

San Diego Unified Port District Energy Road Map

Draft: February 19, 2009

This **San Diego Unified Port District** Energy Road Map is a joint effort between San Diego Gas & Electric (SDG&E) and the San Diego Unified Port District (Port) to support the Port's Green Port Program by identifying programs to deliver net energy savings, peak demand savings and greenhouse gas reductions through implementation of energy efficiency activities in Port operations.



San Diego Unified Port District Energy Road Map *Table of Contents*

<i>Executive Summary</i>	5
<i>1 - Introduction</i>	7
<u>San Diego Unified Port District Overview</u>	7
<u>San Diego Unified Port District Green Port Policy</u>	7
<u>SDG&E Overview</u>	7
<u>SDG&E and San Diego Unified Port District Sustainable Energy Partnership</u>	8
<i>2 - Port Facilities Retrofits</i>	9
<u>Description</u>	9
<u>Clean Generation</u>	14
<u>Recommendations</u>	16
<u>Summary</u>	16
<u>Incentive Programs / Funding</u>	17
<i>3 - Land Use Planning and Development Opportunities</i>	19
<u>Description</u>	19
<u>Recommendations</u>	21
<u>Summary</u>	23
<u>Incentive Programs / Funding</u>	23
<i>4 - Education and Outreach</i>	24
<u>Description</u>	24
<u>Target Audience</u>	24
<u>Recommendations</u>	28
<u>Summary</u>	28
<u>Incentive Programs / Funding</u>	29
<i>5 – Clean Transportation</i>	30
<u>Description</u>	30
<u>Current Port Initiatives</u>	30
<u>Environmentally Preferable Procurement Policy</u>	30
<u>Recommendations</u>	30
<u>Summary</u>	31
<u>Program Incentives / Funding</u>	31
<i>6 – Broadway Pier Cruise Ship Terminal</i>	33
<u>Description</u>	33

<u>Recommendations</u>	33
<u>Summary</u>	33
<u>Program Incentives / Funding</u>	34
<i>7 – B Street Pier Cruise Ship Terminal</i>	35
<u>Description</u>	35
<u>Recommendations</u>	35
<u>Summary</u>	36
<u>Program Incentives / Funding</u>	36
<i>8 – Shore Power</i>	37
<u>Description</u>	37
<u>Tenth Avenue Marine Terminal</u>	37
<u>National City Marine Terminal</u>	38
<u>Recommendations</u>	38
<u>Summary</u>	38
<u>Program Incentives / Funding</u>	38
<i>9 – Emerging Technologies</i>	40
<u>Description</u>	40
<u>Recommendations</u>	40
<u>Summary</u>	41
<u>Program Incentives / Funding</u>	41
<i>10 – Conclusion</i>	42
Table 13. Overview of Partnership Components, Descriptions, and Recommendations.	42
<i>Appendix A – Resources</i>	46
<i>Appendix B – Sources</i>	48
<i>Appendix C – SDUPD Audits</i>	49
<i>Appendix D – SDG&E Customer Programs</i>	50
<i>Appendix E – Contributors</i>	51

San Diego Unified Port District Energy Road Map

Executive Summary

Executive Summary

In December of 2007, the San Diego Unified Port District (Port) Board of Port Commissioners approved a Green Port Policy and directed Port staff to develop a Green Port Program. This Program consists of goals and objectives that will achieve long-term environmental, economic and societal benefits through resource conservation, waste reduction and pollution prevention. Energy conservation is a critical component of the Program, and the Port is dedicated to maximizing energy efficiency and exploring opportunities for renewable energy in Port operations.

The Sustainable Energy Partnership (Partnership) between the Port and San Diego Gas and Electric (SDG&E) will support the Port's Green Port Program by identifying programs to deliver net energy savings, peak demand savings and greenhouse gas reductions through the implementation of energy efficiency activities in Port operations. Program evaluations and recommendations are based on the preferred "loading order", described by California's energy agencies, that prioritizes actions to address energy resource needs. The "loading order" consists of decreasing electricity demand in the following order :

1. Increasing **energy efficiency**
2. Increasing **demand response**
3. Meeting new generation needs first with **renewable** and **distributed generation** resources, and
4. Meeting new generation needs second with **clean fossil-fueled generation**.

This document, the *San Diego Unified Port District Energy Road Map* (Energy Road Map), summarizes the Sustainable Energy Partnership's components:

1. Facilities Retrofits
2. Land Use and Development Opportunities
3. Education & Outreach
4. Clean Transportation
5. Broadway Pier Cruise Ship Terminal
6. B Street Pier Cruise Ship Terminal
7. Shore Power to Support Cruise and Cargo Ships
8. Emerging Technologies

The **Facilities Retrofits** component advises the Port on opportunities to maximize energy efficiency, demand response and renewable energy at Port-owned facilities through a comprehensive retrofit program. SDG&E conducted audits at Port-owned facilities to quantify opportunities and prioritize actions to reduce the kWh, kW and therms used, and to reduce greenhouse gas emissions. The program identifies SDG&E's role in achieving energy efficiency, including energy efficiency incentive levels and financing options such as the California Energy Commission's loan program or SDG&E's On-Bill Financing program.

Land Use and Development Opportunities were analyzed to highlight areas in which the Port is already achieving the goals of the Partnership and to identify opportunities to further meet the goals of the Partnership. Opportunities for the Port to support its existing Master Plan while increasing energy efficiency and reducing greenhouse gases include updating Planning Guidelines and the development of a Climate Protection Plan. As part of those efforts, the adoption of the green building standards specifying that all new or redeveloped Port-owned buildings be designed to use 15 to 20% less energy than allowed under the 2005 version of Title 24 of the Uniform Building Code, would qualify the Port for

participation in SDG&E's Savings by Design or Sustainable Communities programs.

The **Education & Outreach** component provides recommendations for a campaign to educate Port employees, Port tenants, and the public on initiatives to increase energy efficiency, promote the use of renewable energy, promote energy savings, and reduce greenhouse gas emissions. The Partnership will facilitate the development and implementation of education and outreach programs to achieve these goals, in addition to providing information on funding opportunities for these programs.

The **Clean Transportation** component describes some of the current Port initiatives that begin to reduce environmental impacts from Port-related transportation activities. This section provides input on the *Environmentally Preferable Procurement Policy* currently being developed by the Port's Procurement Services, General Services, and Environmental Services departments, and describes opportunities for joint demonstration programs between the Port and SDG&E.

The **Broadway Pier Cruise Ship Terminal** component presents opportunities for SDG&E to collaborate with the Port on recommendations for sustainable energy initiatives for the Broadway Pier Cruise Ship Terminal, including, but not limited to: building design; alternative sources of energy such as solar; energy efficiency measures; cost-saving measures; and exploring opportunities for funding energy efficient measures.

The **B Street Pier Cruise Ship Terminal** component presents opportunities for SDG&E to collaborate with the Port on recommendations for sustainable energy initiatives for the B Street Pier Cruise Ship Terminal, including, but not limited to: energy efficiency retrofits for the existing terminal building; building design; alternative sources of energy such as solar; energy efficiency measures; cost-saving measures; and exploring opportunities for funding energy efficient measures.

The **Shore Power to Support Cruise and Cargo Ships** component presents opportunities for SDG&E to collaborate with the Port on the use of shore power to support cruise and cargo ships while at berth, including, but not limited to: planning for installation of shore power infrastructure; installation of electrical infrastructure to the terminals; and exploring opportunities for funding.

The **Emerging Technologies** section presents an overview of SDG&E's Emerging Technologies program, which identifies, evaluates and demonstrates promising technologies that may help to increase energy efficiency and the use of renewable energy. By collaborating with the Port, demonstration sites could be located to showcase, evaluate and measure emerging technologies that are new to the market but have tremendous potential to save the Port money and energy. Emerging technologies to be assessed include hardware, software, design tools, strategies, and services.

San Diego Unified Port District Energy Road Map

1 - Introduction

San Diego Unified Port District Overview

The Port is a self-supporting public benefit corporation established in 1962 by an act of the California State Legislature. Created as a special government entity to manage the San Diego Harbor and administer the public lands (Tidelands) along San Diego Bay, the Port is governed by appointees from each of its member cities; San Diego, Coronado, National City, Chula Vista and Imperial Beach. The Port has approximately 600 employees and annual revenues of approximately \$117 million. The Port's Real Estate portfolio is comprised of 176 tenants and approximately 277 subtenants that operate businesses on lands under the Port's jurisdiction.

Since it was founded, the San Diego Unified Port District has taken the lead in a variety of initiatives to enhance the environmental quality of San Diego Bay and its surrounding tidelands. These include wildlife and natural resource management, stormwater runoff programs, environmental education programs and environmental partnerships with public and private entities. The Port continues to explore opportunities to reduce environmental impacts and enhance its role as environmental steward of San Diego Bay.

San Diego Unified Port District Green Port Policy

On December 11, 2007 the Board of Port Commissioners adopted the Green Port Policy. The Policy is focused on incorporating a balance of environmental, social and economic responsibility into operations on San Diego Bay and Port Tidelands. The Green Port Program was developed to implement this policy and it focuses on achieving long-term environmental, economic and societal benefits through resource conservation, waste reduction and pollution prevention. The Green Port Program both continues the Port's existing environmental efforts and expands these efforts through new programs and initiatives. The following six categories are the areas in which the Port is attempting to reduce its environmental impact as part of the Green Port Program:

1. Water: Reduce the Port's water usage to help preserve San Diego's water supply
2. Energy: Conserve energy and maximize energy efficiency of Port operations
3. Air: Reduce greenhouse gas contributions and other air emissions from Port operations
4. Waste Management: Reduce waste from Port operations through material reuse, recycling and composting
5. Sustainable Business Practices: Give equal weight to environmental, economic and social concerns in the decision-making process
6. Sustainable Development: Enhance the environmental performance of Port buildings while maximizing long-term economic benefits

SDG&E Overview

San Diego Gas & Electric (SDG&E) is a regulated public utility company that provides service to San Diego and South Orange County. In 2003, California's principal energy agencies—The California Energy Commission, the California Public Utilities Commission, and the California Consumer Power and Conservation Financing Authority—established an energy resource loading order to guide their energy decisions. The loading order consists of decreasing electricity demand by implementing the following policies, in order of priority:

1. Increasing **energy efficiency**
2. Increasing **demand response**
3. Meeting new generation needs first with **renewable** and **distributed generation** resources, and

4. Meeting new generation needs second with **clean fossil-fueled generation**.

As a public utility company, SDG&E must use all available resources to decrease electricity demand by following the loading order (listed above) as outlined by California's energy agencies. One program that supports the goals of the loading order is SDG&E's Local Government Energy Efficiency Partnership Program. This program is a multi-faceted approach where SDG&E works with various City, County and "quasi-government" departments to promote Energy Efficiency, energy conservation and demand response. These collaborative programs are designed to enhance energy efficiency program offerings as well as serve as a marketing channel for projects to complement the portfolio.

SDG&E and San Diego Unified Port District Sustainable Energy Partnership

The Port and SDG&E have signed a memorandum of understanding (MOU) to establish a relationship to work together on energy issues. It is anticipated that the Port and SDG&E will have an official Local Government Energy Efficiency Partnership in 2009-2011, but in the interim, the relationship will be referred to as *the Sustainable Energy Partnership* (Partnership). This Road Map document is the first step in outlining the Partnership's goals by identifying opportunities to increase energy efficiency and reduce greenhouse gasses. The next step in this process will include designing programs to achieve these goals and developing a Sustainable Energy Plan to explain opportunities for using renewable energy on Port tidelands.

While the Port has made significant progress in reducing its environmental impacts with existing programs, this Energy Road Map provides additional analysis of and recommendations for each of the components of the Partnership that can be implemented to establish the goals of the Partnership and further the Port's goals of environmental stewardship.

San Diego Unified Port District Energy Road Map

2 - Port Facilities Retrofits

Description

With assistance from SDG&E, the Port assessed its current operational facilities to identify areas of improvement. Energy efficiency audits play a crucial role in meeting the goals of the “loading order,” by focusing on energy efficiency as the foundation for all recommendations. The objectives of the audits were to:

1. Identify opportunities for energy efficiency through retrofitting inefficient lighting and/or HVAC systems; and
2. Identify opportunities to utilize renewable energy by exploring options for clean energy systems such as on-site photovoltaic panels, in combination with energy efficiency.

Audits were conducted on the following five Port facilities:

1. B Street Cruise Ship Terminal
2. Administration Building
3. General Services Building
4. 10th Avenue Marine Terminal
5. National City Marine Terminal

This section gives a brief overview of the audit findings. A complete report for each facility can be found in Appendix C.

Results

The Port has made significant investments to retrofit the buildings covered in this report. As such, the recommendations outlined in this report are primarily for improved exterior lighting, based on newer technologies that have become available during the last five years.

The quantities and wattages of various light fixtures listed in the report are estimates, particularly for exterior lighting loads, and should be verified before implementing any projects listed in this report. Exterior light fixtures may need to be “dark sky” compliant and/or have a “full cut-off” light distribution. Additionally, the San Diego County Regional Airport Authority (SDCRAA) may have certain restrictions for lighting near its facility. These items are not addressed in the report, although a number of fixtures are available to meet these requirements.

The Port may want to select a site, such as the main parking lot in front of the Administration Building or one of the marine terminals, to test samples of the exterior light sources recommended in this report since there are several options for the potential lighting upgrades. This testing can be arranged by vendors at little or no cost. Alternatively, a list of sites that have already been upgraded locally can be assembled.

Energy Costs

Each site has one main electric meter, with the exception of the National City Marine Terminal, which has five. Table 1 shows the kWh used and annual electricity costs over a two year period at the five Port facilities audited. A more detailed breakdown of the annual billing histories and electric rate schedules is located in Appendix C.

Table 1. Energy Costs at Port Facilities Over Two Year Period

Location	Oct. 2006 - Sept. 2007			Oct. 2007 - Sept. 2008			Avg.kWh Rate
	kWh	Max. Demand (kW)	Annual Cost	kWh	Max. Demand (kW)	Annual Cost	
Cruise Ship Terminal	462,720	115	\$65,797	508,160	134	\$69,847	\$0.14
Admin. Bldg.	1,937,105	439	\$280,424	1,961,261	454	\$264,881	\$0.14
General Service Bldg.	514,880	106	\$66,073	543,200	110	\$70,603	\$0.13
10th Avenue MT ¹	1,224,000	320	\$159,420	1,293,700	480	\$168,234	\$0.13
National City MT- D	302,400	208	\$61,922	270,400	192	\$55,836	\$0.21
National City MT-Quay	99,040	63	\$16,781	96,640	58	\$16,894	\$0.17
National City MT- A	35,360	30	\$5,270	37,280	30	\$5,327	\$0.15
National City MT- 24	20,640	19	\$3,450	21,600	19	\$3,391	\$0.17
National City MT- D2	19,503	0	\$3,275	19,605	0	\$3,130	\$0.17
National City MT Totals	476,943	320	\$90,698	445,525	299	\$84,578	\$0.18
Totals-All Sites	4,615,648	N/A	\$662,412	4,751,846	N/A	\$658,143	\$0.16

¹ MT = Marine Terminal

Lighting Alternatives

For most of the sites there are several possible alternatives to the existing exterior lighting. These alternatives include (in order of increasing costs):

- a) Compact Fluorescent (CFL) and T5H0 lighting fixtures
- b) Induction light fixtures
- c) Light Emitting Diodes (LED) lighting fixtures

Each alternative has its advantage. Fluorescent light fixtures were primarily used for recommendations in this report because induction and LED lighting are relatively new technologies. The two latter alternatives are more expensive than CFLs, but they may offer significantly reduced

maintenance costs. Maintenance costs, however, were not considered in this report due to lack of data. If the Port is interested, they should explore SDG&E's Emerging Technologies Program (see Section 9 of Energy Road Map, "Emerging Technologies") for opportunities to participate in a pilot program showcasing induction and/or LED lighting.

B Street Cruise Ship Terminal – Recommendations

The following recommendations are summarized in Table 2, below.

1. Install occupancy sensors (VendingMisers) at the three soda machines. This addition will save energy on the lights which are in continuous use in the machines as well as refrigeration energy. We recommend the Port discuss this with the beverage vendor leasing the machines prior to implementation.
2. Replace the 17 pole mounted High Pressure Sodium (HPS) fixtures with fluorescent T5H0 outdoor light fixtures. We have assumed that these are 400 watt HPS based on information provided by Port maintenance staff. If the wattages of the existing fixtures are lower, then the wattages of the new fluorescent fixtures should be reduced accordingly. These fixtures could also be replaced with outdoor LED or induction fixtures which would have a longer payback.
3. Replace the 21 250w HPS wall fixtures with 2-lamp F54T5H0, induction or LED fixtures.
4. Replace the 12 100w mercury vapor wall mounted fixtures at the building entry canopy with 42w CFL downlights or wall packs. Note that we only saw six of these fixtures working at night and six properly placed new fixtures may be all that is needed in this area. Induction and LED light fixtures are possible alternates with much longer lamp life.

Table 2. B Street Cruise Ship Terminal Energy Efficiency Recommendations

B Street Cruise Ship Terminal				
Energy Efficiency Measures	kWh Saved per Year	Annual Savings	Total Cost	Simple Payback Years
Vending Misers at 3 soda machines	3,784	\$530	\$630	1.2
Convert 17 Pkg. lot HPS to T5H0	19,660	\$2,752	\$8,925	3.2
Convert 21 wall mtd. HPS to T5H0	15,288	\$2,140	\$10,500	4.9
Convert 12 Merc. Vapor to CFL	4,193	\$587	\$3,000	5.1
TOTAL	42,926	\$6,010	\$23,055	3.8

Administration Building – Recommendations

The HVAC units in the Administration Building were recently upgraded to highly energy efficient models, so the recommendations for this building mostly pertain to lighting. These recommendations are summarized in Table 3 below. In addition to the retrofits listed below for this building, it is recommended that the Port target certification under Leadership in Energy and Environmental Design for Existing Buildings (LEED EB) .

1. Install an occupancy sensor (VendingMiser) to control the soda machine's energy use.
2. Install three sensors (CoolerMisers) to control three of the four glass front coolers. The cooler with perishables (milk etc.) should not be equipped with a sensor.
3. Retrofit the 14 2-lamp T12 fixtures in the basement Building Engineers' office. We recommend that any T8 retrofits include only major

- name brand components such as GE, Advance/Universal/Sylvania for ballasts and GE/Sylvania/Philips for lamps.
4. Perform a detailed survey of all office areas to determine where additional occupancy sensors can be installed. Based on a walk-through of selected areas, we estimate that 60-75 small offices in the main building and annex could be upgraded from manual switches to occupancy sensors.
 5. Replace 14 exterior high pressure sodium parking lot lights with 3 or 4-lamp T5H0 fixtures, LED or possibly induction light fixtures. For calculations we utilized 4-lamp T5HO fixtures.
 6. Retrofit the “San Diego Unified Port District” neon signs on the building with LED lighting. The simple payback for this project is in excess of 15 years if based solely on energy savings. However if maintenance costs are considered, the simple payback may be considerably less (this item is not included in the results below).
 7. Replace the seven pole mounted 100w HPS fixtures (assumed wattage) on the bridge between the annex and airport parking with 42w CFL fixtures. We note in this case the CFLs have only a 10,000 hr life vs. 20,000 hour for HPS. LED and induction lighting are possible alternates.

Table 3. Administration Building Energy Efficiency Recommendations

Administration Building				
Energy Efficiency Measures	kWh Saved per Year	Annual Savings	Total Cost	Simple Payback Years
1 VendingMiser at soda machine	1,261	\$177	\$210	1.2
3 CoolerMisers at glass coolers	3,784	\$530	\$630	1.2
Basement - Retrofit T12s to T8s	837	\$117	\$560	4.8
Occ. Sensors for 60+ offices	6,403	\$896	\$4,500	5.0
Retrofit Parking lot to F54T5H0	12,696	\$1,524	\$7,700	5.1
Convert HPSat Bridge to CFL	2,446	\$294	\$1,750	6.0
TOTAL	27,429	\$3,537	\$15,350	4.3

General Services Building – Recommendations

Because the General Services Building is relatively new and participated in SDG&E's Savings By Design program, there are limited recommendations to further increase the energy efficiency of this building. The following recommendations are summarized in Table 4 below. In addition, it is recommended that the Port target LEED EB certification for this building.

1. Install a VendingMiser at the soda machine.
2. Replace the 28 400w metal halides in the parking lot to 240w F54T5H0 fixtures. LED and induction lighting are possible alternates.
3. Replace the 11 175w metal halide wall packs with 2-lamp 42w CFLs. Induction and LED are possible alternates.

Table 4. General Services Building Energy Efficiency Recommendations

General Services Building				
Energy Efficiency Measures	kWh Saved per Year	Annual Savings	Total Cost	Simple Payback Years
Vending Miser at soda machine	1,261	\$151	\$210	1.4
Replace 28 M. Halide Pkg Lgts	25,393	\$3,047	\$15,400	5.1
Replace 11 M. Halide Wall Fixt.	5,583	\$670	\$3,025	4.5
TOTAL	32,237	\$3,868	\$18,635	4.8

10th Avenue Marine Terminal – Recommendations

The following recommendations are summarized in Table 5 below.

1. Install an occupancy sensor (VendingMiser) at the soda machine at Transit Shed 2. This unit is located outdoors and would require the outdoor model. We recommend the Port discuss this with the beverage vendor(s) leasing the machines prior to implementation.
2. Replace the 18 400w metal halides over the “San Diego Unified Port District” signs at the north and south ends of Transit Sheds 1 and 2 with 200w induction fixtures.
3. Transit Shed 1 – Replace the 167 high pressure sodium fixtures with 4-lamp F54T5H0 or 6-lamp T8 fixtures with clear lenses on occupancy sensors similar to Warehouse C. There are a variety of configurations that can be applied at this building. If there are minimal light level requirements, a lighting layout should be generated showing the footcandle levels at the floor. Operating hours of the current fixtures are highly variable so we have used 1,800 hours per year resulting in a simple payback of 12 years (not included in table below).
4. Replace the 40 55w LPS fixtures and 80 100w HPS fixtures over the rollup doors at Transit Sheds 1 and 2 and Warehouse C with 42w CFL wall packs, induction or LED fixtures. We have used 42w CFL wall packs for the calculations.
5. The lighting at Building B was not included since this building is leased and supposedly pays its own electric bill. Also, the exterior building lights were observed to be off during two nighttime site visits.
6. At present we have no recommendations for the higher pole (40-50') mounted fixtures due to their apparent intermittent usage.
7. The skylights at Building C addition are very dirty. If cleaned they would probably significantly improve the lighting levels in this area during the day. A daylighting control system for this space might be a possibility but that could only be determined after the skylights were cleaned.

Table 5. 10th Avenue Marine Terminal Energy Efficiency Recommendations

10th Avenue Marine Terminal				
Energy Efficiency Measures	kWh Saved per Year	Annual Savings	Total Cost	Simple Payback Years
Vending Miser at soda machine	1,261	\$177	\$210	1.2
Replace 18 400w MH- signs	18,570	\$2,228	\$14,850	6.7
* Replace 40 55w LPS at TS 1&2	5,990	\$719	\$10,000	13.9
* Repl 80 100w HPS @ TS 1&2+C	27,955	\$3,355	\$20,000	6.0
TOTAL	53,777	\$6,479	\$45,060	7.0

*Recommend combining 55w LPS and 100w HPS into one project with same replacement fixture

National City Marine Terminal - Recommendations

The three main buildings are leased and electric bills are paid for by the Pasha Group, a tenant of the terminal. They are currently in the final stages of planning a major lighting retrofit. There are no recommendations for these buildings at present.

While the three smaller electric accounts at this site appear to be for lighting only, we were not able to determine which fixtures the larger two accounts serve. The recommendations shown in Table 6, are limited to the lighting fixtures that are paid for by the Port. These fixtures include the HPS fixtures, located along the berthing areas.

Table 6. National City Marine Terminal Energy Efficiency Recommendations

National City Marine Terminal				
Energy Efficiency Measures	kWh Saved per Year	Annual Savings	Total Cost	Simple Payback Years
4-Lamp F54T5H0's	16,324	\$1,959	\$9,900	5.1

Server Virtualization

Server virtualization consolidates many physical servers running individual operating systems and programs into one physical server with multiple virtual server partitions that act as independent servers. In other words, one server is efficiently doing the work of many. For example, twenty conventional servers under moderate conditions consume about 90,000 kWh / year. One new host server, supporting twenty virtual machines under moderate conditions consumes about 6,600 kWh / year, resulting in 83,400 kWh savings.

The Port currently has approximately forty servers, but will soon face issues such as lack of space to meet future computing needs. In addition, the Uninterruptible Power Supplies (UPS) are nearing the maximum load capacity. Server Virtualization may be a viable solution to resolve these issues. Server virtualization is an important part of SDG&E's energy efficiency incentive programs that can help lower ROI on such projects. Incentives of 8 cents per kWh saved are available. The Port could be able to both run more efficiently and lower its operating costs at the same time.

Clean Generation

The Port is currently planning to install a 60 kW system on the roof of the **Broadway Pier Project**. The system will consist of a 30 kW system, owned and operated by the Port, which will provide between 12-15% of the building's total energy load. The second 30 kW system will be owned and operated by SDG&E through the Sustainable Communities Program and will provide renewable energy to the community.

In addition to the Broadway Pier plans, photos of each building assessed in the energy audit are provided in Appendix C to assist in evaluating future solar photovoltaic (PV) projects. The following comments are based on the assumption that the roofs are structurally capable of supporting solar panel arrays with an estimated average weight of 5-7 lbs. per square foot. The suitability and capacity of various electrical switchgear

connection points was not evaluated. Whether crystalline or thin film solar panels will provide the best efficiencies would need to be determined by potential bidders. All sites are located along the coast where marine fog is a frequent occurrence. An assessment of each site is listed below:

B Street Cruise Ship Terminal – The roof has minimal obstructions, but the future of this building is uncertain after the new Broadway Pier Cruise Ship Terminal is constructed. Also, due to the age of the building, it is uncertain how much load the roof can structurally hold. There are no shading obstructions.

Administration Building – The roof on the main seven -story building has minimal potential due to:

- a) The height of the building and difficulty connecting to the switchgear
- b) Shading problems on the north half of the roof due to the penthouse
- c) The presence of mechanical equipment (cooling tower and AC units) on the east side
- d) The four-foot high parapet wall

The roof of the adjacent **Annex Building**, south of the main building, has better potential. Preliminary plans for a 30 kW system are in process for part of the roof covering this building.

General Service Building – The roof on the main building offers good potential for solar energy generation. Solar panels can usually be attached to a metal seam roof utilizing a racking system that does not require roof penetrations. There are no shading obstructions. The Port is already in the process of obtaining funding for a 30-35 kW PV project at this site for installation by the end of 2009 or beginning of 2010.

10th Avenue Marine Terminal – The roofs on Transit Sheds 1 and 2 and Warehouses B and C offer good potential for solar energy generation. There are no shading obstructions. Some equipment owned by the cement plant on the roof at the south end of Transit Shed 1 would provide some obstructions in that area.

National City Marine Terminal – The roofs at 24-1, 24-A and 24-B offer good potential for solar energy generation, although the skylights on these buildings will decrease potential roof space. There is still sufficient room to place panels in areas between the skylights and there are no shading obstructions.

Recommendations

For best results, we recommend that facility managers of Port-owned buildings meet with their SDG&E Account Executive to discuss the programs and opportunities applicable to each building. The Account Executive can direct Port staff in the right direction to take advantage of all known programs that may apply.

Although funding for server virtualization may not be available at this time, the Port should consider this project for a future SDG&E – Port Partnership item.

In addition to the energy efficiency measures recommended in the audits (summarized in Table 7), we recommend that the Port target LEED EB certification for the General Services and Administration Buildings. Further, it is recommended that the Port work with SDG&E's Emerging Technologies Program (see Section 9, "Emerging Technologies" of *Energy Road Map*) to explore demonstration project opportunities.

Finally, it is recommended that every time the Port looks into facilities retrofits or new construction projects, they also consider the feasibility of renewable energy. Linking energy efficiency measures with renewable energy helps to achieve the goals of the energy resource loading order and it is a cost effective way of achieving energy savings and reducing environmental impacts resulting from energy use.

Summary

Audits were conducted on the following five Port Facilities:

1. B Street Cruise Ship Terminal
2. Administration Building
3. General Services
4. 10th Avenue Terminal
5. National City Marine Terminal

Detailed descriptions of the recommended energy efficiency measures for each building audited can be found in Appendix C. These recommendations are summarized in Table 7.

Table 7. Audit Summary

	Energy Efficiency Measures	kWh Saved per Year	Annual Savings	Total Cost	Simple Payback Years
B Street Cruise Ship Terminal	Vending Misers at 3 soda machines	3,784	\$530	\$630	1.2
	Convert 17 Pkg. lot HPSto T5H0	19,660	\$2,752	\$8,925	3.2
	Convert 21 wall mtd. HPSto T5H0	15,288	\$2,140	\$10,500	5.0
Administration Building	1 VendingMiser at soda machine	1,261	\$177	\$210	1.2
	3 CoolerMisers at glass coolers	3,784	\$530	\$630	1.2
	Basement - Retrofit T12s to T8s	837	\$117	\$560	4.8
	Occ. Sensors for 60+ offices	6,403	\$896	\$4,500	5.0
	Retrofit Parking lot to F54T5H0	12,696	\$1,524	\$7,700	5.1
General Services Building	Vending Miser at soda machine	1,261	\$151	\$210	1.4
	Replace 28 M. Halide Pkg Lgts	25,393	\$3,047	\$15,400	5.1
	Replace 11 M. Halide Wall Fixt.	5,583	\$670	\$3,025	4.5
10th Ave. Marine Terminal	Vending Miser at soda machine	1,261	\$177	\$210	1.2
	Replace 18 400w MH - signs	18,570	\$2,228	\$14,850	6.7
	Replace 40 55w LPSat TS1&2	5,990	\$719	\$10,000	13.9
National Qty Marine Terminal	4-Lamp F54T5H0s	16,324	\$1,959	\$9,900	5.1
TOTAL		172,691	\$21,852	\$112,000	5.1

If the recommended energy savings measures were implemented, the Port could expect annual energy savings of **\$21,852**. The cost to implement the measures is estimated to be **\$112,000**, resulting in a simple payback of **5.1 years**. The recommendations do not include the potential reduced costs through rebate programs available from SDG&E, or reduced maintenance costs.

Incentive Programs / Funding

- SDG&E's **On Bill Financing (OBF)** Program provides zero-interest loans to customers for energy efficient business improvements that cost \$5,000 or more after rebates. The loan is paid back through an adjusted monthly energy bill.
- SDG&E's **Sustainable Communities Program (SCP)** provides energy efficiency incentives and a "green bonus" for achieving LEED certification. This program also offers the option of installing clean energy systems (i.e., fuel cell or photovoltaic panels) on the customer's site. In this case, SDG&E owns and operates the system, and pays the customer a small lease payment, the amount varying depending on system size. NOTE: This program does not affect the customer's utility bill. The customer does not receive any energy from the system; it is fed back into the grid.
- California Center for Sustainable Energy (CCSE)'s **California Solar Initiative (CSI)** Program provides incentives to building owners for

installing solar power on their building site. The incentive amount varies depending on the amount of solar already installed in California and decline over time. For current rates, visit the CSI website at www.csi-trigger.com

- SDG&E's **Tax-Exempt Customer Incentive (TEC)** Program provides technical and administrative assistance plus financial incentives to help tax-exempt organizations implement energy efficiency measures. The program addresses the many barriers tax-exempt organizations face including time, staffing, technical resources and funding. TEC provides the extra resources needed to take projects from concept to successful implementation.
- SDG&E's **Express Efficiency** Program is a nonresidential rebate program designed to help customers add or retrofit existing equipment with high efficiency equipment. The program provides cash rebates to eligible business customers for energy efficient lighting, refrigeration, food service, natural gas and other technologies. Rebates can help offset the overall cost of installed equipment. Customers may qualify for rebates up to \$350,000 per meter, per fuel, per year.

San Diego Unified Port District Energy Road Map

3 - Land Use Planning and Development Opportunities

Description

An analysis of the Port’s Master Plan was conducted to assess the current efforts of the Port to incorporate sustainability into their master planning efforts and to identify opportunities to better support the Partnership goals of delivering net energy savings, peak demand savings and greenhouse gas reductions. Since water use is a major source of energy consumption, opportunities to conserve or reduce water usage are included here.

Analysis of Port’s Master Plan

The Port Master Plan provides the official planning policies for the physical development of the tidelands and submerged lands of the San Diego Unified Port District. The Master Plan already includes planning policies that support and are consistent with sustainable principles. Further analysis was done to identify opportunities to reinforce the Port’s commitment to sustainability, energy efficiency, and reducing greenhouse gas emissions.

Port lands are divided into ten planning districts, each with their own specific planning policies and development guidelines. All ten planning districts are based upon the same planning goals that are enumerated in *Section II* of the Port Master Plan. Table 8 shows the goals and objectives from *Section II* of the Port Master Plan that are supportive and consistent with sustainability.

Table 8. Existing Port Goals that Address Sustainability and Energy Efficiency

From Section II of Port Master Plan	
Goal	Objective
I	Provide for the present use and enjoyment of the bay and tidelands in such a way as to maintain options and opportunities for future use and enjoyment
II	The Port District, as trustee for the people of the State of California, will administer the tidelands so as to provide the greatest economic, social, and aesthetic benefits to the present and future generations
II	Consider the entire San Diego Bay as a complete system when promoting the multi-purpose development of the Port District
III	The Port District will assume leadership and initiative in determining and regulating the use of the bay and tidelands
III	Undertake, where necessary, an acquisition program to gain key land parcels to protect and enhance existing development and to provide for planned projects
IV	Foster and encourage the development of commerce, navigation, fisheries, and recreation by the expenditure of public moneys for the preservation of lands in their natural state, the reclamation of tidelands, the construction of facilities and the promotion of its use
IV	Encourage non-exclusory uses on tidelands

V	The Port District will take particular interest in and exercise extra caution in those uses or modifications of the bay and tidelands, which constitute irreversible action or loss of control
V	Bay fills, dredging and the granting of long-term leases will be taken only when substantial public benefit is derived
VI	Port District will integrate the tidelands into a functional regional transportation network
VI	Improved automobile linkages, parking programs and facilities, so as to minimize the use of waterfront for parking purposes
VI	Providing pedestrian linkages
VI	Encouraging development of non-automobile linkage systems to bridge the gap between pedestrian and major mass systems
VII	The Port District will remain sensitive to the needs and cooperate with adjacent communities and other appropriate governmental agencies in bay and tideland development
VIII	The Port District will enhance and maintain the bay and tidelands as an attractive physical and biological entity
VIII	Establish guidelines and standards facilitating the retention and development of an aesthetically pleasing tideland environment free of noxious odors, excessive noise, and hazards to the health and welfare of the people of California
X	The quality of water in San Diego Bay will be maintained at such levels as will permit human water contact activities
X	Insure through lease agreements that Port District tenants do not contribute to water pollution
X	Cooperate with the Regional Water Quality Control Board, the County Health Department and other public agencies in a continual program of monitoring water quality and identifying source of any pollutant
X	Adopt ordinances, and take other legal and remedial action to eliminate sources of pollution
XI	The Port District will protect, preserve and enhance natural resources, including natural plant and animal life in the bay as a desirable amenity, and ecological necessity, and a valuable and usable resource
XII	Curb the misuse of land so that it will not injuriously affect the people of the State of California through the prevention of substandard construction or unnecessarily add inappropriate developments
XII	Prevent the abuse of land by curtailing abortive development and unfounded pollution contributors
XII	Guide the reuse of land for more appropriate purposes by the clearance and redevelopment of the obsolete

Recommendations

The current Port Master Plan is inherently supportive of the goals and objectives of this Energy Road Map. In addition, documents may be developed as part of the Green Port Program with more specific planning and development objectives that could be referenced in the Port Master Plan and/or used as a planning tool. Specifically, the Port should develop a Climate Protection Plan and updated comprehensive Planning Guidelines.

The Climate Protection Plan should:

1. Address greenhouse gas reductions.
2. Incorporate sustainable land use and planning guidelines into the environmental review process.
3. Commit to the use of green building standards.

The updated Planning Guidelines should:

1. Clearly identify and define all Port policies, goals, and responsibilities that promote sustainability.
2. Clearly prescribe how and when each of these Port policies, goals, and responsibilities should be applied or considered in the planning process.
3. Provide a standard tool or process for recording and tracking the implementation of these Port policies, goals, and responsibilities.

Climate Protection Plan

1. Greenhouse Gas Reductions

CEQA guidelines are currently being reviewed by the State of California and will be updated in the near future to require the study of global warming and the greenhouse gasses that contribute to global warming within all environmental studies. The Port currently requires proposed development projects that are subject to CEQA to study impacts on global climate change as a result of greenhouse gas emissions, including consideration of an environmentally superior alternative. The Port should take a proactive approach with assisting tenants, operators and developers to address greenhouse gasses through their designs and operations as early as possible, such as during the Environmental Application process or when planning for building retrofits.

2. Sustainable Land Use Planning

The following planning guidelines support sustainable energy management which can be considered for incorporating into the Port's planning and environmental review process.

- Develop enforceable mitigation measures that reduce greenhouse gas emissions, where an impact has been identified in an environmental document
- Inform applicants of the benefits of and encourage the voluntary use of green building design principles and building materials, including LEED Certification standard as part of project design,
- Inform applicants of the benefits of and encourage the use of materials and development footprints that reduce the potential urban heat island effect
- Inform applicants of the benefits of and encourage the design of projects that expand waste minimization and increase recycling opportunities
- Require designs that maximize the use of bicycles, transit, walking, and carpooling
- Inform applicants of the benefits of and encourage the use of voluntary energy efficiency standards for commercial buildings at the time of lease, renovations, or additions
- Require designs that maximize the use of reclaimed water for landscape irrigation or other purposes, where feasible
- Inform applicants of the benefits and encourage the use of landscaping designs that maximize carbon sequestration and minimize water use

- Engage in cooperative efforts with member cities and transit agencies to compliment smart growth policies and business/destination connectivity to transit

3. Green Building Standards

The following recommendations for improving building design performance within the Port’s jurisdiction should be considered:

- Recommend early adoption of a policy that encourages design using the new California Green Building Standards for new construction and major renovations on a voluntary basis
- Provide information to tenants on the benefits of green building and measurement and verification of the performance of their buildings’ energy efficiency
- Provide information to tenants on benchmarking their building through the use of Energy Profiler
- Specify that all new or redeveloped Port-owned buildings should be designed to achieve energy efficiencies requiring 15 - 20 % less energy than allowed under the 2005 version of Title 24 of the California Building Code. This would also qualify them for participation in SDG&E’s Savings by Design or Sustainable Communities programs
- Create a program to provide tenants with energy audits and cost effective opportunities to implement energy efficiency improvements and to install renewable energy systems
- Create stringent landscaping design guidelines that reduce water usage from 2007 usage
- Provide incentives for tenants in existing developments to replace turf areas with approved drought tolerant landscaping
- Provide water audits of all Port structures and operators and incentivize upgrades to water saving plumbing fixtures
- Provide incentives to tenants at time of lease or lease renewal for installation of water saving plumbing fixtures
- Provide energy audits of all Port structures and operators and incentivize upgrades for energy savings improvements
- Provide incentives to tenants at time of lease renewal for energy savings retrofits

Summary

While the Port’s Master Plan begins to address sustainable land use and improved energy efficiency through their planning guidelines, the addition of a Climate Protection Plan will improve the ability of the Port to meet the goals of the Partnership (deliver net energy savings, peak demand savings and greenhouse gas reductions). At this time, it is recommended that the Port provide information and green building guidelines for their tenants to adopt on a voluntary basis, and mandate sustainability principles for Port operated facilities similar to many other cities. These will aide the Port in complying with the future regulations of AB 32, the California Global Warming Solutions Act.

Incentive Programs / Funding

SDG&E does not have specific incentive programs to specifically support land use planning at this time. It is recommended that the Port coordinate with SANDAG and explore state and federal programs that may provide funding for increasing sustainability in land use planning. SDG&E does, however, offer Savings by Design and the Sustainable Communities Program, which deliver incentives to building owners and occupants for incorporating sustainable building design and energy efficiency within facilities.

San Diego Unified Port District Energy Road Map

4 - Education and Outreach

Description

An integral part of the Green Port Program will be its public education campaigns, which will help promote Port programs to all who live and work in the region. It is important that Port employees and tenants are educated on the preferred “loading order” outlined by California’s energy agencies that prioritizes actions to address energy resource needs. This knowledge will help Port employees and tenants to prioritize programs and/or initiatives that will achieve greatest energy efficiency. The loading order (listed in order of preference) is as follows:

1. Increase **energy efficiency**
2. Increase **demand response**
3. Meet new generation needs first with **renewable** and **distributed generation** resources, and
4. Meet new generation needs second with **clean fossil-fueled generation**.

The Education and Outreach initiatives are designed to overlap the six Green Port categories and be unified under the Green Port brand throughout three target audiences: Port employees, Port tenants, and the general public. Additionally, public education campaigns will support the Partnership goals of promoting energy efficiency, demand response, and energy conservation through education and outreach.

Target Audience

The Port’s public education campaigns will focus on three major target audiences: Port employees, Port tenants and the general public.

Port Employees

Employee Education and Outreach initiatives are designed with two objectives in mind:

1. Educate employees on the environmental, economic and social importance of sustainability, energy efficiency, and conservation.
2. Train employees to advocate sustainability, energy efficiency and conservation in their business and communities.

Recommendations for Port Employees

There are many methods and programs that can be used to educate Port employees. Table 9 lists recommended training opportunities and other programs to further develop.

Table 9. Education and Outreach for Port Employees

SDG&E’s Recommended Program	Program Description
--	----------------------------

Building Operator Certification: Energy Efficiency Through Operator Training	Building Operator Certification is a nationally recognized training and certification program for building operators offering improved job skills. Two levels of certification are offered in an 8-session, 7-month long program. www.theboc.info/ca
SDG&E's Energy Education & Training	SDG&E offers free workshops and seminars to improve energy usage at facilities including topics on HVAC from The Institute of Heating and Air Conditioning Industries, Title 24 Standards, energy modeling, operations, and efficiency. Workshops are held monthly, with all topics covered on a quarterly basis. www.sdge.com/training
Certificate in Land Use and Sustainable Community Development	This program at University of San Diego helps participants understand how to incorporate sustainable measures in projects through site planning, building design and energy efficient approaches. www.usdce.org/landuse/
SDG&E's Inspector Training	Still in development, SDG&E's curriculum will include equipment identification and compliance, residential and commercial California Energy Code documentation and compliance, building plan verification for energy efficiency standards, and the 2010 California Green Building Code.
California Center for Sustainable Energy (CCSE) Events & Workshops	CCSE offers free public programs, services, information, and forums that facilitate the adoption of renewable and efficient technologies and practices. Their Energy Resource Center offers a library of media and tools that assist making facilities more efficient. Workshops include trainings in permitting, installation, and inspection of alternative generation technologies. www.energycenter.org
LEED Accredited Professional (AP)	The United States Green Building Council (USGBC) offers workshops and study groups to help individuals prepare for the LEED AP exam. www.usgbc.org/DisplayPage.aspx?CMSPageID=1815
Certified Energy Manager (CEM)	Obtaining the Association of Energy Engineers (AEE)'s CEM certification distinguishes high levels of competency and proficiency in energy management. www.aeecenter.org/certification/CEMpage.htm
"The Biggest Loser" - Greenest Employee Competition	<p>Implementation of Port-wide energy and water saving competitions that facilitate widespread participation of Port employees and cultivate competition between co-workers, reinforce commitments to the environment, and help extend learned sustainable behaviors at home.</p> <ul style="list-style-type: none"> • Administer Pre- (and Post-) Competition Surveys to gauge the prior knowledge of energy in the workplace, the effectiveness of the employee training campaign, and incentive for behavior change from conservation and efficiency themes promoted in the workplace. Employees would voluntarily compete to be "The Biggest Loser" in carbon emissions at the Port by reducing at-home consumption of electricity, natural gas, and water. Employees would bring in monthly residential energy and water bills to work, which will allow for verification of reduced usage. Awards could include "Highest Total Reduction" and "Highest Percentage Reduction." • To incentivize participation and promote education, awards will be designed to educate employees about the connection between energy and environment. Awards could include public recognition, energy efficient technology, and a family trip to local ecotourism destination or sustainable restaurant.

General Employee Outreach	<p>Outreach can be conducted to Port employees during staff meetings and Port-wide emails regarding various aspects of resource conservation and waste management, with focus on the following topics:</p> <ul style="list-style-type: none"> • Lighting- daylight use, efficiency, CFLs • HVAC- space heating and cooling, window temperature mitigation, programmable thermostats • Energy efficient technology- Smart Power Strips, LEDs • Demand Response participation in “Energy Alert Days” • Appliance Use- eliminating phantom loads, Energy Star, standby settings • Recycling- Reduce, reuse, duplex printing, waste reduction • Water- conservation at sinks and showers
---------------------------	---

Port Tenants

The Port tenant Education and Outreach initiatives are designed with four objectives in mind:

1. Collaborate with the Port’s Real Estate and Environmental Services departments to develop a comprehensive plan to educate tenants on SDG&E’s Energy Efficiency and Sustainable Energy programs.
2. Assist in the development and implementation of energy efficiency initiatives for tenants.
3. Identify SDG&E’s role in assisting tenants in implementing energy efficiency retrofits and financing options via participation in SDG&E’s current portfolio of energy-efficiency programs.
4. Increase businesses’ motivation to adopt sustainable operations

Recommendations for Port Tenants

In addition to the recommendations listed in Table 9 for Port Employees, Port Tenants may be interested in the following programs, listed in Table 10 below.

Table 10. Education and Outreach for Port Tenants

SDG&E’s Recommended Program	Program Description
EPA Energy Profiler Training	This is a benchmarking tool for measuring energy use of buildings. www.epa.gov
Annual Port Environmental Excellence Awards	The Port may adapt standards for commercial tenants in the form of a public awareness recognition program, including Hotels and Manufacturers. Plaques, Energy Star products, etc. may be given to businesses that exceed the standards outlined for specialized categories. Suggested specialized categories include: Greenest Overall, Greenest Employee Transportation Program, Sustainability Education Program, Resource Conservation, Waste Reduction, Pollution Prevention, and Sustainable Building. Criteria may be based on greatest percentage and net reductions in energy/water use and waste, normalized by business size (FTEs/building size/annual revenue) to allow for viable competition.

<i>The San Diego Natural Guide</i>	This magazine evaluates businesses individually on health and sustainability and produces a bi-annual publication. Writers determine the characteristics of products and services that make them more earth-friendly than conventional businesses and include the “greenest shade” for a particular type of business on defined criteria. The Natural Guide will promote tenants recognized by the Port in future publications such as the <i>Go Green Book</i> . www.sandiegonaturalguide.com
Green Port Online Information Center	The Online Information Center would act as an online resource center administered as part of the San Diego Unified Port District’s website. This website would provide the following information to tenants: <ul style="list-style-type: none"> • SDG&E Commercial Programs (see attachment: SDG&E Customer Programs) • Case studies with best practices of Certified Green Businesses. • A listing of green businesses and destinations throughout the Port. • Explain Green Port Program features available for the public to visit • Electronic copies of registration materials. • Best practices from other ports.

General Public

The Public Education and Outreach initiatives are designed with two objectives in mind:

1. Motivate residents to make sustainable consumer choices
2. Foster an appreciation and understanding of the link between energy consumption and the protection of the San Diego Bay and surrounding tidelands.

Recommendations for General Public

The recommended programs to further develop in order to educate and motivate the general public are listed in Table 11.

Table 11. Education and Outreach for General Public

SDG&E’s Recommended Program	Program Description
Green Port Program Branding	Create a series of materials that can be offered to employees, customers, and tourists for educational purposes and displayed in public parks and land. Building features at tenant Certified Green Businesses can display signage to educate employees and visitors about the sources and benefits of building design, materials, and fixtures.
Building Energy Information and Monitoring Systems	Interactive, easy-to use, real-time displays would show energy and water consumption at Certified Green Businesses or LEED certified buildings. These displays facilitate understanding of consumption and how choices made in the workplace translate to monthly bills and greenhouse gases. LEED points can be earned from the displays. http://buildingdashboard.com
LEED Construction	The LEED-Silver Broadway Pier development has good potential to widely publicize the Green Port Program’s goals. Identifying how the LEED aspects of the design, construction, and completed project help meet the six categories with signs to educate the public may gain LEED points and will increase visibility of the program.
Public Art	Art created from sustainable or recycled materials can showcase the relationship of energy to the natural environment. Port ecology can demonstrate the importance of conservation and sustainable consumer choices with placards explaining the symbolism, noting environmental impacts of the materials, its sustainable features, or the waste diverted.

Parks	The Port's 16 Parks can be equipped with signs or kiosks that display information on how to save water and energy, xeriscape (or replant for drought tolerance), and reduce pollution.
LED Holiday Light Exchanges & Displays	"Black Friday" exchanges in Seaport Village and other tourist attractions can target consumers before they install their old holiday lights.
Holiday Boat Parade	An annual Boat Parade Decoration Contest, with a possible theme of "I'm Dreaming of a Green Christmas" could require parade participants to use LED holiday lights and Energy Star decorations. A SDG&E – Port Partnership boat can showcase products to achieve energy efficiency at home and on a boat.
Tree Lighting Ceremonies	A LED-lit Holiday Tree lighting ceremony set up in Seaport Village, Convention Center or parks can promote energy efficiency and new technology to tenants, employees, and Port visitors. The event could be kept green by using sustainably-farmed live trees, recycled decorations, providing electricity to decorations using a photovoltaic array with batteries, and community participation in decoration.

Recommendations

In addition to the recommended programs listed in the tables above, the Port should consider participating in the San Diego Area Green Business Program, a county of San Diego program. The goal of the Green Business Program is to promote "green" practices among businesses in the region by assisting businesses to operate in an environmentally efficient manner, and to recognize businesses that meet environmental compliance and conservation criteria. The Green Business Program has established checklists for Food Facilities, Automotive Repair Facilities, and Commercial Offices. After completing the audit and recognition process, a business will receive a sticker and certificate for display. The certificate is good for three years, after which the business must update their application for another audit. At the onset of the Program, the Port may build an inventory of tenant businesses representative of different business segments, detailing alternative energy generation, retrofit, and conservation opportunities. Interest among Port tenants can be generated by offering the first five businesses in each segment to participate in a free SDG&E energy audit. SDG&E Small Business efficiency and rebate materials can be distributed to inform businesses how they can begin improving operations (see Appendix D: SDG&E Customer Programs). www.sdgreenbiz.com

Summary

It would be useful for all Port employees to regularly review the schedule for both SDG&E's and CCSE's training workshops, as a wide variety of topics are covered and may be applicable to specific employees or projects. Below is a summary of the top recommendations for programs in which specific groups of Port tenants and employees may wish to obtain training.

Port and Tenant Facility Managers:

- Certified Energy Manager (CEM)
- Leadership in Energy and Environmental Design (LEED)
- EPA Energy Profiler
- Building Operator Certification (BOC)

Port Environmental Services staff:

- Leadership in Energy and Environmental Design (LEED)
- EPA Energy Profiler

Real Estate Management:

- University of San Diego: Certificate in Land Use and Sustainable Community Development

Incentive Programs / Funding

Funding for several of the education and outreach activities suggested above will be available with the pending the implementation of the Local Government Energy Efficiency Partnership between the Port and SDG&E. In the interim, the Port may look into SDG&E's program offerings (listed in Appendix D). Port employees and tenants are also encouraged to attend the free training workshops, such as those hosted by SDG&E and CCSE. Additionally scholarships may be available for Port employees though the SDG&E and University of San Diego sponsored municipal employee scholarship program.

San Diego Unified Port District Energy Road Map

5 – Clean Transportation

Description

The Port has a fleet of 249 vehicles, the majority of which run on traditional gasoline or diesel fuel. This section assesses the Port's current initiatives to reduce the environmental impact of their fleet in order to identify opportunities to reduce greenhouse gas emissions in the region.

Current Port Initiatives

The Port has taken measures to reduce the environmental impact of its fleet vehicles through the acquisition of hybrid vehicles and proposed acquisition of alternative fuel vehicles. Recently, the Port replaced 13 conventional fleet vehicles with hybrid Ford Escapes. These vehicles consume approximately 55% of the fossil fuels utilized by a conventional vehicle, and reduce tailpipe emissions by 31%. A variety of alternative fuels have also been analyzed for future fleet enhancements, and plans are underway to acquire five Compressed Natural Gas (or CNG) Honda Civics for administrative use. These vehicles will not require the consumption of foreign fossil fuels and are expected to reduce emissions by up to 95%.

Environmentally Preferable Procurement Policy

The Port is currently considering adoption of a policy that updates requirements for vehicle procurement. The following are recommendations to include in this policy:

- All vehicles must be the most fuel efficient model available, or must be fueled by non-petroleum derived fuels as defined by the state of California, and must fulfill the intended municipal function.
- The following types of vehicles will be evaluated as part of the procurement process: hybrid and plug-in hybrid electric vehicles, battery electric vehicles, and alternative fuel vehicles (including, but not limited to, biodiesel, compressed natural gas, liquefied natural gas, hydrogen-enriched compressed natural gas, and hydrogen).
- This Policy can also apply to vehicles used for public safety purposes if the alternative fueled vehicles used for this purpose are approved by the California Highway Patrol.

Recommendations

Joint Product Demonstration and Development Programs:

SDG&E and the San Diego Unified Port District can engage in joint alternative fuel vehicle development programs. SDG&E's Clean Transportation Program is active with many vehicle suppliers in the evaluation of alternative vehicle platforms – many of which could serve the Port's needs. For example, in the near future, Nissan will have a pilot program to lease their new electric vehicles to select groups in an effort to evaluate their performance. SDG&E will work with the Port and Nissan to determine whether the program may be useful for both organizations. Another example of a joint alternative fuel vehicle development programs is a demonstration project to replace gasoline and diesel powered forklifts with battery-electric powered forklifts for 2009. Battery-electric forklifts can provide the Port with an opportunity to educate and encourage tenants to adopt similar policies to use alternative fueled vehicles. State funding is available to assist the Port in many of these efforts.

Infrastructure Coordination with SANDAG:

SANDAG is developing a regional alternative fuel infrastructure plan that can provide mutually beneficial deployment opportunities at the Port. SANDAG will work with their members to identify future locations for infrastructure, such as fueling stations, so the Port may be able to provide input on their preferred locations. This, coupled with a well coordinated vehicle procurement program, can help the Port realize the benefits of alternative fueled vehicles sooner rather than later.

Effectively Leveraging Public/Private Partnerships:

The federal government and the state of California each have policies and incentives in place to promote the deployment of alternative fueled vehicles. The San Diego Unified Port District, along with SDG&E, can work together to effectively leverage these incentives, in some cases, through public/private partnerships. Coupling federal tax incentives with state clean air bond funds and municipal dollars (non-taxable entity) can help to leverage municipal buying power.

Summary

The Port has already begun to reduce the environmental impacts of its fleet vehicles by replacing conventional vehicles with hybrids and alternative fuel vehicles. Incorporating some of the additional recommendations, listed above, into the Port's Green Port Program will help to increase energy efficiency and further reduce greenhouse gas emissions resulting from Port activity.

Program Incentives / Funding

SDG&E will support the Port when applying for public funds or grants and will work to identify opportunities for demonstration projects that will further both SDG&E's and the Port's goals to increase energy efficiency and reduce greenhouse gas emissions in the region.

Accessing Public Funds:

The state of California has several clean air funds that provide grants and loans to advance the deployment of alternative fueled vehicles. Each of these programs has qualification criteria related to various transportation market segments. These programs are typically accessed via a grant or loan application to the relevant agency. These programs include:

Proposition 1B:

Proposition 1B - The Highway Safety, Traffic Reduction, Air Quality, and Port Security Bond Act of 2006 - authorized \$19.925 billion of state general obligation bonds for specified purposes. These included high-priority transportation corridor improvements and trade infrastructure and port security projects, among others. Several billion dollars of this program are being directed towards transportation improvement projects at the state ports. The regional Air Quality Management Districts are on point for identifying opportunities, acquiring state funds, and directing these funds towards approved transportation related projects. The 1B program focuses on criteria air pollution (nitrogen oxides [NOx], sulfur oxides [SOx], particulate matter [PM], and reactive organic gas [ROG]) and related congestion management. Alternative fueled vehicles and their supporting infrastructure which move goods to and from the Ports are high on the state's list of priorities.

AB 118:

AB 118, the Alternative Fuels and Vehicle Technologies Act, was signed by Governor Schwarzenegger on October 14, 2007. The bill provides grants and revolving loans to state agencies, California-based businesses and projects, public-private partnerships, vehicle and technology consortia, fleet owners, consumers, and academic institutions towards the development of alternative fuel and vehicle technologies to help attain the state's climate change policies. AB 118 provides funding from fees on vehicle registrations for a term of seven years and is expected to yield about \$205 million per year in program funding. Approximately \$120 million would be managed by the California Energy Commission (CEC) for transportation programs that would not only improve air quality but also reduce dependence on oil and cut greenhouse gas emissions. The remaining \$85 million would be managed by the California Air Resources Board on programs focused solely on improving air quality. The CEC projects would support the research and development, as well as the deployment of clean transportation technologies. AB118 funding can be sought through the CEC or the California Air Resources Board (CARB).

The Carl Moyer Program:

Carl Moyer Memorial Air Quality Standards Attainment Program (CMP) provides incentive grants for cleaner-than-required engines, equipment and other sources of pollution providing early or extra emission reductions. Eligible projects include cleaner on-road, off-road, marine, locomotive and stationary agricultural pump engines. The program achieves near-term reductions in emissions of NOx, PM, and ROG which are necessary for California to meet its clean air commitments under the State Implementation Plan. The Carl Moyer program is managed by CARB.

San Diego Unified Port District Energy Road Map

6 – Broadway Pier Cruise Ship Terminal

Description

The Port is in the planning and design phase for the construction of a new cruise ship terminal at the Broadway Pier in downtown San Diego. A two-story, 52,000 square foot building is planned and will serve as the auxiliary terminal used to embark and disembark passengers from cruise ships. An estimated 150,000 people will move through this facility annually. New construction provides the opportunity to achieve the first goal of the “loading order,” by maximizing energy efficiency at the design phase. The Port is targeting LEED New Construction certification for the new building. The construction of the Broadway Pier Cruise Ship Terminal could also help to achieve the third goal of the “loading order,” by utilizing renewable energy on Port-owned facilities, since roof-top photovoltaic panels are incorporated into the plans for this project. Currently, the Port has plans to install a 30 kW PV system on the roof of the new Broadway Pier Cruise Ship Terminal building, which they will own and operate. In addition, another 30 kW rooftop PV system will be owned and operated by SDG&E through the Sustainable Communities Program. The two systems will be part of the same bid to help minimize costs.

Recommendations

It is recommended that the Port continue with plans to design the Broadway Pier Cruise Ship Terminal building according to green building standards, such as LEED, to maximize energy efficiency opportunities. Specifically, the Port should target energy efficiency levels of greater than 10% better than the 2005 version of Title 24. The Port should continue exploring the feasibility of adding rooftop PV panels, which could reduce greenhouse gas emissions, reduce peak demand energy use and deliver cost savings over time. In the design phase, the Port should review the recommendations set forth in Section 2, “Facilities Retrofits” of this Energy Road Map. Although this particular facility was not audited, many of the recommendations for other Port-owned facilities, such as installing more efficient lighting and vending machines, can be applied to the Broadway Pier Cruise Ship Terminal.

After the building is constructed, it is recommended that the Port benchmark the building each year to document energy efficiency improvements. Adopting a measurement and verification program would help in benchmarking efforts. If this building does achieve LEED New Construction certification, it is recommended that the Port target certification under LEED Existing Buildings (EB). LEED EB will help to increase energy efficiency within the building and ensure sustainable operations.

Summary

The Port’s current plans to obtain LEED New Construction certification for the Broadway Pier Cruise Ship Terminal are in alignment with both the Green Port Program and the Partnership goals. This project will help meet the “loading order” goals, of increasing energy efficiency and utilizing renewable energy. In addition, this facility will serve as an educational tool for the public to learn about clean energy technology and the environmental savings achieved through energy efficient building design.

Program Incentives / Funding

If the building is designed to be 10% more energy efficient than the 2005 Title 24, this project would qualify to participate in SDG&E's Savings By Design program, through which the Port would receive incentives for achieving energy efficiency goals. If even greater energy efficiency levels are achieved (i.e. greater than 10% more efficient than Title 24), this facility would qualify to participate in SDG&E's Sustainable Communities Program, which awards additional incentives for energy savings.

San Diego Unified Port District Energy Road Map

7 – B Street Pier Cruise Ship Terminal

Description

The Port is in the scoping and feasibility phase of redeveloping the cruise ship terminal at the B Street Pier, downtown San Diego. This terminal is the primary facility used by the Port for cruise ship embarking and disembarking. Redevelopment of this facility, including the replacement of the existing terminal building, may not occur within the next three years and so may go beyond the extent of the Partnership. Since a defined redevelopment program and timeline for this facility has not been finalized, the energy conservation strategy at this facility may take one of two steps, as outlined below.

Recommendations

If it is determined through cost/benefit and funding analysis that a new building will not be constructed at B Street Pier, then the project team will explore the following energy initiatives, as outlined in the audits (See Section 2, “Port Facilities Retrofits” of this document:

Install occupancy sensors (VendingMisers) at the three soda machines.

1. Replace the 17 pole mounted HPS fixtures with fluorescent T5H0 outdoor light fixtures. These fixtures could also be replaced with outdoor LED or induction fixtures which would have a longer payback.
2. Replace the 21 250w HPS wall fixtures with 2-lamp F54T5H0, induction or LED fixtures.
3. Replace the 12 100w mercury vapor wall mounted fixtures at the building entry canopy with 42w CFL downlights or wall packs. Induction and LED light fixtures are possible alternates with much longer lamp life.

As shown in Section 2, “Port Facilities Retrofits,” these measures will achieve energy and cost savings. These savings are summarized in Table 12 below.

Table 12. Energy Efficiency Measures for B Street

B Street Cruise Ship Terminal				
Energy Efficiency Measures	kWh Saved per Year	Annual Savings	Total Cost	Simple Payback Years
Vending Misers at 3 soda machines	3,784	\$530	\$630	1.2
Convert 17 Pkg. lot HPS to T5H0	19,660	\$2,752	\$8,925	3.2
Convert 21 wall mtd. HPS to T5H0	15,288	\$2,140	\$10,500	4.9
Convert 12 Merc. Vapor to CFL	4,193	\$587	\$3,000	5.1
TOTAL	42,926	\$6,010	\$23,055	3.8

If it is determined that the Port will proceed with the construction of a new building at B Street, then the Port and SDG&E will explore opportunities to collaborate and identify recommendations for sustainable energy initiatives for the B Street Pier Cruise Ship Terminal, including, but not limited to:

- LEED certification;
- Green building design;
- energy efficiency measures;
- alternative sources of energy, such as solar and/or fuel cells;
- cost-saving measures; and
- funding opportunities.

Summary

Redevelopment of this facility may not occur within the next three years and so may go beyond the extent of this partnership. SDG&E will collaborate with the Port on sustainability initiatives as opportunities arise.

Program Incentives / Funding

Further information will follow.

San Diego Unified Port District Energy Road Map

8 – Shore Power

Description

In December 2007, CARB adopted a regulation to reduce air emissions from ships while docked at berth. The first phase of this regulation will go into effect in January 2014 and will affect cruise ships and refrigerated container ships visiting the San Diego Unified Port District. Although not all ships calling at the Port are affected by this regulation, the Port is currently exploring options for reducing air emissions at all three marine terminals as part of its Clean Air Program. The installation of electrical infrastructure, referred to as shore power, which allows ships to shut down their diesel auxiliary engines while at berth, is one strategy to comply with these state regulations and reduce air pollution and greenhouse gases.

Through the Partnership, SDG&E will explore opportunities to collaborate with the Port on the use of shore power to support cruise and cargo ships while at berth. This component has the potential to enhance several of the Partnership goals, including significantly reducing air pollution and greenhouse gases.

Cruise Ship Terminal

The Cruise Ship Terminal will be the first Port marine terminal to receive shore power infrastructure. In August 2008, the Port was awarded a Carl Moyer Program grant for the installation of shore power electrical equipment infrastructure at the Cruise Ship Terminal. This is the first shore power project awarded under the Carl Moyer Program in San Diego County, and only the second such project awarded in the State. The Carl Moyer Program grant requires that the shore power system be in place and operational by May 31, 2010. Port staff coordinated with SDG&E in the application for this grant to ensure sufficient power will be made available to shore power ships at the Cruise Ship Terminal. SDG&E has already committed to completing the service connection in time to fulfill the grant obligations.

Approximately 20 different cruise ship vessels are expected to make over 250 visits annually to the Cruise Ship Terminal. Currently, there are cruise ships visiting the Port that could accept shore power if the infrastructure was available at the Cruise Ship Terminal. This project is expected to remove a total of 70 tons of air emissions and significantly reduce greenhouse gas emissions from this terminal each year, fulfilling a primary objective of the Port's Clean Air Program.

Tenth Avenue Marine Terminal

Options for shore power are also being explored at the Tenth Avenue Marine Terminal. The Port was awarded up to \$2.5 million in Proposition 1B Goods Movement Emissions Reduction Program grant funding to install shore power at one cargo berth. SDG&E will collaborate with the Port on options for shore power and other emissions reduction alternatives at this terminal. The shore power project at this berth would remove an estimated 65 tons of air pollutants annually, and significantly reduce greenhouse gas emissions from this terminal.

National City Marine Terminal

Although ships that call at this terminal are not affected by current regulations, the Port is exploring options for reducing emissions from ships that call there. The Port has nearly completed a feasibility study of shore power options at the National City Marine Terminal and SDG&E will

collaborate on emission reduction strategy options at this terminal.

Recommendations

The Port has been working extensively to reduce emissions from ships while at berth. Two grants have been awarded to support these efforts: \$2.5 million in Proposition 1B funding for Cargo Ships; and \$2.4 million in Carl Moyer Program funds for cruise ships. SDG&E will continue to work collaboratively with the Port on those efforts. In addition, it is recommended that the Port explore opportunities for using renewable energy to support or offset shore power electrical loads.

Effectively Leveraging Public/Private Partnerships:

The federal government and the state of California each have policies and incentives in place to promote the deployment of alternative fuel in a variety of applications, including shore power. The San Diego Unified Port District, along with SDG&E, can work together to effectively leverage these incentives, in some cases through public/private partnerships. Coupling federal tax incentives with state clean air bond funds and municipal dollars (non-taxable entity) can leverage capital and increase project returns for investors in many cases.

Summary

The Port and SDG&E are already working together to install electrical infrastructure so ships can shut down their diesel engines while at berth. This project is expected to remove significant amounts of air emissions and greenhouse gases annually, meeting the goals of this Partnership, as well as the goals of the Green Port Program. It is recommended that the Port continue to investigate the use of shore power at its marine terminals and to explore opportunities for using renewable energy.

Program Incentives / Funding

Accessing Public Funds:

The state of California has several clean air funds that provide grants and loans to advance the deployment of alternative fuel in transportation applications. Each of these programs has qualification criteria related to various transportation market segments. These programs are typically accessed via a grant or loan application to the relevant agency. The Port has already been awarded Prop 1B and Carl Moyer Program grants. Additional opportunities for funding may be available through AB118. SDG&E will work collaboratively with the Port on grant funding opportunities, where feasible.).

San Diego Unified Port District Energy Road Map

9 – Emerging Technologies

Description

The Emerging Technologies Program identifies, evaluates, and demonstrates promising technologies to save customers money and energy while meeting California's future energy efficiency goals. The goal of the program is to help accelerate the adoption of advanced technologies that can help California save energy and reduce demand. The program assesses, tests, and demonstrates promising new technologies. The program is actively looking for host sites for these technologies.

Recommendations

SDG&E and the Port should explore opportunities to work together to locate host sites for potential emerging technologies. Host sites could include Port facilities, port tenant facilities and outdoor lighting opportunities. The following are some potential new technologies that could be explored:

- Exterior LED lighting: LED luminaries are emerging as one of the newest technologies in the market capable of replacing traditional High Intensity Discharge (HID) light sources for exterior lighting applications. LED lighting offers several features that make it an attractive low-maintenance and energy-efficient choice. It can be useful in applications where lamp replacement is cumbersome and expensive.
- Induction lighting: Low maintenance and energy efficient, induction lighting delivers energy savings and crisp white light in a variety of color temperatures. Induction lighting offers a low maintenance light source with a 100,000 hour rated life. It can be useful in applications where lamp replacement is cumbersome and expensive.
- Interior LED lighting: The latest interior LED lighting delivers clean crisp light along with substantial energy savings and low maintenance for homes and businesses. Interior LEDs are useful in applications where lamp replacement is cumbersome and expensive, including interior lighting in hard to reach areas such as cove lighting, under cabinet lighting, down lights, MR16 track lights, accent lighting and office task lighting.
- New Boiler Controls / Condensing Economizers: These latest technologies help industrial customers get more out of their boilers, while optimizing efficiency, minimizing emissions, saving energy and cutting costs. Compared to mechanical systems, advance linkage less boiler controls provide new boilers and older boilers by way of retrofit, the ability to meter air and gas precisely, optimize heat production, and minimize emissions.
- Tankless water heating: Highly efficient and compact, tankless water heaters promise on demand hot water while saving customers energy, money and space. Tankless water heaters are compact devices designed to provide a large amount of hot water at a specified temperature and maximum flow "on demand" in a way that minimizes the energy losses characteristic of storage or tank type water heaters.
- Hydronic Loop Control optimization: These new options bring energy savings in hot water circulation for hotels and motels.
- Guest room controls: with advanced guest room controls, hotels and motels can keep guests comfortable while automatically adjusting heating, cooling, and lighting in unoccupied rooms to save energy and money.

Summary

The Port would be an ideal agency for SDG&E to collaborate with on demonstration projects in Emerging Technologies. Staff from SDG&E and the Port will work together to identify the best application for some of the available technologies.

Program Incentives / Funding

If opportunities are identified that meet SDG&E's Emerging Technologies Program criteria, the Port may enter into a two-way agreement with SDG&E. This agreement allows the customer to share the project equipment and installation costs with SDG&E. Further, SDG&E will fund all monitoring and evaluation costs and if the Port would like to replace the technology after the assessment is complete, SDG&E will remove it at no cost.

San Diego Unified Port District Energy Road Map

10 – Conclusion

The foundation of the recommendations in this document is **energy efficiency**—the first goal of the “loading order.” Renewable energy should also be considered, where feasible, and should be linked with energy efficiency to achieve the greatest energy savings. The addition of photovoltaic panels on Port facilities will provide clean energy to the region, and should be explored further in the future.

Table 13 provides an overview of the components that make up the Energy Road Map, the objective of the component, how it fits in with the Port / SDG&E partnership goals and a summary of the recommendations relating to each component. More detailed information can be found in the respective sections of each component.

Table 13. Overview of Partnership Components, Descriptions, and Recommendations.

COMPONENT	DESCRIPTION		RECOMMENDATION	
	Objective	How Component Achieves MOU Goals	Summary	Incentive Programs/Funding
Port Facilities Retrofits	Conduct audits to identify opportunities for energy efficiency retrofits at Port-owned facilities; Identify opportunities for renewable energy	Utilizing renewable energy and/or retrofitting lighting, HVAC and other mechanical retrofits will: <ul style="list-style-type: none"> • Reduce kWh, kW and therms; • Reduce greenhouse gas emissions; • Reduce peak demand 	See Section 2, “Port Facilities Retrofits” for detailed recommendations; See Table 7. Audit Summary, pg. 16	<ul style="list-style-type: none"> • SDG&E Rebates and Incentives • SDG&E On Bill Financing • California Energy Commission loan program • Sustainable Communities Program
Land Use Planning & Development Opportunities	Highlight areas of Port’s Master Plan that help to achieve Partnership goals; Identify opportunities to further meet the goals	Master Plan analysis helps to incorporate sustainability into the Port’s master planning efforts and enables consistency and recording in the implementation of Port sustainability policies, goals and responsibilities	<ul style="list-style-type: none"> • Develop a Climate Protection Plan to support the Port’s existing Master Plan • Encourage the use of California Green Building Standards in building design • Incorporate into updated Planning Guidelines a tool that provides for consistent implementation and recording of sustainability policies goals and responsibilities 	<ul style="list-style-type: none"> • Savings By Design • Sustainable Communities Program

Education & Outreach	Educate Port employees, tenants, and the public on energy efficiency	Education and Outreach will help promote programs and initiatives on energy efficiency, demand response and energy conservation	See Tables 9-11, pp. 22-25	<ul style="list-style-type: none"> • Building Operator Certification • SDG&E Inspector Training • SDG&E Energy Education & Training • California Center for Sustainable Energy Events & Workshops • San Diego Area Green Business Program • LEED • Certified Energy Manager • <i>San Diego Natural Guide</i> • Building Energy Information and Monitoring Systems
Clean Transportation	Provide input on Port's current initiatives	Greening the Port's fleet will help reduce greenhouse gasses and promote energy conservation	The Port currently has an Environmentally Preferable Procurement Policy that begins to address greenhouse gas reductions in the region. It is recommended that the Port replace its diesel-powered forklifts with electric powered forklifts to achieve significant emissions reductions.	<ul style="list-style-type: none"> • SANDAG's Alternative Fuel Toolkit for Local Government • Prop 1 B • AB 118 • Carl Moyer Program
Broadway Pier & Cruise Ship Terminal	Provide input on developing the cruise terminal to maximize energy efficiency	Designing a green building will achieve energy efficiency; incorporating solar panels will utilize renewable energy on Port facilities	Achieve LEED New Construction certification and Pursue LEED EB certification	<ul style="list-style-type: none"> • Savings By Design • Sustainable Communities Program

B Street Pier Cruise Ship Terminal	Provide input on developing the cruise terminal to maximize energy efficiency	Designing a green building will achieve Energy Efficiency; incorporating solar panels will utilize renewable energy on Port facilities	Initially, the Port should adopt the recommended retrofits, outlined in Section 2, "Port Facilities Retrofits."	<ul style="list-style-type: none"> • SDG&E Rebates and Incentives • SDG&E On Bill Financing • California Energy Commission Loan Program • Sustainable Communities Program
Shore Power	Collaborate to provide shore power to ships while at berth	Access to shore power will enable ships to shut down their diesel engines while at berth, which reduces greenhouse gas emissions and smog.	<ul style="list-style-type: none"> • Utilize electricity to power ships • Explore opportunities for renewable energy to further reduce emissions 	<p>Additional funding may be available through:</p> <ul style="list-style-type: none"> • Prop 1B • AB 118
Emerging Technologies	Identify opportunities for Port to work with Emerging Technologies	Participating in Emerging Technologies demonstration projects could save the Port energy and money through cutting edge energy efficiency technology	<p>Look into opportunities in the areas of:</p> <ul style="list-style-type: none"> • Light Emitting Diode (LED) lighting—interior and exterior • Induction Lighting opportunities • Tankless water heaters • New Boiler Controls • New guest room controls (hotel/motel) 	Projects and funding will be considered on a case-by-case basis through SDG&E's Emerging Technologies Program

This Road Map document is the first step in outlining the goals of the Partnership between the San Diego Unified Port District and SDG&E. It begins to identify opportunities for the Port to increase energy efficiency and reduce greenhouse gasses in the Port's jurisdiction and provides recommendations to achieve long-term environmental, economic and societal benefits. The next step in this process will be designing programs to achieve these goals and developing a Sustainable Energy Plan to explain opportunities for using renewable energy on Port tidelands.

San Diego Unified Port District Energy Road Map

Appendix A – Resources

Useful Resources for Climate Protection Plan (“Section 3” of *Energy Road Map*)

The Local Government Commission (LGC) produced a detailed report in 2002 entitled General Plan Policy Options for Energy Efficiency in New and Existing Development. The document sets forth energy saving policies suitable for inclusion in general plans. Policies range from exceeding State minimum building efficiency standards, to retrofitting buildings to reduce energy consumption, to implementing energy conservation strategies for roofs, pavement and landscaping. The report also contains suggested general plan language. The report is available at www.redwoodenergy.org/uploads/Energy_Element_Report.pdf.

In cooperation with U.S. EPA, LGC has produced a booklet discussing the benefits of density and providing case studies of well-designed, higher density projects throughout the nation. Creating Great Neighborhoods: Density in Your Community (2003) is available at www.lgc.org/freepub/PDF/Land_Use/reports/density_manual.pdf.

Various cities' Climate Protection Plans are located at the Cool Cities website at www.coolcities.us/resources.php.

The Institute for Local Government (ILG), has instituted a program that provides information about the latest climate action resources and case studies at www.cacities.org/index.jsp?displaytype=§ion=climate&zone=ilsg. A detailed list of climate change “best practices” for local agencies is available at www.cacities.org/index.jsp?displaytype=§ion=climate&zone=ilsg&sub_sec=climate_local

The non-profit group Natural Capitalism Solutions (NCS) has developed an on-line Climate Protection Manual for Cities. NCS states that its mission is “to educate senior decision-makers in business, government and civil society about the principles of sustainability.” The manual is available at www.climatemanual.org/Cities/index.htm.

The Governor’s Office of Planning and Research (OPR) provides valuable resources for lead agencies related to CEQA and global warming at <http://opr.ca.gov/index.php?a=ceqa/index.html>. Among the materials available are: a list of environmental documents addressing climate change and greenhouse gas emissions and a list of local plans and policies addressing climate change. In addition, OPRs’ The California Planners’ Book of Lists 2008, which includes the results of surveys of local agencies on matters related to global warming, is available at www.opr.ca.gov/index.php?a=planning/publications.html#pubs-C.

The California Air Pollution Control Officers Association has prepared a white paper entitled “CEQA and Climate Change” (January 2008). The document includes a list of mitigation measures and information about their relative efficacy and cost. The document is available at www.capcoa.org/ceqa/?docID=ceqa.

The Attorney General's global warming website includes a section on CEQA. See <http://ag.ca.gov/globalwarming/ceqa.php>. The site includes all of the Attorney General's public comment letters that address CEQA and global warming.

In 2007, The Urban Land Institute (ULI) produced a report entitled, “Growing Cooler: The Evidence on Urban Development and Climate Change,” which reviews existing research on the relationship between urban development, travel, and greenhouse gases emitted by motor vehicles. It further discusses the emissions reductions that can be expected from compact development and how to make compact development happen.

“Growing Cooler” is available at <http://www.uli.org/ResearchAndPublications/Reports/~//media/Documents/ResearchAndPublications/Reports>

Useful Resources for Clean Transportation (“Section 6” of *Energy Road Map*)

The California Transportation Commission (CTC) recently made recommendations for changes to regional transportation guidelines to address climate change issues. Among other things, the CTC recommends various policies, strategies and performance standards that a regional transportation agency should consider including in a greenhouse reduction plan. These or analogous measures could be included in other types of planning documents or local Climate Protection Plans. The recommendation document, and Attachment A, entitled Smart Growth/Land Use Regional Transportation Plan Guidelines Amendments, are located at www.dot.ca.gov/hq/transprog/ctcbooks/2008/0108/12_4.4.pdf.

Useful Resources for Facilities Retrofits and Emerging Technologies (“Section 2” and “Section 9”, respectively of *Energy Road Map*)

The California Energy Commission’s Public Interest Energy Research (PIER) Program supports energy research, development and demonstration projects designed to bring environmentally safe, affordable and reliable energy services and products to the marketplace and can be reached at www.energy.ca.gov/pier/

San Diego Unified Port District Energy Road Map

Appendix B – Sources

Sources

Bragado, N. (2008). *General Plan Update, Report to Council*. San Diego: City of San Diego.

Brown, E. (2008). *Global Warming*. Retrieved from Office of the Attorney General: <http://ag.ca.gov/globalwarming/ceqa.php>

California, S. o. (2003). *state of California, General Plan Guidelines*.

General, O. o. (2008). *California Environmental Quality Act*. Retrieved July 2008, from Office of the Attorney General: http://ag.ca.gov/globalwarming/pdf/GW_mitigation_measures.pdf

Goldberg, S. (2007, June 11). Retrieved from City of San Diego Website: <http://www.sandiego.gov/planning/genplan/pdf/peir/13bbonly.pdf>

Plan, C. o. (1994). *City of Imperial Beach General Plan & Coastal Plan*. City of Imperial Beach: City of Imperial Beach.

SANDAG. (2006). *2006 Department of Finance Population Estimates*.

SANDAG. (2008). *Data Warehouse*.

California Energy Commission. (2005), "Implementing California's Loading Order for Electricity Resources."

(<http://www.energy.ca.gov/2005publications/CEC-400-2005-043/CEC-400-2005-043.PDF>)

San Diego Unified Port District Energy Road Map

Appendix C – SDUPD Audits

[Insert complete Audits – file too large to include at this time]

San Diego Unified Port District Energy Road Map
Appendix D – SDG&E Customer Programs

San Diego Gas and Electric Customer Programs as of August 2008		
Residential	Home Energy Efficiency Rebates	http://www.sdge.com/residential/singleFamilyRebate.shtml
	Multi-Family Rebates and Services-	http://www.sdge.com/residential/multiFamilyRebate.shtml or 800-289-2440
	Air Conditioning Tune-Ups	http://www.actimeprogram.com/ProjectCenter/
	Summer Saver Program	http://www.sdge.com/business/esc/promo_summersaver.shtml
	Affordable Financing for Home Improvements	http://www.sdge.com/residential/homeImpFinance.shtml
	Refrigerator-Freezer Recycling Program	http://www.arcaincutility.com/CA/SDGE/Step2_ZipCode.cfm?ServiceCompany=43
	Clothes Washer Rebate Program	http://www.20gallonchallenge.com/ or 888-376-3314
	Residential Energy Survey	http://www.sdge.com/residential/resEnergyProfiles.shtml or 800-411-SDGE (7343)
	Earn Tax Credits	http://www.energytaxincentives.org/
Low Income Energy Efficiency	Residential Rate Assistance Program	http://www.sdge.com/residential/assistServCare.shtml
	The Energy Team Program	http://www.sdge.com/residential/energyTeam.shtml or 866-597-0597
	Medical Baseline	http://www.sdge.com/residential/assistServices.shtml#medBaseline or 800-411-SDGE (7343)
	Back Up Power Devices for Medical Equipment	http://www.sdge.com/residential/assistServices.shtml#bupd
	Neighbor to Neighbor	http://www.sdge.com/residential/assistServices.shtml#neighbor
	Low Income Home Energy Assistance	http://www.sdge.com/residential/assistServices.shtml#iheap
	Third Party Notification Program	http://www.sdge.com/documents/forms/reminder.pdf
	Marking Appliances for the Blind	http://www.sdge.com/residential/assistServices.shtml#blind
	Temperature Sensitive Program	http://www.sdge.com/documents/residential/temperature_sensitive.pdf
	Cool Zones	http://www.sdge.com/documents/residential/cool_zones.pdf
Commercial	Peak Day Credit	800-644-6133
	Industrial Laundry Improvements	800-644-6133
	Energy Efficient Food Service Rebates	www.sdge.com/esc or 800-644-6133
	Small Business Super Saver	800-644-6133
	Summer Saver	800-850-1705
	On Bill Financing	800-644-6133
	Energy Savings Bid	www.sdge.com/bid
	Technical Assistance/ Technical Incentives (TA/ TI)	www.sdge.com/esc
	Energy Audits	www.sdge.com/audit or 800-644-6133
	Energy-Efficiency Seminars	www.sdge.com/training
Building Operator Certification	http://www.sdge.com/business/esc/promo_boct.shtml	
Renewable Energy	Self-Generation Incentive Programs	http://www.sdge.com/business/incentivePrograms.shtml
	The California Solar Initiative	http://www.sdge.com/environment/solar/calSolarInitiative.shtml
	California Energy Commission's Emerging Renewables	http://www.consumerenergycenter.org/erprebate/index.html
	The Solar Energy Project	http://www.sdge.com/environment/solar/sdSolarInitiative.shtml
	Net Energy Metering (NEM)	http://www.sdge.com/business/netMetering.shtml
New Construction	The California Solar Initiative	866-631-1744
	California ENERGY STAR® New Homes Program	newconstructionservices@semprautilities.com
	Maximum Cooling Capacity	newhomes@sdge.com
	Verified Duct Design	newhomes@sdge.com
	Verified Ducting System	newhomes@sdge.com
	Quality Insulation Installation	newhomes@sdge.com
Tankless Water Heaters	newhomes@sdge.com	

**San Diego Unified Port District Energy Road
Map**
Appendix E – Contributors

San Diego Unified Port District

David Merk
Michelle White
Matt Valerio
Allison Gutierrez
Kelly Makley
Cody Hooven
Jenny Lybeck

San Diego Gas & Electric Company, SDG&E

Risa Baron
Julie Ricks
Michelle Menvielle
Noel Crisostomo

Ayala Architecture

Jennifer Ayala, AIA, LEED® AP