458	1,849	2,225	2,614	2,986	3,363	3,406
3	Cumulative Program Potential (GWh) w/ 2011-2013	793	1,145	1,520	1,894	2,285	2,661	3,051	3,423	3,800	3,843
4	Incremental Savings from Codes and Standards	71	76	84	78	62	50	45	39	33	29
5	Cumulative Savings from Codes and Standards (w/ 2011-2013)	249	326	410	488	550	600	645	684	717	746
6	Annual Savings Target (Program + Codes & Standards)	428	429	459	452	453	427	434	411	410	72
7	Baseline Sales (LADWP Gross)	23,970	24,110	24,302	24,553	24,837	25,114	25,388	25,746	25,986	26,220
8	Savings as % of Baseline Sales (no standards)	3.3%	4.8%	6.3%	7.7%	9.2%	10.6%	12.0%	13.3%	14.6%	14.7%
9	Savings as % of Baseline (with Standards)	4.3%	6.1%	7.9%	9.7%	11.4%	13.0%	14.6%	15.9%	17.4%	17.5%
10	Savings as % of Baseline Sales Rolling 10-Year (excludes 2011-2013)	4.3%	6.1%	7.9%	9.7%	11.4%	13.0%	14.6%	15.1%	15.8%	15.2%
11	Incremental Demand Savings (MW)	94	90	96	96	99	97	99	97	98	12
12	Cumulative Demand Savings (MW)	94	184	280	377	475	573	672	769	866	878
13	Total Budget ($000)	$212,100	$206,877	$224,381	$226,032	$238,656	$223,204	$235,590	$222,883	$229,116	$30,888
14	TRC Levelized Cost ($/kWh)	$0.0705	$0.0705	$0.0705	$0.0705	$0.0705	$0.0705	$0.0705	$0.0705	$0.0705	$0.0705
15	UCT Levelized Cost ($/kWh)	$0.0604	$0.0604	$0.0604	$0.0604	$0.0604	$0.0604	$0.0604	$0.0604	$0.0604	$0.0604

Table 5-13. Detailed Results - Scenario 9

Row #	Category	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
1	Incremental Program Potential (GWh)	354	350	370	370	385	371	383	366	51	38
2	Cumulative Program Potential (GWh)	354	704	1,074	1,444	1,829	2,200	2,583	2,948	2,999	3,038
3	Cumulative Program Potential (GWh) w/ 2011-2013	790	1,140	1,510	1,880	2,265	2,636	3,019	3,385	3,436	3,474
4	Incremental Savings from Codes and Standards	71	76	84	78	62	50	45	39	33	29
5	Cumulative Savings from Codes and Standards (w/ 2011-2013)	249	326	410	488	550	600	645	684	717	746
6	Annual Savings Target (Program + Codes & Standards)	425	426	454	448	447	422	428	404	84	67
7	Baseline Sales (LADWP Gross)	23,970	24,110	24,302	24,553	24,837	25,114	25,388	25,746	25,986	26,220
8	Savings as % of Baseline Sales (no standards)	3.3%	4.7%	6.2%	7.7%	9.1%	10.5%	11.9%	13.1%	13.2%	13.2%
9	Savings as % of Baseline (with Standards)	4.3%	6.1%	7.9%	9.6%	11.3%	12.9%	14.4%	15.8%	16.0%	16.1%
10	Savings as % of Baseline Sales Rolling 10-Year (excludes 2011-2013)	4.3%	6.1%	7.9%	9.6%	11.3%	12.9%	14.4%	14.9%	14.4%	13.7%
11	Incremental Demand Savings (MW)	90	86	91	92	94	93	94	92	11	10
12	Cumulative Demand Savings (MW)	90	176	267	359	453	545	639	731	742	752
13	Total Budget ($000)	$149,507	$144,943	$157,496	$158,605	$167,762	$156,450	$165,574	$155,981	$28,773	$21,194
14	TRC Levelized Cost ($/kWh)	$0.0585	$0.0585	$0.0585	$0.0585	$0.0585	$0.0585	$0.0585	$0.0585	$0.0585	$0.0585
15	UCT Levelized Cost ($/kWh)	$0.0419	$0.0419	$0.0419	$0.0419	$0.0419	$0.0419	$0.0419	$0.0419	$0.0419	$0.0419

Table 5-14. Detailed Results - Scenario 10

Row #	Category	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
1	Incremental Program Potential (GWh)	207	233	357	437	479	470	427	202	127	90
2	Cumulative Program Potential (GWh)	207	440	798	1,235	1,714	2,184	2,610	2,812	2,940	3,029
3	Cumulative Program Potential (GWh) w/ 2011-2013	643	876	1,234	1,671	2,150	2,620	3,047	3,248	3,376	3,465
4	Incremental Savings from Codes and Standards	71	76	84	78	62	50	45	39	33	29
5	Cumulative Savings from Codes and Standards (w/ 2011-2013)	249	326	410	488	550	600	645	684	717	746
6	Annual Savings Target (Program + Codes & Standards)	278	310	442	515	541	520	471	240	161	118
7	Baseline Sales (LADWP Gross)	23,970	24,110	24,302	24,553	24,837	25,114	25,388	25,746	25,986	26,220
8	Savings as % of Baseline Sales (no standards)	2.7%	3.6%	5.1%	6.8%	8.7%	10.4%	12.0%	12.6%	13.0%	13.2%
9	Savings as % of Baseline (with Standards)	3.7%	5.0%	6.8%	8.8%	10.9%	12.8%	14.5%	15.3%	15.8%	16.1%
10	Savings as % of Baseline Sales Rolling 10-Year (excludes 2011-2013)	3.7%	5.0%	6.8%	8.8%	10.9%	12.8%	14.5%	14.4%	14.1%	13.7%
11	Incremental Demand Savings (MW)	52	57	89	110	119	118	106	50	31	24
12	Cumulative Demand Savings (MW)	52	109	198	307	426	544	650	701	731	755
13	Total Budget ($000)	$84,597	$94,742	$144,932	$177,633	$193,758	$189,789	$171,939	$80,876	$50,648	$35,723
14	TRC Levelized Cost ($/kWh)	$0.0620	$0.0620	$0.0620	$0.0620	$0.0620	$0.0620	$0.0620	$0.0620	$0.0620	$0.0620
15	UCT Levelized Cost ($/kWh)	$0.0394	$0.0394	$0.0394	$0.0394	$0.0394	$0.0394	$0.0394	$0.0394	$0.0394	$0.0394

Nexant

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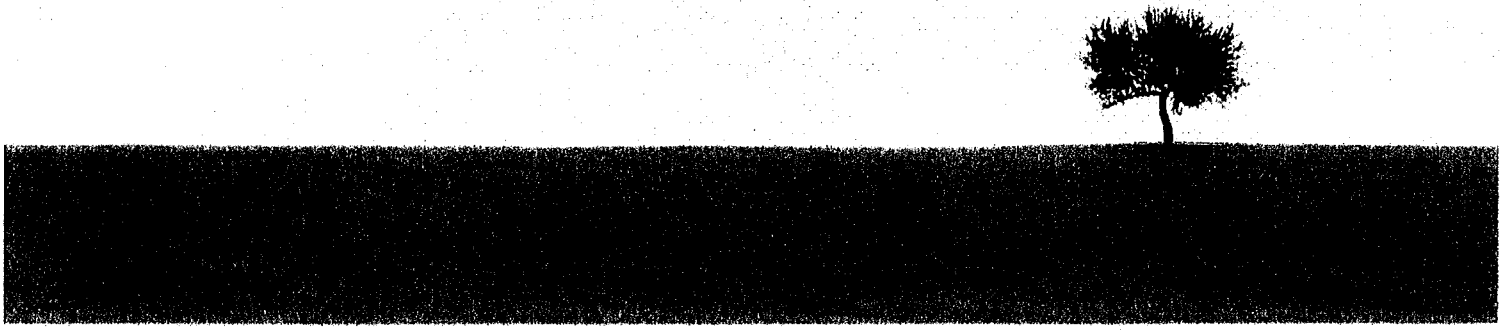

#18

Committees:

Chair
Personnel & Animal Welfare

Vice Chair
Transportation
Ad Hoc on Social Equity

Member
Budget & Finance
Energy & Environment
Ad Hoc on Waste Reduction & Recycling

Website: http://cd5.lacity.org
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PAUL KORETZ
Councilmember, Fifth District

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August 4, 2014

President Mel Levine
LADWP Commissioners
111 N Hope Street
Los Angeles, CA 90012

Dear President ~~Levine and~~ Commissioners: Michael –

As you may know, I have introduced a motion to the City Council calling on the City of Los Angeles to reduce its greenhouse gas emissions 80% of 1990 levels by 2050, and on the DWP to reduce its greenhouse gas emissions to 80% of 1990 levels by 2030. Evidenced by increasing extreme storm events around the world, including our own historic drought, the climate crisis is getting worse quickly and, as one of the historically worst polluters, Los Angeles needs to lead the way in addressing and resolving the problem. An essential tool to help us reach those targets will be aggressive and forward-thinking energy efficiency targets.

In 2010, the European Commission for advancement of the European Union economy proposed a 10-year strategy aiming for "smart, sustainable, inclusive growth," which included a target of achieving a 20% increase in energy efficiency by 2020 for the entirety of the 28-nation state Union and its 505,572,500 residents. As Los Angeles is considerably smaller and DWP is more centralized, I believe we can do as well, if not better, in half the time.

When the DWP staff proposes its 10-year energy efficiency targets on August 5th, I urge you to support a target of 15% or higher energy efficiency by 2020. From a fiscal viewpoint alone, it is good policy. The savings will far outweigh the investment. DWP's Territorial Potential Study shows that the utility – just by using existing technology at today's prices – can reduce energy use 15% by 2020. Such an investment would reduce the City's energy bill by around $750 million and produce more than a $1.25 in savings for every $1 invested in the programs.

I urge you to support a "15% or higher by 2020" energy efficiency target.

Best regards,

Paul
PAUL KORETZ

#18

NURY MARTINEZ
COUNCILWOMAN, SIXTH DISTRICT

August 1, 2014

President Mel Levine
Board of Water and Power Commissioners
111 N Hope Street
Los Angeles, California

Dear President Levine:

As a commissioner guiding the Los Angeles Department of Water and Power (LADWP) into its second century, your leadership can help direct the City and its electricity system toward a more equitable, sustainable, and prosperous future. You will have an opportunity to exercise this leadership later this month, when LADWP staff proposes 10-year energy efficiency targets, which must be submitted to the California Energy Commission under AB 2021. I urge you to support Staff's proposal for a 15% by 2020 energy efficiency target.

LADWP's Territorial Potential Study shows that the utility – just by using existing technology at today's prices – can reduce energy use 14.5% by 2020. Such an investment in energy efficiency would reduce the City's energy bill by around $750 million and produce more than a $1.25 in savings for every $1 invested in the programs.

LADWP can meet these targets by expanding its energy efficiency programs. These programs are benefitting residents and businesses in our community, helping customers manage and reduce their energy bills, and creating jobs. In my district alone, 690 businesses have been assessed for a retrofit under the Small-Business Direct Install program, 623 have enrolled in the program and 428 businesses have completed retrofits. Energy efficiency programs help reduce the need to build and maintain expensive, polluting power plants, and should be our first consideration before we examine rate increases. I urge you to support a "15% by 2020" target.

Sincerely,

NURY MARTINEZ
Councilwoman, 6th District

Cc: Commissioner William W. Funderbunk Jr.
Commissioner Jill Banks Barad
Commissioner Michael F. Fleming
Commissioner Christina E. Noonan

City Hall, 200 N. Spring Street, Room 425, Los Angeles, CA 90012
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#18

NURY MARTINEZ
COUNCILWOMAN, SIXTH DISTRICT

August 1, 2014

President Mel Levine
Board of Water and Power Commissioners
111 N Hope Street
Los Angeles, California

Dear President Levine:

As a commissioner guiding the Los Angeles Department of Water and Power (LADWP) into its second century, your leadership can help direct the City and its electricity system toward a more equitable, sustainable, and prosperous future. You will have an opportunity to exercise this leadership later this month, when LADWP staff proposes 10-year energy efficiency targets, which must be submitted to the California Energy Commission under AB 2021. I urge you to support Staff's proposal for a 15% by 2020 energy efficiency target.

LADWP's Territorial Potential Study shows that the utility – just by using existing technology at today's prices – can reduce energy use 14.5% by 2020. Such an investment in energy efficiency would reduce the City's energy bill by around $750 million and produce more than a $1.25 in savings for every $1 invested in the programs.

LADWP can meet these targets by expanding its energy efficiency programs. These programs are benefitting residents and businesses in our community, helping customers manage and reduce their energy bills, and creating jobs. In my district alone, 690 businesses have been assessed for a retrofit under the Small-Business Direct Install program, 623 have enrolled in the program and 428 businesses have completed retrofits. Energy efficiency programs help reduce the need to build and maintain expensive, polluting power plants, and should be our first consideration before we examine rate increases. I urge you to support a "15% by 2020" target.

Sincerely,

NURY MARTINEZ
Councilwoman, 6th District

Cc: Commissioner William W. Funderbunk Jr.
Commissioner Jill Banks Barad
Commissioner Michael F. Fleming
Commissioner Christina E. Noonan

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#18

GLOBAL GREEN USA®

Tuesday, August 5, 2014

LADWP Board of Commissioners
LADWP, Room 1555-H
111 North Hope Street
Los Angeles, CA 90012

Re: Item 18, Energy Efficiency Goals

Dear President Levine and Board of Commissioners,

Global Green USA, an environmental non-profit organization headquartered in Los Angeles, is writing in regards to the proposed 10-year energy efficiency targets, which will be submitted to the California Energy Commission under AB 2021. We are pleased by the Los Angeles Department of Water and Power's staff recommendation for a target of 15% by 2020, and we strongly urge the Board to approve this goal.

Global Green has long advocated for energy efficiency measures as the first resource used to save energy, as it is the cheapest, easiest, and cleanest option. For years, California has been a leader in approving bold energy efficiency targets; this forward thinking has saved residents billions of dollars and avoided millions of tons of greenhouse gas emissions. While LADWP's investment in energy efficiency has lagged behind other California utilities, LADWP doubled its investment in 2012, which we applaud, and approving today's goals is the logical next step in this decision.

LADWP's own study, as well as independent experts who performed similar analysis, found that the utility can reach a 15% target by 2020 at a budget of $151 million per year, one-half to one-fourth the cost of a new power plant. Energy efficiency savings on this level would also create an estimated 22,000 jobs by 2033, more jobs than any other energy industry. In the long term, it would also save the city $775 million in energy bills.

With a growing population and many more days of extreme heat ahead, the city needs to rethink how we use our energy. Increasing our energy efficiency translates to immediate savings for Angelenos on their utility bills, cleaner air, and increased comfort. We strongly support raising our energy efficiency target to 15% by 2020.

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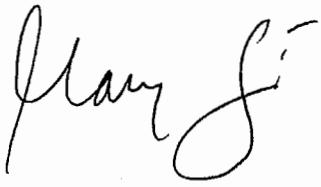
WASHINGTON.D.C: 1100 15th Street, NW. 11th Floor | Washington D.C. 20005| Phone: 202.222.0701| Fax:202.222.0703
NEW ORLEANS: 2407 South Broad Street | New Orleans, LA 70125 | Phone: 310.581.2700 | Fax:310.581.2702

Sincerely,



Mary Luévano, Vice President

Global Green USA

GLOBAL GREEN USA®

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RE: #18

Moschos, Barbara

From: gstaack24@socal.rr.com
Sent: Monday, August 04, 2014 11:24 PM
To: commission
Subject: Board of Commissioners Website Contact Us

Form for: Board of Commissioners Website Contact Us

Form Data:

First name: Gerald
Last name: Staack
Email address: gstaack24@socal.rr.com
Phone number: 661-424-0262
Subject: Energy efficiency
Comments/Questions: The 15% energy efficiency goal being proposed is a good start.

RE: #18

Moschos, Barbara

From: jdietrick9@gmail.com
Sent: Monday, August 04, 2014 10:04 PM
To: commission
Subject: Board of Commissioners Website Contact Us

Form for: Board of Commissioners Website Contact Us

Form Data:

First name: Jan
Last name: Dietrick
Email address: jdietrick9@gmail.com
Phone number: 805-746-5365
Subject: Energy conservation
Comments/Questions: Kudos to the commission for planning a 15% energy efficiency goal. Many people support it and want to pitch in and make it an example of how conservation is better for the economy than business as usual.

RE: #18

Moschos, Barbara

From: chergilmore@sbcglobal.net
Sent: Monday, August 04, 2014 1:24 PM
To: commission
Subject: Board of Commissioners Website Contact Us

Follow Up Flag: Follow up
Flag Status: Completed

Form for: Board of Commissioners Website Contact Us

Form Data:

First name: Cher
Last name: Gilmore
Email address: chergilmore@sbcglobal.net
Phone number:
Subject: Energy Efficiency Proposal
Comments/Questions: I am writing to thank you and to express my total support for your goal of 15% reduction in energy use by increasing efficiency in your operations. Please continue to do everything you can to reduce our use of fossil fuels, and therefore carbon emissions, so that we can stop global warming.

RE: #18

Moschos, Barbara

From: benjamin.d.fraser@gmail.com
Sent: Monday, August 04, 2014 4:48 PM
To: commission
Subject: Board of Commissioners Website Contact Us

Form for: Board of Commissioners Website Contact Us

Form Data:

First name: Ben
Last name: Fraser
Email address: benjamin.d.fraser@gmail.com
Phone number:
Subject: Energy Efficiency Proposal
Comments/Questions: I am commenting to express support for the energy efficiency proposal that will reduce energy consumption 15% by 2020.

RE: #18

Moschos, Barbara

From: lynne3095@att.net
Sent: Monday, August 04, 2014 10:38 AM
To: commission
Subject: Board of Commissioners Website Contact Us

Form for: Board of Commissioners Website Contact Us

Form Data:

First name: Lynne
Last name: Girdlestone
Email address: lynne3095@att.net
Phone number:
Subject: Energy efficienty goal proposal
Comments/Questions: Dear Commissioners, I would like to express my STRONG support for your adopting the measures that will lead to a reduction in the use of non-renewable energy sources, helping the most-needy Angelinos cope with both the economic and environmental effects of outdated technology, and move us into a CLEANER future. I am deeply concerned about global warming and the impact it is having ALREADY on everyone, everywhere. Please vote in favor of the 15% reduction goal.

RESOLUTION NO. 015 007

WHEREAS, the Los Angeles Department of Water and Power (LADWP) is committed to the promotion of energy efficiency through the sustained implementation of programs and services; and

WHEREAS, there continues to be a statewide need to promote the efficient use of energy and meet the Governor's greenhouse gas reduction targets established in Executive Order S-3-05; and

WHEREAS, the State of California has enacted Assembly Bill (AB) 2021 (2006) (adding Section 25310 to Public Resources Code and amending Section 9615 of the Public Utilities Code) which directs investor-owned utilities and publicly owned utilities to identify achievable, cost-effective efficiency potential periodically and establish annual targets based on that potential for the ensuing ten-year period; and

WHEREAS, the State Legislature intends that load-serving entities procure all cost-effective energy efficiency measures so the State can meet its goal of reducing total forecasted electricity consumption by ten percent over the next ten years; and

WHEREAS, publicly owned utilities are directed to identify efficiency potential and establish draft annual targets for submission to the California Energy Commission (CEC) within 60 days of their adoption dates; and

WHEREAS, in May 2012, the LADWP Board of Commissioners made a commitment, in accordance with Board Resolution No. 012-247, to explore ways to achieve up to 15 percent in energy efficiency savings targets by 2020 by developing a long-term plan and implementing additional programs; and

WHEREAS, in February 2013, the LADWP issued a Request for Proposal (RFP) No. 90113 seeking proposals from qualified firms to conduct an updated energy efficiency potential study, including all City facilities, to determine energy efficiency, and provide support in the development of new energy efficiency and demand response programs based on the findings of the study; and

WHEREAS, the LADWP hired Nexant, Inc. (Nexant) to conduct a study to determine the achievable potential for energy savings; and

WHEREAS, the LADWP acknowledges that adopting aggressive energy efficiency targets is not without trade-offs or risks.

NOW, THEREFORE, BE IT RESOLVED that the Board of Water and Power Commissioners (Board) hereby adopts its ten-year energy efficiency savings targets as shown in the following table.

LADWP ENERGY EFFICIENCY GOALS (AB 2021)

FY	GWh Target	MW Target
2013-14	278	52
2014-15	310	57
2015-16	442	89
2016-17	515	110
2017-18	541	119
2018-19	520	118
2019-20	471	106
2020-21	240	50
2021-22	161	31
2022-23	118	24

BE IT FURTHER RESOLVED, that the General Manager or his designee, and the Secretary, Assistant Secretary or the Acting Secretary of the Board are hereby authorized and directed to execute the necessary documents transmitting the AB 2021 compliance plan to CEC for and on behalf of LADWP resulting from this Board action.

I HEREBY CERTIFY that the foregoing is a full, true, and correct copy of the Resolution adopted by the Board it's meeting held AUG 05 2014

Barbara E. Moschos
Secretary

APPROVED AS TO FORM AND LEGALITY
MICHAEL N. FEUER, CITY ATTORNEY

JUL 17 2014

BY
WILLIAM H. KYSELLA, JR.
DEPUTY CITY ATTORNEY

F. BOND REFINANCING SAVINGS (WATER & POWER SYSTEMS)

This appendix provides the refinancing savings for both Water and Power System bonds.

Refunding Savings Since June 2, 2009

Adjusted Savings

WATER SYSTEM REFUNDING SAVINGS

Date	Wtr Systm Savings	PV
6/30/2012	956,089.67	882,425.03
6/30/2013	5,976,561.76	5,781,480.71
6/30/2014	6,502,526.26	6,083,251.29
6/30/2015	15,162,286.26	14,342,313.54
6/30/2016	14,205,611.26	13,055,450.29
6/30/2017	2,677,636.26	2,276,617.65
6/30/2018	6,818,792.50	5,491,773.60
6/30/2019	1,895,830.00	1,542,150.95
6/30/2020	1,892,200.00	1,494,778.36
6/30/2021	1,889,487.50	1,448,713.07
6/30/2022	1,891,900.00	1,407,873.77
6/30/2023	4,228,750.00	3,272,645.02
6/30/2024	4,226,468.76	3,193,550.94
6/30/2025	4,214,756.26	3,108,415.36
6/30/2026	4,208,193.74	3,030,723.05
6/30/2027	4,203,887.50	2,956,017.49
6/30/2028	1,214,937.50	687,709.19
6/30/2029	1,215,450.00	663,869.97
6/30/2030	1,215,368.74	640,577.30
6/30/2031	1,214,693.74	617,835.43
6/30/2032	1,213,368.74	595,622.14
6/30/2033	2,996,143.74	1,442,053.59
6/30/2034	2,634,618.76	1,223,052.16
6/30/2035	1,060,343.76	467,963.26
6/30/2036	1,051,787.50	447,150.19
6/30/2037	2,985,487.50	1,247,617.05
6/30/2038	2,982,956.26	1,203,283.76
6/30/2039	2,984,562.50	1,161,940.99
6/30/2040	2,964,862.52	1,114,490.44
6/30/2041	2,957,306.26	1,074,361.39
6/30/2042	2,973,750.00	1,043,959.73
6/30/2043	2,963,000.00	1,004,969.32
6/30/2044	2,960,000.00	969,816.13
	0.00	0.00
	118,539,615.25	84,974,452.16
Adjustments:		
FY 2012	(6,994,270.42)	(6,994,270.42)
FY 2013	527,584.58	527,584.58
Per Pricing Report - Unadjusted		
Total	**125,006,301.09**	**91,441,138.00**

Adjusted Savings

POWER SYSTEM REFUNDING SAVINGS

Date	Pwr Systm Savings	PV
6/30/2010	(337,654.44)	(332,854.08)
6/30/2011	836,265.82	819,734.79
6/30/2012	32,460,363.08	32,246,398.74
6/30/2013	21,389,689.72	20,648,883.55
6/30/2014	26,379,300.01	25,061,475.92
6/30/2015	58,773,349.94	55,455,819.97
6/30/2016	57,156,657.50	52,682,498.93
6/30/2017	47,640,612.50	43,859,053.89
6/30/2018	17,041,843.76	15,590,759.00
6/30/2019	1,973,453.13	1,567,587.61
6/30/2020	1,977,837.51	1,530,601.76
6/30/2021	1,878,740.63	1,408,669.35
6/30/2022	1,881,540.62	1,375,825.46
6/30/2023	6,155,637.50	3,605,963.07
6/30/2024	6,409,075.00	3,704,954.29
6/30/2025	1,748,700.00	1,306,903.55
6/30/2026	1,761,575.00	1,284,906.10
6/30/2027	1,762,275.00	1,254,883.62
6/30/2028	1,758,400.00	1,221,431.41
6/30/2029	1,758,400.00	1,192,826.43
6/30/2030	1,760,650.00	1,166,433.29
6/30/2031	1,739,750.00	1,125,924.98
6/30/2032	1,730,800.00	1,094,267.26
6/30/2033	1,728,750.00	1,067,941.10
6/30/2034	1,724,900.00	1,041,232.80
6/30/2035	1,723,850.00	1,016,921.70
6/30/2036	1,725,000.00	994,526.95
	302,539,762.28	272,993,571.44
Adjustments:		
FY 2013	(2,062,023.17)	(2,062,023.17)
Per Pricing Report - Unadjusted		
Total	**304,601,785.45**	**275,055,594.61**

Adjusted Savings

COMBINED WATER & POWER SAVINGS

Date	Combined Savings	Combined PV
6/30/2012	33,416,452.75	33,128,823.77
6/30/2013	27,366,251.48	26,430,364.26
6/30/2014	32,881,826.27	31,144,727.21
6/30/2015	73,935,636.20	69,798,133.51
6/30/2016	71,362,268.76	65,737,949.22
6/30/2017	50,318,248.76	46,135,671.54
6/30/2018	23,860,636.26	21,082,532.60
6/30/2019	3,869,283.13	3,109,738.56
6/30/2020	3,870,037.51	3,025,380.12
6/30/2021	3,768,228.13	2,857,382.42
6/30/2022	3,773,440.62	2,783,699.23
6/30/2023	10,384,387.50	6,878,608.09
6/30/2024	10,635,543.76	6,898,505.23
6/30/2025	5,963,456.26	4,415,318.91
6/30/2026	5,969,768.74	4,315,629.15
6/30/2027	5,966,162.50	4,210,901.11
6/30/2028	2,973,337.50	1,909,140.60
6/30/2029	2,973,850.00	1,856,696.40
6/30/2030	2,976,018.74	1,807,010.59
6/30/2031	2,954,443.74	1,743,760.41
6/30/2032	2,944,168.74	1,689,889.40
6/30/2033	4,724,893.74	2,509,994.69
6/30/2034	4,359,518.76	2,264,284.96
6/30/2035	2,784,193.76	1,484,884.96
6/30/2036	2,776,787.50	1,441,677.14
6/30/2037	2,985,487.50	1,247,617.05
6/30/2038	2,982,956.26	1,203,283.76
6/30/2039	2,984,562.50	1,161,940.99
6/30/2040	2,964,862.52	1,114,490.44
6/30/2041	2,957,306.26	1,074,361.39
6/30/2042	2,973,750.00	1,043,959.73
6/30/2043	2,963,000.00	1,004,969.32
6/30/2044	2,960,000.00	969,816.13
	420,580,766.15	357,481,142.89
Adjustments:		
FY 2012	(6,994,270.42)	(6,994,270.42)
FY 2013	(1,534,438.59)	(1,534,438.59)
Per Pricing Report - Unadjusted		
Total	**429,109,475.16**	**366,009,851.90**

G. RESPONSE TO COUNCIL RECOMMENDATIONS

On September 19, 2012, the City Council Energy and Environment Committee adopted a report with ten recommendations associated with third party review of LADWP's Incremental Electric Rate Ordinance. The full City Council (Council) adopted the same recommendations in connection with its approval of the Incremental Electric Rate Ordinance on October 2, 2012. Many of these recommendations stemmed from the recommendations found in Appendix E of the "Los Angeles Department of Water and Power (LADWP) - Power System Financial Review and Rate Restructuring Analysis" report issued to the City Council on August 23, 2012 (RPA Power Report) in accordance with Council action of April 8, 2011.

A summary of the activities and status for each of the applicable recommendations is included in this report. LADWP has made significant progress toward addressing each item, including working collaboratively with the Ratepayer Advocate (RPA), Chief Legislative Analyst (CLA) and Chief Administrative Officer (CAO).

As shown in the table below, formal programs or other activities are underway to address all of the recommendations, and LADWP has made significant progress in each area.

Response to City Council Recommendations

a. Conduct negotiations with labor to find common ground that allows for greater flexibility to contract out effectively and bring salaries and benefits closer to other power utility providers.

In December of 2013, the Council approved a new Memorandum of Understanding (MOU) with IBEW Local 18 that provides significant savings to LADWP ratepayers and makes significant progress towards addressing this recommendation. Specifically, the new MOU makes progress in the following major areas:

- MOU term was extended from 10/1/14 to 9/30/17
- Defer the existing 2.9% COLA from 10/1/13 to 10/1/16
- Create new lower (Tier 2) pension benefits for new employees
- Entry level salaries are reduced for 34 common classes
- Contracting out overtime restriction – reduction from 10% to 5%
- Sick time medical certification requirement for three days rather than the previous five days

As a result of these changes, LADWP is projected to reduce labor costs by $456 million over the

next four years:

Key MOU Components for 10/1/14-9/30/17	Four Year Savings Estimate ($M)
Defer COLA from 10/1/13 to 10/1/16	$385.0
Entry Level Salary Reduction for 34 Common Classes	$15.0
Sick Time Medical Certification Requirement	$12.0
Contracting Out Overtime Restriction - Reduction from 10% to 5%	$3.0
Retirement Plan Tier 2 For All New Hires	$41.0
Total Estimated Savings Over Four years	**$456.0**

b. Re-evaluate and consider replacing the surcharge-based restructuring approach with fully restructured permanent rates once legal considerations allow.

In its report on the last Power System rate action, the Ratepayer Advocate (RPA) proposed that LADWP reevaluate and consider replacing the surcharge-based restructuring approach with fully restructured permanent rates. The City Council made the same recommendation when it approved the 2012 rate action. Consequently, LADWP has evaluated the current approach to the ordinance structure.

While there may be a desire to undertake a modification of the current rate structure to provide a simpler rate framework, several lawsuits have recently been filed asserting that Proposition 26 does not permit LADWP's annual transfer of monies, financial conditions allowing, from the Power Revenue Fund ultimately to the City's General Fund. The City disputes the merits of those lawsuits. While the transfer is being contested, the City will continue to adopt an electrical rate structure that preserves the rates in effect on November 3, 2010, and layers incremental charges on top of them. Therefore, for purposes of the current rate action, LADWP proposes that the results of the cost of service studies and the impact of the new revenue requirements for power service be applied to only the Incremental Ordinance.

c. Conduct a new formal cost of service study in order to prepare for future power rate restructuring.

LADWP has new cost of services studies for both Water and Power. These studies are based on marginal cost principles to allocate the overall water and power revenue requirement to each major customer class.[1] The new costs of services studies by themselves have no impact on the overall revenue requirement; however, they will be used to allocate revenues between customer classes and provide guidance on rate design. This methodology is consistent with industry best practice and leads to the most efficient use of utility resources by LADWP customers.

d. Conduct a benchmarking assessment to review the cost per project for the repowering program and the Power Reliability Program to ensure cost

[1] Embedded cost of service analyses were also developed to verify the results of the marginal cost of service studies.

reasonableness.

Repowering Program

Direct benchmarking assessments for the repowering program are challenging, given the circumstances facing LADWP in the repowering of its coastal gas-fired plants to eliminate Once-Through Cooling (OTC) and maintain a reliable system which is supported by these key generating units. To ensure cost effectiveness, LADWP is relying primarily upon (1) a highly competitive procurement process for the coastal plant repowering and (2) use of new construction bids for similar combined cycle generating units in a separate power plant procurement process underway by LADWP for comparative purposes. Actual awarded prices for the LADWP repowering project came within the median pricing range of the new projects proposed by various competitive proposers for the Navajo replacement project.

The coastal repowering effort is being conducted to comply with the State and Federal, Environmental Protection Agency, requirements to eliminate the use of ocean water for cooling. These plants must be replaced sequentially over a period extending through 2029. Given the program magnitude, significant resources and attention have been allocated to ensure the work is completed timely and cost effectively.

In regard to the overall status of the repowering program and compliance, OTC has been eliminated from Harbor Units 1, 2, 3, and 4; Haynes Units 3, 4, 5 and 6. To ensure cost effectiveness, LADWP is using the following tools to ensure the repowering effort is as efficient as possible:

- Conceptual Cost Estimates: Prior to the development of a repowering project, a conceptual cost estimate is developed based on current pricing trends for similar projects recently built by other generation companies.
- Third Party Reviews: LADWP retains a third party engineering firm to provide a target cost estimate for the project based on similar projects, the specific project attributes, and current market conditions.
- Competitive bidding: To encourage best pricing and performance, contracts are competitively bid through a public process in accordance with the provisions of the Los Angeles City Charter.
- Comparison with Other Projects: The Scattergood Unit 3 project is unique in several aspects, and, therefore, exact project-to-project comparisons are not possible. However, it was of interest to compare costs, while recognizing these limitations. LADWP evaluated a natural gas-fired project and also reviewed an El Segundo plant, located close to the Scattergood site. While not exact comparisons, LADWP used these other plants as benchmarks for some of the market based and other construction costs for Scattergood Unit 3. Based on the comparison of contracts between the El Segundo and Scattergood Unit 3 plants, costs appeared to be within five percent on a per kWh basis.
    - Targeted Outsourcing: To minimize project risk and to keep existing generators functioning during the project, LADWP used a combination of in-house forces and contractors for various aspects of the project.
    - Additional Cost Savings Efforts: To reduce project costs on the repowering projects, LADWP has purchased the turbine/generators separately to eliminate

most of the approximate ten percent mark-up on parts by the Engineer-Procure-Construct (EPC) contractor. In addition, this approach puts the selection of the key components of the project under the control of LADWP to ensure critical materials will be available when required by the project schedule. Typically, the turbine/generators comprise thirty to fifty percent of the overall project cost, and, by LADWP performing the contract administration, the savings can be in the range of $30 to $40 million per project.

The repowering of LADWP's coastal generating units not only ensures that LADWP complies with the State's OTC mandate, but it also has other benefits including operating efficiencies and improved reliability associated with new technologies. As an example, the repowering of Scattergood Unit 3 increased its efficiency by almost 30% (reducing fuel consumption and greenhouse gas emissions) from what was previously in place.

Power System Reliability Program (PSRP)[2]

LADWP has completed several steps toward examining the costs of the PSRP which takes a more comprehensive approach to reliability improvement investments. LADWP retained IEC to assist with a more detailed analysis of the PSRP. As part of IEC analysis, the PSRP business plan has been updated to ensure that expenditures maximize the reliability benefits for customers. The primary goal of the updated PSRP is identify and prioritize all of the projects necessary to improve the reliability of the aging infrastructure – distribution, substation, transmission, and non-RPS generation – in a cost effective manner and consistent with industry best practices.

To that end, IEC has performed an assessment of LADWP's reliability capital program expenditures and methodologies, including a Reliability Benchmark Assessment (RBA) consistent with industry's best practices to ensure that appropriate levels of expenditures are committed to the overall PSRP in regard to distribution, substation, transmission, and generation. The assessment addressed but was not limited to the following issues:

- How LADWP sets priorities or targets;
- Effectiveness of the spending; and
- Spending compared with others in the industry.

Preliminary recommendations are provided in all the major program areas:

- Generation,
- Substation,
- Transmission,
- Distribution,
- Overall capital prioritization methodology, and
- Labor resource planning.

[2] Note that the "Power Reliability Program" has been renamed the "Power System Reliability Program" and has evolved to include all aspects of the power service delivery infrastructure.

e. Identify opportunities to contract out and explore the potential savings, including the benchmarking of staffing and outsourcing levels against utility peers.

As part of the recent LADWP reorganization by the General manager, a new Corporate Performance function has been created. This new function will focus on:

- Initial High-Level Benchmarking: As of February 2015, the Department has completed its initial high-level benchmarking. The study identifies areas where LADWP is good or better than industry norms; and, where there are opportunities for improvement. This high-level study provides a "roadmap" for follow-up in-depth studies to be conducted. Key findings of the study indicate:
    - Total O&M costs per customer are comprised of Generation, Transmission, Distribution, Customer Service, and Administrative & General (A&G) O&M functional costs including labor and benefits. This metric is one of the LADWP's most significant operational metrics. For LADWP, this metric benchmarked favorably in the 2nd quartile.
    - While the Total O&M costs benchmarked favorably, the Power System's A&G O&M and Distribution O&M function metrics benchmarked in the 4th quartile and warrant further analysis.
    - LADWP reliability metrics benchmarked favorably in the 1st and 2nd quartiles.
    - The LADWP's key financial metrics are in line with industry peer sets.
    - Overall Customer Service O&M costs are in the 1st quartile relative to Investor Owned Utilities (IOU) which comprised the bulk of this peer set.
    - LADWP's Uncollectible Expenses (i.e. write-offs of customer payments) of 0.72 percent or approximately $23 million for Fiscal Year (FY) 2012-13 benchmarks negatively in the 4th quartile. If LADWP was at the peer set median, it would result in a savings of approximately $12 million annually.
    - Total power system energy losses of 13.1 percent benchmark in the 4th quartile.
    - Distribution O&M costs benchmark in the 4th quartile.
    - This benchmarking study centralizes all pension/benefit costs into the A&G category consistent with IOU practice. LADWP benchmarked in the 4th quartile for this metric.
- Follow-up In-depth Studies: As a result of the high level benchmarking study, there will be a number of areas that require further study and analysis. While the specific areas to be studied will be identified after completion of the initial benchmarking, some potential components will be:
    - Number of employees and overtime.
    - Contracting amounts as a percent of total for various functions and sub-functions.
    - More detailed salary/pension/healthcare benchmark study with adjustments for cost of living in the greater Los Angeles area.
    - Identification of areas/processes where benchmarking data shows that there is room for improvement. These areas/processes will be the subject of future

Business Process Improvement Studies.

- Determination of the financial impacts of the significant policies that increase LADWP's costs.

- Business Process Mapping Studies: As a result of the above studies, there will be a number of areas that will present opportunities for significantly improving financial and/or Departmental performance. These functions will be the subject of specific business process mapping studies. These studies will compare industry best practices and evaluate what steps need to be taken for LADWP to move toward the best practice.

Additionally, the Department contracts out significant amounts of work as part of its capital and O&M programs. For the current FY 2014-15 Budget, LADWP projects to spend over $2.3 Billion on Power System work. Inductive economic analysis done by the Los Angeles Economic Development Corporation (LAEC) suggests that Department spending in Los Angeles creates jobs and stimulates additional economic output. In FY 2011-12, the LAEDC estimated the impact of Department spending using an industry accepted input-output model that is founded on local economic characteristics. If the local characteristics of the current Los Angeles economy have remained similar to the assumptions made by the LAEDC, in FY 2014-15, the Power System spending will support 30,051 total jobs and induce $7.57 billion in additional economic activity and output. Over the five-year rate action, the average annual Power System spending of $2.65 billion per year will support an annual 33,321 jobs and induce an annual $8.39 billion in additional economic activity and output.

f. Review overtime expenses allocation, as well as the Department's contractual requirements that have an impact on overtime.

The new MOU with IBEW Local 18 has key provisions in it for reducing overtime as a consequence of obtaining contracting services. Overtime at a utility is affected by several factors, many of which are operational in nature and in some cases outside the immediate control of the utility; for example, emergency outage restoration and mandated power supply replacement projects such as the elimination of OTC.

Additionally, overtime is considered a safe and cost effective means of obtaining needed resources when used in moderation. In general, it is good utility practice to use overtime at the rate of roughly 15% of regular labor costs. Currently, LADWP is limited in its ability to recruit replacement employees in a timely manner. These outcomes are resulting in somewhat higher overtime levels. While overtime was higher than the budget at 23.3% for FY 2013-14, this is offset by underspending in regular labor due to the slow hiring process. The approved budget for overtime for the Power System in FY 2014-15 is 10.9% with a proposed five-year average of 16.4%.

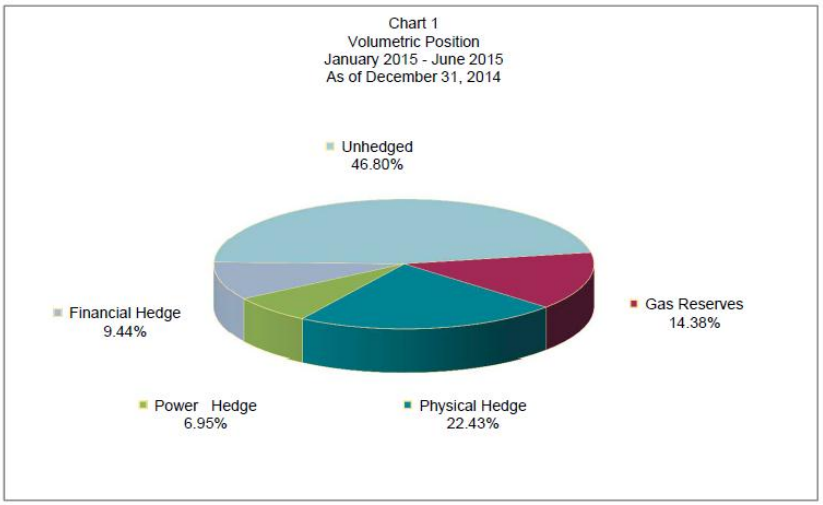
g. Complete a rigorous review of the Department's hedging plan to lock in low fuel prices.

The main objective of LADWP's hedging program is to reduce the volatility in the price of natural gas used in the production of electricity to serve retail customers; the program is not designed to necessarily reduce the cost of fuel. LADWP's budgeted spending on natural gas is on the order

of $200 million per year based on the current price and usage outlook, but the amount could be substantially more if prices increase. The Department's rate structure, with the Variable Energy Adjustment (VEA), allows fuel and purchased power costs to be flowed through to customers through quarterly rate adjustments. However, the Department recognizes that customers appreciate a degree of certainty as to what prices will be. The Department would like to minimize unplanned rate changes based on fuel cost fluctuations, and can do so through a fuel hedging program. The hedging program is authorized through Sections 10.1.1 (b), 10.5.3 and 23.135 of the Los Angeles Administrative Code, as well as governed by various internal LADWP policies and internal controls, including its recently approved Dodd-Frank Act compliance policy.

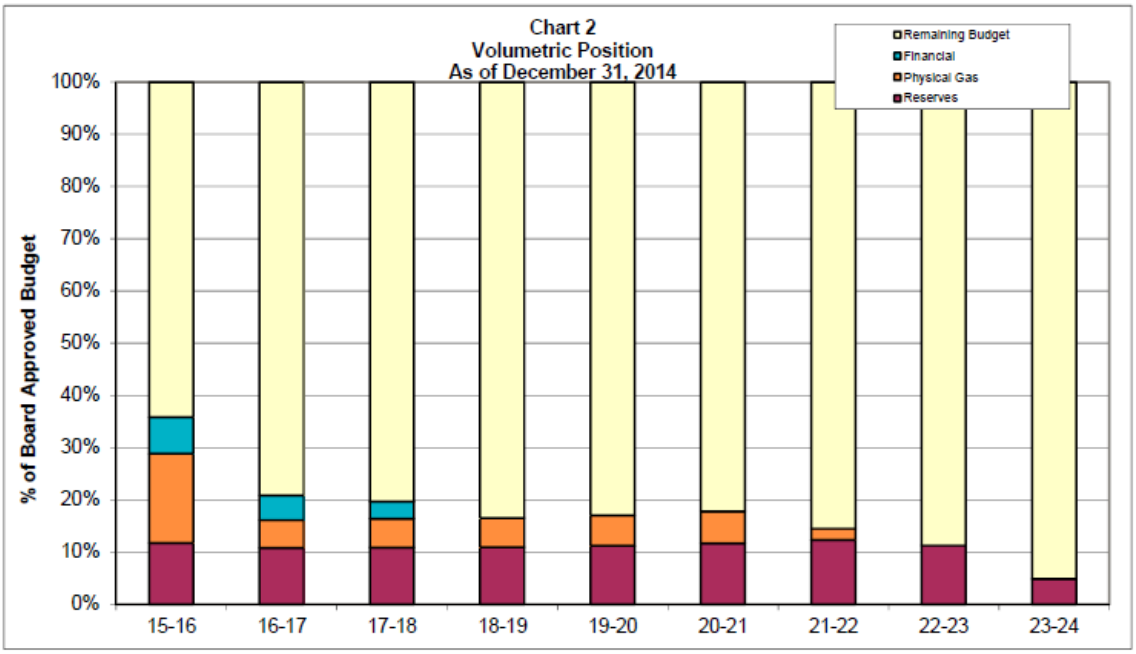
The Department has had a fuel hedging program in place since just after the last energy crisis in FY 2001-02, and prior to FY 2008-09, LADWP was active in its natural gas hedging program and had hedged up to 50% of its budgeted volume requirements using dollar cost averaging method for up to ten years forward. No new physical or financial hedges were entered into from 2009 through 2013 due to several factors, including (1) falling gas prices, (2) the VEA that allowed pass-through (without caps) of all fuel costs; (3) expected increased production volume from the Natural Gas Reserves in Pinedale, Wyoming; and (4) the anticipation of long-term fixed-price Biogas contracts as part of its Renewable Portfolio Standard (RPS) program. However, given the recognition that gas prices remain the largest driver of unplanned rate volatility, the Department recognizes that a properly structured hedging program is in its customers' interests. In 2014, LADWP retained a consultant to review the hedging program to ensure that the goal of reducing rate volatility was most effectively achieved. The Department's consultant recommended a hedging framework that provides an integrated approach for developing and evaluating hedging strategies that satisfies LADWP's stated goal of reducing potential rate volatility.

Staff, during 2014, developed a short term hedging plan and executed hedges related to the current and following fiscal year, with the goal of having the nearest fiscal year 50% hedged. The chart below shows the remaining current fiscal year hedging status, with 53.2% hedged:



The core of the program, however, will be to implement hedges for up to five years out, with decreasing amounts hedged from 50% down to 10% in year five (a "stair step" plan). The following chart shows the Department's current hedged status for future years, and indicates that additional hedges (particularly in the first three years) will be required to achieve these

targets.



Such hedges would be added using a dollar cost averaging approach. These longer term hedges will be achieved through either fixed physical contracts or financial contracts. In March 2015, the Board of Water and Power Commissioners (Board) approved a Dodd-Frank Act compliance policy to help ensure its compliance with Dodd-Frank requirements. The Department will begin implementing the hedging strategy for the five-year "stair-step" plan. In addition, the Department has a goal of executing hedges such that unplanned rate changes will not (with a 95% confidence level) vary by more than 1% from the announced level due to natural gas volatility. The Department's hedging strategy is to be developed by the Power System's Fuel and Power Purchase Division with oversight of the Energy Services Executive Risk Policy Committee, and approval by the General Manager.

To enhance transparency of the operation and effectiveness of the hedging program, the Department began publishing the Risk Control Reports to the Board. These reports show the Department's anticipated fuel requirements over ten years, what portion of the requirements are hedged and through what manner, and indicate whether the Department is in compliance with the various ordinance and internal requirements governing the hedging program.

h. Establish a plan for energy efficiency that maintains expenditure levels at an achievable and cost effective level.

LADWP has significantly increased its energy efficiency (EE) program targets and has developed/updated its EE Portfolio Business Plan. For FY 2014-15, the EE program portfolio is consistent with existing approved rates. The Efficiency Solutions Portfolio Business Plan includes a significant ramping up of programs and GWh savings through 2020 consistent with the overall Board-adopted EE plan principles in a manner designed to maximize the savings while minimizing the customer rate impact. Highlights of the new EE Portfolio Business Plans

include the following:

- Direct Install Programs: LADWP continues its $60M/year of Direct Install programs, serving residential (HEIP) and small business (SBDI) customers, as well as LAUSD (LAUSD DI)
- Joint Programs with Southern California Gas (SoCalGas): As part of the expanded EE portfolio, LADWP has been entering into joint programs with SoCalGas for residential and commercial new construction programs and a comprehensive home retrofit program. LADWP has also entered into partnerships with SoCalGas on SBDI and LAUSD, as well as a combined effort to provide technical project development assistance to larger, more complex projects. In addition, LADWP and SoCalGas are exploring partnering on a food service program. All of these joint efforts bring economies of scale to both LADWP and SoCalGas.
- Codes and Standards: LADWP is adopting the Codes & Standards methodology used by the Investor-Owned Utilities (IOUs) to account for declining overall savings potential in voluntary EE programs due to increasingly stringent codes and standards.
- Use of bond financing in lieu of customer billings to fund EE programs which allows for lower customer rate impacts and better alignment of the program costs over the life of the EE investments.

LADWP is required by SB 1037 to perform regular measurement and verification on its EE programs to evaluate the performance of EE investments, and commit to applying the feedback received to the portfolio in order to drive continuous improvement in future program design and execution. Therefore, LADWP has and will continue to update the EE Portfolio Business Plans to incorporate refined projections for coming years based on actual performance. The EE potential study has been completed. Results indicated achieving 15% EE by 2020 is both cost effective and achievable. As a result of these findings, the Board has formally adopted the 15% EE goal by 2020.

i. Seek greater Departmental efficiencies by pursuing process improvement efforts across a range of areas and practices.

LADWP has created a new Corporate Performance function. This function will first seek to evaluate the overall performance by conducting a high-level benchmarking study, followed by a more In-Depth Follow-up study to specifically evaluate where there are opportunities to improve cost, reliability, and/or customer service performance of LADWP. Ultimately, the results of these studies will result in a number of Business Process Mapping Studies where LADWP operations can be compared to and moved toward industry best practice. Some potential changes could require the “meet and confer” process, as well as require subsequent MOU changes.

Additionally, consistent with the Mayor’s goal of making City government more efficient and effective, LADWP will be implementing the COMSTAT key performance indicator tool and process throughout the Department, beginning with a soft launch in April 2015. The COMSTAT is built on a single platform with four tiers of performance indicators, each tailored to the appropriate audience. The targeted data monitors and manages dozens of key performance indicators at the Departmental, System, and Division levels, and the integrated COMSTAT platform enables LADWP to evaluate and verify the integrity of the indicators. The goal of the COMSTAT system is to define a “single source of truth” for key indicators and enable

transparency for the Mayor, the City, and the public. LADWP expects the COMSTAT tool to be fully operational by the end of 2015.

In FY 2011-12, LADWP initiated a Department wide $459 million, three-year cost reduction program. The final results from the cost reduction plan, concluded in June 2014, exceeded the total $459 million cost reduction plan target. The source of the cost savings has changed somewhat, and the Department has saved more through non-labor and capital budgets; however, LADWP has managed the overall portfolio of savings opportunities to exceed the original target by $7.8 million.

Source	February 2011-June 2014 Savings ($M)
Labor	$230.0
Non-Labor	$142.8
Capital	$94.1
Total	**$466.9**

As a result of these cost reduction efforts, LADWP had no rate ordinance changes for both Water and Power in FY 2014-15. It should be noted that LADWP has used cost containment programs to limit rate actions in the past. Results of this are:

- Water System: The Water System has not had a base rate increase for five years, with the last base rate increase taking place in FY 2009-10. The last rate ordinance change took place with the Water Quality Improvement Adjustment Factor cap increase in FY 2011-12.
- Power System: Over the five-year period, Power System has gone through three of the years (FY 2010-11, FY 2011-12, and FY 2014-15) without any base rate increase. The last rate ordinance change was a two-year rate action for FY 2012-13 and FY 2013-14.

j. Submit a semi-annual report to the Mayor and Council regarding the status of the Renewable Portfolio Standards program and its impact on rates.

LADWP currently reports monthly on the status of the RPS program to the Board. This report provides LADWP's portion of energy derived from renewable sources, the status of the solar incentive program, a listing of projects (current, under-construction, planned and potential), Feed-In Tariff (FiT) information, and their contribution toward RPS goals.

On a quarterly basis, as part of the Energy Cost Adjustment (ECA) calculation, LADWP provides for Board approval costs related to the RPS program, which are allocated to the Variable Renewable Portfolio Standard Energy Adjustment (VRPSEA) and the Capped Renewable Portfolio Standard Energy Adjustment (CRPSEA). In conjunction with this, LADWP is also required to provide one, two, and three-year projections for the CRPSEA factor. If the projected charges do not adequately fund the planned project costs, such that a balance of $50 million to under $100 million is projected, then LADWP must communicate this to the Board and City Council. If the projected balance grows to $100 million or more in the three-year projection, LADWP's Board shall fix rates as necessary. This reporting requirement seeks to ensure that

there will be no unexpected rate increase in the future as a result of LADWP RPS projects.

H. PRAG FINANCIAL METRICS

This appendix provides Public Resources Advisory Group's (PRAG's) letter on June 12, 2013 to LADWP regarding financial metrics.