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Office of Energy Efficiency & Renewable Energy

Strategic Plan for Sustainable Energy Management and Environmental Stewardship for Los Angeles Unified School District

A. Walker, D. Beattie, and K. Thomas
National Renewable Energy Laboratory

With guidance from:

K. Davis and M. Sim
Los Angeles Unified School District

A. Jhaveri, PhD
Arun Jhaveri and Associates

Technical Report
NREL/TP-710-42007
November 2007

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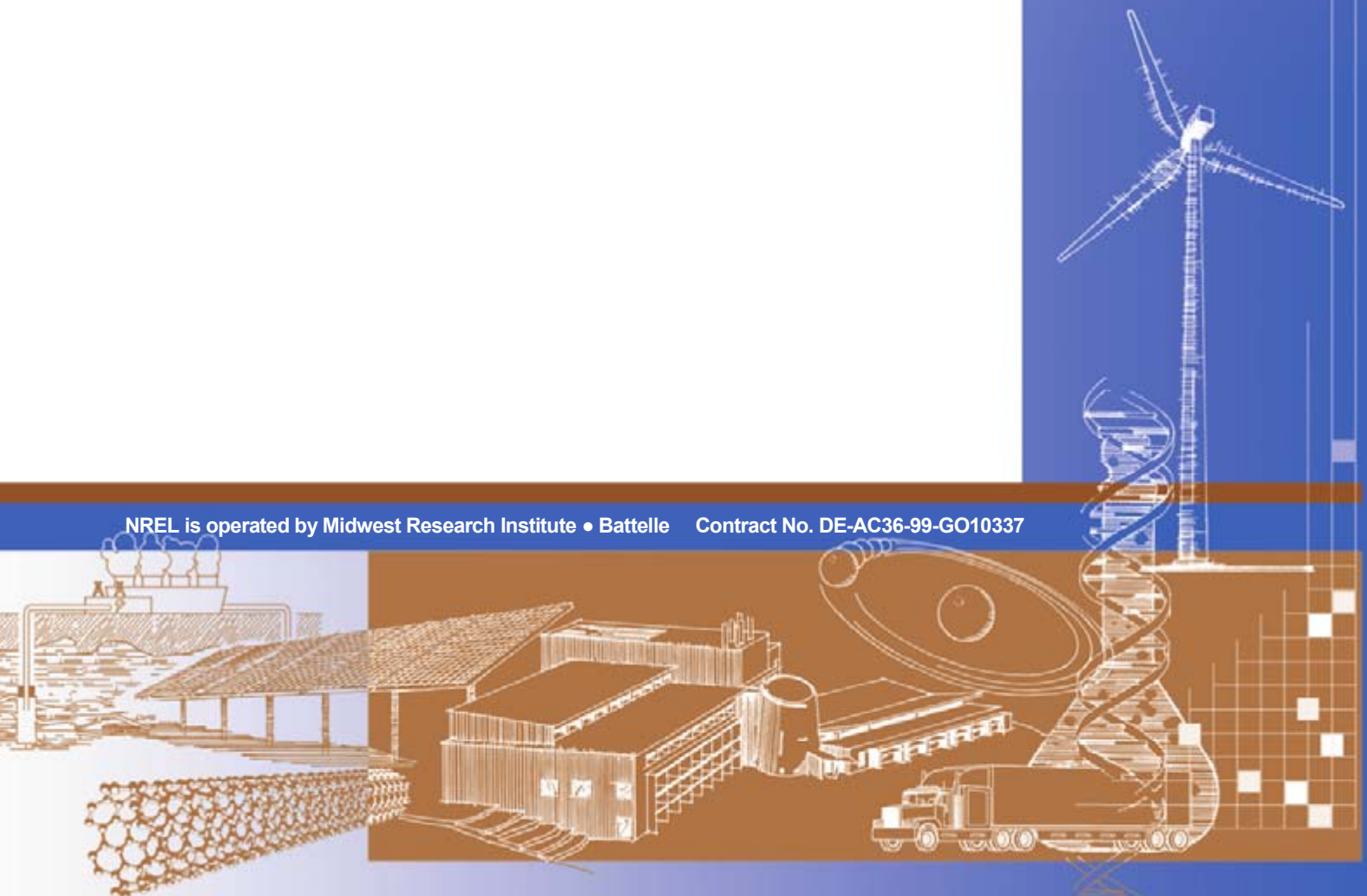

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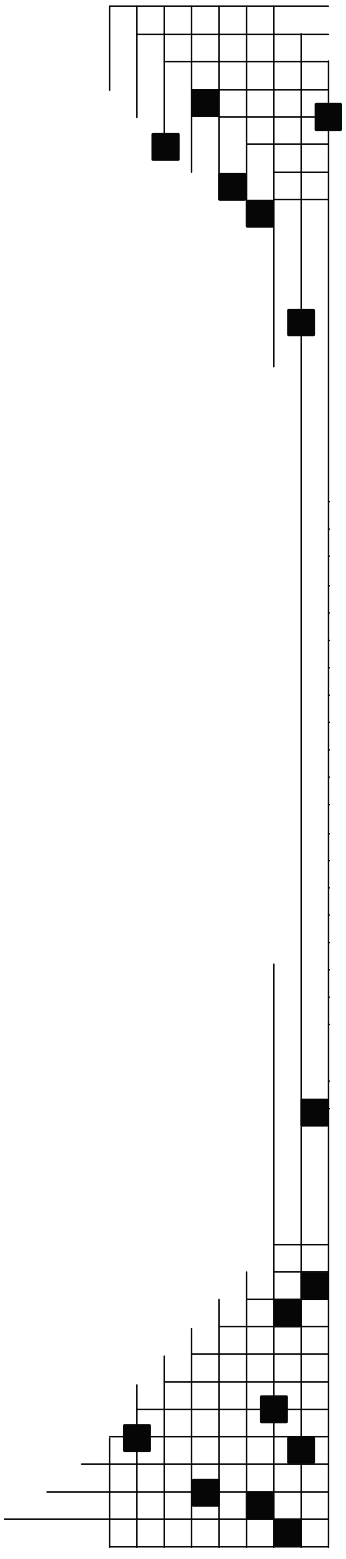

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Letter to Staff and Students from the Superintendent of LAUSD

Within the Los Angeles Unified School District, it is our goal to transform the LAUSD into a world-class school district. Everything we do must support what happens inside the classroom. LAUSD's five guiding principles will be the platform from which we will execute our transformation. Energy and the Environment are key aspects of accomplishing this end. Our guiding principals are: decision-making based on data, research, and analysis; professional development for all employees; promoting innovation and change within the District; engaging parents and partnering with the community; and ensuring the physical and emotional safety of students on campus.

This Strategic Plan for Sustainable Energy Management and Environmental Stewardship lays out a strategy for us to identify, plan, and implement effective systemic change based on new and proven ideas district-wide. In order to meet our sustainability goals and simultaneously have them support our wider district goals, we have to be financially and environmentally responsible. We need to work with our employees, our unions, other public sector agencies, and the state.

In closing, I want this District to be known for three things: top-rate instruction in the classroom, complete accountability and transparency, and responsiveness to the needs of our students and their families. This plan supports the accomplishment of these objectives. And as always, our teachers, parents, students, administrators, classified workers, and stakeholders will be a crucial part of our success.

David Brewer III

Note: This is a sample statement developed from the superintendent's previous presentations available on-line.

LAUSD Vision for Sustainability

The LAUSD vision does not end at the school house door, but stretches out to the community:

Through strong partnerships with public, private, and non-profit organizations, LAUSD schools are serving as centers of community. Construction and modernization projects are enhancing the educational, environmental, and economic condition of neighborhoods.

LAUSD Facilities Services Division is providing, at best value, sustainable schools that exceed expectations, enhance student productivity, and reflect our commitment to environmental leadership

Note: This is a sample vision statement developed by NREL staff, not LAUSD.

Acknowledgements

Development of this Strategic Plan for Sustainable Energy Management and Environmental Stewardship is made possible by a contract from Los Angeles Unified School District (LAUSD) to Arun Jhaveri and Associates (AJA) combined with a Technical Assistance Grant from the U.S. Department of Energy to the National Renewable Energy Laboratory (NREL). This report was prepared by Deb Beattie, Karen Thomas, and Dr. Andy Walker of NREL; with guidance from Dr. Arun Jhaveri of AJA, Certified Sustainable Design Professional, and Ken Davis and Michelle Sim of LAUSD.

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Executive Summary

This Strategic Plan for Sustainable Energy Management, and Environmental Stewardship, henceforth referred to as the Plan, is based on an approach of stating our goals, stating how we measure progress toward those goals, and stating how we continuously monitor and adjust actions to achieve continuous improvement.

LAUSD Facilities Goals

1. ***Provide best value for each school facility and the taxpayers*** by establishing strategic and tactical partnerships with customers, comparing costs with the private sector, and measuring customer satisfaction.

2. ***Achieve responsible asset management*** by diligently and fully implementing the "Family of Plans," deriving maximum benefit from the LAUSD inventory, and implementing the National Portfolio Strategy.

3. ***Operate efficiently and effectively*** by applying results-oriented business measures, sharing best practices, evaluating the organization to ensure optimum support, managing operating costs, and improving project delivery for revenue start.

4. ***Ensure financial accountability*** by establishing financial targets and measures, maximizing funds from operations, and maintaining accurate financial data.

5. ***Maintain a world-class workforce and a world-class workplace*** by promoting associate engagement and development, succession planning, and a world-class workplace in conjunction with LAUSD's national Human Capital Strategy.

6. ***Carry out social, environmental, and other responsibilities as a public school district*** by maintaining an active child care program, supporting the Good Neighbor Program, promoting "green" programs, conserving energy, and meeting Procurement Preference Program goals.

Energy Objectives of LAUSD

To achieve our objectives, we will . . .	
Improve asset value and reduce operating costs	Maintain a portfolio of efficient, sustainable workspaces with comfortable conditions that enhance productivity, meet customer needs, and achieve financial objectives.
Ensure focus on sustainability in facility design, renovation, and construction	Enhance, support, and guide District processes to ensure that new and renovated facilities are designed, constructed, commissioned, and operated with sustainability in mind.
Install renewable systems and procure renewable source energy	Seek to influence the movement of schools toward renewable energy sources by installing renewable systems and procuring energy from renewable sources, as well as leveraging our buying power to obtain the best pricing available in the market.
Optimize energy use	Consistently implement demand reduction and energy conservation measures at our facilities.
Provide education	Educate and involve students, teachers, administrators, parents, and visitors in our energy conservation efforts through awareness campaigns and other communication so they can make informed choices that have positive environmental results.

Introduction

This Strategic Plan for Sustainable Energy Management and Environmental Stewardship (Plan) will help us fulfill the Los Angeles Unified School District (LAUSD) vision of serving the community as a center of education and community. We developed this Plan as a platform for making smart financial and thoughtful environmental decisions about sustainable and energy-saving practices as we build, refurbish, and maintain our schools and offices.

As LAUSD staff, students, families, and partners, your input is welcome and needed to further craft our Plan, so it helps each of us contribute to a sustainable future.

Using the Plan

The Plan is both a guide and workbook. It describes how we intend to implement our approach and how it will be improved. Whether schools are new or old, this plan will help operations staff, design teams, and others accomplish environmental goals and balance costs.

The Plan provides the strategies, best practices, resources and tools we can use to meet our objectives outlined.

Strategy

This Plan is intended to consolidate existing policies and requirements, and set new policies that are consistent with the State of California and Federal laws, legislations, regulations, and guidelines as part of the broader VISION 2020 that the district is proposing.

To be successful, a strategic plan must clearly demonstrate how the proposed recommendations can be implemented by LAUSD, in an efficient and life-cycle-cost-effective manner, without compromising the vision, mission, goals and objectives, and strategic initiatives, as articulated in the above sections.

Background

LAUSD is committed to operating in an energy efficient and environmentally sensitive manner through integrated planning, decision-making, and implementation processes.

As the second largest School District in the United States, we believe LAUSD can model and present a measurable and decisively positive impact on surrounding communities and global environmental issues. Implementing this Plan through partnerships with staff, students, communities, and others provides leverage for the impacts of implementation to grow far beyond the boundaries of the school district.

In fiscal year 2005-2006, LAUSD focused on energy conservation and optimizing system efficiency through maintenance, resulting in energy cost avoidance. Despite these efforts there have been cost increases over the past few years that may be attributed to remodeling, HVAC installation and new schools coming on line.

Some approximations that emphasize the size and impact of the LAUSD are:

- 78,000 employees
- 700,000 students
- 1,000 new and existing school sites
- 75 million square feet of building area
- $7 billion annual operating budget
- $2 billion budget for design, construction, renovation, and maintenance
- $85 million annual utility costs.

LAUSD Organizational Structure

It is important to acknowledge that there are both internal and external entities that adopt, manage, advise, and implement high priority policies, programs, and projects.

Internal stakeholders within LAUSD include:

- Board of education
- Facilities services division
- Energy unit
- Maintenance and operations
- Support groups
    - Procurement
    - Contracting
    - Legal counsel
    - Teacher representatives.

External stakeholders include:

- High performance schools working group
- Electric utilities
- Gas utilities
- Water utilities
- Waste and wastewater management districts
- Local and regional governments
- Members of the community.

Policies and Mandates

LAUSD is exhibiting environmental and community leadership through current planning, design, and construction practices – meeting California aggressive and stringent laws, regulations, and best practices/guidelines in the areas of energy, environment, sustainability, and climate change. LAUSD intends to reduce its impact on the environment while expanding its positive impacts on students and surrounding communities.

National, state, county, and school district policies and mandates provide the guidance and specific directives we need to follow while we pursue our energy and environmental goals and objectives. On all levels, legislative directives provide mandates related to energy and the environment. And within the school district, LAUSD has developed energy management policies and procedures that are relevant to our mission.

National Policy

The Energy Policy Act of 2005, signed August 5, 2005, establishes Federal-level requirements, policy and incentives regarding energy production, efficiency, and alternative energy sources. The Energy Policy Act of 2005, along with its amendments to the National Energy Conservation Policy Act, forms the statutory basis of energy management programs for public buildings. Subtitle B Energy Assistance and State Programs, Section 124 of the Act focuses on energy efficiency in public buildings.

For more information about the Energy Policy Act, see Web site:
http://www.cemtpp.org/PDFs/EnergyBillHighlights.pdf

California Policy

State-level mandates and policy include legislation, executive orders, and utility regulatory policy. There are the three executive orders that the Governor of California issued in 2005 and 2006 that relate to energy, environment, sustainability, and climate change.

Executive Order S-3-05

E.O. S-3-05 (June 1, 2005) establishes GHG targets:

- 2000 levels by 2010
- 1990 levels by 2020
- 80% below 1990 levels by 2050.

The order charges the secretary of the California Environmental Protection Agency (Cal/EPA) with the coordination of the oversight of efforts to achieve those targets. The secretary started reporting to the Governor January 2006 and reports biannually on the impacts of global warming on California, including impacts on water supply, public health, agriculture, the coastline, and forestry. A report addressing mitigation of these impacts is also shall be submitted.

For more information on Executive Order S-3-05, see Web site: http://www.dot.ca.gov/hq/energy/ExecOrderS-3-05.htm.

Executive Order S-06-06

E.O. S-06-06 (April 25, 2006) targets for the use and production of biomass products such as biofuels (liquid) and biogas (gas) as an integral part of California's renewable portfolio standard. It also directs the California Energy Commission (CEC), the Resources Agency and other state agencies to collaborate, research, promote, and identify funding to advance biomass programs in California.

- California must produce a minimum of 20% of its own biofuels by 2010, and 40% by 2020. Currently, of the 900 million gallons of ethanol consumed in California (which is 25% of the entire nation's consumption); only 5% is produced in California.
- The executive order also calls for the use of biomass for electricity to reach 20% within the state's Renewables Portfolio Standard (RPS) goals for 2010 and 2020.

For more information on Executive Order S-06-06, see Web site: http://www.dot.ca.gov/hq/energy/Exec%20Order%20S-06-06.pdf.

Executive Order S-20-06

E.O. S-20-06 (October 17, 2006) directs the Cal/EPA to develop an emission trading system as part of the implementation of Assembly Bill 32. The Cal/EPA is directed – with the State Air Resources Board, State Energy Resources and Conservation Development Commission, and the Public Utility Commission – to develop a plan by June 1, 2008 to incentivize investment and compliance, enhance research, and develop and demonstrate GHG reduction technologies through various methods.

For more information on Executive Order S-3-05, see Web site: http://www.dot.ca.gov/hq/energy/Exec%20Order%20S-06-06.pdf.

California Assembly Bill 32 (CA AB-32), Global Warming Solutions Act of 2006

CA AB-32 (September 27, 2006) limits GHG emissions at the state level. The bill establishes annual mandatory reporting of GHG emissions for significant sources. The definition of GHGs includes carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride.

For more information on CA AB-32, see Web site: http://www.leginfo.ca.gov/pub/07-08/bill/asm/ab_0001-0050/ab_32_bill_20070501_amended_asm_v96.pdf

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California Revised Building Energy Codes (CA BEC Rev), Title 20, 2006 Appliance Efficiency Regulations

Adopted October 11, 2006, effective December 2006, CA BEC Rev… includes both Federally regulated appliances and non-Federally regulated appliances. There are 21 categories of appliances included in these regulations. The regulations apply to appliances sold or offered for sale in California.

For more information on CA BEC Rev, see Web site:
http://www.energy.ca.gov/appliances/2006regulations/index.html

California Revised Building Energy Codes, Title 24, Part 6, California's Energy Efficiency Standards for Residential and Nonresidential Buildings

CA BEC Rev… became effective October 1, 2005. The updates to these regulations were adopted in response to California's energy crisis to reduce energy bills, statutes and regulations, and emphasize energy efficiency measures.

For more information on CA BEC Rev, see Web site:
http://www.energy.ca.gov/title24/2005standards/index.html.

City, County, or School District Policy

Collaborative for High Performance Schools (CHPS)

Founded in 2000, CHPS is a non-profit organization that works to improve the quality of education for California's children. CHPS is the nation's first building rating program created to facilitate the design of school learning environments. Under CHPS guidelines, schools are to have good air quality; be thermally, visually, and acoustically comfortable; and be efficient in use of energy, water, and materials. They should also be easy to use and maintain, have a commissioning plan in place and make sure existing natural areas are protected and restored. Schools are to be safe and secure, and feature stimulating architecture.

For more information on CHPS, see Web site: http://www.chps.net/.

The following chart illustrates the goals of the California legislation and the governor's executive orders.

Goals of California Legislation and Governor Executive Orders

Category	Authority / Goal	Comments
Energy Efficiency	California Revised Building Energy Codes, Title 24, Part 6	Effective October 1, 2005 Supersedes 2001 Standards
Appliance Standards	*California Revised Building Energy Codes, Title 20, 2006 Appliance Efficiency Regulations*	Effective December 2006
Greenhouse Gas Emissions	S-20-06	Signed October 17, 2006 Makes the Secretary of the California Environmental Protection Agency (Cal/EPA) the statewide leader for GHG emission reduction programs. Creates a Market Advisory Committee of national and international experts to recommend to the State Air Resources Board (ARB) designs for a market-based compliance program. Requires the ARB to collaborate with the Cal/EPA Secretary and the Climate Action Team to develop a market-based compliance program with the goal of creating a system that allows trading with the European Union, the Regional Greenhouse Gas Initiative, and other jurisdictions with cap and trade programs. Plan due June 1, 2008

Goals of California Legislation and Governor Executive Orders

Category	Authority / Goal	Comments
Greenhouse Gas Emissions	**AB 32 Global Warming Solutions Act** By 2020: reduce GHG to 1990 levels	Signed September 27, 2006 Limits GHG emissions at state level and requires annual reporting of GHG emissions. GHGs include those defined in the Kyoto Protocol. Impact to LAUSD – compliance cost and higher cost of fossil-fuel related energy and purchased products.
Greenhouse Gas Emissions	**S-3-05** By 2010: reduce GHG to 2000 levels By 2020: reduce GHG to 1990 levels By 2050; reduce GHG to 805 below 1990 levels	Signed June 1, 2006 Requires the Secretary of the Cal/EPA to coordinate oversight efforts of a Climate Action Team including the following Departments: Business, Transportation and Housing, Air Resources Board, Food and Agriculture, CEC, Resources Agency, and CPUC. Must consider impacts to California of global warming, including impacts to water supply, public health, agriculture, the coastline, and forestry with a report on mitigation and adaptation plans to combat impacts First report was due January 2007 with biannual reports due thereafter.

Goals of California Legislation and Governor Executive Orders

Category	Authority / Goal	Comments
Biofuels & Biomass	**S-06-06** Produce a minimum of 20% of biofuels by 2010; 40% by 2020; 75% by 2050 For electricity generation, meet 20% target for renewable generation for 2010 and 2020	Signed April 25, 2006 Targets for the use and production of biomass products such as biofuels (liquid) and biogas (gas) as part of California's RPS. Directs the California Energy Commission (CEC), the Resources Agency and other state agencies to collaborate, research, promote and identify funding to advance biomass programs in California. Also calls for the use of biomass for electricity to reach 20% within the state's RPS goals for 2010 and 2020. CEC to report through Integrated Energy Policy Report and biannually thereafter progress made in achieving sustainable biomass development.
Renewable Energy	Initiative #3 of proposed LAUSD Roadmap: Increase the use of clean, renewable energy to reduce dependence on fossil fuels and to optimize environmental benefits and sustainability	

Goals of California Legislation and Governor Executive Orders

Category	Authority / Goal	Comments
Sustainability	California's Collaborative for High Performance Schools Characteristics of High Performance schools are – 1) healthy; 2) comfortable; 3) efficient; 4) easily maintained; 5) commissioned; 6) environmentally responsive; 7) secure; and 8) have good architecture. Leadership in Energy and Environmental Design Certified: 29-36 points Silver: 37-43 points Gold: 44-57 points Platinum: 58-79	CHPS: Schools are to have good air quality; be thermally, visually, and acoustically comfortable; and be efficient in use of energy, water, and materials. They should also be easy to use and maintain, have a commissioning plan in place and make sure existing natural areas are protected and restored. Schools are to be safe and secure, and feature stimulating architecture. LEED: Launched in April 2007 Project Checklist 1. Sustainable sites – 16 points 2. Water Efficiency – 7 points 3. Energy & Atmosphere – 17 points 4. Materials & Resources – 13 points 5. Indoor Environmental Quality – 20 points 6. Innovation in Design Process – 6 points

LEED for Schools

In 2004, the U.S. Green Building Council (USGBC) committed to a program geared for schools. Leadership in Energy and Environmental Design (LEED) for Schools is based on *Green Building Rating System for New Construction and Major Renovations, Version 2.2* (also called *LEED for New Construction Version 2.2*). LEED for Schools, with its emphasis on classroom acoustics, master planning, mold prevention, and environmental site assessment provides a comprehensive, unique tool for school systems that wish to build green. LEED for Schools is accepted as the standard for high performance schools.

For more information and evaluation tools, see the *LEED for Schools* Web site: http://www.usgbc.org/DisplayPage.aspx?CMSPageID=1586

Global Green Southern California Schools Initiative

In 2004, Global Green launched a new effort focused on K-12 schools in Southern California. This effort integrates the green building principles developed by Collaborative for High Performance Schools (CHPS) with broader neighborhood and regional issues including energy generation, stormwater management, joint-use of school facilities, and the growing movement to use school buildings as teaching tools. Although CHPS is relatively new, it is crucial that a number of districts including Los Angeles, Burbank, Santa Ana, and San Diego have adopted policies requiring CHPS for all future projects. Global Green is working to ensure that these policies are fully implemented and that other districts are aware of the benefits that CHPS and green schools provide. Thus the goals of the Initiative are to:

- Ensure complete implementation of the existing LAUSD green schools policy
- Encourage other Southern California school districts to adopt green school policies
- Develop state legislation to ensure that all new and modernized schools are built to CHPS minimum design standards
- Create additional showcase schools that incorporate cutting-edge practices to educate, inform, and inspire LAUSD and other school districts
- Create a coalition to provide a Southern California base of support for statewide green schools policies and initiatives.

For more information: http://www.globalgreen.org/greenbuilding/GreenSchools-SC.html

LAUSD Environmental Management System, Leadership in Environmental Management Document

The goals of this document are to provide leadership to integrate environmental accountability into all operations; implement strategies to support environmental policies and procedures; comply with environmental regulations and emphasize pollution prevention; inform workers and the public of possible pollution sources; and develop environmental management systems.

LAUSD guidance includes facility standards, design information, best practices, and other essential information and tools. Our goals fully embrace and comply with all internal policy. In addition, they meet or exceed the Federal and state legislation and executive orders regarding environment and energy.

Related mandates and policies with implications for sustainability may also be found in the LAUSD Board of Education's Approved Policies/Resolutions regarding Energy Management & Environmental Stewardship, and other relevant subject documents from the City, County, and local/regional utilities in Los Angeles and/or Southern California. LAUSD Facilities Services Division policy and guidance stresses providing the best value for customer, operating efficiently and effectively, and enhancing student productivity.

Approach and Process

We are committed to reaching our energy management goals through the collaborative efforts of planning, engineering, maintenance-smart fiscal strategies, partnerships, and our personal commitments.

Partnerships form the foundation of the Plan. We will combine our talents, knowledge, and services to provide comfortable, energy-efficient, and sustainable schools at best value to our taxpayers.

The approach taken in the development of these recommendations is one that has been proven extensively by organizations such as the International Standards Organization and the Malcomb Baldridge Quality Awards. The approach can be summarized in three steps:

1. State what it is that we are trying to accomplish.
2. State how we measure and report progress.
3. State how we continuously improve.

The first step is addressed by surveying the existing environment and making informed decisions about what vision the LAUSD has for the future and in what direction the LAUSD must lead to realize that vision. Sections of this report related to specific goals and objectives outline each action we are trying to accomplish.

The second step is addressed by identifying measurable metrics associated with each action or major goal. Some of these metrics will be readily available numbers such as utility bills, but others will be more subjective. Ideally, other internal and external stakeholders would participate in the evaluation of measurement of progress toward the goals.

The third step is addressed by taking actions to continuously improve the sustainability of LAUSD as indicated by the metrics in the previous step.

The basic elements of our approach are:

- Program administration
- Program funding
- Program performance and evaluation
- Training and education
- Coordination and collaboration
- Staff, student, and community awareness
- Awards, recognition, and incentives
- Progress toward goals.

Program Administration

Two primary groups will administer our Plan – an advisory board and an energy management team. See *Appendix A* for membership.

Advisory Board

The advisory board will meet periodically to provide advice and review our progress. The board will include representatives from the school board, LAUSD, the community, teachers, etc. A chair from Facilities will oversee the board. It may also include representation from public and private partners, contractors, and other energy and environmental professionals such as the U.S. Department of Energy (DOE) and U.S. Environmental Protection Agency (EPA).

Energy Management Team

The energy management team (EMT) will be composed of representatives from Facilities and led by the LAUSD energy manager (EM). In pursuing the opportunities to achieve the intent of the Plan, the EMT will use a collaborative approach for project planning, budget planning, design charrettes, and other key meetings.

A management advocate will support the Plan and enhance the effectiveness of the EMT. The EM will facilitate the implementation of the Plan through coordination, communication, and guidance. The role of the other team members will be to participate fully by contributing their expertise, current information, and commitment to meet the objectives of our plan.

Regular team meetings will be held to provide opportunities to communicate, define, and improve processes to meet our goals and allow feedback for improvement. Focus meetings will address specific issues or projects and identify resources and opportunities.

Roles and Responsibilities of EMT Members

Management Advocate – Encourages collaboration across work groups; provides guidance on priorities; and represents the interests of Facilities, the Plan, and the EMT during management and resource planning discussions.

Energy Manager – Is the spokesperson and coordinator for the EMT, collaborates and shares lessons learned with external partners, coordinates and leads EMT meetings, carries out action items identified in the Plan, distributes and interprets energy policy, and coordinates and implements the energy program.

Planning and Design – Bring the perspective of the project managers, suggest procedural and policy changes essential to implementation of the Plan, identify opportunities and projects, and share objectives and lessons learned.

Customer Representatives – Bring the perspective of the teachers, students, and community; identify concerns and needs of the classroom and community; suggest outreach and awareness-related procedural and policy changes to implement the Plan. These members may lead efforts to encourage and teach energy awareness and conservation within the school and the community.

Lead Planner – Brings the perspective of the planning group to the EMT, with a particular focus on meeting district needs for new construction and renovations, schedules, and impacts on the community.

Lead Architect – Brings the perspective of the architectural group to the EMT, with a focus on sustainable architecture and creating an educational center for the surrounding community; identifies opportunities and projects; and transfers implementation strategies back to the design group.

Lead Electrical Engineer – Brings the perspective of the electrical design group to the EMT, identifies projects and opportunities, and transfers implementation strategies back to the design group.

Lead Mechanical Engineer – Brings the perspective of the mechanical design group to the EMT, identifies opportunities and projects, and transfers implementation strategies back to the design group.

Operations and Maintenance (O&M) – Brings the perspective of the O&M staff to the EMT, identifies opportunities and projects, and transfers implementation strategies back to the O&M staff.

Contracting Representative – Provides contracting expertise, brings the perspective of the contracting group to the EMT, suggests essential procedural and policy changes, identifies opportunities, and transfers implementation strategies back to the contracting group.

Resource Efficiency Manager (REM)

A Resource Efficiency Manager (REM) or Resource Conservation Manager (RCM) is a designated individual acquired by an agency to support its energy and resource efficiency program. The REM's or RCM's sole focus is to bring about reductions in the cost of energy, water, natural gas, fuel oil, refuse disposal and any other utilities. This is done through improved use practices, greater attention to utility billings and rate structures and the installation and use of resource management equipment. To overcome barriers of insufficient funding and also to motivate, the REM's salary is often derived from, and dependent upon, the savings stream resulting from the REM's success in realizing utility cost savings. Often an organization will fund the first year of REM support, with subsequent years funding derived from realized savings. REM's have been successful in many Federal facilities and school districts such as Olympia Washington have also reported success with this approach.

For more information and resouces provided for the REM see http://www.energy.wsu.edu/projects/rem/rcm.cfm

See *Appendix A* for EMT membership and *Appendix D* for LAUSD Sustainability Plan Staffing Requirements.

Program Funding

With environmental leadership as our goal and smart fiscal planning as our objective, we will continue to prepare and request an inclusive annual energy budget to submit as a specific line item. This budget will include funds to accomplish the initiatives, goals, and objectives of our Plan. In addition, we will focus on opportunities to use all current budgets to fulfill the objectives of this Plan.

All project cost estimates for the school district will include the resources to design, implement, commission, and verify project savings. The EMT will develop a five-year plan to achieve the objective of the Plan, see *Appendix B: Action Plan for the Goals, Resources, and Implementation Schedule*.

Project Funding and Financing

LAUSD will continue to take advantage of available program funding and financing tools. A great variety of resources are in existence to fund and finance energy and water projects and for sustainable construction of our new facilities. Alternative financing will be considered including:

- Energy saving performance contracting
- Utility energy services and incentives
- Tax incentives
- Grants.

Budget Submissions

Budget submissions will be submitted in a timely and compelling manner in order to enhance obtain adequate funding levels and to increase our likelihood of success. Our budget submissions for all new and renovation construction projects will include costs for:

- Sustainable design and construction
- Life-cycle, cost-effective energy projects
- High efficiency replacement equipment purchases
- Energy efficiency-focused O&M and continuous commissioning
- Renewable energy procurements and projects
- Environmentally preferable product purchases.

Bonds

Bonds are one source of funding the LAUSD will continue to utilize to modernize, repair and construct new facilities. The District's 900-plus schools are a priority to the citizen's of Los Angeles and we will seek this funding to enhance our facilities' infrastructure.

Through Propositions 47 and 55, LAUSD is eligible for energy grants for new school facilities. Additionally, Proposition 1D, the California High Performance Schools (CHPS), provides grants to offset the added cost of high performance schools. LAUSD will maximize use of these grants and others as they become available in the future.

Energy Savings Performance Contracts

We will rely on the benefits of energy performance contracts with energy service companies (ESCOs) and utility companies to implement the necessary projects to optimize efficiency and management of energy, water and renewable technologies. ESCOs and utilities have a track record of developing and installing comprehensive, cost-effective projects that maximize energy and water efficiency, and incorporate strategies to integrate renewable energy. The ESCO or utility company acts at the prime contractor and if needed, provides the financing, and LAUSD will pay the contractor back with our energy savings.

For more information on ESCOs, please see the National Association of Energy Service Companies's *What is an ESCO?* http://www.naesco.org/about/esco.htm

Utility Energy Services and Incentives

All eligible LAUSD projects participate in Savings By Design, a technical assistance and incentive program offered by Southern California Edison for electricity and by the Southern California Gas Company for gas savings.

Energy Efficiency Programs

When necessary, LAUSD will tap into low interest loans for the installation of energy-saving measures or for energy audits and studies. LAUSD will utilize the loans from the California Energy Commission to install energy projects that include high-efficiency lighting, equipment upgrades, and renewable energy systems. The maximum amount of these loans is $3 million with no minimum loan amount. Loans are to be repaid within 15 years.

For more information, see California Energy Commission's Energy Efficiency Financing Web site: http://www.energy.ca.gov/efficiency/financing/index.html

Incentives for Renewables and Efficiency

Los Angeles Department of Power and Water's Rebates for Non-Residential Energy Efficiency Rebate Program (http://www.ladwp.com/ladwp/cms/ladwp001859.jsp) offers a variety of incentives to increase the energy efficiency of our facilities. The rebates are available for equipment installed on or after January 1, 2006. Applicable equipment includes lighting, central air conditioning, chillers and more. Installations are expected to achieve at least 20% in energy savings.

For more information, see the Database of State Incentives for Renewables and Efficiency's Federal and California Incentives for Renewables and Efficiency Web site: http://www.dsireusa.org/

Project Budgeting

Funds for projects typically are allocated in the following budget accounts:

- New construction
- Major reconstruction/renovation
- O&M (equipment replacement, minor projects)
- Repair and alteration.

Funding Process

During this process, ongoing energy project identification and analysis are conducted. Funding is provided based on LCC analysis. Projects should be submitted as soon as energy audits are completed (see *Facility Energy Audits and Assessments*, pg. 32).

Program Performance and Evaluation

The progression to leadership in energy efficiency and sustainability depends on effective program evaluation and honest performance feedback. The EMT will work each year with the school board to solicit input on additional goals for our Plan, identify revisions and additions, and gauge our performance for the past year.

The intentions of performance evaluation are to:

- Track, monitor, and report on progress and activities of the Plan.
- Request input from and provide feedback to project management, facility operations, and others.
- Use our reporting routine as an opportunity to evaluate our performance.
- Use the LAUSD scorecard to identify opportunities to support goals and improve on performance.
- Invite input from and provide feedback to our clients and customers.
- Inform school users of energy consumption history, progress toward goals, and impact of their actions.

Training and Education

Because adequate training is essential to meet our goals and objectives, we will strive to provide personnel to enhance knowledge in energy efficiency, efficient O&M, sustainable buildings, Leadership in Energy and Environmental Design (LEED), performance contracting, renewable energy projects, water conservation, and other areas that are pertinent to our Plan. We will increase opportunities for education, on-the-job training, mentoring, presentations, and workshops.

We will strive to provide training opportunities that are cost effective. These include local training opportunities, hands-on education (such as PV installation), district meetings that provide information and education for specific groups (such as the annual Building Operator Conference), and on-site group training by educators from outside LAUSD.

We will take advantage of the certification programs available to us, such as Certified Energy Manager, Operation and Maintenance Manager, and LEED accreditation.

Our training goals will be supported by the following activities:

- The EMT will identify, recommend to staff, and take advantage of training opportunities.
- We will identify and encourage targeted training for the management team, project managers, designers, O&M staff, and custodial staff.
- We will work with other agencies in the region to identify and sponsor or co-sponsor training sessions.

For more information on training and education:

Energy Ideas Clearinghouse
www.energyideas.org

Federal Energy Management Program (FEMP) Training
http://www1.eere.energy.gov/femp/services/training.html

U.S. Green Building Council
www.usgbc.org

Coordination and Collaboration with Others

Our internal and external partners are valuable resources for information sharing, collaboration, and technical assistance. We will continue to collaborate with these partners and look for additional opportunities to share resources and information and to achieve common objectives.

Internal Partnerships

Within the LAUSD community this plan would involve participation of:

- Administrators in each school
- Facility management staff
- Design and construction staff
- Teachers
- Student
- Business and financial office
- External partnerships
- Parents' groups
- Utility companies.

Staff, Student, and Community Awareness

To minimize environmental impact and meet our goals and objectives, our employees, school administrators, teachers, and students must make conscious choices daily. We can all increase efficiency through wise procurement choices, such as selecting ENERGY STAR® and other energy-saving products. Additionally, our personal choices, such as turning off computers and desk lamps and accepting lighting controls and temperature set points, reduce energy use.

To support individuals on the continuum from awareness to action, we will:

- energy awareness efforts on Earth Day and during Energy Awareness Month.

The EMT, along with staff and student representatives, will develop outreach programs for our district employees, principals, teachers, and students to promote an awareness and

understanding of the objectives of our Plan. Outreach efforts will include education, information, and training in multiple areas. Areas of outreach focus include:

- ENERGY STAR® and other energy-efficient products
- Integration of sustainability in design and construction
- Use of renewable energy systems and procurement
- Facility operations focused on energy efficiency
- Informational and inspirational signage
- Incentives and motivational efforts.

We will use promotional materials by DOE, EPA, the Collaborative for High Performance Schools, and others, and guidance to provide information and education.

Outreach and Awareness

Conscious choices minimize environmental impact. All the way from design professionals down to students require an awareness of the impact of everyday decisions regarding:

- Sustainable design & construction
- Conservation practices (recycling and resource conservation)
- Procurement Practices (Energy Star & energy-saving products, products made from recycled materials, and products made from non-toxic and recyclable materials)
- Renewable energy systems & green power purchases
- Energy efficiency focused O&M.

Some outreach will be focused on Employees programs and other efforts will focus on our Students. For example, Student Projects could further the objectives of the plan. Other examples can be found at the DOE's Office of Energy Efficiency and Renewable Energy (EERE), which has a great deal of resources that will be useful to students, teachers and administrators on the EERE *Energy Education and Training* Web site (http://www1.eere.energy.gov/education/learning.html) and on the EPA *Take Action At Work Web* site (http://www.epa.gov/epahome/atwork.htm).

Awards, Recognition, and Incentives

We understand the value of recognizing achievement. It is a necessary and important activity and motivates us all to continue our efforts even when they become challenging or routine. We will use available venues and create new avenues to acknowledge energy-saving efforts, communicate progress, and determine customer satisfaction. Awards and recognition for staff, students, architects and engineers, partners, and others will be a key part of our Plan. In addition, we will create a model O&M contract, which will give incentives to contractors to provide energy efficiency benefits as part of their O&M activities.

Awards and recognition are essential to garner support for comprehensive sustainability management and to celebrate success. LAUSD should develop awards and recognition

program to provide awards and recognition for staff, architects, engineers, teachers, students and partners who commit resources and implement actions to meet goals for planning, implementation and maintenance. This program should also include a nomination directive that actively nominates those recognized by the program for other prestigious state and national award programs, e.g. EnergyStar Award, EPA Green Power Leadership Award and the American Institute of Architects Green Project Award.

An available statistic points out the importance that behavior plays in energy use and cost: between 1985 and 1995 the Federal government reduced its energy bill by $1.2 billion, $0.5 billion of which was attributed to changes in behavior (the remaining $0.7 billion by capital projects). The LAUSD has a lot of intellectual resources and an energy management team that could roll out a very robust, diverse, and effective occupancy awareness campaign. Some ideas learned from other institutions include "Building Energy Monitors" who may be appointed in each building to help with keeping lights off in unoccupied rooms and to avoid setting a thermostat high, then opening a window. Sound bites or in-depth content could be delivered over the Public Address and/or Closed Circuit TV system. The LAUSD website and school informational signs could also be used to generate awareness. The team has recommended that LAUSD sponsor a Sustainability Charrette, which would involve broad participation of stakeholders at the center and present an opportunity to discuss an awareness program. The team should make a commitment to developing an ongoing Occupancy Awareness Program as student and employee turnover and changing priorities over time tend to reduce the impact of such programs after the success in the initial launch. Specific tips for saving energy at school and at home are available from GSA, DOE, and EPA sources. Energy use data could be provided to the various schools, and a competition could be developed that would track the greatest energy savings. The team could customize occupancy awareness brochures and other products such as this DOE publication available as an occupancy awareness brochure and other information:

http://www.eere.energy.gov/femp/services/energy_aware.cfm

Progress Toward Goals

LAUSD intends to make steady progress in reducing Btu-per-gross-square-foot energy consumption in our buildings and to meet our district energy goals. Tracking progress toward goals involves selection of appropriate metrics; collecting information required to evaluate the metric; and reporting results to the right people that can control the outcome. Often a benchmark or basecase is established first, and then progress is measured relative to the basecase.

An example of a comprehensive metric is the "carbon footprint," wherein all activities are reduced to their impact on atmospheric carbon emissions.

Strategies, Best Practices, and Tools

To successfully accomplish the goals set forth in the Plan, we need the right resources for planning, implementation, and maintenance. The strategies, best practices, and tools that will help us accomplish our goals are available to us now. In fact, we use many of them already for projects that involve new construction, renovations, equipment replacement, retrofit projects, and building O&M. These resources help us increase energy efficiency and occupant satisfaction, reduce water consumption, support sustainability and renewable energy, and reduce utility costs.

The EMT will work with stakeholders to develop actions and an implementation schedule to meet our goals. (See *Appendix B* for the action plan template—Goals, Resources, and Implementation Schedule.)

Elements of the Plan consist of specific goals, strategies, policies, and action plans for each category. Categories include: energy efficiency; renewable energy; sustainable development and design of new schools and renovations; infrastructure modernization; water conservation; and operation and maintenance.

Facility Energy Audits and Assessments

We will continue to conduct energy audits, assessments, and surveys at a rate of 10% each year. Information we obtain will be used to identify the most cost-effective projects for implementation.

We will use audits and assessments to:

- Assign priorities to facilities that will receive audits on the basis of energy costs, upcoming renovations and equipment replacement opportunities, as well as the potential for emissions reductions
- Use a variety of resources for audits, assessments, and surveys
- Encourage facility staff to conduct annual walk-through surveys to gain a greater understanding of their facilities and identify opportunities for more efficient operations and replacement of equipment.

For more information, see FEMP's SAVEnergy Audits Web site:
http://www1.eere.energy.gov/femp/services/assessments_savenergy.html

Life Cycle Cost Analysis

Use of building LCC is mandated by policy and good business practices. We will continue to use and reinforce the use of LCC analysis to make effective, long-term business decisions about investments in energy-using systems. New construction, retrofit projects, and equipment replacement are areas in which we will use LCC. In addition, LCC is valuable in making decisions about non-energy-using materials (such as carpeting and wall treatments).

We will support the use of LCC in the following ways:

- Use LCC analysis for energy-using systems in all new construction, renovation, and retrofit projects.
- Follow the guidance developed in the LCC program used by the National Institute of Standards and Technology.
- Ensure that facility and procurement staff members are knowledgeable in the use of LCC.

For more information and a list of useful tools, please see the Department of Energy's Building Life-Cycle Cost Software Web page:
http://www1.eere.energy.gov/femp/information/download_blcc.html

Energy Efficiency

Every dollar spent on energy is a dollar not available for teachers' salaries, required maintenance, or enhancements to a student's education. We need to use energy to deliver education, especially in this age of high standards for space conditions (temperature, lighting, etc.) and high technology in the classroom. However, we need not waste energy, and the approach to energy efficiency is to minimize the amount of energy spent to achieve the desired objective.

LAUSD spends $85 million per year in annual energy costs. So each 1% savings in utilities equates to an additional 25 teachers available to schools (at an average salary of $33,000 per year from www.payscale.com). LAUSD's Energy Utilization Index (EUI, ratio of annual energy use in British Thermal Units [Btu] to facility square footage) for fiscal year (FY) 04-05 was 30,245 BTU/sq. ft. A report by Coalition for Affordable School Housing indicated that California's K-12 school districts spend approximately 2.5% of the general fund budget for utilities. Nationally the energy budget average was 2.1% in FY03-04. But LAUSD's average is only 1.5%. LAUSD's energy costs are less than the national and state average because the Board of Education and Senior Management have made a long-term commitment to energy efficiency and energy supply and demand side management programs.

Goals

In years past, district staff has been able to demonstrate due diligence in remodeling projects, HVAC installation and new schools coming on line and we are maintaining our operative goal of 3% per year energy cost reduction though we have not yet achieved it. The ANSI/MSE 2005 approach described below consists of setting goals and measuring

the effect of actions to achieve the goal. Thus specific goals will be developed and adjusted under the context of that management system.

Other goals affect the District's goal-setting process such as:

- Countywide Energy and Environmental Policy (Dec. 19, 2006) which establishes a goal of reducing energy consumption in County facilities by 20% by the year 2015.
- CA AB 32 calls for a 30% reduction in GHG emissions, which translates loosely into a 30% reduction in energy consumption (green power and fuel switching being the other means).

Strategies

The overall strategy to get traction on energy use reductions is through a management system that structures the measurement of progress and indicates the direction toward continuous improvement. LAUSD staff has drafted a plan to adopt a management system standard for energy (ANSI/MSE 2005) that describes the elements required for a lasting program of continual improvement in energy management. Under this plan LAUSD would develop, document, implement, and maintain a management system for energy, and continually improve its effectiveness according to the requirements of the standard.

The management system for energy includes documentation of an energy policy, energy goals, and targets; an energy manual; and planning, operation, and control of energy-related processes and equipment. The plan will address goals, monitoring and measuring key performance indicators, energy profile, strategic procurement policy and best practices, measurement and verification data collection and results.

Policies

Los Angeles County policy is embodied in the Energy and Environmental Policy adopted December 19, 2006. The policy provides a structure for the development and implementation of energy efficiency and environmental initiatives under four program categories.

1. Energy and Water Efficiency Program establishes a goal of reducing energy consumption in County facilities by 20% by the year 2015.
2. Environmental Stewardship Program requires measurement of the County's "environmental footprint" including determining the amount of air pollutants produced through County operations and enhances existing County environmental policies and programs such as environmentally responsible purchasing standards, recycling programs, and the use of environmentally friendly products.
3. Public Outreach and Education Program uses the County's communication and outreach channels to share utility industry information, facilitate implementation of subsidy and assistance programs, and spread energy conservation practices throughout the region.
4. Sustainable Design Program integrates sustainable, "green building" technologies into the designs of the County's capital improvement and refurbishment projects.

The Energy and Environmental Policy establishes the Energy and Environmental Team led by ISD to coordinate the development, implementation, and monitoring of the Energy and Water Efficiency, Environmental Stewardship, and Public Outreach and Education Programs.

The district also maintains a design guide with a section (Section 2.4) related to energy and environmental considerations. The LAUSD has elected to make the Collaborative for High Performance Schools (CHPS) Criteria a mandatory design standard.

For more information, see the *CHPS Best Practices Manual 2006, Volume III, Criteria*: http://www.chps.net/chps_schools/Recognition.htm#Criteria

Action Plans - Specific actions to enhance energy efficiency include:

- Analyze the District's energy usage patterns, utility rate schedules, and the cost impact of inflation and rate increases. Participate in utility regulation (CA PUC, CEC, LADWP) to achieve equitable rate structures and encourage passage of energy efficiency programs. Leverage the district's buying power and the influence of parents to further the goals of the district within the utility regulatory process. Work with legislators representing the district to review and comment on pending legislation on energy matters that affect the district. These activities could be consolidated in the position of an expert "Regulatory Advocate" who could be hired, contracted, or shared with another public agency.
- Benchmark the District's utility budget and normalize with respect to weather, enrollment, equipment, and square footage in order to identify efficient and inefficient schools and use this information to focus efforts and inform occupant awareness programs.
- Scrutinize metering and billing to identify and correct billing errors and reduce overpayment and ensure that neighbors and concessionaires are not freeloading on service to LAUSD facilities.
- Partner with utility companies to take full advantage of utility rebate programs. Try to leverage rebate funds into more energy projects. Take full advantage of the utility's Savings By Design Energy Efficiency Incentives for projects 10% more efficient than the Title 24 Energy Efficiency Standards.
- Take full advantage of grants offered by other State and Federal energy conservation programs. Participate in development of the incentive levels, verification process, and submittal and review requirements for Proposition 1D High Performance School Incentives and take maximum advantage of available incentives. Take full advantage of funds remaining in Propositions 47 and 55 Energy Grants for schools performing 15% better than Title 24.

- Evaluate equipment types frequently used in schools and recommend products based on energy efficiency. Refer to lists of energy efficient equipment maintained by EPA and FEMP. (http://www1.eere.energy.gov/femp/procurement/eep_requirements.html). LAUSD procurement officials should allow purchase of only ENERGYSTAR and recommended equipment for all future purchases.
- Solicit and evaluate proposals for District-wide comprehensive Energy Retrofit Projects from Energy Service Companies.
- Follow-up with energy retrofit projects to verify that energy cost savings are achieved.
- Participate in conferences and other interaction with utilities; energy services companies, and other agencies organizations regarding energy efficiency to identify lessons-learned, best practices, and to stay current on new developments. Participate in National and District Coalition for High Performance Schools (CHPS) programs and information sharing.
- Training school personnel to read utility expenditure reports and to implement programs to reduce energy expenditure at each school through installation of energy saving equipment, optimization of operation and maintenance, and occupancy awareness programs.

Some highlights of previous LAUSD ongoing demand side management program (DSM) include:

- Replacing inefficient fluorescent lighting with high efficiency T-8 lamps
- Replacing HVAC equipment with high efficiency equipment
- Cool roof program
- Water conservation program.

LAUSD Supply Side Management (SSM) programs include:

- Electric power sales agreements with LAUSD's energy suppliers

For more information:

ENERGY STAR® Products
http://www.energystar.gov/

EPA Environmentally Preferable Purchasing
http://www.epa.gov/oppt/epp/index.htm

FEMP Recommendations for Energy-Efficient Products
http://www1.eere.energy.gov/femp/procurement/eep_requirements.html

Infrastructure Modernization

In keeping with efforts to incorporate sustainable principles throughout the LAUSD, infrastructure modernization represents a tremendous opportunity to impact the learning and working environment of the students and employees of the LAUSD. It is essential to consider infrastructure modernization as a component of this energy management plan.

As we modernize the existing facility infrastructure we will continually modernize our buildings and use the most innovative and high performing technologies while seeking to optimize space in support of productivity and as community centers.

Sustainable Building Design and Construction

Leading the way to sustainable design at educational facilities is an important goal for LAUSD. We embrace sustainable building design and "whole building" principles in which the interdependence of a building's elements and systems is maximized to make it as sustainable and energy efficient as possible. Sustainable design recognizes the impact of every design choice (such as window placement and type of cooling system) on the natural and cultural resources of the local, District, and global environments.

When designing new construction and major renovations, we will use many available resources. These include the *Procurement of Architectural and Engineering Services for Sustainability*; *LAUSD Sustainable Design Guide*, *Whole Building Design Guide*; the LEED program of the US Green Building Council, and the Sustainable Design Studio.

We will continue to support sustainable design and construction in the following ways:

- Educate asset managers, portfolio managers, project managers, facility staff, architects, engineers, designers, budget analysts, maintenance staff, and other key personnel about sustainable design principles, energy efficiency, and LCC.
- Submit budgets that include costs for sustainable design and construction; include commissioning, building modeling, and other critical elements.
- Determine beforehand the rating to be obtained for each new construction project (such as LEED [including level]
- Hold design charrettes and include customers, project managers, maintenance staff, A/E team, designers, and others to identify requirements and discuss sustainability, commissioning, and optimized O&M.
- Ensure that the selection criteria for A/E firms and design/build firms include experience with energy efficiency, water conservation, use of LCC, and sustainable building design.
- Incorporate sustainable design criteria into requirements for all new construction and major renovation projects.
- Review design guide specifications and incorporate current sustainability guidance. Consider O&M during planning and design.
- Include building commissioning in all new construction and substantial renovation projects.

- Incorporate continuous commissioning and O&M planning in all new and renovation design specifications.
- Use software such as Building for Environmental and Economic Sustainability (BEES), Life Cycle Costing (LCC), DOE2, Energy 10, and other tools.
- Continue to nominate projects and buildings for District and national design, energy efficiency, and sustainability awards.

For more information, see Web site:
http://www.eere.energy.gov/buildings/info/design/

LAUSD Sustainable Development Overview

Emerging organizations in the 21st century and new millennium, with successful and effective leadership potential, are increasingly adopting as well as practicing the fundamentals of the sustainable development principle, which is a common-sense holistic approach, integrating:

- Planet and environment
- People and community
- Prosperity and economy.

This three-pronged strategy has evolved into realistic and practical action plans in many of today's forward-looking public, private, and non-profit sector organizations and agencies, including but not limited to school districts. Even in the private sector's emerging profitable multinational corporations and industries, the Corporate Social Responsibility (CSR) has taken the central stage in strategic planning. CSR is based on the similar Sustainable Development triad principle of environment, community, and economy.

Why then is the concept and implementation of sustainable development so critical in today's competitive global economy and technological revolution? The simple answer is that without the so-called balanced triad of environmental stewardship, social justice (community), and economic prosperity, an organization and its leadership may not sustain the severe tests of stability, integrity, vision, trust, passion, and common good, so vital for meaningful survival and generational legacy to be left behind, in the 21st century.

Environmental stewardship, as an element of sustainable development, can become the key engine for LAUSD's functional responsibilities. Its broader implications are based on creative activities, such as, energy efficiency and management; renewable and clean energy technologies; water and resource conservation; recycling; greenhouse gas emissions reduction (global climate change); indoor air and environmental quality; pollution prevention; sustainable building (schools) planning, design, construction, renovation, commissioning, O&M; alternative financing; infrastructure modernization; and alternative-fueled vehicles (school buses). One must not, however, underestimate the

importance of another sustainable development element, namely: economic prosperity and jobs creation, through which LAUSD can exert significant leadership influence in the District economy and/or economic development. And last but not least, the third element of sustainable development—social justice (community)—can have long-term societal benefits, such as public and private partnerships; community asset development; equal and non-discriminatory opportunities and practices; and sustainable physical and material infrastructure legacies for generations to come.

Therefore, LAUSD, as the second largest school district in the United States, now has a great opportunity to become a recognized leader in the fields of energy, environment, sustainability, climate change, and organizational performance, without compromising the integrity of its core mission of educational excellence, infrastructure efficiency, and LCC effectiveness. This challenge will be even more significant for LAUSD, in California—which has already taken the national leadership role in the ever so vital areas of energy, environment, and sustainability. The proposed recommendations in this document are intended for LAUSD to adopt and take an aggressive approach towards bold and innovative policies and strategies, action plan and roadmap implementation, and organizational change effectiveness, during both the pre-established short and medium and long-range periods.

For more information on sustainable development:

Building for Environmental and Economic Sustainability
http://www.bfrl.nist.gov/oae/software/bees.html

Child Care Center Design Guide
http://www.LAUSD.gov/ (Type in "Child Care Design" in search box.)

Federal Network for Sustainability
http://www.federalsustainability.org/

Leadership in Energy and Environmental Design (U.S. Green Building Council)
http://www.usgbc.org/

Procurement of Architectural and Engineering Services for Sustainability
http://www1.eere.energy.gov/femp/program/procuring_services.html

Whole Building Design Guide
http://www.wbdg.org/

Highly Efficient Systems

As the second largest school district in the country, LAUSD is in a strong position to lead in the adoption of new and more efficient technologies, distributed energy resources, and other highly efficient systems. We will continue to identify opportunities to demonstrate the appropriate use of promising technologies and to show leadership by example.

To fulfill these objectives, we will:

- Install and use advanced metering and monitoring techniques
- Identify opportunities for use of geothermal heat pumps, combined heat and power (CHP), biomass, micro turbines, and other underused technologies
- Disseminate information on results of demonstration projects.

For more information on highly efficient systems:

FEMP Advanced Metering Program
http://www.eere.energy.gov/femp/technologies/om_advmetering.cfm

FEMP Distributed Energy Resource Program
http://www1.eere.energy.gov/femp/der/index.html

FEMP Technology Demonstration Program
http://www1.eere.energy.gov/femp/new_technology/index.html

Building and System Commissioning

Commissioning helps us achieve, validate, and document that our building performance and systems meet the design needs and requirements of LAUSD Teachers, students, and staff.

Because all building systems are integrated, a problem in one system or component can affect the operation and performance of other components. Identifying and eliminating problems are important for improved occupant comfort and productivity, energy savings, environmental conditions, system and equipment functioning, and building O&M.

To remain in the forefront of building commissioning, we will:

- Emphasize building commissioning in all five phases of projects: scope and budget, design, construction, acceptance, and post-acceptance and occupancy, including recommissioning and continuous commissioning
- Use available tools such as commissioning guides, information on selection of independent commissioning authorities, commissioning specifications, and commissioning reports to define and continuously improve our knowledge of commissioning
- Train O&M staff
- Procure commissioning services.

For more information on building and system commissioning:

Continuous Commissioning Guidebook for Federal Managers
http://www.eere.energy.gov/femp/operations_maintenance/

Greening Federal Facilities (Chapter 9.2 Building Commissioning)
http://www.nrel.gov/docs/fy01osti/29267.pdf

Portland Energy Conservation, Inc. (PECI) Commissioning and O&M Resources
http://www.peci.org/commissioning.htm

Operations and Maintenance – Facility Operations

LAUSD facilities include more than 1,000 new and existing school buildings totalling more than 75 million square feet of building area. We administer a $2 billion annual budget for design, construction, renovation, and maintenance, and pay more than $85 million per year in utility costs. Our inventory consists mainly of schools but also includes support spaces such as office buildings, warehouses, laboratory space, and child care space.

Operations and maintenance is one of the most cost-effective areas for ensuring reliability, safety, and energy efficiency. Good maintenance practices can generate substantial energy savings. Energy losses from steam, water and air leaks, uninsulated lines, and maladjusted or inoperable controls are often considerable. Improvements to facility maintenance programs can often be immediate and low cost.

We can meet our targets by focusing our operations on environmental stewardship as follows:

- Review and modify our District O&M procedures and maintenance plans to reflect O&M best practices, focusing on energy efficiency and cost-effective O&M.
- Identify and track energy consumption.
- Provide periodic training on building monitor and control systems.
- Provide information to students, teachers, administrators, and parents about the status of energy and sustainability projects; and continue to educate maintenance personnel about equipment and how to optimize energy-consuming systems.
- Demonstrate to customers the results of projects and efforts.
- Ask our occupants for feedback about the building environment to improve where necessary and to determine the effectiveness of our sustainable operating and custodial procedures.
- Educate occupants about comfort control and its impacts and costs.
- Budget for O&M training, continuous commissioning, and energy, environmental, and sustainability education.
- Where O&M is contracted, review and refine O&M contracts to include performance requirements and efficiency and sustainability bonuses for contractors. Ensure that the criteria for O&M services include proven success with energy management, continuous commissioning, and sustainable building practices.

For more information on operations and management:

Building Operator Certification
http://www.theBOC.info/

FEMP O&M Best Practices Guide
http://www.eere.energy.gov/femp/operations_maintenance/

Greenhouse Gas Emissions Reduction

GHG emissions could alter forests, crops, and water supplies. We will take advantage of all opportunities to reduce emissions through the following measures:

- Switch to less polluting fuels as opportunities are presented
- Increase the use of renewable energy technologies such as PV, wind, and geothermal
- Assign priorities to energy-saving projects on the basis of technologies used and potential savings to obtain the best emissions reductions.

Source Energy

LAUSD will strive to reduce total energy use and associated GHG and other air emissions as measured at the source (such as at electric or coal power plants). We will undertake cost-effective projects, for which LCC analysis has verified cost-effectiveness, that result in decreasing source energy, even if site energy use (measured at the point of use) increases. In addition, projects that result in source energy reductions will contribute directly to LAUSD's performance in reaching GHG reduction goals.

We will undertake the following actions in support of these objectives:

- Adopt a self-generation strategy that supports the use of on-site generation and renewable energy by focusing on sites served by utilities that use fossil fuels.
- Follow guidelines to receive credits toward energy efficiency goals for cost-effective projects when source energy use declines (for example, purchasing green power or fuel switching).
- Purchase Renewable Energy Certificates.

For more information on source energy:

Purchasing Renewable Power (FEMP)
http://www.eere.energy.gov/greenpower/buying/index.shtml

Source Energy Reduction Credit (toward energy efficiency goals)
http://www.eere.energy.gov/femp/pdfs/source_crediting.pdf

Renewable Energy

LAUSD can be a leader in the use of renewable energy. By using renewable energy at our facilities, we can help advance the renewable energy market and preserve our precious natural resources. Use of renewable energy is expanding at our facilities through targeted projects and energy purchases from renewable sources. The most sustainable kWh is the one not used. Before a renewable energy system is considered every effort should be taken to optimize energy efficiency. But as the saying goes "you can't save yourself rich" and renewable energy should then be considered to provide the energy needed to accomplish LAUSD's mission. School districts have a tremendous opportunity and a clear responsibility to educate students about energy alternatives, save energy cost and associated emissions, and lead by example.

The following renewable energy technologies are available with applications to school buildings:

Daylighting

Daylighting is perhaps the principal opportunity for solar energy in school buildings. Even on cloudy days there are thousands of footcandles of daylight available (9000 fc on a sunny day). It takes only a small percent of this daylight to make it through the building envelope in order to meet lighting requirements. It is easy to get enough daylight into a space; the challenge for the designer is to meet other lighting quality goals such as avoidance of backlighting a subject and to minimize ratio of lightest to darkest spots in a room. In new construction, daylighting apertures are integrated into the architecture while retrofit projects usually involve the addition of skylights. Automatic controls are recommended to achieve energy cost savings. The installed cost of daylighting units together with lighting upgrades and controls is, on average, around $2 per square foot of floor area served. An increase in heating and cooling loads must be considered. In general, however, one can expect to see energy savings in the range of 2.5 to 4.5 kWh per year per square foot of area served. Any school built before 1940, when lighting became inexpensive, will have daylighting and the only cost will be the addition of automatic controls.

Solar Water Heating

Most schools have a lot of use for hot water. Some have swimming pools for recreation and fitness purposes. Hot water is used in cafeterias, shower facilities, and laundry facilities. Swimming pool energy use represents a significant cost; swimming pool covers and solar heating are two strategies that are often cost effective. Heating swimming pools is a good application for solar water because: solar collectors operate at a temperature lower than other solar water heating applications so there is less heat loss and the collectors are more efficient; low temperature operation allows for use of low-cost unglazed polymer solar collectors; the pool itself acts as a huge reservoir of thermal storage, increasing solar utilization; and the solar heating system often utilizes the pump that is required anyway to filter the water.

Solar collectors for swimming pools are extruded from a polymer such as polypropylene with UV stabilizers and do not have cover glass or insulation. They heat water up to 18°F (10°C) above ambient temperature. For higher temperatures such as service hot

water the collectors must be insulated and glazed to retain heat. These can heat water to 100°F (50°C) above ambient temperature. RS Means & Co. reports installed system cost of $17 per square foot for unglazed swimming pool heating systems. The cost for a complete system to heat potable water is typically $60 to $100 per square foot. The size of the solar heating system is determined by minimizing LCC. Often, the best size meets two thirds to three fourths of the water-heating load. The energy subcommittee of the High Performance Schools Program has recommended solar water heating for swimming pools at:

- Central Region High School #13
- Central Region High School #9
- Central Los Angeles Learning Center #1/Heritage K-12
- Banning High School San Pedro
- Fremont High School Los Angeles.

Grid-Connected Photovoltaics

Photovoltaic (PV) arrays convert sunlight to electricity without moving parts and without producing fuel wastes, air pollution, or GHGs. Arrays can be ground mounted on all types of buildings and structures. PV dc output can be conditioned into grid-quality ac electricity or used to power small DC loads on the site, such as signboard lighting or irrigation controls. PV systems are generally fixed in a single position, but can be mounted on structures that tilt toward the sun on a seasonal basis, or on structures that roll east to west over the course of a day. PV systems currently sell for about $9/Watt including installation. They are highly reliable and last 20 years or longer. The energy subcommittee of the High Performance Schools Program has recommended photovoltaics at:

- Building "D" at Elementary School #6—20 kW system
- Other schools identified as candidates for further consideration by the subcommittee include: Belvedere MS; Carson HS; Clay MS; Curtis MS; Drew MS; Elizabeth LC; Gage MS; Garfield HS; Griffith MS; Miles ES; Nimitz MS; Perez SpEd; San Fernando MS; Southgate MS; and Washington HS.

While it is often difficult to compete in price with electricity and natural gas from the local utility company, these prices have been rising and there are definitely applications where one or more of these technologies can save money. There are many places in the schools where these technologies are operational today, and where some have been operational for over 25 years. There are state government and public utility financial incentives and tax credits that can help make these technologies cost effective now.

In January 2006, the California Public Utilities Commission (CPUC) adopted the California Solar Initiative (CSI) to provide more than $3 billion in incentives for solar projects with the objective of providing 3,000 MW of solar capacity by 2017. The CSI will fund solar PV initially, with other solar technologies included at a later point. Originally limited to customers of the state's investor-owned utilities, the CSI was expanded in August 2006, as a result of Senate Bill 1, to encompass municipal utility territories as well. Municipal utilities are required to offer incentives beginning in 2008

(nearly $800 million), but note that LA DWP already offered PV rebates. CSI incentive levels will automatically be reduced over the duration of the program in 10 steps based on the aggregate capacity of solar installed. CSI incentives for 2007 begin at the following levels for schools: for systems under 100 kW the rebate is $3.25/W AC and the performance-based incentives for systems 100 kW and larger is $0.50/kWh for first five years.

Under a private sector-ownership arrangement, a supplier would be able to take a 30% business energy tax credit [26 USC § 48 (2005)] and also take the tax benefits associated with MACRS [accelerated depreciation, 26 USC § 168 (2005)]. Some of this savings could be passed on to the school district.

Net metering is an incentive for photovoltaics because it allows free "banking" of power with the utility. California net metering laws provide net metering for PV systems up to 1 MW in size. Net Excess power produced in any month is credited to customer's next bill for up to one year.

Goals

We recommend that the district consider a goal of 10% renewable energy in existing facilities and 10% for new construction projects.

Strategies

Strategies for the use of renewable energy fall into two categories:

1. On-site projects to offset purchased energy
2. Purchasing "green power" generated from renewable energy sources and offered by the utility.

On-site projects are characterized by a higher capital cost but followed by little or no fuel costs. They entail a lower societal and environmental cost. On-site projects employ local electricians and plumbers, thus keeping financial resources within the school district's community. On-site projects offer a redundant source of power if so configured which is a hedge against power outages or interruption of the conventional system.

Utilities charge a premium for green power, but sometimes this premium is less than the fuel cost adjustment charged with conventional power, so there is occasionally a cost savings on the monthly bill.

Policies

Renewable Energy would contribute to the general energy policies described in the "Energy Efficiency" section of this report. In addition, In May 2007, LAUSD staff proposed a road map to: leverage policy, programs, resources, and other investment programs to meet all of LAUSD goals; provide detailed plans, identify metrics, and other resources needed to execute the strategy; provide a year-by-year investment plan that proposes projects and systems; and establish initiatives. Staff proposed four energy and water initiatives including:

Initiative #3

Increase the use of clean, renewable energy to reduce dependence on fossil fuels and to optimize environmental benefits and sustainability.

Action Plans

Specific actions to enhance renewable energy in LAUSD facilities include:

- Review performance of renewable energy systems already installed in LAUSD schools to ensure that they are performing as expected.
- Evaluate current cost and performance of renewable energy technologies for application in LAUSD buildings. Prepare a list of candidate technologies.
- For candidate technologies conduct screening based on utility rates, renewable energy resources, and technology characteristics without visiting schools to identify candidate sites for each technology.
- For each candidate site conduct a site visit to measure dimensions and observe configuration of existing systems and site conditions. Prepare feasibility assessment of each candidate technology at each candidate site.
- Prepare packages of bundled measures that are sufficiently cost-effective to compete for LAUSD appropriations or alternative financing.
- Prepare procurement specifications and quality control standards and procedures.
- Issue Request for Proposals for bundles of appropriated or alternatively financed projects.
- Execute contract and installation of renewable energy systems.
- Perform long term Measurement and Verification to ensure cost savings.
- Procure renewable power when sources are available from serving utilities or power marketing administrations; strive for 100% at sites when possible.
- Procure Renewable Energy Certificates/Green Tags for sites when direct renewable power delivery is not available.

For more information using renewable energy technologies:

FEMP Renewable Energy Program
http://www.eere.energy.gov/femp/technologies/renewable_energy.cfm

Purchasing Renewable Power (FEMP)
http://www.eere.energy.gov/femp/technologies/renewable_purchasepower.cfm

Buying Renewable Energy Certificates (EERE):
http://www.eere.energy.gov/greenpower/markets/certificates.shtml

Water Conservation

Using our limited supply of water is vitally important as the demand for freshwater increases while the supply remains constant. Boosting water efficiency has a significant role in ensuring the achievement of the goals of any comprehensive energy management program, while protecting this precious resource. Research shows that while the population of the State of California grows, per capita water use is high as well. LAUSD can show leadership in the area of water efficiency by striving to employ the best practices for water efficiency and exceeding compliance standards.

Goals

Federal water efficiency goals require reduction in water consumption intensity through life-cycle cost-effective measures by 2% annually through 2015, or 16 % by 2015. In an effort to exceed compliance standards established for the school district, we will seek to reduce water consumption in accordance with Federal requirements.

Strategies

LAUSD will lead by example and follow the guidelines established by the EPA's WaterSense program, the tenets of the Global Green program, and criteria established by the U.S. Green Building Council's Leadership in Energy and Engineering Design (LEED) program.

Policies

Our policy will be to make investments in water infrastructure and technologies; adhere to all environmental regulations of the Water Resources Control Board and other relevant authorities; and always remember that clean water is a privilege, not a right.

Action Plans

- Adopt practices to identify and utilize water-efficient products and practices.
- Ensure design for all new construction and renovations incorporate methods to optimize water efficiency and adhere to the requirements of the State Water Resource Control Board and other appropriate authorities.
- Integrate water efficiency into energy education and awareness campaigns.

For more information:

High Performance Buildings (EERE)
http://www.eere.energy.gov/buildings/highperformance/

EPA ENERGY STAR Buildings & Plants
http://www.energystar.gov/index.cfm?c=business.bus_index

LEED Rating System (U.S. Green Building Council)
http://www.usgbc.org/

Conclusion

This Plan is our roadmap to accomplishing LAUSD environmental leadership goals, meeting the requirements of California, County and District legislation and Executive Orders, creating community centers, and sustainable classrooms that exceed expectations and enhance student productivity.

We will achieve our objectives in applying these processes and strategies and by implementing the actions defined in our plan.

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Appendix A

Advisory Board

	Name	Representing
Standing Board Members	Management Advocate	LAUSD
Auxiliary Members	LAUSD School Board	Representative
	Utility	As invited – Utilities
	Contractors	Building operations and maintenance contractors, vendors, and A/E firms – as invited
	Major LAUSD Client • Principals • Teachers • Student	Representatives – as invited

Energy Management Team

Title	Topics and Issues
Management Advocate	Overall perspective
Facilities Services Division	Facility operations, maintenance, energy consumption
District Energy Coordinator	Energy, commissioning, sustainable design
Project Management Representative	Project management procedures and policy
Lead Electrical Engineer	Electrical design
Lead Mechanical Engineer	Mechanical design
O&M Representative	Operations & maintenance
Contracting Representative	Contracting
Architect/Designer	Architectural and interior design

Appendix B

*Action Plan (Goals Resources and Implementation Schedule)**

District Goal:	Develop the Plan such that it supports the accomplishment of District goals
Responsible Office	**Facilities Services Division**
Objective	Deliver superior classrooms through optimized building operations and sustainable design principles. Incorporate Plan objectives during decision-making process.

	Energy Management Plan	Resources	Target Dates
Supporting Action 1	Establish the EMT 1. Name personnel 2. Define purpose of the EMT 3. Draft EMT Charter (a) Develop an energy management program vision statement and develop vision statements for each member of the EM program. (b) Obtain Division and District level signatures.		
Supporting Action 2	Develop an implementation schedule based on the Strategic Plan and the EMT Charter.		
Supporting Action 3	Provide Plan education to Facilities Services Division, project managers, and design teams.	See training and education objective	
Supporting Action 4	Verify progress and course correction.		
Tools	LAUSD Business Plan LAUSD Performance Measures		

** Appendix B is intended as a template to serve as an action plan showing the resources needed to implement District goals on schedule.*

Appendix C

LAUSD Sustainability Scorecard*

Contact Name and Phone			
Name of Senior District Official	**Signature of Senior District Official**		
Did your agency . . .	**Yes**	**No**	**Anticipated Submittal Date**
1. Prepare a strategic plan			
2. Submit an Implementation Plan			
3. Implement or continue to use renewable energy projects			If yes, how many projects and how much energy generated? (Specify unit: MWh or MMBtu) Solar ____ _____M____ Wind ____ _____M____ Thermal [1] ____ _____M____ Biomass ____ _____M____ Other RE ____ _____M____
4. Purchase energy generated from new renewable energy sources			If yes, how much: _____ MWH or _____ MMBtu
5. Invest appropriations in projects that contribute to the goals			If yes, how much: $_____
6. Specifically request funding necessary to achieve the goals			If yes, how much: $_____
7. Perform energy audits of 10% of its facility space			What percentage of facility space was audited during the FY?___% How much facility space has been audited since 1992? ____%
8. Issue to private sector energy service companies (ESCOs) any energy savings performance contract (ESPC) task orders			How many? _____ Annual savings (MMBtu): _____ Total investment value:[3] $_____ Cumulative guaranteed cost savings: $_____ Contracts award value: $_____

** This template is intended to serve as a means of evaluating progress toward goals and effectiveness of performance.*

Appendix D - LAUSD Sustainability Plan Staffing Requirements

Staffing requirements to implement the plan are estimated very roughly as detailed in the following tables. Total investment is estimated at 950 FTE MONTHS, or an average of about 16 persons working on various elements of the plan in various offices at any given time. Table 3 shows how the 5-year plan adds up to almost $8 million, but these should not be considered new additional costs. Much of the work involved in implementing the plan does not involve new positions but rather just organizing the work of existing positions.

Table 1. Staffing in FTE MONTHS by Resource Office

Resource	FY08	FY09	FY10	FY11	FY12	Total
Budget Services and Financial Planning	10.7	19.1	12.9	11.9	11.1	65.7
Existing Facilities	22.2	39.5	36.4	35.3	33.2	166.6
Facilities Contracts	5.9	10.6	5.5	4.8	4.3	31.1
Facilities Support Services	2.7	4.8	10.8	10.1	9.4	37.8
Local District Superintendents	4.5	7.8	9.1	8.6	8.3	38.3
New Construction Building and Planning	15.3	27.4	24.6	23.3	21.2	111.8
Parent/Community Services	3.2	5.5	4.6	4.3	3.7	21.3
Program Manager	21.6	38.4	43	40.8	38.3	182.1
Project Leader	26.3	46.7	44.4	39.6	35.8	192.8
School Management Services	5.3	9.5	10.4	9.9	9.3	44.4
School Policies	5.9	10.5	14.7	14	12.9	58
Total	**123.6**	**219.8**	**216.4**	**202.6**	**187.5**	**949.9**

Table 2. Rough Estimate of FTE MONTHS Required to Implement Plan by Strategy Area

Strategy Area	FY08	FY09	FY10	FY11	FY12	Total
Administration	8.4	15	11.5	11.1	10.6	56.6
Alternative Financing	11.9	20.9	10.2	9	8.2	60.2
Awards, Recognition & Incentives	5.6	9.9	9.6	9.3	8.6	43
Coordination & Collaboration	4.5	7.9	5.7	4.7	4.1	26.9
Employee & Student Awareness	6.3	11.1	16.8	16.3	15.5	66
Energy Efficiency	14.3	25.8	14.3	13.4	12.3	80.1
Infrastructure Modernization	10.5	18.6	13.5	12.4	10.4	65.4
Life Cycle Costing	5.2	9.3	11.1	10.3	9.6	45.5
Operation and Maintenance	12	21.4	34.2	33.1	31.6	132.3
Performance & Evaluation	10.6	18.9	24.6	21.8	20	95.9
Project Financing	7.3	13	6.4	5.8	5.5	38
Renewable Energy	5.8	10.3	19.2	18.7	17.3	71.3
Sustainable Development and design of new schools, renovations	7.7	13.8	9.8	8.9	8	48.2
Training & Education	7.3	13	11.4	10.5	9.5	51.7
Water Conservation	6.2	10.9	18.1	17.3	16.3	68.8
Total	**123.6**	**219.8**	**216.4**	**202.6**	**187.5**	**949.9**

Table 3. Staff Funding based on $100,000 per year professional salary

	FY08	FY09	FY10	FY11	FY12	Total
Annual Funding Level	$1,030,000	$1,831,667	$1,803,333	$1,688,333	$1,562,500	$7,915,833

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This Strategic Plan for Sustainable Energy Management and Environmental Stewardship states goals, measures progress toward goals and how actions are monitored to achieve continuous improvement for the Los Angeles Unified School District.

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