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CARLSBAD SEAWATER DESALINATION PROJECT

ENERGY MINIMIZATION AND GREENHOUSE GAS REDUCTION PLAN

MAY 23, 2008

INTRODUCTION

In October 2007, Poseidon Resources (Poseidon) made public its voluntary commitment to render the Carlsbad Desalination Project (Project) net carbon neutral. Poseidon followed its unprecedented commitment with the development of a Climate Action Plan (CAP), Poseidon's roadmap to achieving net carbon neutrality over the 30-year life of the Project. Based on internationally accepted protocols including those adopted by the California Climate Action Registry (CCAR), the CAP was reviewed by the California Coastal Commission (CCC), the California State Lands Commission (CSLC), the California Air Resources Board (CARB) and, at the request of a Coastal Commissioner, the South Coast Air Quality Management District (SCAQMD). Poseidon's November 20, 2007 draft of the CAP reflects changes made in response to helpful comments from these agencies and is attached to this document as Appendix A. Poseidon's written responses to numerous questions and comments from the CCC and CSLC about the CAP are attached as Appendix B.

On November 15, 2007, the CCC approved the Project subject to the condition, among others, that the CCC approve the CAP at a subsequent hearing. Since then, Poseidon has reviewed comments from the November 15 hearing as well as CCC staff's draft findings, and continued to work with the CCC, CSLC and CARB to refine the CAP and ensure a complete understanding of the process it sets forth to meet Poseidon's commitments. More recently, the CCC staff issued to Poseidon additional comments and a draft "Greenhouse Gas Emissions Template" (the Draft CCC Template), and instructed Poseidon to revise its CAP in accordance with the template. CCC staff also requested that Poseidon rename the CAP with a new title, the Project's Energy Minimization and Greenhouse Reduction Plan (the Plan). The Draft CCC Template and most recent comments and Poseidon responses are attached as Appendix C.

On May 2, 2008, Poseidon met with representatives of the CCC, CSLC and various agencies in the San Diego region to further discuss details of the Plan and its implementation. The purpose of this document is to present Poseidon's revised Plan in response to the additional comments, the May 2nd meeting and the draft CCC Template.

Project Overview.

The 50 million gallons per day (MGD) Project (Figure 1) is co-located with the Encina generation station, which currently uses seawater for once-through cooling. The Project is developed as a public-private partnership between Poseidon and nine local utilities and municipalities.

Figure 1 - Carlsbad Seawater Desalination Project

In 2006 California legislation introduced the AB 32 Global Warming Solutions Act that aims to reduce the GHG emissions of the state to 1990 levels by year 2020. While neither the legislation nor its implementing regulations apply to the Project, Poseidon applauds the objectives of AB32 and is committed to helping California maintain its leadership role on addressing the causes of Climate Change. As a result, Poseidon has voluntarily committed to offset the net carbon footprint associated with the Project's operations.

CCC Draft Emissions Template.

The draft CCC Template establishes "a protocol for how to assess, reduce, and mitigate the GHG emissions of applicants," and calls for the organization of relevant information in the following three sections:

1. Identification of the amount of GHG's emitted from the Project,
2. On-Site and Project related measures planned to reduce emissions, and
3. Off-site mitigation options to offset remaining emissions

After a brief explanation of Poseidon's overall strategy for eliminating the Project's net carbon footprint, this document then organizes the Plan in the CCC's three general categories.

Overview of the Project's GHG Reduction Strategy.

Since maintaining net carbon neutrality is an ongoing process dependant on dynamic information, Poseidon's plan for the assessment, reduction and mitigation of GHG emissions establishes a protocol for identifying, securing, monitoring and updating measures to eliminate the Project's net carbon footprint. Once the Project is operational and all measures to reduce energy use at the site have been taken, the protocol involves the following steps, completed each year:

1. Determine the energy used by the Project for the previous year using utility billing data from SDG&E.

2. Determine San Diego Gas & Electric's (SDG&E) emission factor for system power from its most recent CCAR Annual Emissions Report. Reports are done annually and are accessible on the CCAR's website.

3. Calculate the Project's gross carbon footprint by multiplying its energy use by the emissions factor.

4. Calculate the Project's net carbon footprint by subtracting emissions avoided as a result of the Project (Avoided Emissions) and any existing offset projects and/or RECs.

5. If necessary, purchase carbon offsets or RECs to zero-out the Project's net carbon footprint.

Energy efficiency measures and on-site renewable resources will be given the highest priority. In addition, through its annual program to offset net carbon emissions for that year, Poseidon will commit the first $1 million spent on this program to fund the revegetation of areas in the San Diego region impacted by wildfires that occurred in the fall of 2007.[1]

The following are elements of the Plan organized in accordance with the draft CCC template.

IDENTIFICATION OF THE AMOUNT OF GHG EMITTED

The Project will produce fresh drinking water using reverse osmosis membrane separation. The treatment processes used at the Plant do not generate GHGs. The desalination process does not

[1] The California Coastal Commission conditioned Project's Coastal Development Permit on Poseidon committing the first $1 million spent on this program to the revegetation of areas impacted by wildfires in the San Diego region.

involve heating and vaporization of the source seawater and thus does not create emissions of water vapor, carbon dioxide, methane, nitrous oxide hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), or sulfur hexafluoride (SF_6). Reverse osmosis membranes do not reject the carbon dioxide which is naturally dissolved in the source seawater and this carbon dioxide is retained in dissolved form in the fresh drinking water.

The modest number of fleet vehicles used by plant personnel will create a small amount of GHG emissions, but since these emissions make up less than 5% of the Project's carbon footprint, these emissions are considered *de minimis* and are not required to be reported (CCAR General Reporting Protocol of March 2007 (Chapter 5)). The Project will not store or use fossil fuels on site, and will not self-generate electricity that emits GHGs. As a result, the Project operations will not create any other direct sources of GHG emissions. There are no direct fugitive emissions from the plant. The only other GHG emissions of any significance are indirect emissions that are the result of purchased electricity. All of the supply for the desalination plant operations will be provided by the SDG&E. Therefore, the complete accounting of the GHG emissions for the Project, or the Project's "carbon footprint," are entirely from the indirect emissions from purchased electricity from SDG&E.[2]

Currently, approximately 65% of the electricity supplied by SDG&E is generated from fossil fuels[3]. As a result, until such time when SDG&E switches to 100% "green" power supply sources, the Project operations will be indirectly linked to the generation of GHGs.

The carbon footprint of the Project is the net amount of carbon dioxide created and avoided by the Project each year. The total Project carbon footprint is dependent on three key factors: (1) how much electricity is used by the Project; (2) sources of energy (fossil fuels, wind, sunlight, etc.) used to generate the electricity supplied to the plant, and (3) the Avoided Emissions, i.e., the amount of energy saved or emissions avoided as a direct result of the Project's operations. These factors will vary over time.

Electricity Use by the Project.

The Project will operate continuously, 24 hours a day for 365 days per year, to produce an average annual drinking water flow of 50 million gallons per day (MGD). The total baseline power use for this plant is projected to be 31.3 megawatts (MW), or 4.9 MWh per acre-foot (AF) of drinking water. The power use incorporates both production of fresh drinking water, as well as conveyance and delivery of the water to the distribution systems of the public water agencies that have contracted to purchase water from the Project. The total annual energy consumption for the Project Baseline Design is 274,400 MWh/yr.

SDG&E's Emission Factor.

The Project will purchase all of its electricity from SDG&E system power. Accordingly, the appropriate emission factor to use for the Project's indirect carbon emissions from its electricity

[2] Typically the GHG emissions from construction of a project are not included in the on-going reporting of GHGs from operations. In fact, GHGs from construction are not typically accounted for in a GHG inventory at all.
[3] SDG&E Power Content Label, September 2007

use is SDG&E's most recently certified and published emission factor. The certified emission factor for delivered electricity is set forth in the utility's Annual Emissions Report, most recently registered with the CCAR in April 2008. In the published Emission's Report, the current certified emission factor for SDG&E system power is 780.79 lbs of CO_2 per delivered MWH of electricity.

It is important to understand that circumstances will change over the life of the Project. SDG&E's emission factors are periodically updated and the amount of energy consumed by the Project may change.[4] As a result, it will be necessary to recalculate the net carbon footprint of the Project on an annual basis using the most recent SDG&E CCAR emission factors. Poseidon has committed to address its net carbon emissions based upon annual calculations of its carbon footprint. That is one reason why it is critical to use a known, certified, reliable emission factor– as well as one that is easily accessible over the life of the project – that is based on internationally accepted protocols. Until the CARB-certified factors become available, the only known emissions factor for SDG&E is the one registered with the CCAR.

Statewide initiatives to expand the use of renewable sources of electricity are expected to decrease the emission factors of all California power suppliers in the future. For example, currently approximately 6% of SDG&E's retail electricity is generated from renewable resources (solar, wind, geothermal, and biomass).[5] In their most-recent Long-term Energy Resource Plan, SDG&E has committed to increase energy from renewable sources by 1% each year, reaching 20% by year 2017. These and other reductions are expected to further reduce the Project's net carbon footprint over time.

Table 1 summarizes the Project's estimated gross "GHG Amount Emitted" based on the most current information.

Table 1 - Identification of Gross GHG Amount Emissions

Source	Total Annual Power Use (MWh/ year)	Total Annual Emissions (metric tons CO_2/ year)
Project Baseline Design	274,400	97,165

ON-SITE AND PROJECT-RELATED REDUCTION OF GHG EMISSIONS

To determine the Project operation's net carbon footprint, on-site and project-related reductions in emissions must also be considered. These are carbon emission reductions that result from

[4] SDG&E Annual Emissions Reports to CCAR have changed each year. For years 2004, 2005 and 2006 the emissions factors have been 614, 546 and 781 lbs of CO_2/MWh, respectively.
[5] SDG&E Power Content Label, September 2007.

measures that reduce energy requirements (increased energy efficiency, potential onsite solar, recovery of CO2 and green building design), as well as Project-related emissions that will be avoided (Avoided Emissions) as a direct result of the project and its various components (coastal wetlands restoration, reduced energy use from water reclamation, and SWP replacement water).

Increased Energy Efficiency.

Poseidon has committed to implement certain measures to reduce the Project's energy requirements and GHG emissions, and will continuously explore new technologies and processes to further reduce and offset the carbon footprint of the Project, such as the use of carbon dioxide from the ambient air for water treatment. These measures are set forth below.

The Project's high-energy efficiency design incorporates state-of-the-art features minimizing plant energy consumption. One such feature is the use of state-of-the art pressure exchanger-based energy recovery system that allows recovering and reusing 33.9% of the energy associated with the reverse osmosis (RO) process. A significant portion of the energy applied in the RO process is retained in the concentrated stream. This energy bearing stream (shown with red arrows on Figure 2) is applied to the back side of pistons of cylindrical isobaric chambers, also known as "pressure exchangers" (shown as yellow cylinders on Figure 2). These energy exchangers recover and reuse approximately 45% of the energy used by the RO process.

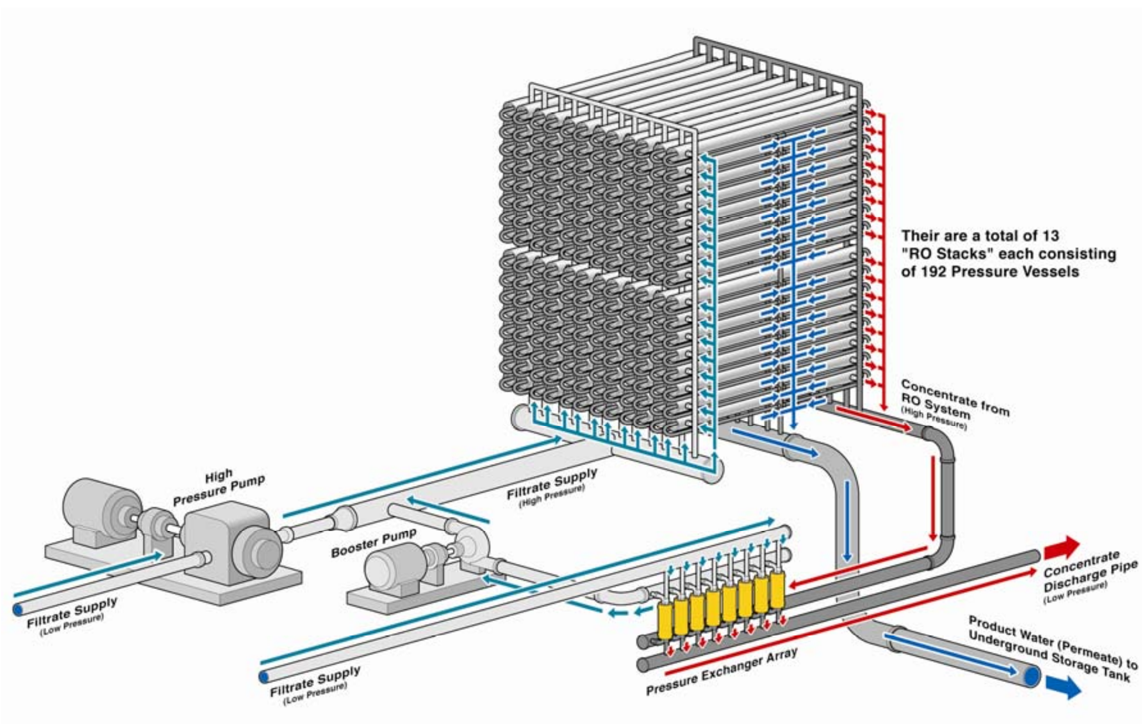

Figure 2 - Energy Recovery System for the Carlsbad Seawater Desalination Plant

Currently there are no full-scale seawater desalination plants in the US using the proposed state-of-the art pressure exchanger energy recovery technology included in the "High Efficiency Design" (Table 2). All existing seawater desalination projects in the US, including the 25 MGD Tampa Bay seawater desalination plant, which began commercial operation on January 25, 2008, are using standard energy recovery equipment – i.e., Pelton wheels (see Figure 2). Therefore, the Pelton wheel energy recovery system is included in the "Baseline Design" in Table 2.

The pressure exchanger technology that Poseidon proposes to use for the Project is a national technology. The manufacturer of the pressure exchangers referenced in Table 2 of the Project Power Budget is Energy Recovery, Inc., a US company located in San Leandro, California (www.energyrecovery.com).

A pilot-scale seawater desalination plant using the pressure exchanger technology proposed by Poseidon and supplied by Energy Recovery, Inc. has been in operation at the US Navy's Seawater Desalination Testing Facility in Port Hueneme, California since 2005. The overall capacity of this desalination plant is 50,000 to 80,000 gallons per day. The pilot testing work at this facility has been conducted by the Affordable Desalination Collaboration (ADC), which is a California non-profit organization composed of a group of leading companies and agencies in the desalination industry (www.affordabledesal.com). A portion of the funding for the operation of this facility is provided by the California Department of Water Resources (DWR) through the state's Proposition 50 Program. The DWR provides independent oversight of this project and reviews project results. In addition, representatives of the California Energy Commission and the California Department of Public Health are on the Board of Directors of the ADC.

Specific power consumption using the ADC's SWRO process design was demonstrated to range from 6.81 to 8.90 kW-hr/kgal at the most affordable operating point. Note that based on the information provided by Poseidon for the High Efficiency Design in Table 2 (Power Budget) the specific power consumption of the SWRO process (Reverse Osmosis Pumps + Energy Recovery System) for the Carlsbad seawater desalination plant is 7.13 kW-hr/kgal (30,100 hp – 10,200 hp)*24 hrs*0.746 kW/hp * 1000 gal/50,000,000 gallons/day = 7.13 kW-hr/kgal). Therefore, the energy consumption for the Project (7.13 kWh/kgal) is within the low end of the range (6.81 to 8.90 kWh/kgal) determined by the ADC to be "the most affordable operating point" (i.e., optimal) when using pressure exchangers for the site-specific conditions of the Pacific Ocean water in California.

The proposed pressure exchanger technology (i.e., the same pressure exchanger employed at the ADC seawater desalination plant) was independently tested at the Poseidon's Carlsbad seawater desalination demonstration plant. Over one year of testing has confirmed the validity of the conclusions of the ADC for the site-specific conditions of the Project. The test results from the Carlsbad seawater desalination demonstration plant were used to calculate the energy efficiency of the pressure exchangers included in Table 2. Poseidon's technology evaluation work at the Carlsbad seawater desalination demonstration plant was independently reviewed and recognized by the American Academy of Environmental Engineers and by the International Water Association, who awarded Poseidon their 2006 Grand Prize in the field of Applied Research.

Table 2 - Comparison of Baseline and High-Efficiency Power Budget for 50 MGD Water Production Capacity

Unit	Baseline Design - Power Use			High Efficency Design - Power Use			Additional Costs for Premium Efficiency Equipment
Key Treatment Process Pumps	(Hp)	Equipment Efficiency	Equipment Type	(Hp)	Equipment Efficiency	Equipment Type	(US$2008)
Power Plant Intake Pumps (Stand-Alone Operation)	3,750	70%	High Efficiency Motors - No VFDs	3,750	70%	High Efficiency Motors - No VFDs	None
Seawater Intake Pumps	2,100	70%	High Efficiency Motors - No VFDs	1,838	80%	Premium Efficiency Motors - VFDs	US$0.7 MM
Reverse Osmosis Pumps	30,100	82%	Premium Efficiency Motors - No VFDs	30,100	82%	Premium Efficiency Motors - No VFDs	None
Energy Recovery System - Power Reduction	(7,550)	-25.1%	Pelton Wheels	(10,200)	-33.9%	Pressure Exchangers	US$5.0 MM
Product Water Transfer Pumps	10,680	70%	High Efficiency Motors - No VFDs	9,350	80%	Premium Efficiency Motors & VFDs	US$3.4 MM
Pretreatment Filter Service Equipment							
Microscreen Pumps	150	65%	High Efficiency Motors - No VFDs	150	65%	High Efficiency Motors - No VFDs	None
Ultrafiltration Vacuum Pumps	780	70%	High Efficiency Motors - No VFDs	680	80%	Premium Efficiency Motors - with VFDs	US$0.3 MM
Filter Backwash Blowers	400	70%	High Efficiency Motors - No VFDs	400	70%	High Efficiency Motors - No VFDs	None
Backwash Pumps	160	70%	High Efficiency Motors - No VFDs	160	70%	High Efficiency Motors - No VFDs	None
Backwash Equalization Basin Blowers	80	70%	High Efficiency Motors - No VFDs	80	70%	High Efficiency Motors - No VFDs	None
UF and RO Membrane Cleaning Systems							
Membrane Cleaning Pumps	30	70%	High Efficiency Motors - No VFDs	30	70%	High Efficiency Motors - No VFDs	None
Scavenger Tank Mixing System	50	70%	High Efficiency Motors - No VFDs	50	70%	High Efficiency Motors - No VFDs	None
Flush Pumps	150	70%	High Efficiency Motors - No VFDs	150	70%	High Efficiency Motors - No VFDs	None
Cleaning Chemicals System	15	70%	High Efficiency Motors - No VFDs	15	70%	High Efficiency Motors - No VFDs	None
Sewer System Transfer Pumps	15	65%	High Efficiency Motors - No VFDs	15	65%	High Efficiency Motors - No VFDs	None
Chemical Feed Equipment							
Polymer Feed System	15	65%	High Efficiency Motors - No VFDs	15	65%	High Efficiency Motors - No VFDs	None
Ammonia Feed System	30	65%	High Efficiency Motors - No VFDs	30	65%	High Efficiency Motors - No VFDs	None
Lime Feed System	200	65%	High Efficiency Motors - No VFDs	200	65%	High Efficiency Motors - No VFDs	None
Carbon Dioxide Feed System	30	65%	High Efficiency Motors - No VFDs	30	65%	High Efficiency Motors - No VFDs	None
Sodium Hypochlorite Feed System	40	65%	High Efficiency Motors - No VFDs	40	65%	High Efficiency Motors - No VFDs	None
Other Chemical Feed Systems	10	65%	High Efficiency Motors - No VFDs	10	65%	High Efficiency Motors - No VFDs	None
Service Facilities							
HVAC	260	80%	High Efficiency Equipment	250	80%	High Efficiency Equipment	None
Lightning	120	80%	High Efficiency Equipment	120	80%	High Efficiency Equipment	None
Controls and Automation	40	80%	High Efficiency Equipment	40	80%	High Efficiency Equipment	None
Air Compressors	100	80%	High Efficiency Equipment	100	80%	High Efficiency Equipment	None
Other Miscellaneous Power Uses	250	80%	High Efficiency Equipment	250	80%	High Efficiency Equipment	None
TOTAL DESALINATION PLANT POWER USE	**42,005**			**37,653**			

Figure 3 - Tampa Bay Desalination Plant Pelton Wheel Energy Recovery System

Table 2 presents a detailed breakdown of the projected power use of the Project under a Baseline Design and High-Energy Efficiency Design. As indicated in this table, the Baseline Design includes high efficiency motors for all pumps, except the largest reverse osmosis feed pumps, and a Pelton wheel energy recovery system which is the most widely used "standard' energy recovery system today. The total desalination power use under the Baseline Design is 31.3 MW, which corresponds to a unit power use of 15.02 kWh/kgal (4,898 kWh/AF).

In addition to the state of the art-pressure exchanger system described above, the High-Energy Efficiency Design incorporates premium efficiency motors and variable frequency drives (VFDs) on desalination plant pumps that have motors of 500 horsepower or more. The total desalination plant energy use under the High-Energy Efficiency Design is 28.1 MW, which corresponds to unit power use of 13.488 kWh/kgal (4,397kWh/AF).

The main energy savings result from the use of pressure exchangers instead of Pelton wheels for energy recovery. The pressure exchangers are projected to yield 2,650 hp (1.98 MW) of power savings, which is 6.3 % reduction of the total power use of 31.3 MW. Converted into unit power savings, the energy reduction of 1.98 MW corresponds to 0.95 kWh/kgal (310 kWh/AF). The installation of high-efficiency motors and VFDs on large pumps would result in additional 1.26 MW (4%) of power savings.

The power savings of 0.95 kWh/kgal associated with the use of pressure exchangers instead of Pelton wheels for energy recovery are substantiated by information from several full-scale desalination plants which have recently replaced their existing Pelton wheel energy recovery systems with pressure exchangers in order to take advantage of the energy savings offered by this technology (see Appendix D).

Appendix D contains energy data for a seawater desalination plant in Mazarron, Spain where Pelton wheel system was replaced with PX pressure exchangers. As indicated on Table 2 of Attachment 1, the replacement resulted in energy reduction from 3.05 kWh/m^3 to 2.37 kWh/m^3 (i.e., 0.68 kWh/m^3 or 2.57 kWh/kgal). Similar retrofit for a desalination plant in the Caribbean (see Table 3 of Appendix E) yielded power reduction from 3.94 kWh/m^3 to 2.15 kWh/m^3 (i.e., energy savings of 1.79 kWh/m^3 – 6.78 kWh/kgal). Estimated energy savings for a large seawater desalination plant in Fukuoka, Japan when pressure exchanger (PX) is used instead of Pelton wheel are (3.96-3.14 = 0.82 kWh/m^3 or 3.1 kWh/kgal). In summary, the examples included in Appendix E, indicate that the use of pressure exchanger instead of Pelton wheel technology has the potential to save over 2.5 kWh/kgal (815 kWh/AF) of electricity. Actual energy savings are anticipated to be larger.

In addition to the state-of-the-art pressure exchanger energy recovery technology, the Project design incorporates variable frequency drives on seawater intake pumps, filter effluent transfer pumps, and product water pumps as well as premium efficiency motors for all pumps in continuous operation that use electricity of 500 hp-hr or more. Installation of premium - efficiency motors and variable frequency drives on large pumps would result in additional 1.26 MW (4%) of power savings. The combined effect of the High-Energy Efficiency Design is a 11.5 % (3.2 MW) reduction in amount of electric power used for seawater desalination as compared to the Baseline Design. These energy savings correspond to a total annual electricity use reduction of 28,244 MWh/yr and a carbon footprint reduction of 10,001 tons of CO_2/yr. These reductions are already accounted for in the net carbon footprint of the Project (i.e., 19,658 tons of CO_2 per year).

The total actual energy reduction that would result from the use of state-of-the-art desalination and energy recovery technologies and design will be verified by direct readings of the total electric energy consumed by the desalination plant at the Project's main substation electric meter and documented as soon as the Project is fully operational.

GHG Emission Reduction by Green Building Design.

The Project will be located on a site currently occupied by an oil storage tank no longer used by the power plant. This tank and its content will be removed and the site will be reused to construct the Project. To the extent reasonably practicable, building design will follow the principles of the Leadership in Energy and Environmental Design (LEED) program. LEED is a program of the United States Green Building Council, developed to promote construction of sustainable buildings that reduce the overall impact of building construction and functions on the environment by: (1) sustainable site selection and development, including re-use of existing industrial infrastructure locations; (2) energy efficiency; (3) materials selection; (4) indoor environmental quality, and (5) water savings.

The potential energy savings associated with the implementation of the green building design as compared to that for a standard building design are in a range of 300 MWh/yr to 500 MWh/yr. The potential carbon footprint reduction associated with this design is between 106 and 177 tons of CO_2 per year.

On-Site Solar Power Generation.

Poseidon is exploring the installation of rooftop photovoltaic (PV) system for solar power generation as one element of its green building design. If implemented, the main desalination plant building would accommodate solar panels on a roof surface of approximately 50,000 square feet with the potential to generate approximately 777 MWh/yr of electricity. If installed, the electricity produced by the onsite PV system would be used by the Project and therefore would reduce the Project's electrical demand on SDG&E. The corresponding reduction of the Project's net carbon footprint is 275 tons of CO_2 per year.

If Poseidon proceeds with an onsite PV system, the total actual energy reductions will be verified by direct readings of the total electric energy produced by the solar panels at the system's electric meter and documented once the system is fully operational.

Recovery of CO_2.

Approximately 2,100 tons of CO_2 per year are planned to be used at the Project for post-treatment of the product water (permeate) produced by the reverse osmosis (RO) system. Carbon dioxide in a gaseous form will be added to the RO permeate in combination with calcium hydroxide or calcium carbonate in order to form soluble calcium bicarbonate which adds hardness and alkalinity to the drinking water for distribution system corrosion protection. In this post-treatment process of RO permeate stabilization, gaseous carbon dioxide is sequestered in soluble form as calcium bicarbonate. Because the pH of the drinking water distributed for potable use is in a range (8.3 to 8.5) at which CO_2 in a soluble bicarbonate form, the carbon dioxide introduced in the RO permeate would remain permanently sequestered.

A small quantity of carbon dioxide used in the desalination plant post-treatment process is sequestered directly from the air when the pH of the source seawater is adjusted by addition of sulfuric acid in order to prevent RO membrane scaling. A larger amount of CO_2 would be delivered to the Project site by commercial supplier for addition to the permeate. Depending on the supplier, carbon dioxide is of one of two origins: (1) a CO_2 Generating Plant or (2) a CO_2 Recovery Plant. CO_2 generating plants use various fossil fuels (natural gas, kerosene, diesel oil, etc.) to produce this gas by fuel combustion. CO_2 recovery plants produce carbon dioxide by recovering it from the waste streams of other industrial production facilities which emit CO_2-rich gasses: breweries, commercial alcohol (i.e., ethanol) plants; hydrogen and ammonia plants, etc. Typically, if these gases are not collected via CO_2 recovery plant and used in other facilities, such as the desalination plant, they are emitted to the atmosphere and therefore, constitute a GHG release.

To the extent that it is reasonably available, Poseidon intends to acquire the carbon dioxide from a recovery operation. Use of recovered CO_2 at the Project would sequester 2,100 tons of CO_2 per year in the Project product water. Verification would be provided through certificates of origin received from suppliers of CO_2 delivered to the Project site indicating the actual amount of CO_2 delivered to the site, date of delivery, origin of the CO_2, and the purity of this gas. Poseidon will ensure that the CO_2 is not accounted for through any other carbon reduction program so as to avoid "double counting" of associated carbon credits.

Avoided Emissions from Reducing Energy Needs for Water Reclamation.

The Project causes avoided emissions from change in operations from the Carlsbad Municipal Water District (CMWD), which owns and operates a water reclamation facility that includes micro-filtration (MF) and RO treatment for 25% of their water supply. The purpose of the MF/RO system is to reduce the salinity of the recycled water to below 1,000 mg/L so it will be suitable for irrigation. The elevated salinity of the recycled water is due in part to the salinity of the City's drinking water supply.

The Project will effectively eliminate this problem by lowering the salinity in the source water of the communities upstream of the water recycling facility, thereby eliminating the need for operation of the MF/RO portion of the water recycling process. Therefore, the Project results in the shutdown of the MF/RO system and benefits from its avoided emissions from the lower electricity use by CMWD. This will reduce the carbon footprint of the Carlsbad Water Reclamation Facility as follows: 1,950 MWh/yr x 780.79 lbs of CO_2 /MWh = 1,522,541 lbs of CO_2/yr (690 tons of CO_2/yr).

The total actual energy reduction that would result from the higher quality water use upstream of the water recycling facility will be verified annually by CMWD using actual billing and performance data.

Avoided Emissions from Displaced Imported Water.

Another source of Avoided Emissions results from the fact that the Project is introducing a new, local source of water into the San Diego area; water that will displace imported water from the State Water Project (SWP) – a system with its own significant energy load and related carbon emissions.

One of the primary reasons for the development of the Project is to replace imported water with a locally produced alternative drought-proof source of water supply. Currently, San Diego County imports approximately 90 % of its water from two sources – the State Water Project (SWP) and the Colorado River. These imported water delivery systems consist of a complex system of intakes, dams, reservoirs, aqueducts and pump stations and water treatment facilities.

The proposed Project will supply 56,000 acre-feet of water per year to the San Diego region. The Project will provide direct, one-to-one replacement of imported water to meet the requirements of the participating water agencies, thus eliminating the need to pump 56,000 acre feet of water into the region.[6]

The 2003 multi-state Colorado River quantitative settlement agreement forced Metropolitan Water District of Southern California (MWD) to reduce its pumping from the Colorado River by 53% -- from 1.20 MAFY to 0.56 MAFY. As a result, MWD now operates its imported water delivery system to base load its Colorado River allotment and draw from the SWP only as needed to serve demand that cannot be met by the lower cost water available from the Colorado River Aqueduct. Consequently, the proposed Project will result in MWD having a reduced demand on the SWP.

The total amount of electricity needed to provide treated water to Poseidon's public agency partners via the SWP facilities is shown in Table 1. The net power requirement to pump an acre-foot of water through the East Branch of the SWP is 3,236 KWh (source: MWD). Approximately 2% of the SWP water pumped to Southern California is lost to evaporation from Department of Water Resources' reservoirs located south of the Tehachapi Mountains (source: DWR). The evaporation loss results in a net increase of 68.3 KWh per acre-foot of SWP water actually delivered to Southern California homes and businesses. Finally, prior to use, the SWP water must be treated to meet Safe Drinking Water Act requirements. The San Diego County Water Authority (SDCWA) entered into a service contract with CH2M Hill Constructors, Inc, to operate its Twin Oaks Water Treatment Plant with a guaranteed energy consumption of 100 KWh/AF of water treated (source: SDCWA). The energy required to deliver an acre foot of treated water to the SDCWA is shown in Table 3.

[6] *See* Poseidon Resources Corporation Letter to Paul Thayer Re: Desalination Project's Impact on Imported Water Use, November 8, 2007, including attachments from nine water agencies (Attached as Appendix E).

Table 3

State Water Project Supply Energy Use

Energy Demand	**KWh/AF**	**Source**
Pumping Through East Branch	3,236	MWD
Evaporation Loss	68	DWR
Twin Oaks Water Treatment Plant	100	SDCWA
Total	**3,404**	

The reduction of demand for imported water is critical to Southern California's water supply reliability, so much so that MWD not only supports the Project, but has also committed $14 million annually to reduce the cost to Poseidon's customers. Under MWD's program, $250 will be paid to water agencies for every acre-foot of desalinated water purchased from the Carlsbad facility, *so long as the desalinated water offsets an equivalent amount of imported water*. MWD has established Seawater Desalination Policy Principles and Administrative Guidelines that require recordkeeping, annual data submittals, and MWD audit rights to ensure that MWD water is offset.[7]

The benefits of a reduction in demand on MWD's system are reflected in, among other things, the energy savings resulting from the pumping of water that – but for the Project – would have to continue. For every acre-foot of SWP water that is replaced by water from the proposed Project, 3.4 MWh of energy use is avoided, along with associated carbon emissions. And since the Project requires 4.4 MWh of energy to produce one acre-foot of water, the net energy required to deliver water from the Project is 1.0 MWh/AF.

Since the Project will avoid the use of 56,000 AFY of imported water, once in operation, the Project will also avoid 190,641 MWh/yr of electricity consumption, and the GHG emissions associated with pumping, treatment and distribution of this imported water. At 780.79 lbs CO_2 per MWh,[8] the total Avoided Emissions as a result of the Project is 67,506 metric tons CO_2/yr.

Some have argued that Avoided Emissions resulting from displacing imported water should not be considered when calculating the Project's net carbon footprint because it is not permanent, verifiable and enforceable. Specifically, a concern has been raised that Poseidon cannot guarantee that imported water replaced by the Project will not be pumped through the SWP for other purposes. This perspective is incorrect.

The flaw in viewing Avoided Emissions as not being permanent, verifiable and enforceable is demonstrated by the following analogy. Imagine that Company C replaces 50% of its existing power purchased from coal-fired power plants with power from a new large solar PV project.

[7] MWD's program is documented in a June 22, 2007 letter from its General Manager to Peter Douglas, Executive Director of the California Coastal Commission, as well as various contracts with relevant water agencies.

[8] Since the SWP does not have a published Annual Emissions Report with the CCAR, Poseidon used the certified emission factor for SDG&E system. Poseidon believes this a conservative estimate and will update its calculations when more accurate data is available.

The moment the solar project goes on line, Company C's carbon footprint is no longer completely based on dirty coal-fired power, but in-part by clean zero emission solar power. Company C's carbon footprint is now reduced by half. However, this does now free-up the coal-fired power to be resold to another utility customer. It would be not be reasonable or fair to disallow Company C to take credit for its substantial investment in solar power, because now someone else is using that coal-fired utility power. Nor would it be reasonable or fair to continue to hold Company C responsible for the emissions from that coal-fired power they once used. The GHG emissions from that coal-fired power are now the responsibility of the new user of that power.

Similarly, in Poseidon's case, if replaced water is pumped through the SWP for purposes other than supplying that water to the Project's customers, then the responsibility for the GHGs associated with that conveyance lies with the new recipient of that water. Any other result would be an unfair and unwarranted "double counting" of carbon emissions, requiring Poseidon to offset emissions caused by other parties' activities not associated with Poseidon's operations. In addition, holding otherwise would eliminate a strong incentive for developing local water supplies to diminish the burden on the already overtaxed SWP system, and be a disincentive for the development of clean renewable energy.

Avoided Emissions through Coastal Wetlands.

The Project also includes the restoration and enhancement of 37 acres of wetlands. The cost will be approximately $3 million. The restoration project will be in the proximity of the Project. These wetlands will be set-aside and preserved for the life of the Project. Once the wetlands are restored they will act as a carbon "sink" or carbon sequestration project trapping CO_2.

Tidal wetlands are very productive habitats that remove significant amounts of carbon from the atmosphere, a large portion of which is stored in the wetland soils. While freshwater wetlands also sequester CO_2, they are often a measurable source of methane emissions. For comparison, coastal wetlands and salt marshes release negligible amounts of greenhouse gases and therefore, their carbon sequestration capacity is not measurably reduced by methane production.

Based on a detailed study completed in a coastal lagoon in Southern California the average annual rate of sequestration of carbon in coastal wetland soils is estimated at 0.03 kg of C/m^2.yr.[9] Another source indicates that in addition to accumulating CO_2 in the soils, central and southern California tidal marshes could also sequester 0.45 kg of C/m^2.yr in the macrophytes growing in the marshes and 0.34 to 0.63 kg of C/m^2.yr in the algal biomass.[10] Given that the total area of the proposed wetland project is 37 acres, the carbon sequestration potential of the wetlands is between 4.9 and 83 tons of C/m^2 yr. With a conversion factor from carbon to carbon dioxide of 3.664 the estimated emissions avoided is estimated to be between 18 and 304 tons of CO_2/year.

In order to verify the actual carbon sequestration capacity of the proposed wetland system, a site-specific carbon dioxide sequestration study would be conducted once the wetland project is completed and is fully functional.

[9] www.slc.ca.gov/Reports/Carlsbad_Desalinization_Plant_Response/Attachment_4.pdf
[10] www.sfbayjv.org/tools/climate/CarbonWtlandsSummary_07_Trulio.pdf

While Poseidon does not believe the wetlands mitigation project should be evaluated as an "offset project" as that term is defined later in this document, the project nonetheless fits the criteria because it is not being implemented as a result of any existing law, policy, statute, regulation or other legal obligations imposed on Poseidon. Rather, it is a direct result of development of the project. But for the Project, the wetlands mitigation would not occur, and therefore it satisfies the Regulatory Surplus additionality test. (See, Carbon Offset Projects – Definition (Page 16 herein) for a more detailed discussion of the Regulatory Surplus additionality test.)

Table 4 summarizes the on-site and project-related reductions of GHG Emissions.

Table 4 - On-site and Project-Related Reduction of GHG Emissions

Source	Total Annual Reductions in Power Use (MWh/ year saved)	Total Annual Emissions Avoided (metric tons CO_2/ year avoided)
Reduction due to High-Efficiency Design	(28,244)	(10,001)
Green Building Design	(300 to 500)	(106 to 177)
On-site Solar Power Generation	(0-777)	(0-275)
Recovery of CO_2	(NA)	(2,100)
Reducing Energy Needs for Water Recycling	(1,950)	(690)
Reduced Water Importation	(190,641)	(67,506)
Sequestration in Coastal Wetlands	(NA)	(18 to 304)
Subtotal On-site Reduction Measures	(NA)	**(70,421 to 71,053)**

ADDITIONAL OFF-SITE REDUCTIONS OF GHG EMISISONS

Offsite reductions of GHGs that are not inherently part of the Project include actions taken by Poseidon to participate in local, state or national offset projects that result in the cost-effective reduction of carbon emissions equal to the indirect emissions Poseidon is not able to reduce through other measures. One project – spending one million dollars to reforest areas burned out by fires in the San Diego region in the fall of 2007 – has been identified by the CCC as the first priority among these measures. Other projects will be identified through a selection process beginning about eighteen months before operations, commencing with the issuance of a Request for Proposal (RFP) for carbon offset projects and renewable energy credits.

The RFP will require compliance with comprehensive standards for carbon offset projects such as those set forth in AB 32. Working with an experienced, qualified carbon offset broker – together with the California Center for Sustainable Energy (CCSE) and other appropriate representatives, such as the San Diego Air Pollution Control District (SDAPCD) – Poseidon will select the most cost-effective mix that meets its criteria, and then contract for their acquisition or development. The exact nature and cost of the offset projects and RECs will be known once the RFP process is complete. Offsets or RECs will be used as the swing mitigation option to "true-up" changes over time to the Project's net carbon footprint.

Carbon Offset Projects – Definition.[11]

An offset is created when a specific action is taken that reduces, avoids or sequesters greenhouse gas (GHG) emissions in exchange for a payment from an entity mitigating their GHG emissions. Examples of offset projects include, but are not limited to: increasing energy efficiency in buildings or industries, reducing transportation emissions, generating electricity from renewable resources such as solar or wind, modifying industrial processes so that they emitted fewer GHGs, installing cogeneration, doing reforestation, or preserving forests. Renewable Energy Credits (RECs) or Green Tags which create GHG reductions solely from the development of renewable energy projects are also offsets.

A threshold requirement is that quality offset projects will not occur without funding from Poseidon. Once selected and completed, reductions will be quantified, verified and monitored. To measure reductions, a baseline of GHG emissions will first be established that quantifies the GHG emissions prior to the development of the offset project. Then, after the offset project is developed, a new evaluation of GHG emissions will be undertaken by an independent third party to quantify the amount of the reduction in GHGs. Offset projects will be monitored to verify that reductions persist over time.

Poseidon is committed to acquiring cost-effective offsets that meet rigorous standards. Adherence to the principles and practices described here are intended to assure that offset projects deliver on their basic promise to mitigate GHG emissions as effectively as on-site or direct GHG reductions. Adherence will ensure that the offset projects acquired by Poseidon are real, permanent, quantifiable, verifiable, enforceable, and additional.

Additionality. The concept of "additionality" was introduced in the Kyoto Protocol in Article 12.5, which states that "emission reductions resulting from each project activity shall be . . . reductions in emissions that are additional to any that would occur in the absence of the certified project activity". Poseidon will assess the additionality of each project proposal on a case-by-case basis. Offset project proposers – i.e., those who respond to an RFP – must demonstrate the additionality of their project. Specifically, Poseidon, working with third party validators such as CCSE, and other appropriate representatives, will perform an initial screening of all proposed offset projects against the following additionality tests before evaluating any other aspects of the proposed project.

[11] The following two sections are based on information provided by the Climate Trust (http://www.climatetrust.org/)

The offset acquisition process will use three widely used tests to determine a project's additionality: 1) Regulatory Surplus Test, 2) Barriers Tests, and 3) Common Practice Test. These tests are based on the Kyoto Protocol's Clean Development Mechanism methodology, as well as the World Resource Institute's GHG Protocol for Project Accounting; and are the emerging norms and best practices in the burgeoning offset market in the United States and internationally.

Test 1: Regulatory Surplus. The Regulatory Surplus Test ensures that the project that is proposed is not mandated by any existing law, policy, statute, regulation, or other legal obligations. If it is, then it is assumed that the project is being developed to comply with the law or regulation and thus, cannot be considered additional to the business as usual scenario.

Key Question**:** Is this project mandated by any existing law, policy or statute?

Test 2: Implementation Barriers. The implementation barriers tests are at the heart of the additionality determination process. There are three main implementation barriers tests: 1) Financial, 2) Technological, and 3) Institutional. A project must meet at least one of the following barriers tests in order to be considered additional.

Test 2(a): Financial Barriers. The Financial Barriers Test addresses how offset funding impacts the project in question. Financial barriers tests are generally considered to be one of the more rigorous and stringent tests of additionality. There are two main types of financial barriers a project can face: capital constraint and internal rate of return. The Capital Constraint Test addresses whether a project would have been undertaken without offset funding. Internal rate of return indicates whether or not a project would have met established targets for internal rates of return without offset funding. These are not the only acceptable tests of financial barriers, but are the most commonly used.

Positive economic returns do not necessarily make a project non-additional. There are instances where projects with high rates of return remain unimplemented – the energy efficiency sector is the most well know of these examples. To demonstrate additionality for projects that generate rates of return, it can be useful to describe the barriers faced by the project by including a clear explanation of the project's return rate with a performa financial analysis showing both the with and without project case. For example, Company Y typically does not pursue project activities unless they provide a 15% rate of return. An energy efficiency upgrade at the facility will generate a 5% rate of return. The additionality case is that offset funding can be used to increase the return of the efficiency measures to a level that is acceptable to management.

Key Question(s): Does this project face capital constraints that offset funding can address?
OR
Will offset funding bring the internal rate of return to a level that enables the implementation of the project?

Test 2(b): Technological Barriers. There are several categories of assessment that could fall under this test. If the primary reason for implementing a technology is its GHG reduction benefits, that project is generally considered to be additional. For example, if a more energy efficient, though more expensive to manufacture, model of a hot water heater is available and the additional cost is barring its entry into the market, offset funding can help bridge that gap and bring a technology to market that otherwise would not have been. In this case, the GHG reductions resulting from the deployment of the new technology are clearly above and beyond business as usual.

Key Question: Is the primary benefit or purpose of the technology in question its GHG reduction capabilities?

Test 2(c): Institutional Barriers. Institutional barriers can be organizational, social or cultural. If a GHG reduction project falls outside of the normal purview of a company or organization and there is reluctance to implement a project that is not within that purview or to capitalize a project with uncertain returns, offset funding can often assist in overcoming that barrier.

Key Question: Does this project face significant organizational, cultural or social barriers that carbon funding will help overcome?

Test 3: Common Practice. This test is intended to determine whether or not a project is truly above and beyond "business as usual". If a practice is widely employed in a field, it is not considered additional.

Key Question: Is the project, technology or practice commonly employed in the field or industry?

Carbon Offset Acquisition Process and Timeline.

There are three phases to the offset acquisition process. It is expected to take up to 12 months from the time of the release of the RFP until Emission Reduction Project Agreements (ERPAs) are completed. The development of the RFP should take an additional 3 months.

- **Phase I: Submission of Project Information Document**. Offset project proponents will be required to complete an application giving sufficient information about the proposed project. The official requirements for submission will be set forth in the RFP. Two examples of a short and long Project Information Document are included in Appendix F.
- **Phase II: Detailed Project Information Document**. A selected short-list of proposals will be invited to submit a more detailed project information document.
- **Phase III: Contract Finalization**. Selected proposals will be invited to finalize an ERPA. The amount of the funding, tons of GHG offsets, and terms will be set forth in the final ERPA.

Third-Party Validation. Throughout the offset selection and implementation process, Poseidon will work with experienced third party brokers that specialize in the evaluation and selection of offset projects. Poseidon will also work with CCSE and other appropriate respresentatives to provide local third-party validation of the process and its outcome. Poseidon, CCSE and other appropriate representatives will form the Offset Evaluation and Monitoring Committee (the Committee) responsible for overseeing the carbon offset purchasing and implementation process.

Project Requirements. Poseidon will detail in the RFP the requirements project proposers must adhere to in order to qualify for consideration. The project requirements will include, at minimum, the following:

- **Minimum project size** (e.g., the project reduces or avoids at least 25,000 metric tons of CO_2 emissions over the contract term).
- **Minimum term for the sale of their emissions reductions** (i.e., terms of 1-5 years, at least 5 years, up to the life of the project, or beyond for sequestration projects).
- **Geographic boundaries** for acceptable projects. Poseidon will establish a hierarchy of geographic preference, beginning with local and regional projects, then in-state, national and international.
- **Contract terms and conditions** based on standard Emission Reduction Purchase Agreement (ERPA).
- **Price Target** for each metric ton of carbon offset.
- **Evaluation and selection committee members,** including CCSE and other appropriate representatives.
- **Timeline and milestone dates**

Evaluation Criteria. The RFP will clearly set forth the criteria to evaluate and select the final projects for contracting. Each project will be evaluated to determine whether or not it meets the initial requirements, including whether the project meets the additionality test and is an eligible project type. (Only those that pass these tests will be considered further.) Among other factors, Projects will be required to complete an extensive application to allow the Committee to fully evaluate the project. Poseidon will make the final decision on which Committee-approved offset projects to fund. Selection criteria will include at the least the following:

1. **Cost Effectiveness.** The measure of cost effectiveness will be defined as U.S. dollars per metric ton.
2. **Reliability of Proposing Entity.** The Committee will consider the qualifications of the proposing entity, the proposing entities past experience with similar projects, if any, and the qualifications of any organizations cooperating with the project. Proposing entities should be required to demonstrate their financial and institutional capability to deliver the project that they propose. This criterion assesses whether the project is real, permanent and enforceable.
3. **Reliability of Project Concept.** In evaluating the reliability of offsets delivery, the Committee will consider the quality of the project concept and design, and the performance of similar projects. This criterion assesses whether the project is real, permanent and quantifiable.
4. **Monitoring and Verification Plan.** The Committee will expect high quality Monitoring and Verification (M&V) Plans to be implemented for all projects. Although final M&V Plans are not expected to be developed until later in the process, a detailed M&V concept is encouraged. This criterion assesses whether the project is permanent, quantifiable, verifiable and enforceable.
5. **Mitigating Financial Risk of Initiative Participants.** The Committee will prefer projects that reduce the risk that their investment may not yield the anticipated amount of

tons of GHG offsets. The Committee will evaluate all the risk mitigation options that applicants propose. This criterion assesses whether the project is real and enforceable.

6. **Willingness to Accept ERPA Terms and Conditions.** This criterion assesses whether the project is enforceable.
7. **Location.**

Examples of Offset Projects.

Offset projects typically fall into seven major strategies for mitigating carbon emissions. A similar range and set of offset projects should be expected from a solicitation or purchase by Poseidon. While it is difficult to anticipate the outcome of Poseidon's offset RFP process, the following examples of offset projects provides some sense of what to expect.

Energy Efficiency (Project sizes range from: 191,000 metric tons to 392,000 metric tons; life of projects range from: 5 years to 15 years)

- Steam Plant Energy Efficiency Upgrade
- Paper Manufacturer Efficiency Upgrade
- Building Energy Efficiency Upgrades

Renewable Energy (Project sizes range from: 24,000 metric tons to 135,000 metric tons; life of projects range from: 10 years to 15 years)

- Small Scale Rural Wind Development
- Innovative Wind Financing
- Other renewable resource projects could come from Solar PV, landfill gas, digester gas, wind, small hydro, and geothermal projects

Fuel Replacement (Project size is: 59,000 metric tons; life of project is: 15 years)

- Fuels for Schools Boiler Conversion Program

Cogeneration (Project size is: 339,000 metric tons; life of project is: 20 years)

- University Combined Heat & Power

Material Substitution (Project size is: 250,000 metric tons; life of project is: 5 years)

- Cool Climate Concrete

Transportation Efficiency (Project sizes range from: 90,000 metric tons to 172,000 metric tons; life of projects range from: 5 years to 15 years)

- Truck Stop Electrification
- Traffic Signals Optimization

Sequestration (Project sizes range from: 59,000 metric tons to 263,000 metric tons; life of projects range from: 50 years to 100 years)

- Deschutes Riparian Reforestation
- Ecuadorian Rainforest Restoration
- Preservation of a Native Northwest Forest

Further details on these projects are set forth in Appendix G.

Potential Offset Projects Funded by Poseidon.

Participants at the May 2, 2008 CCC Workshop proposed several other potential projects that were suggested to be wholly or partially funded by Poseidon through the RFP process. Proposers were not prepared at that time to provide details for these projects other than generally describe the project concept. As a result, it is impossible to evaluate them for consistency with the applicable criteria for valid carbon reduction projects. The projects include the following:

- Reforestation Projects in the San Diego area ravaged by the 2007 fires
- Urban Forestry projects
- Estuary sequestration project
- Wetlands projects
- Fleet Fuel Efficiency Increase & Replacement project
- Accelerated Fleet Hybrid Deployment
- Large-Scale Solar PV project on a covered reservoir
- Mini-Hydro from installing pressure reducing Pelton wheels
- Solar Water Heating for a new city recreation swimming pool
- Lawn Mower Exchange Program (gas exchanged for electric mowers)
- Truck Fleet Conversion (especially older trucks from Mexico)
- School Bus Conversions
- White Tag projects or Energy Efficiency projects

While these and other potential offset projects must be evaluated through the RFP process, there is one project – the San Diego fire reforestation project identified by the CCC – that can be identified at this time. Poseidon is also exploring off-site renewable energy initiatives with some of its water agency partners.

Sequestration through Reforestation.

The CCC identified as a carbon offset project the reforestation of areas in the San Diego region impacted by the wildfires that occurred during the fall of 2007. Specifically, Poseidon has agreed to invest the initial $1.0 Million it spends on offset projects in reforestation activities in the San Diego region. As a result of the CCC's actions, Poseidon will forego the RFP process for this first project and will instead focus its efforts on implementation. CCSE and other appropriate representatives will provide third-party validation and administration of the reforestation project to ensure Poseidon's funding meets carbon reduction objectives in a cost-effective manner.

According to the California Center for Sustainable Energy (CCSE), the average cost for planting a 15 gallon suitable, drought tolerant shade tree in San Diego neighborhoods affected by the 2007 wildfires is $100 per tree, including staff time and marketing. The average annual watering and maintenance cost required for the trees after installation is $0 per tree for Poseidon, since property owners would cover these expenses. Expected survival rate would be 90%. Poseidon's $1.0 million investment in urban reforestation with shade trees is expected to yield 9,000 mature trees within 10-15 years of planting. At an annual tree sequestration rate of 60 lbs of CO_2 per tree, the annual carbon footprint reduction associated with the trees would be approximately 245 tons of CO_2 per year (the number is about 25% higher if energy demand reductions from trees shading homes were included in the calculations).

The total actual GHG emissions that result from the reforestation project will be verified by CCSE and other appropriate representatives.

Renewable Energy Partnerships.

Poseidon is exploring the possibility of participating in renewable energy projects with its water agency partners. Table 5 presents a summary of some of the project opportunities and associated GHG offsets that are under consideration.

Table 5 - Potential Renewable Energy Partnerships

Desalination Project Public Partner/ Location	Green Power Project Description	Annual Capacity of Green Energy Projected to be Generated by the Project (MWh/yr)
City of Encinitas	95 KW Solar Panel System Installed on City Hall Roof	160
Valley Center Municipal Water District	1,000 KW Solar Panel System	1,680
Rainbow Municipal Water District	250 KW Solar Panel System	420
Olivenhain Municipal Water District / Carlsbad Municipal Water District / City of Oceanside	Various solar and hydro-electric generation opportunities	To Be Determined
Santa Fe Irrigation District	Hydropower generation facility At R.E. Badger Filtration Plant	To Be Determined
	Total Renewable Power Generation Capacity (MWh/yr)	2,260

Based on the proposed projects described in Table 5, the total currently quantifiable energy reduction potential is 2,260 MWh/yr and carbon footprint offset for the Project is projected at 800 tons of CO_2/year. Should Poseidon decide to proceed with one or more of the potential renewable energy partnerships, the total actual energy reduction that would result from the partnership would be verified by direct readings of the total electric energy produced by the Project at the partner's electric meter.

Implementation Schedule.

The timing for implementation of Poseidon's Plan elements is set forth in the Table 6 below.

Table 6 - Implementation Schedule for the Plan

Measure	**Process**	**Timing**
Reduction due to High-Efficiency Design	Engineering/design & include in construction	4-6 months after issuance of construction permits
Increased Energy Efficiency	Engineering/design & include in construction	4-6 months after issuance of construction permits
Other Energy Efficiency Measures	Audit & engineering/design & include in construction	4-6 months after issuance of construction permits
Green Building Design	LEED-type process & engineering/design & include in construction	4-6 months after issuance of construction permits
Potential On-Site Solar Power Generation	Design, procure & construct	TBD
Sequestration through Reforestation	Identify projects, develop implementation plan and implement	Start 4-6 months after issuance of construction permits
Sequestration through Coastal Wetlands Mitigation	Identify & purchase lands, develop mitigation plan & construct	Start 4-6 months after approval of restoration project
Offset and REC Purchases	RFP, evaluation & selection, contracting, acquisition or development, monitoring & verification	Issue RFP 18 months before commencement of commercial operations
Annual True-Up Process	Obtain new emissions factor form the annual web-based CCAR/CARB Emissions Report, calculate subject year's emissions using actual billing data and new emissions factor, purchase necessary offsets	Review CCAR/CARB reports within 60 days of publishing on the internet, calculate necessary offsets to purchase within 90 days of publishing, purchase necessary offsets

Quality Assurance and Monitoring.

Poseidon is developing a framework to provide third-party monitoring of the implementation of the Plan by the CCSE and other appropriate representatives. Under the framework, the CCSE would serve as Poseidon's third-party carbon "accountants", responsible for reviewing and validating the annual accounting of Poseidon's net carbon emissions and offsets. Other appropriate representatives, such as SDAPCD, would serve an oversight role, verifying CCSE's accounting and managing a publicly accessible database for the program. As set forth above, CCSE and the other appropriate representatives would also serve as members of the Carbon Offset Evaluation and Monitoring Committee responsible for reviewing and selecting offset projects.

The Project's Annual Net-Zero Carbon Emission Balance.

Table 6 presents a summary of the assessment, reduction and mitigation of GHG emission for the proposed Project. As shown in the table, up to 83% of the GHG emissions associated with the proposed Project could be reduced by on-site reduction measures and the remainder would be mitigated by off-site mitigation projects and purchase of offsets or renewable energy credits. It should be noted that the contribution of on-site GHG reduction activities is expected to increase over the useful life (i.e., in the next 30 years) of the project because of the following key reasons:

- SDG&E is planning to increase significantly the percentage of green power sources in its electricity supply portfolio, which in turns will reduce its emission factor and the Project carbon footprint.

- Advances in seawater desalination technology are expected to yield further energy savings and carbon footprint reductions. Over the last 20 years there has been a 50% reduction in the energy required for seawater desalination.

Table 7 - Assessment, Reduction and Mitigation of GHG Emissions

Part 1: Identification of GHG Amount Emitted		
Source	**Total Annual Power Use (MWh/ year)**	**Total Annual Emissions (metric tons CO_2/ year)**
Project Baseline Design	274,400	97,165
Part 2: On-site and Project-Related Reduction of GHG Emissions		
Reduction due to High-Efficiency Design	(28,244)	(10,001)
Green Building Design	(300 to 500)	(106 to 177)
On-site Solar Power Generation	(0-777)	(0-275)

Recovery of CO_2	(NA)	(2,100)
Reducing Energy Needs for Water Recycling	(1,950)	(690)
Reduced Water Importation	(190,641)	(67,506)
Sequestration in Coastal Wetlands	(NA)	(304)
Subtotal On-site Reduction Measures	(NA)	**(70,707 to 71,053)**
	Net GHG Emissions	**16,457 to 16,111**
Part 3: Additional Off-Site Reductions of GHG Emissions		
Sequestration Through Reforestation	(NA)	(245)
Potential Renewable Energy Partnerships	(0 - 2,260)	(0 - 800)
Subtotal Off-site Measures	(NA)	(245-1,045)
Offset and REC Purchases	(NA)	**(16,212 to 15,066)**
	Net GHG Emissions	0