

▶ City of San Diego

ENERGY STRATEGY FOR A SUSTAINABLE FUTURE

The sustainability of the region requires an energy infrastructure that is diversified, reliable, and as self-contained as possible. The City of San Diego is California's second largest city and is the eighth largest in the nation. Between 1990 and 2004, the City's population increased by 16% to nearly 1.3 million residents. During that same time period, the energy used in the residential sector increased nearly 45%, the commercial sector by nearly 108%, and the industrial sector by 2%. San Diego has a choice-- face a crisis of unsustainable resource use or follow an energy strategy for a sustainable future. San Diego chooses the later, and has a plan for 100 MW clean energy capacity by achieving a 50 megawatt (MW) increase in renewable energy use by 2013¹ and by implementing energy efficiency measures that reduce consumption by 50 MW by 2020².

Currently, California has regulations in place that will result in more efficient energy use and a strategic plan with aggressive goals for energy efficiency and renewable energy generation. The Federal government is providing incentives to achieve similar goals³. The State's requirements include, but are not limited to:

- 2008 updates in the California Green Building Standards Code, Part 11, Title 24, giving authority to State agencies to require specific green building measures;
- 2008 Executive Order S-14-08 requiring that California utilities reach the 33% renewable energy goal by 2020;
- 2008 CA Public Utilities Commission Strategic Plan identifying targets in the public and private sector, including net-zero energy use in residential buildings by 2020 and for commercial buildings by 2030, and promoting renewable energy; and
- 2006 CA Global Warming Solutions Act (AB 32) aiming to reduce greenhouse gas (GHG) emissions by pursuing all cost-effective energy efficiency options and increasing clean energy generation.

The City of San Diego's Energy Plan for a Sustainable Future (Plan) has six objectives to achieve more sustainable generation and use of energy:

1. **ENERGY CONSERVATION**- All City employees will be aware of and implement energy conservation measures by 2010;
2. **ENERGY EFFICIENCY**- Reduce energy use 10% by 2012, using 2000 as a baseline.
3. **RENEWABLE ENERGY**- Increase megawatts (MW) of renewable energy used at City facilities to 17 by 2012, and to 25 by 2020;
4. **MANAGEMENT OF SDG&E ENERGY BILLS**- Continue the use of the Electronic Data Interchange (EDI);
5. **POLICY DEVELOPMENT AND IMPLEMENTATION**- Guide City efforts by institutionalizing policies and programs that increase energy conservation, efficiency and the use of renewable energy; and
6. **LEVERAGE RESOURCES**- Ensure that State and Federal funds are leveraged to the extent possible with existing programs such as California Energy Commission loans and the California Public Utilities Commission Partnership funds.

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ENERGY CONSERVATION

Conservation efforts include simple actions that reduce energy demand, and this remains the most cost effective way to manage energy budgets. Employee education and outreach have been successful, including the use of newsletters, the “Watts Up” campaign, and electronic monitoring of HVAC systems.

OBJECTIVES:

1. By 2010, all City employees will understand the importance of energy conservation and will take actions at work and at home to reduce energy use;
2. By 2012, all residents in San Diego have the information available to make well-informed decisions about how to conserve energy; and
3. By 2020, *per capita* residential, commercial and industrial energy use is reduced by 50% using 2000 as a baseline.

ACTIONS:

1. Continue outreach programs to employees, including award programs for staff in buildings or departments with significant reductions in energy consumption; and
2. Expand outreach to the community through the use of City TV, working with existing community groups, adding an “energy page” to telephone books, and updating the City’s websites.

SHORT –TERM PROJECTS (2009-2012)

- Promote various workshop educating City staff involved in energy conservation and sustainable building design. Increasing the knowledge of City staff will enhance energy conservation and sustainable building efforts.

LONGER-TERM PROJECTS (2012-2020)

- Identify and implement new programs and conservation measures using emerging technologies. Continue to promotion conservation goals to City staff, especially policy and decision makers involved with procurement decisions.

ENERGY EFFICIENCY

Energy efficiency is the use of technologies that provide the same or better service while using less energy. In 2007, the City used 14 million kilowatt hours less electricity than in 2000. Examples of energy efficiency include: replacement of City Administration building chillers that are 30 % more efficient; replacement of T-12 florescent lamps with magnetic ballasts to T-8 bulbs with electronic ballasts that are 50% more efficient; replacement of incandescent traffic signal bulbs with LED bulbs that use 90% less energy and have a 5 to 7 year life compared to 18 months for incandescent bulbs; replacement of rooftop air conditioning packages that are 30% more efficient; and installation of active day lighting systems in large buildings, thus reducing the need for artificial lighting during most daylight hours.

OBJECTIVES:

1. Reduce energy use by 10% in 2012, using 2000 as a baseline; and
2. Ensure that all lighting in City facilities is more efficient than traditional lighting.

ACTIONS:

1. Replace aging package roof top units on aging City facilities;
2. Convert 50% of the street lights from High Pressure Sodium to induction lighting; and
 - a. Continue to identify and manage energy system upgrade projects in city owned facilities and implement a Smart Energy Management and Monitoring System (SEMMS) that will manage and monitor energy use at City Facilities with larger consumption and demand. The system will be interfaced with the SDG&E Demand Response program

SHORT –TERM PROJECTS (2009-2012)

- Lighting Efficiency Conversion resulting in 150,000 kWh reduction per year
- HVAC Conversion resulting in 225,000 kWh reduction per year
- Implement a pilot project for Smart Energy Management and Monitoring System (SEMMS) with anticipated saving of 80,000 kWh per year and 25,000 kW associated with participating in demand-side reduction programs.
- Implement projects to “green” Balboa Park, which is anticipated to save 250,000 kWh annually.

LONGER-TERM PROJECTS (2012-2020)

- Expand board spectrum lighting conversion for Street Lights and install second-generation LED Traffic Signal Lighting, resulting in approximately 1,000,000 kWh savings annually.
- Install energy saving measures in City owned facilities, resulting in anticipated savings of 250,000 kWh annually.

- Expand Smart Energy Management and Monitoring Systems to gain an additional 80,000 kWh savings.
- Continue to improve the energy efficiency of Balboa Park, resulting in 200,000 kWh savings per year.

RENEWABLE ENERGY

Approximately 19 Megawatts of renewable energy is produced at City facilities. This is a benefit to the City and also decreases the energy load on the SDG&E system. The Miramar Landfill and the Metro Biosolids Center provide methane gas for the cogeneration facility, resulting in 10.2 MW of energy. This meets the needs of the North City Water Reclamation Plant and the excess energy is sent to the power grid. The Point Loma gas utilization facility produces 4.6 MW and the Point Loma hydroelectric system produces 1.35 MW. There is also a 1.2 MW dual-fueled backup generator. The City also operates 1.2 MW of photovoltaic (solar) systems. The combined generation produces 152,617 megawatt-hours (MWh) of renewable power on an annual basis. This is equal to 50% of the total City's municipal electric use. Installation of a new 800 kilowatt photovoltaic system is planned in 2009 to power the City's South Bay water treatment facility.

OBJECTIVES:

1. Reach grid parity using renewable energy;
2. Become energy independent and less reliant on fossil fuels; and
3. Reduce the region's carbon footprint.

ACTIONS:

1. Continue to develop renewable energy projects at facilities with high energy use;
2. Conduct pilot tests of emerging technologies;
3. Complete the Strategic Plan for Solar Energy, as per the Department of Energy Solar America Cities grant (2007-2009); and
4. Participate in a State of CA or Federal cap and trade system for Renewable Energy Credits and carbon trading credits beginning in 2013.

SHORT –TERM PROJECTS (2009-2012)

- Design and install landfill gas to power generation systems at the Arizona Street and South Chollas landfill, resulting in 7,000 megawatt-hours (MWh) in 2010 and decreasing over time to approximately 5000 MWh in 2024;
- Design and install of 800 kWh photovoltaic system at Otay Mesa Water Treatment Plant, resulting in generation of 13, 500,000 kWh annually;
- Complete the Strategic Plan for Solar Energy and the associated deliverables as part of the Department of Energy Solar America Cities grant (2007-2009); and
- To the extent practicable, implement solar projects to “green” Balboa Park, resulting increases in renewable energy generation.

LONGER-TERM PROJECTS (2012-2020)

- Pursue additional renewable opportunities including the design and installation of 500 kWh Photovoltaic system at the Rancho Bernardo Reservoir, resulting in generation of 9,000,000 kWh's annually.

MONITOR AND MANAGEMENT UTILITY ENERGY ACCOUNTS

Beginning in 2002, the conversion was made from the paper billing process, which was labor intensive and inefficient, to Electronic Data Interchange (EDI) for electronic payments to San Diego Gas and Electric (SDG&E) for all 2,840 City electric and gas accounts. With this more efficient system, unused accounts were identified, saving \$9,700 annually. Analysis also resulted in tariff changes, saving another \$30,000.

OBJECTIVES:

1. Process energy invoices more efficiently and accurately; and
2. Analyze energy bills to evaluate the proper rate and tariffs.

ACTIONS:

1. Continue to perform bill analysis; and
2. Continue to expand the City real time metering and monitoring capabilities to monitor energy performance.

SHORT –TERM PROJECTS (2009-2012)

- Develop software analysis tools to review and identify anomalies in energy bill data. The software will flag spikes so investigations can be performed to identify the cause of the increased consumption;
- Review trend data captured in the Smart Energy Management and Monitoring System (SEMMS) and compare with actual consumption data.

LONGER-TERM PROJECTS (2012-2020)

- Implement and refine the energy monitoring programming for SEMMS (identified above) so the software monitors both energy bills and energy consumption data captured through SEMMS;
- Integrate an automated system to identify and flag 95% of profiles that exceed normalized energy values;
- Automate individual SEMMS building systems with SDG&E Demand Response Program for seamless integration of demand reduction calls.

POLICY and PROGRAM DEVELOPMENT and IMPLEMENTATION

Following the 2001 energy shortages in Southern California, the San Diego City Council adopted a comprehensive resolution, R-2001-1112, establishing a centralized coordination program for the City that is charged with advancing energy efficiency, conservation and renewable energy systems in all City departments and to provide outreach to the community. The program resides in the Environmental Services Department.

The City's General Plan, adopted in March 2008, integrates energy efficiency and renewable energy into an overarching framework of reducing greenhouse gas emission (GHG) and is the foundation of how the City will grow in the next 20-30 years. Achieving the Mayoral goals of 50 MW of solar power by 2013 and the 50 MW (900 MWh) reduction in energy use by 2020 are critical to a more sustainable energy future, resulting in 100 MW of clean energy capacity.

OBJECTIVES:

1. Create a more informed City workforce by providing training opportunities for City planners and project managers that will lead to more sustainable practices;
2. Establish a revolving loan fund for City projects that are repaid to the fund through the cost-savings in the utility bills, similar to SDG&E's on-bill-financing program.
3. Reduce greenhouse gas emissions to 1990 levels by 2020, as per the CA Global Warming Solutions Act of 2006 (AB 32) with a suite of programs, including: a) incentives and/or mandates for energy efficiency and renewable energy in new construction and major renovations in the public and private sectors; b) a community fuel reduction and transportation efficiency policy; and c) use of planning and technology that reduce the urban heat island effect in the city; and
4. Encourage the installation of renewable energy in the commercial and residential sectors through innovative financing programs.

ACTIONS:

1. Evaluate the financial mechanisms in place that will support a revolving loan program;
2. Evaluate the success of the AB 811 pilot project and if appropriate, design a citywide program that includes financing for energy and water retrofit programs in addition to solar energy installation;
3. Update the City's Climate Protection Action Plan and GHG emissions inventory every two years and use this as a tool for evaluating the effectiveness of existing actions and to set priorities for future actions;
4. Provide at least one quarterly training for City staff that highlights more sustainable practices, including energy and water conservation and "green building" technology;
5. Update the City's Sustainable Building Policy (900-14) every two years to ensure that it remains a viable instrument to advance the best practices and technologies;
6. No later than 2010, implement a community fuel reduction and transportation efficiency policy and an urban heat island reduction policy; and

7. In concert with a nonprofit organization(s), design a program that would assist disadvantaged neighborhoods with home energy audits and upgrades.

SHORT –TERM PROJECTS (2009-2012)

- Increase the knowledge base of City staff in “green building,” sustainable design, and opportunities for GHG reductions ;
- Consider the development of an Assessment District to finance the installation of solar for San Diego Residents, including solar hot water systems, with anticipated annual savings of 500,000 kWh and 300,000 Therms.
- Begin a residential assistance program to identify energy conservation measures with incentives for residential energy enhancements;
- Implement a special energy plan check section to recommend energy conservation measures on all projects plan checked by Development Services Department.

LONGER-TERM PROJECTS (2012-2020)

- Review, revise, and redirect the above programs, and expand the successful ones;
- Expand Assessment District to include financing for energy efficiency, water conservation

LEVERAGE RESOURCES

The City receives funding for a variety of energy projects through State and Federal grants and low-interest loans.

- The “Partnership” between the City, CA Public Utilities Commission and SDG&E is funded through utility rate-payers, and the current 2009-2011 program cycle provides nearly \$4 million for a broad range of energy projects;
- The Solar America City grant from the U.S. Department of Energy provides \$200,000 from October 1, 2007 to September 30, 2009;
- Low interest loans are available through the CA Energy Commission for upgrades to City facilities and infrastructure; and
- The CA Department of Conservation will be funding a community outreach program in San Diego in 2009-2010 for energy and water conservation.

OBJECTIVES:

1. Identify priority projects and determine all appropriate funding sources; and
2. Engage other entities, such as San Diego Gas and Electric, to help leverage resources through their rebate programs as well as on-bill-financing.

ACTIONS:

1. No later than April 2009, define the projects that will be implemented within 2-years;
2. No later than January 2010, define mid-term projects that will be implemented by 2015; and
3. Continue to evaluate new state and federal mandates in order to ensure that the City organization is in compliance and that the community is aware of changing regulations.

SHORT –TERM PROJECTS (2009-2012)

- Develop a City task force to identify comprehensive water and energy savings, and combined sustainable power using funding from the CPUC Partnership Program, CEC loan program, and the CA Department of Conservation.

LONGER-TERM PROJECTS (2012-2020)

- Expand distribution infrastructure for reclaimed water program.

REFERENCES

1. RESOLUTION NUMBER R-298412, ADOPTED ON SEPTEMBER 23, 2003
RESOLUTION REGARDING SUSTAINABLE ENERGY GOALS FOR THE CITY OF SAN DIEGO.
2. RESOLUTION NUMBER R-295074, ADOPTED ON JUNE 19, 2001
3. The Energy Efficiency and Conservation Block Grant Program (EECBG) provides grants to U.S. local governments, states, territories, and Indian tribes to fund programs and projects that reduce energy use and fossil fuel emissions and improve energy efficiency. The Program represents a Presidential priority to deploy the cheapest, cleanest, and fastest energy sources. EECBG was authorized in Title V, Subtitle E of the Energy Independence and Security Act (EISA), signed into law on December 19, 2007, and is modeled after the [Community Development Block Grant Program](#) administered by the Department of Housing and Urban Development (HUD).

Appendices

1. Appendix One: 2003-2009 City of San Diego Accomplishments in Energy Efficiency and Renewable Energy

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Sectors	Accomplishments	Awards
ENERGY EFFICIENCY AND RENEWABLE ENERGY	1995- Completed the City's Green Building Demonstration Project (Environmental Services Department Headquarters) that was used as a pilot project for the USGBC LEED rating system and was selected as an AIA top ten green building.	The nation's first EPA Energy Star Award for Buildings
	2002- Adopted the City's Sustainable Building policy (900-14) that requires all City buildings greater than 5,000 sq ft to meet LEED Silver Rating equivalent and encourages private development to meet Green Building standards.	
	Developed and Implemented Sustainable Building Permit Expedite Program - 2003. After 5 years over 1000 residential and commercial units have added energy efficiency and solar photovoltaic systems to their projects This incentive has been responsible for nearly 2 MW of new solar power since inception.	
	18 MW Methane (Biogas) from Municipal Landfill and Municipal Wastewater Treatment Plant	1997 San Diego County Tax Payer's Association Golden Watch Dog Award for Installation of Landfill and Digester Gas Fueled 6.4 MW Cogeneration System

Sectors	Accomplishments	Awards
	33.3 MW solar in region (commercial and residential), with 1.2 MW at City facilities	<p>2005 Green Power Purchaser (DOE and EPA)</p> <p>2005 Flex your Power (State of California)</p>
	Strategic incorporation of energy efficiency measures in City facilities such as lighting retrofits and HVAC improvements, and installation of photovoltaic and co-generation systems	Five ENERGY STAR awards for City buildings
	2007- One of the initial cities selected by the DOE as a “Solar America City”	
	Contract in place to use Biogas at POTW for fuel cell power generation.	