# The Los Angeles Solar Energy Plan

Mayor Antonio R. Villaraigosa

Los Angeles Department of Water and Power

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# EXECUTIVE SUMMARY

## THE CHALLENGE

Cities and countries across the world are struggling to deal with the devastating effects of climate change and to curb their contribution to this global crisis.

For decades, the City of Los Angeles – home to more than 4 million people – has been synonymous with the smog and sprawl at the heart of this crisis. In 2004, the City emitted over 50 million tons of carbon dioxide into the atmosphere – more than the entire country of Sweden. One-third of the emissions came from the municipally owned Los Angeles Department of Water and Power (LADWP), which today draws 76 percent of its energy from the fossil fuels of coal and natural gas.

Confronted with the reality that climate change diminishes the quality of life for everyone who lives and works in America's second largest city, in 2007 Mayor Antonio Villaraigosa released the Green LA initiative in 2007 to reduce the City's carbon emissions to 35 percent below 1990 levels. The cornerstone of the aggressive plan is to increase LADWP's Renewables Portfolio Standard to 35 percent by 2020. Under the Mayor's tenure, LADWP has more than tripled its renewable energy portfolio in less than 4 years to 10 percent.

The City's peak electricity demand particularly from residential customers has risen to all-time highs in Los Angeles, while stricter state regulations have added pressure on the City to move quickly to diversify its energy mix away from carbon based energy resources. The City now faces a challenge to find a path to reliable, renewable energy on a system-wide scale.

## MEETING THE CHALLENGE: SOLAR LA

The answer to this challenge lies partially in the source of our City's problem: The 276 days of sunshine in Los Angeles. While long, hot summer days drive peak energy demand, the sun's power and our climate make solar power Los Angeles' most abundant natural resource.

Solar LA seeks to harness this power by laying out a far-reaching course of action to create a 1.3 gigawatt solar network of residential, commercial and municipally-owned solar energy systems.

Solar LA is simply the largest solar plan undertaken by any single city in the world – with the utility-owned portion of the plan alone representing more solar capacity than in all of California today. By 2020, the plan will lower carbon

emissions in Los Angeles and increase the City's solar portfolio by nearly 100-fold.

Solar LA also represents a major opportunity to turn environmental solutions into economic opportunities for Angelenos by investing in and stimulating the local economy. When every 10 megawatt (MW) of solar can create 200 to 400 jobs, the opportunity for green-collar jobs in Los Angeles is substantial and reaches across a broad range of occupations: research and development, manufacturing, installation, maintenance and repair.

The Solar LA plan consists of three primary components: Programs to boost residential and commercial customer solar systems; LADWP-owned solar projects in Los Angeles; and large-scale solar projects located outside the Los Angeles basin.

**Customer Solar Programs** – *Total goal: Installation of 380 MW by 2020*

- Expand Residential Program: Using $313 million in power revenue funds set aside in support of the state's SB1 program for solar projects, LADWP will expand its incentive programs to encourage DWP ratepayers to install solar panels on their roofs. In low-income communities, LADWP will provide solar systems at substantially lower cost to a limited number of qualified customers. LADWP will also look to extend to residential customers low-interest loans for the installation of solar systems now available to commercial customers. In an effort to widen customer access to solar power, LADWP anticipates that a number of innovative financing models will be explored including loans made to residential customers that are repaid through property taxes. The goal is to install 130 MW of customer owned solar systems by 2020.

- New Feed-in Tariff (FiT): A significant challenge to developing solar projects in Los Angeles has been the long-standing prohibition against non-LADWP entities from selling electricity to other customers on the local grid. A Feed-in-Tariff (FiT) program would help to bridge this problem by allowing a solar developer in the City to sell wholesale power directly to LADWP through a long-term contract between the private seller and LADWP. These third-party sellers could take advantage of tax incentives of 30-60 percent of the installation costs, and after 5-8 years may chose from several options including selling the solar systems to LADWP. The FiT goal is to install 150 MW of solar systems by 2016.

- New SunShares Program: For residential customers interested in investing in solar power, but without the means or opportunity to install their own solar systems, SunShares will give customers the opportunity to purchase shares of an LADWP solar power plant. SunShares would leverage the collective purchase power of groups of customers to fund

commercially-sized solar power plants built and operated by LADWP. Customers, in turn, would receive their "dividend" through net-metering credits on their own energy bills earned on their share of a centralized solar plant. The goal of SunShares is to install 100 MW of solar systems by 2020.

**LADWP-owned Solar Projects in LA** – *Goal: Installation of 400 MW by 2014*

- Installing solar systems on rooftops, reservoirs and parking lots on City-owned property, the Los Angeles Green Energy and Good Jobs for Los Angeles Initiative is a critical step towards ensuring future generations of Angelenos will not have to rely on dirty, polluting energy sources. Under the Initiative, LADWP installs 400 MW of solar systems by 2014. This utility-owned component alone would make the City of Los Angeles the national leader in solar energy generation.

**Large-Scale Solar Projects** – *Goal: Installation of 500 MW by 2020*

- Taking advantage of some of the world's best solar resource areas in the nearby Mojave Desert, LADWP will procure 500 MW of utility-scale solar power projects developed under agreements with third-party solar developers. These "out-of-basin" solar energy systems will leverage existing infrastructure wherever possible, including feeding into LADWP-owned transmission stations in the area. These projects will be developed by private developers through power purchase agreements that give LADWP the option to purchase the plants after about eight years.

By tapping its most abundant natural resource, the City of Los Angeles seeks to create a home-grown solution to an energy and public health problem facing cities across the country.

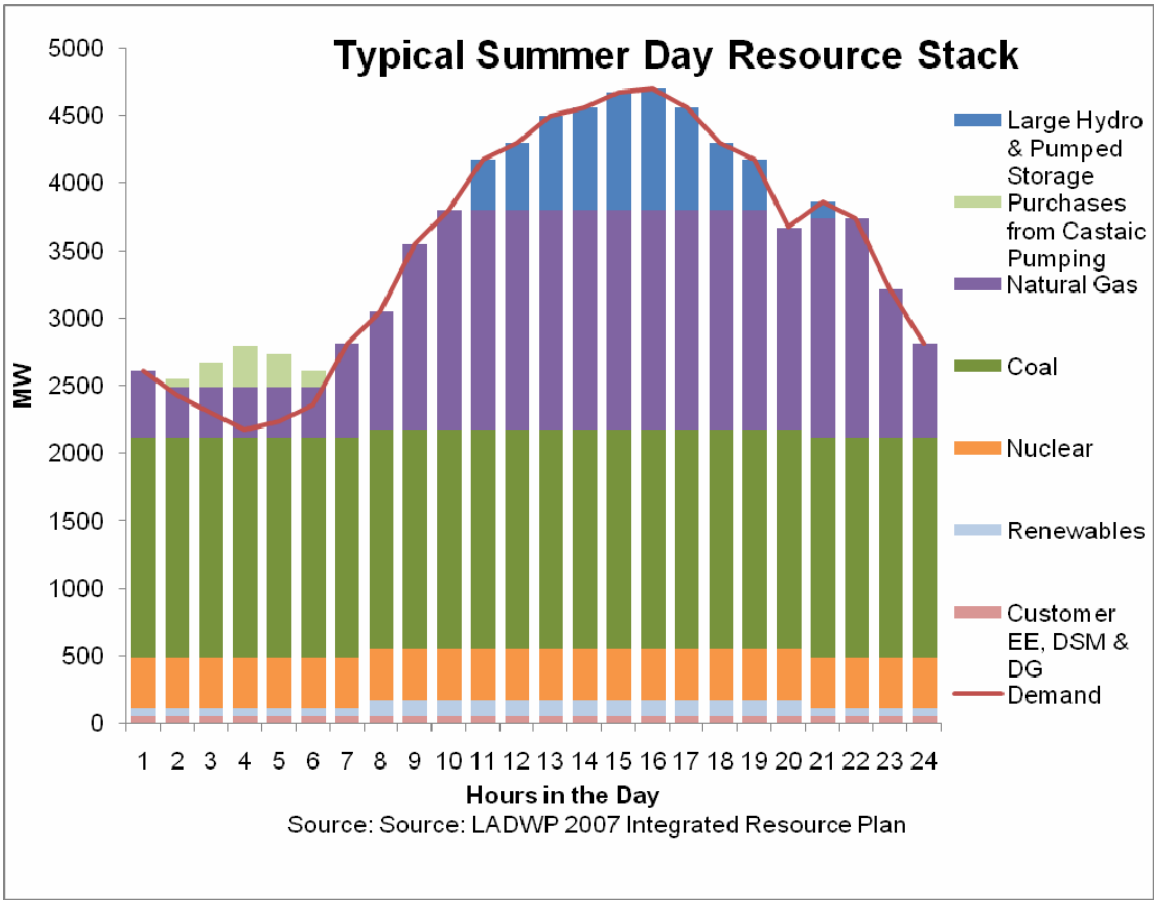
While "going solar" will require a significant up-front investment by LADWP it will also require that the solar industry do its part to lower the relative cost of solar energy to make this ambitious plan viable. Moreover, proposed Federal and State mandates for Los Angeles to increase its renewable energy portfolio will require the City to invest now for the long-term or face stiff financial penalties and continued challenges to its jurisdictional integrity. Under these pressures, Solar LA will provide Los Angeles with the best option for a reliable, self-sufficient and diverse energy portfolio by shifting away from fossil fuels.

Solar LA serves as more than a blueprint to a greener LADWP. By sparking a broad movement through a sustained commitment to solar energy across a city of 4 million residents, the plan primes the pump for Los Angeles to become a world leader in the solar industry and delivers on the vision of re-making Los Angeles into the cleanest, greenest big city in America.

# OVERVIEW OF ENERGY IN LOS ANGELES

## LA'S SUPPLY & DEMAND FOR ELECTRICITY

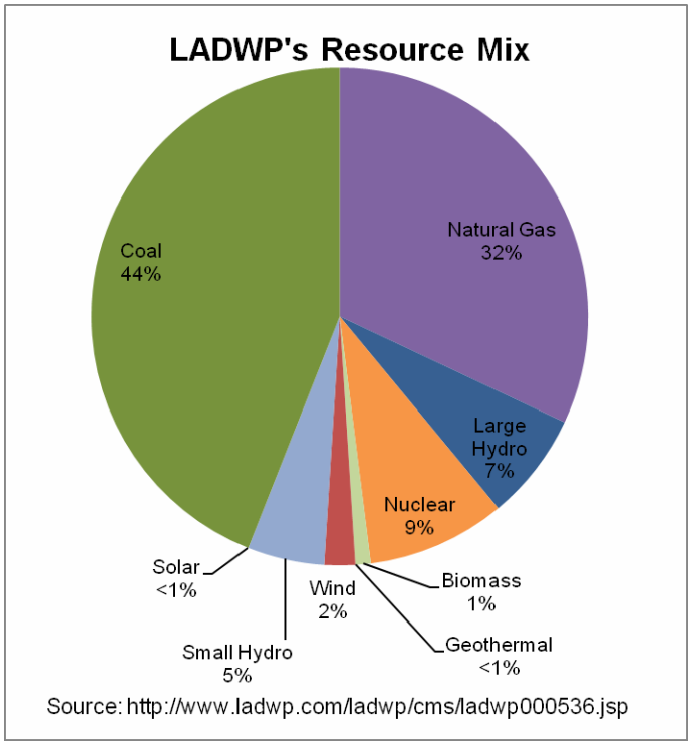
Peak electricity demand in Los Angeles is 6,165 megawatts (MW). On a typical summer day, demand is about 5,100 MW at the daily peak. The level of demand – or the "load" – changes depending on the time of day and time of year. For instance, during the summer, electricity demand reaches "peak load" between the hours of 12 noon and 6 pm, because of increased air conditioning, lighting, commercial, residential, and industrial electricity usage. The figure below shows the hourly electricity demand profile for a summer day within LADWP territory.




Throughout the day, the LADWP will increase or decrease its supply of electricity to fit demand. Baseload resources, such as coal, large hydro and nuclear plants, supply power on a sustained basis over the course of the day and typically do not vary production with changes in demand. Peaking resources, provided primarily from LADWP's in-basin natural gas-fired power plants, supply power on a variable basis and can be ratcheted up or down as required by changes in daily demand.

## LADWP'S CARBON FOOTPRINT

Today, LADWP relies primarily on fossil fuels to produce electricity for its 4 million residents. The chart below shows the most recent breakdown of generation resources used by LADWP to provide electricity to its customers. Fossil fuels account for 76% of the energy produced by LADWP – 44% comes from coal plants and 32% comes from gas-fired plants.




The primary sources of coal-energy are the Intermountain Power Project, located in Utah, and the Navajo Generating Station, located in Arizona. LADWP's natural-gas plants are located throughout the Los Angeles basin.

Through its production of electricity, LADWP accounts for 16.6 million metric tons of carbon dioxide ($CO_2$), representing a major source of $CO_2$ emissions from Los Angeles municipal operations[i].

## EFFORTS TO COMBAT GLOBAL WARMING

In May 2007, Mayor Villaraigosa introduced "Green LA: An Action Plan to Lead the Nation in Fighting Global Warming," which set the goal of reducing the City's carbon dioxide emissions to 35% below 1990 levels.

Under the Green LA Plan, the Mayor called on the LADWP to increase its reliance on renewable energy sources to 20% by 2010 and to 35% by 2020 through its Renewable Portfolio Standard (RPS) goals. LADWP is on track to reach these goals through an aggressive program to develop a variety of

renewable energy sources including solar, wind, hydroelectric, biomass, and geothermal.

## THE ROLE OF SOLAR ENERGY

This past summer, the City experienced record energy demand, making the role of solar power even more crucial. Solar technology is most effective on cool, sunny days, producing electricity during afternoon hours which coincides with the time of our highest electricity demand. By nature, solar energy is available when electricity is most expensive and demand is the highest – during "peak" hours.

Consequently, solar power is the ideal renewable alternative to meet the City's peak load – constituting a sustainable, carbon-free "peaking resource" that is expected to help mitigate the City's reliance on natural gas-fired generation. By increasing solar energy production, LADWP can reduce reliance on natural gas-fired plants particularly during spring and summer peak demand periods. This action will also reduce carbon emissions ($CO_2$) by about 400,000 metric tons per year, or 2.5 percent of LADWP's current $CO_2$ emissions.

The increased use of solar energy and partial displacement of natural gas-fired generation will also offer environmental justice advantages through its beneficial impact on air quality throughout Los Angeles and in particular those communities surrounding LADWP's natural gas-fired peaking stations. By reducing our reliance on natural gas, we improve the health and quality-of-life for all Angelenos.

## BUILDING THE GREEN ECONOMY IN LOS ANGELES

Solar LA represents a major opportunity to turn environmental solutions into economic opportunities for Angelenos. The LADWP and the City will not only reduce emissions and fight global warming, but also use Solar LA to stimulate our local economy and grow local green jobs.

The solar industry is growing rapidly[ii], and following the 8-year extension of the federal investment tax credit (ITC), the Solar Energy Industries Association (SEIA) reported that an economic study by Navigant Consulting, Inc. predicts the solar industry to gain 440,000 permanent jobs and $325 billion in investment by 2016. The opportunity to create good jobs for Los Angeles residents is substantial, and across a broad range of occupations: R&D, manufacturing, services, installation, maintenance and repair. In particular, many solar firms typically represent occupations that do not require a four-year degree and community colleges can provide an excellent path to employment in the solar industry.

To capture these jobs, in partnership with the City of Los Angeles, LADWP will develop a comprehensive and world-class program to leverage Solar LA and

grow the green economy in Los Angeles. This aggressive renewable program will encourage the growth of solar-related businesses in Los Angeles, facilitate the development of a solar innovation cluster in Los Angeles and create the foundation for the growth of green collar jobs.

## THE COST OF SOLAR ENERGY

Although increased use of solar may help decrease the immediate need to build new fossil fuel fired peaking power plants, solar still remains relatively expensive as compared to both conventional and renewable energy sources (see chart below).

This can change over time but overcoming this hurdle will require a commitment by installers and manufactures to help lower the relative cost of solar power. Broader use of solar technologies is expected nationwide, as all utilities including LADWP report record peak loads. A dramatic increase in residential "peak power" demand is expected to drive further growth in the solar industry. LADWP believes that by making a sustained commitment to the solar industry, it will realize the benefits of this partnership through improved economies of scale and volume solar equipment purchases.

LADWP is also expected to benefit both operationally and financially from continued technological advancement. A welcome development of Solar LA is that of new market entrants with various types of pure silicon and non-silicon based solar technologies. While LADWP will not attempt to pick technology "winners," it should encourage innovation and technological advancement which should further reduce the relative cost of solar power.

**Typical Energy Resources**

| Resource Type | Generation Type | Economic Life (Years) | Capacity Factor (%) | Energy Cost (cent/kwh) |
|---|---|---|---|---|
| Combined Cycle Gas | Intermediate/Base | 30 | 80 – 95 | 5.5 - 11.0 |
| Simple Cycle - Gas | Peak | 30 | 10 – 90 | 6.5 – 17.5 |
| Coal | Base | 30 | 85 – 95 | 2.0 - 4.0 |
| Wind | Intermittent | 30 | 27 – 36 | 6.0 - 10.5 |
| Geothermal | Intermediate/Base | 30 | 80 – 95 | 8.0 – 12.0 |
| Landfill | Intermediate/Base | 30 | 80 – 95 | 6.0 – 11.0 |
| Biomass | Intermediate/Base | 30 | 80 – 95 | 8.0 - 13.0 |
| Solar/Thermal | Peak/Intermediate | 30 | 25 – 35 | 8.5 - 21.0 |
| Photovoltaic | Peak | 30 | 18 – 25 | 17.0 – 30.0 * |
| Fuel Cell | Intermediate/Base | 30 | 80 – 95 | 8.0 – 35.0 |

* These estimates assume availability of tax credits, volume discounts, enhanced performance and technological innovations, economies of scale etc.

In addition, Federal and State tax subsidies will be essential in supporting long-term investment in developing new, more efficient, and less expensive solar equipment. If the solar industry is going to grow and thrive in the United States, extension of tax credits must remain a priority.

The Emergency Economic Stabilization Act of 2008 (H.R. 1424) was signed into law on October 3, 2008 as part of a Federal stimulus package, extending a 30 percent tax credit on the total installed cost of a commercial or residential solar project. Several creative ownership structures including the use of financial institutions are being reviewed that may allow LADWP to take advantage of federal tax credits and pass along the benefits to its ratepayers. Presently, LADWP, in cooperation with the City Attorney's Office, is reviewing financial structures that will permit the use of federal tax credits and accelerated depreciation schedules directly on projects installed, operated and maintained by LADWP. Both credits are scheduled to expire on December 31, 2016.

# SOLAR LA: THE LOS ANGELES SOLAR ENERGY PLAN

Solar LA includes three main structural components:

1. Customer Solar Program
2. Utility-owned Solar Program
3. Large-scale Solar Program

## COMPONENT 1: CUSTOMER SOLAR PROGRAMS

GOAL: Install a total of 380 MW by 2020:

Solar LA will expand existing customer solar programs, and include some new elements:

- Expanded Residential Programs (130 MW)
- LADWP Feed-in Tariff (150 MW)
- SunShares Program (100 MW)
- Expand Innovative Financing
- Solar Water Heating

### Expanded Residential Program

GOAL: Install 130 MW on residential rooftops by 2016

BENCHMARKS:

| Year | Cumulative Installed Solar Capacity (MW) |
|---|---|
| 2009 | 21 |
| 2010 | 27 |
| 2011 | 36 |
| 2012 | 46 |
| 2013 | 60 |
| 2014 | 78 |
| 2015 | 100 |
| 2016 | 130 |

LADWP will continue to offer rebates under its existing solar incentive program to customers who wish to install and operate solar equipment on their own home or business. To date, this program has stimulated development of an estimated

200 full time jobs in the manufacture and installation of solar equipment. LADWP is committed pursuant to the state's SB1 program to offer $313 million in rebates to its customers through 2016, which it intends to use in support of development of up to 130MW in new solar installations.

**LADWP Feed-in Tariff (FiT)**

GOAL: Install 150 MW of solar capacity by 2016

BENCHMARKS:

| Year | Cumulative Installed Solar Capacity (MW) |
|---|---|
| 2009 | 1 |
| 2010 | 7 |
| 2011 | 16 |
| 2012 | 30 |
| 2013 | 47 |
| 2014 | 72 |
| 2015 | 105 |
| 2016 | 150 |

A significant challenge to developing new solar projects in the City has been the longstanding prohibition against entities other than LADWP selling electricity directly to its customers that restricts use of some power purchase agreements. LADWP is proposing a new program that directly addresses this "direct access" issue, which will create a new market opportunity for solar project installers. Solar LA includes a new program element, known commonly as a Feed-in Tariff that will be designed to permit project developers to build solar systems on buildings within the City and sell the power to LADWP through a long-term contract between the private energy producer and LADWP.

By allowing third party ownership of the solar power facility during the tax incentive vesting period (currently 5 years from the date of initial operation for the Investment Tax Credit and 8 years for accelerated depreciation), solar customers can realize 30 to 60 percent price reductions in the installed cost of these systems. Once the tax benefits are exhausted and tax code recapture provisions are satisfied, an option for either the site owner or LADWP itself, to purchase the solar energy system may be exercised.

Feed-in Tariffs provide certainty to solar project developers by offering a long-term contract with LADWP to receive payments for energy production from a solar facility. Feed-in Tariffs have been used throughout Europe to stimulate rapid deployment of renewable technologies. LADWP's proposed Feed-in Tariff

will be made available through a Standard Offer Power Purchase Agreement (SOPPA). SOPPA projects will likely be built at privately held customer sites within LADWP service territory with all electricity produced sold directly to LADWP.

Under SOPPA, LADWP would pay an established price that would be set at the market price of power plus a "green" marker premium paid for the renewable value of solar power. The SOPPA program will allow solar developers or customers to take advantage of significant tax benefits in addition to LADWP's SB1 solar incentives. These tax subsidies provide a significant and important cost reduction benefit to entities like LADWP which are generally unable to take advantage of federal tax incentives because they have no tax liability. These non-taxable entities may also include schools or non-profits or building owners who lack capital to purchase a solar energy system on their own.

**SunShares Program**

GOAL: Install 100 MW by 2020.

BENCHMARKS:

| Year | Cumulative Installed Solar Capacity (MW) |
|---|---|
| 2009 | 1 |
| 2010 | 5 |
| 2011 | 10 |
| 2012 | 20 |
| 2013 | 30 |
| 2014 | 40 |
| 2015 | 50 |
| 2016 | 60 |
| 2017 | 70 |
| 2018 | 80 |
| 2019 | 90 |
| 2020 | 100 |

The SunShares Program (SunShares) will provide LADWP customers the chance to purchase an ownership interest in a solar power plant. The SunShares program will enable anyone, including low and moderate income customers, the prospect of owning a "virtual share" of an LADWP solar power facility. LADWP's SunShares program will offer customers the opportunity to participate in the solar program who otherwise could not install solar systems because they either do not own the property or face a financial constraint that prohibits them from having a solar system on their home.

SunShares will leverage the collective buying power of groups of customers to jointly fund development of a commercially sized solar power plant constructed and operated by LADWP. Unlike the utility-owned solar program, SunShares customers would form a partnership with LADWP to become "virtual owners" of solar energy systems sized large enough to achieve greater economies of scale (i.e. over 50kW in size) than could be accomplished by LADWP customers individually. Each solar energy plant would be paid for through a combination of LADWP power revenues and funds generated through a SunShares customer premium rate package. SunShares revenues would then be paid into an account designed to help fund the development costs of solar power facilities located throughout Los Angeles.

LADWP intends to develop a "rate protection" mechanism to ensure that SunShares participant rates reflect the net-metering benefits associated with their solar investment during the contract term, which is expected to be up to 20 years depending on the expected life of the underlying solar assets.[iii] A marketing and outreach campaign will also be developed by LADWP to create a personal connection between SunShares customers and "their" solar plant including updates on the construction and performance of the facility.

## Innovative Financing

LADWP is exploring ways to expand its existing loan program to offer low interest loans to residential customers in an effort to make solar installations more affordable for more customers. Currently, LADWP offers low interest loans to commercial customers for utility infrastructure improvements, including energy efficiency upgrades and solar installations. At present, these loans are being extended for up to 10-year terms at interest rates between 5 and 6 percent.

LADWP will also consider a new financing model similar to one that will be offered by the City of Berkeley, California. In the Berkeley model, the City of Berkeley will finance installation of a residential solar system, which the customer then repays through their property taxes. The assessment remains with the property so that if the property is sold, the repayment will carry forward to subsequent owners. A pilot program to test the Berkeley model will be demonstrated later this year in Northern California. The results of the pilot will be reviewed by LADWP to determine applicability here in Los Angeles.

Regardless of which financing strategy is ultimately adopted in support of Solar LA, LADWP will remain committed to providing the lowest cost, most reliable electricity service possible to its 4 million residents.

## Solar Water Heating

LADWP will work with the Mayor's Office and City staff to propose that the City's Green Building Ordinance and related "green" building codes include minimum solar energy requirements including, requiring solar water heaters on all new

construction. Switching to energy efficient technologies like solar water heaters will not only extend the life of the region's energy supplies but will substantially reduce LADWP's greenhouse gas emissions. Additionally, LADWP has initiated discussions with Southern California Gas Company to develop programs designed to encourage customers to convert gas water heating to solar water heating. The Gas Company is offering up to $2,000,000 in incentives and rebates per large industrial customer for various energy efficiency and process improvements and equipment replacement including, but not limited to, solar water heaters. LADWP will partner with the Gas Company to determine how to leverage their respective rebates and incentives.

### COMPONENT 2: UTILITY-OWNED SOLAR PROGRAM

GOAL: Install 400 MW by 2014.

BENCHMARKS:

| Year | Cumulative Installed Solar Capacity (MW) |
|---|---|
| 2009 | 0 |
| 2010 | 50 |
| 2011 | 125 |
| 2012 | 200 |
| 2013 | 300 |
| 2014 | 400 |

Mayor Antonio Villaraigosa, the City Council and Working Californians, a non-profit organization, recently sponsored the Los Angeles Green Energy and Good Jobs for Los Angeles Initiative (Initiative). The Initiative calls for installation of solar energy systems sufficient to produce at least 400 MW of generation capacity primarily on property located in the City of Los Angeles by 2014. LADWP estimates that 400 MW of capacity would provide for the electricity needs of about 100,000 customers. These solar energy systems would be installed, owned, operated and maintained by LADWP except as required to take advantage of federal tax subsidies.

LADWP will initially focus on installing solar systems on City-owned properties located throughout Los Angeles including City-owned airports. The initial planning effort will include, but not be limited to, developing staffing, costing and load forecasting models to create a set of standardized protocols to support large scale roll out of this program. In order to lower the cost of the Initiative, LADWP will focus on large-scale projects sited on properties located in places like the San Fernando Valley where the solar resources are the best.

In the process of preparing Solar LA, LADWP identified a number of buildings it owns as well as buildings in commercial and industrial zones that have potential to host large scale installations. In addition to rooftops, LADWP intends to utilize properties located throughout the City including structures such as transmission corridors, reservoirs and parking lots. LADWP's utility-owned solar program will substantially expand its existing residential rooftop program and will also provide an opportunity to develop new blue and green collar jobs in the City. LADWP plans to coordinate with IBEW Local 18 to site solar projects at or near existing load centers in order to minimize the cost of traditional electric utility infrastructure needed to import power produced outside the Los Angeles basin.

LADWP has begun developing a detailed plan in support of the Initiative which is due within 90-days of its approval date. This plan is to include a cost analysis, financing strategy, a rooftop and City-owned property availability survey, a job training and job creation program, incentives for in-basin solar manufacturers as well as private property owners. The plan also calls for stakeholder outreach including regular status updates to the Board of Water and Power Commissioners (Board) and City Council.

### COMPONENT 3: LARGE SCALE SOLAR PROGRAM

GOAL: 500MW by 2020

BENCHMARKS:

| Year | Cumulative Installed Solar Capacity (MW) |
|---|---|
| 2009 | 0 |
| 2010 | 75 |
| 2011 | 150 |
| 2012 | 200 |
| 2013 | 200 |
| 2014 | 250 |
| 2015 | 250 |
| 2016 | 300 |
| 2017 | 350 |
| 2018 | 400 |
| 2019 | 450 |
| 2020 | 500 |

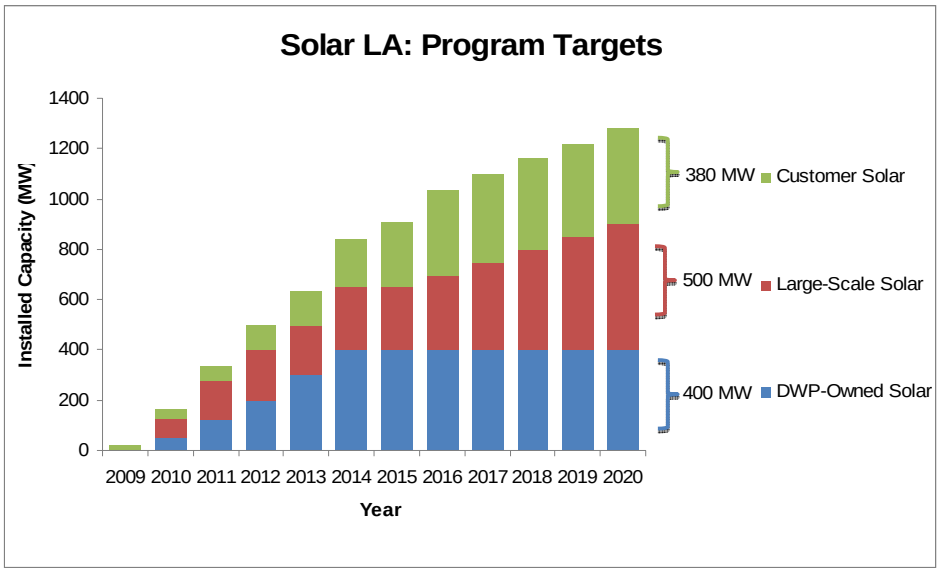
Some of the best solar resource areas in the world are located just north of Los Angeles, in the California deserts, particularly from Mojave eastward. These areas combine very high annual solar energy levels (the amount of solar energy

striking the Earth that can be converted to usable energy) with wide expanses of flat, undeveloped land. LADWP has two high voltage transmission systems located within the area that are well suited to receiving large amounts of solar generated electricity.

LADWP intends to procure at least 500MW of large scale solar power facilities to help meet Los Angeles' on-peak electricity needs. Most of these large-scale plants will probably be developed in response to Request for Proposals offering long-term Power Purchase Agreements (PPAs) to third-party solar developers that can take advantage of tax subsidies. Once approved, these PPAs will include options for LADWP to acquire the plants after the tax benefits have been monetized, which is typically 8 years after commercial operation.

These out of basin plants will be large, commercially sized solar energy systems whose electricity price is about half that of conventional solar PV installations. These plants also produce more electricity than systems installed in more urban settings as they typically are located in the desert where the solar resource is better. Some large-scale solar projects may also include mechanical tracking systems that allow the system to automatically orient its energy collection to follow the movement of the sun and optimize the solar system's output.

These out of basin solar facilities present their own environmental challenges because they occupy large surface areas. For example, 500MW of conventional solar energy plants have a footprint of about 5 square miles of desert land and, in the case of concentrating solar plants, may also need a water supply from which to create steam for use in a steam turbine. Accordingly, any and all necessary environmental assessments and attendant mitigation measures will need to precede development of these projects. Moreover, LADWP will work closely with the local desert communities and environmental groups to minimize the impacts of its renewable power plants.



# IMPLEMENTATION & NEXT STEPS

Over the next 90 days, the LADWP will develop a detailed implementation plan for Solar LA. Solar LA should be implemented with the following objectives in mind:

I. Improving Service, Reliability, and Stabilizing Rates
II. Building the Green Economy in Los Angeles
III. Economic & Community Opportunities

## I. IMPROVING SERVICE, RELIABILITY, & STABILIZING RATES

### Incentive Rate Structure

Low energy rates and system reliability are some of the key benefits of vertically integrated, publicly owned utilities like LADWP. However, in a service territory with such low energy rates, the financial motivation for customers to purchase a solar energy system is significantly diminished. In May 2008, the LADWP Board of Commissioners attempted to address this challenge by adopting a new Electric Rate Restructure designed to send the appropriate pricing signals to customers to encourage both energy efficiency (reducing usage during peak hours) and investment in renewable energy.

The rate design changes shifted some revenue collection from demand charges to energy charges and established a tiered rate structure that charges customers based on their actual consumption. LADWP's new rate design ensures that lower rates are charged for lower consumption. It also allows time of use customers to receive monetary credits for energy produced during peak times that can be used to offset lower cost energy usage during off peak time periods. The adoption of these rate changes are designed to create a financial incentive to promote customer solar installations within LADWP service territory.

**Action Item**:

- LADWP will explicitly link the May 2008 rate restructure to Solar LA.

### Net Metering

A new Net Energy Metering Rate Ordinance became effective September 1, 2008. Net Energy Metering (NEM) allows customers to measure the difference between the electricity supplied from the electric grid and the electricity generated on the customer's premises and delivered back to the electric grid. Typical systems are designed to offset most if not all of a customer's bill and some systems actually provided net energy back to the utility grid. The NEM Rate Ordinance is applicable to any Customer who owns and operates a solar

electrical generating facility with a capacity of not more than 1MW and is located on the customer's premises. LADWP's net metering rate goes beyond what is being offered by the state's investor owned utilities and is applicable for solar generating facilities that are intended primarily offset part or all of the customer's own electricity requirements. Without NEM, the Electric Rate Restructure could not serve as a financial incentive to promote customer solar installations.

**Action Item**:

- LADWP will take measures to enable broad use of Net Energy Metering.

## Permitting & Interconnection

LADWP will continue its efforts to improve customer service. This extends to the process by which solar customers are able to interconnect with the DWP grid. Much like the City's Green Building efforts, multiple departments will be required to work in conjunction with LADWP to establish and connect solar equipment.

**Action Item**:

- Working with other City departments, LADWP will establish a workgroup to improve permitting and interconnection service to match the targets established in Solar LA.

## Enhance Power Reliability

The use of solar energy can minimize the cost of traditional electric utility infrastructure needed to import power generation produced outside the Los Angeles basin. Solar LA will also help to improve the reliability of the LADWP's electrical infrastructure by providing distributed generation without the need for additional in-basin transmission infrastructure.

**Action Item**:

- Together with its plan to reduce the impact of fossil fuel generation on communities throughout the City, the LADWP will develop a plan that serves to enhance the reliability of the power system through the increased use of distributed generation.

## Least Cost Approach

Solar LA represents a multi-year investment to fund large and small scale projects that will significantly increase the City of Los Angeles' solar generation resources while significantly decreasing LADWP's carbon footprint and greenhouse gas emissions. In addition to seeking volume discounts and benefits derived from emerging technologies, funding Solar LA will require a blend of

conventional bond financing and innovative third-party and customer financing. To that end, LADWP staff will analyze various funding options to support the plan including, but not limited to the use of revenue bonds, private capital, power revenues and federal and state grants. While the issuance of revenue bonds may be used to fund some of Solar LA projects, the program's actual cost will depend on the installation size, location, and technology employed as well as the availability of federal tax subsidies.

LADWP staff is currently performing sensitivity analysis based on a wide variety of implementation scenarios. These scenarios and related costs are being used to determine Solar LA's preliminary costs estimates. However, offering more precise estimates of potential costs at this time is not possible as the specific program parameters have yet to be approved by the various stakeholders including, but not limited to, the Mayor, Council and the Board. Once a final program approach is approved for Solar LA, including ownership structures, project scope, technology and timing of implementation, LADWP will be in a position to provide a more definitive cost and overall budgetary impact estimate.

**Action Item**:

- LADWP will develop a financing plan within the next 90 days with the aim of maintaining a commitment to procuring sustainable, clean solar energy at the lowest rates.

## II. BUILDING THE GREEN ECONOMY IN LOS ANGELES

### Attract and Grow Solar Companies in LA

With Solar LA, LADWP is making a commitment to developing Los Angeles as the nation's solar capital. Already, LADWP has and will continue to seek feedback from the solar industry and incorporate that feedback into procedural and program improvements to Solar LA. LADWP and the City of Los Angeles are prepared to create incentive packages aimed at building and growing a significant solar cluster in Los Angeles. This will bundle new and existing federal, state, local and LADWP financial incentives, rebates and subsidies, promotional power rates, preferences for local firms and in specially designated "cleantech zones," loan programs, New Market tax credits, favorable ground lease terms and many other incentives

**Action Items:**

- As part of Solar LA, LADWP will develop an action plan to build a robust solar industry "ecosystem" in Los Angeles that attracts and grows solar R&D, manufacturing, distribution, and construction companies in the City.
- LADWP will continue meeting with various industry stakeholders to develop a more business friendly environment.

- Together with the Mayor's Office of Housing & Economic Development, LADWP has established an interdepartmental working group empowered to analyze and make recommendations on strategies to grow the solar and associated cleantech industries in Los Angeles, including incentives for local manufacturing, workforce development, permitting/approvals of installations. This workgroup can also provide valuable expertise and knowledge for standardizing installations, developing training curricula, expanding opportunities from various City-sponsored training programs and recommending program modifications to improve outcomes.

## Establish a Solar Innovation Cluster in Los Angeles

Solar power will be a significant part of our City's low-carbon future and Solar LA is a roadmap for Los Angeles to become the most aggressive and progressive solar city in America. Solar LA will maximize technological flexibility to allow for the use of different solar technologies to be used and encourage competition among solar providers. Coupled with a large scale, sustained commitment to solar development, Solar LA is expected to encourage substantial reductions in the relative cost of solar power in the future. Solar LA represents a unique opportunity to expand development of cost effective and reliable solar technologies for use by the City and throughout the world.

Leveraging local centers of excellence is a key part of establishing an innovation cluster in Los Angeles. The LADWP is committed to developing working partnerships with the world class Los Angeles-area research universities, laboratories and entrepreneurial clean technology firms to encourage and facilitate the development of cutting edge solar technology right here in Los Angeles. On this path from cleantech innovation to "green" jobs, LADWP can be a powerful partner promoting emerging solar technology research and development in the commercialization process and ultimately as a customer and consumer of clean technology.

**Action Item:**

- LADWP will ensure flexibility in Solar LA, allowing for periodic program modification as required to achieve success, particularly as to timing and technology.
- LADWP will develop partnerships (through the signing of MOUs) with local research universities, laboratories and clean technology firms with the aim of promoting R&D, testing and commercialization of innovative technologies, and the deployment of clean technology solutions through Solar LA .

## Facilitate the Growth of Green Collar Jobs

Solar LA represents a tremendous opportunity to leverage job creation in the emerging green economy. Based on estimates that approximately 200-400 jobs are created for every 10 MWs of solar installed annually, (from manufacturing to installation), this could mean that as much as 26,000-52,000 jobs in

development, manufacturing, installation and maintenance could be created by the nearly 1,300 MW of solar projects contemplated by Solar LA . LADWP will capitalize on this opportunity by partnering with public and private institutions and entities to prepare a workforce through job training and outreach, particularly in communities where job creation is most needed.

The LADWP has already begun to tap into the best practices and innovative programs that already exist in Los Angeles. One example is the partnership with the Los Angeles Unified School District and the International Brotherhood of Electrical Workers (IBEW) to fund programs to train both solar thermal and photovoltaic installers at the East Los Angeles Skills Center. This program has successfully provided training and re-training for low-income residents. The staff at the Skills Center is also developing a train-the trainer program to help expand the number of training programs available at other schools. Solar LA will look to cement existing strong partnerships while always seeking out new and innovative programs to incorporate.

**Action Items:**

- LADWP will develop training programs to ensure that the City's low and modest income residents will be afforded an opportunity to develop skills and find family wage paying, meaningful careers in the renewable energy field.
- In collaboration with partners, LADWP will establish a Green Corp Training Academy that will emphasize youth recruitment efforts in underserved communities throughout Los Angeles.
- LADWP will continue to foster close partnerships with training organizations to address the need for skilled, local talent.
- LADWP will develop partnerships with local schools and innovative organizations including community colleges, IBEW, and local vocational schools and programs to provide assistance and technical support for standardized curricula, instructor training, and link graduates from these programs to employers developing solar projects in the City.

# III.Economic and Community Opportunities

## Low Income Customers

Because revenues supporting the City's solar programs are derived from every LADWP customer, it is imperative that all customers have an opportunity to participate. While LADWP's low income residents have benefited from lower energy bills than those living in neighboring communities; some customers have been unable to take advantage of environmental programs. Solar LA will allocate staff and resources to develop programs to ensure that residents in the City's underserved communities will participate in a meaningful way in the program. Further, Solar LA will also work with IBEW and City Departments to develop training programs to ensure that the City's low and moderate income residents

are afforded an opportunity to develop skills and find long term careers in the renewable energy field. LADWP will develop and implement changes to its existing solar incentive program to offer greater incentives to its low and moderate-income households in order to make solar energy within reach of more of its customers.

**Action Items:**

- Create/enhance incentive programs for low and moderate income residents.
- Reevaluate the current LADWP discount rate for qualifying low income customers.
- Identify ways to provide solar systems at substantially lower cost to a limited number of qualified low income customers living in single family homes.
- Construct solar systems on a number of multifamily low income buildings and enter into a shared saving program to provide lower energy bills to tenants based on the solar output.
- LADWP will work with the Housing Authority of the City of Los Angeles (HACLA) to identify ways to build and operate solar plants installed on multi-family government owned housing developments located within the City.

**Community Impacts**

Solar LA will be implemented in a meaningful manner that is mindful of communities impacted by environmental and public health issues related to fossil fuel based power generation. The use of fossil fuel based power generation correlates to thousands of cases of lung disease, asthma and other respiratory ailments. Solar LA along with the Mayor's broader strategy of increased reliance on renewable resources represents a proactive means to achieve clean, sustainable energy self sufficiency for generations of Angelenos in every community.

**Action Item**:

- LADWP develop its plan in accordance with the goal of reducing environmental and public health impacts in communities living near natural-gas fired plants.

# PROPOSED BUDGET

| Element | Sub-element | Annual Budget Request | Budget Request |
|---|---|---|---|
| Element I: Customer Solar Program | A. SB1 Rebate Program | $35 million through 2016 | $313 million through 2016 |
| | B. Feed In Tariff | $15 million | $180 million through 2020 (partially funded from funds allocated to existing rebate program |
| | C. SunShares | $15 million | $120 million through 2020 |
| | D. Financing | -0- | -0- |
| | E. Solar Water Heating | -0- | -0- |
| Element II: Utility-Owned Solar Rooftop Program | | TBD within 90 days | TBD within 90 days |
| Element III: Large Scale Solar | | $180 million through 2020 | $1.1 billion through 2020 (possible energy purchase commitments through 2050) |
| Element IV: Low Income Customers, Jobs, Economic Development | A. Low Income Customers | -0- | -0- |
| | B. Jobs | -0- | -0- |
| | C. Economic Development | -0- | -0- |

The budget anticipates a “scale up period,” therefore the initial program funding levels will be lower than when the program is fully operational.

# STAFFING

Each program element activity includes:

- Developing program with Stakeholder input
- Presenting program to LADWP Management
- Presenting program to Board of Water and Power Commissioners
- Presenting recommended program to Solar Stakeholders
- Board of Water and Power Commissioner Approval

| Element | Sub-element | Staff Resources | Milestones |
|---|---|---|---|
| Element I: Customer Solar Program | A. Existing Rebate Program | Current staff level is 5 (engineers, utility marketing representatives and electrical construction crews). Propose increase of current staff levels to 8 | Hiring begins August 2008<br><br>Program changes implemented December 2008 |
| | B. Feed In Tariff | 4 to 5 with ultimate expansion to 6 by 2012 | Hiring begins August 2008<br><br>Program operational April 2009 |
| | C. SunShares | 4 to 5, combination of engineers and utility marketing staff | Hiring begins August 2008<br><br>Program operational April 2009 |
| | D. Financing | Included above | |
| | E. Solar Water Heating | Included above | |
| Element II: Utility-Owned Solar Rooftop Program | | TBD within 90-days | TBD within 90-days |

| Element | Sub-element | Staff Resources | Milestones |
|---|---|---|---|
| Element III: Large Scale Solar | | Currently staff level is 2 engineers. Propose increase to 4 engineers | Hiring begins August 2008 |
| | | | Negotiations complete 2008 |
| | | | RFPs issued annually |
| Element IV: Low Income Customers, Jobs, Economic Development | A. Low Income Customers | Included in Element I | |
| | B. Jobs | Included in Element I | |
| | C. Economic Development | Included in Element I | |

Similar to the budget, the staffing plan will develop over time as the programs become fully operational.

[i] "GreenLA: An Action Plan to Lead the Nation in Fighting Global Warming" Los Angeles, May 2007

[ii] According to a recently completed study published by the San Francisco Bay Center for Excellence for the California Community College's Chancellor's Office,[ii] the solar energy industry is "expected to be one of the most rapidly growing industries in the U.S. and California" with a projected annual growth of 30 to 40 percent in the next decade. Additionally, the 8-year extension of the federal Investment Tax Credit (ITC) will facilitate and accelerate this process, signaling to the solar industry to build new manufacturing capacity, expand the installer work force and construct the new utility-scale solar power plants contemplated by Solar LA

[iii] The Sacramento Municipal Utility District (SMUD) recently initiated its version of this concept, called SolarShares. SMUD's SolarShares participants are offered long-term fixed rates for solar with residential rates ranging from $5 to $30 monthly based on their allocation of energy production from the solar facility they helped to fund.