Poseidon Resources
Huntington Beach Desalination Plant

ENERGY MINIMIZATION AND GREENHOUSE GAS REDUCTION PLAN

NOVEMBER 6, 2015

Key elements of this Plan include:

- *Poseidon's total indirect GHG emissions from construction and operations will be calculated using California Air Resources Board (CARB) or The Climate Registry (TCR) or Climate Action Reserve (CAR) methodologies.*

- *The offset projects, except for Renewable Energy Credits (RECs), that Poseidon implements pursuant to this Plan will be purchased through/from TCR, CAR, CARB or any California Air Pollution Control District (APCD) or Air Quality Management District (AQMD).*

POSEIDON WATER

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INTRODUCTION

Poseidon Resources Surfside LLC (Poseidon) is offering The Huntington Beach Energy Minimization and Greenhouse Gas Reduction Plan (the Plan) as part of its voluntary commitment to account for and bring to zero the total amount of direct and indirect Greenhouse Gas (GHG) emissions from the construction and operation of its Huntington Beach Desalination Project (Project). Based on protocols adopted by The Climate Registry (TCR) and the Climate Action Reserve (CAR), the Plan is Poseidon's roadmap to achieving its commitment over the 50-year life of the Project.

1. Project Overview.

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

Figure 1 - Huntington Beach Seawater Desalination Project

In 2006, California legislation introduced the AB 32 Global Warming Solutions Act that aims to reduce statewide GHG emissions to 1990 levels by year 2020. While the legislation and its implementing regulations do not currently apply to the Project because the Project only generates *de minimis* direct GHG emissions[1], Poseidon applauds the objectives of AB 32 and is committed to helping California maintain its leadership role in addressing the causes of Climate Change. As a result, Poseidon has voluntarily committed to offset the indirect GHG emissions associated with the Project's operations. For the Huntington Beach Project, Poseidon voluntarily submits this Plan, which is consistent with the general obligations of the Carlsbad project's GHG plan with the added enhancement that gross indirect GHG emissions instead of net indirect GHG emissions will be offset, as part of its application materials.

2. Emissions Template.

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

> Identification of the amount of indirect GHGs due to the Project's electricity use;
> On-Site and Project related measures planned to reduce emissions; and
> Off-site mitigation options to offset remaining emissions.

After a brief explanation of Poseidon's overall strategy for eliminating the Project's indirect GHG emissions, this document then organizes the Plan into the three general categories.

3. Overview of the Project's GHG Reduction Strategy.

Since offsetting indirect GHG emissions is an ongoing process dependent 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 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 consumed by the Project for the previous year using substation(s) electric meter(s) readings from Southern California Edison (SCE) or any other entity from which the Project obtains all or part of its electricity at any time in the future.

2. Determine SCE's reported emissions factor, described as pounds of CO_2 per MWh from delivered electricity. Emissions factors will be obtained from SCE or CARB if and when

[1] The AB 32 Scoping Plan (the "Scoping Plan") was adopted on December 8, 2008 and a majority of the Plan's measures will be adopted by December 31, 2010. The First Update to the Scoping Plan was approved by the Board on May 22, 2014, and builds upon the initial Scoping Plan with new strategies and recommendations. AB 32's regulations, when promulgated, are expected to target direct emitters of GHGs, including SCE (the expected source of the Project's electricity), rather than indirect generators such as the Project. Currently, the Scoping Plan does not anticipate regulation of the Project under AB 32. The process is managed by the California Air Resources Board (CARB).

SCE certified and reported emissions factor for pounds of CO_2 per MWh from delivered electricity is publicly available. If at any time in the future the Project obtains all or part of its electricity from an entity other than SCE, the appropriate CARB or TCR reported emissions factor for that entity shall be used.

3. Calculate the Project's indirect GHG emissions resulting from Project operations by multiplying its electricity use by the reported emissions factor.

4. If necessary, implement carbon offsets projects and purchase carbon offsets or RECs to zero-out the Project's indirect GHG emissions. Subject to the provisions of Sections III.C, E and F below: (i) Offset projects, except for RECs, implemented pursuant to this Plan will be purchased through/from TCR, CAR, CARB, or a California APCD or AQMD, and (ii) Poseidon may propose purchasing other offset projects in the event that sufficient offsets are not available from TCR, CAR, CARB, California APCD or AQMD at a price that is reasonably equivalent to the price for offsets in the broader domestic market.

Energy efficiency measures and on-site use of renewable resources will be given the highest priority. In addition to the steps completed each year, Poseidon will quantify direct Project GHG emissions associated with project construction and operational vehicles based on data in the Project's 2010 Certified Final Subsequent Environmental Impact Report (FSEIR) and the November 6th, 2015 Dudek technical memorandum entitled "Huntington Beach Desalination Project Technical Modifications Supplemental Environmental Analysis", which are considered *de minimis* under applicable reporting protocols. All such emissions for the entire 50 years of Project operations are quantified and aggregated in Part I of this Plan, and Poseidon shall purchase carbon offsets or RECs to zero-out these emissions on a one-time basis by the time Poseidon submits the first Annual GHG Report required in Part III of this Plan.

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

PART I. IDENTIFICATION OF THE AMOUNT OF GHG EMITTED

The Project will produce potable water using reverse osmosis membrane separation. The treatment processes used at the Plant do not generate GHGs. The desalination process does not involve heating and vaporization of the source seawater and thus does not create emissions of water vapor, carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), 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 created by desalination.

The Project will not store or use fossil fuels on site, nor will it emit GHGs from self-generation of electricity. There are no direct fugitive emissions from the plant. As a result, Project operations will not create direct sources of GHG emissions except for emissions from construction and operational vehicles. The modest number of fleet vehicles associated with plant and the construction emissions will create GHG emissions that make-up less than 5% of the Project's annual carbon footprint, and thus these emissions are considered *de minimis* and are not

required to be reported (TCR, General Verification Protocol for the Voluntary Reporting Program, Version 2.1 (Chapter 2.5)). However, Poseidon has calculated these emissions and included them in the overall GHG emissions total for the Project.

GHG emissions were calculated using emissions factors from the TCR General Verification Protocol for the Voluntary Reporting Program and the South Coast Air Quality Management District's (SCAQMD) web site which were extrapolated out to 50 years where necessary. Table 1 shows emissions from construction equipment, construction site electricity use, and operational emissions from passenger vehicles and delivery trucks during the 50 year life of the project after completion. These emissions amount to less than one percent of the lifetime emissions of the Project. Poseidon shall make a one-time purchase of carbon offsets or RECs to zero-out the Aggregate 50-Year Construction and Operational GHG Emissions set forth in Table 1 by the time Poseidon submits the first Annual GHG Report required in Part III of this Plan.

Table 1 – Aggregate 50-Year Construction and Operational GHG Emissions

Estimated Emission Source	**$MTCO_2e$**
On-site Construction Equipment & Travel	822
Off-site Construction Equipment & Travel	1,233
Construction Site Electricity	136
Construction Brine Diffuser and Fish Return System	117
Construction Onshore Traveling Screen Intake	948
Post-Construction Operational Passenger Vehicle and Delivery Truck Emissions	6,880
Total	**10,136**

The Project's on-going source of quantifiable GHG emissions will be indirect emissions resulting from purchased electricity. All of the electricity supply for the desalination plant operations is expected to be provided by SCE. Therefore, with the exception of the offsets or RECs for construction and vehicle operations discussed above, the accounting of GHG emissions for the Project addressed in this Plan will consist entirely of indirect emissions resulting from electricity purchased from SCE.

Currently, about 24% of the electricity supplied by SCE is generated from renewable power[2]. As a result, until SCE switches to 100% "green" power supply sources, the Project operations will be indirectly linked to SCE's generation of GHGs.

The Project's total indirect GHG emissions from the stationary combustion of fossil fuels to generate electricity is dependent on two 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.

[2] SCE 2014 Power Content Label (24% Eligible Renewables, 0% Coal, 3% Large Hydro, 27% Natural Gas, 6% Nuclear, 40% Unspecified)

A. Electricity Use by the Project.

The Project will operate 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 power use incorporates both production of fresh drinking water as well as pumping the water from the plant into the distribution systems of the public water agencies that will purchase water from the Project[3].

Table 2 –Project Electricity Use

Estimated Emission Source	Baseline Energy Use (aMW)	MWh/AF	MWh/year
Stand Alone Operation	30.34	4.7	265,888

B. SCE's Emissions Factor.

The Project currently intends to purchase all of its electricity from SCE.[4] Accordingly, the appropriate emissions factor to use for the Project's indirect GHG emissions from its electricity use is the independently verified and published emissions factor for the electricity purchased and consumed during the previous year. The current reported emissions factor for SCE's 2014 delivered electricity is 570 lbs of CO_2 per delivered MWH of electricity.

Circumstances will change over the life of the Project. SCE's reported emissions factors are updated annually and the amount of energy consumed by the Project may change. As a result, it will be necessary to recalculate the indirect GHG emissions of the Project on an annual basis using the actual SCE reported emissions factor.

Statewide initiatives to expand the use of renewable sources of electricity are expected to decrease the emissions factors of all California power suppliers in the future. For example, approximately 24% of SCE's retail electricity is currently generated from renewable resources (solar, wind, geothermal, small hydro and biomass). In October 2015, Governor Brown signed legislation to target 50% of California's power generation to be supplied by renewable power by 2030. These and other reductions are expected to further reduce the Project's indirect GHG emissions over time.

Table 3 summarizes the Project's estimated indirect CO_2 emissions from purchased electricity based on the most current information.

[3] The period of co-located operations will use slightly less electricity

[4] If at any time in the future the Project is able and desires to obtain all or part of its electricity from an entity other than SCE, Poseidon may do so without amending the Plan and the appropriate reported emissions factor for that entity shall be used.

Table 3 - Identification of Gross Indirect CO_2 Emissions from Purchased Electricity

Esimated Emission Source	Total Annual Electricity Use (MWh/year)	Total Annual Emissions (metric tons CO_2/year)
Stand Alone Operation	265,888	68,745

PART II: PROJECT AND PROJECT-RELATED REDUCTION OF GHG EMISSIONS

To determine the Project's indirect GHG emissions, on-site and project-related reductions in emissions must also be considered. These are carbon emission reductions that result from measures that reduce energy requirements (increased energy efficiency, potential onsite solar, recovery of CO_2 and green building design). The total of each year's indirect GHG emissions will be determined using emissions factors for SCE[5] .

A. 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 a state-of-the art pressure exchanger-based energy recovery system that allows recovery and reuse of 32.1% 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.[6]

The manufacturer of the pressure exchangers referenced in Table 4 of the Project Power Budget is Energy Recovery, Inc., a US company located in San Leandro, California (www.energyrecovery.com).

[5] Or such other entity from whom Poseidon purchases its electricity.

[6] The "45 % percent energy recovery and reuse" refers to the gross energy recovery potential, while the "32.1 % energy recovery and reuse" refers to the actual energy savings associated with the energy recovery system. The difference between gross and actual energy savings is due to mechanical inefficiencies of the recovery system and associated friction losses. Thus, for purposes of calculating the overall energy savings, Tables 4 correctly reflects the approximate 32% savings associated with the pressure exchanger.

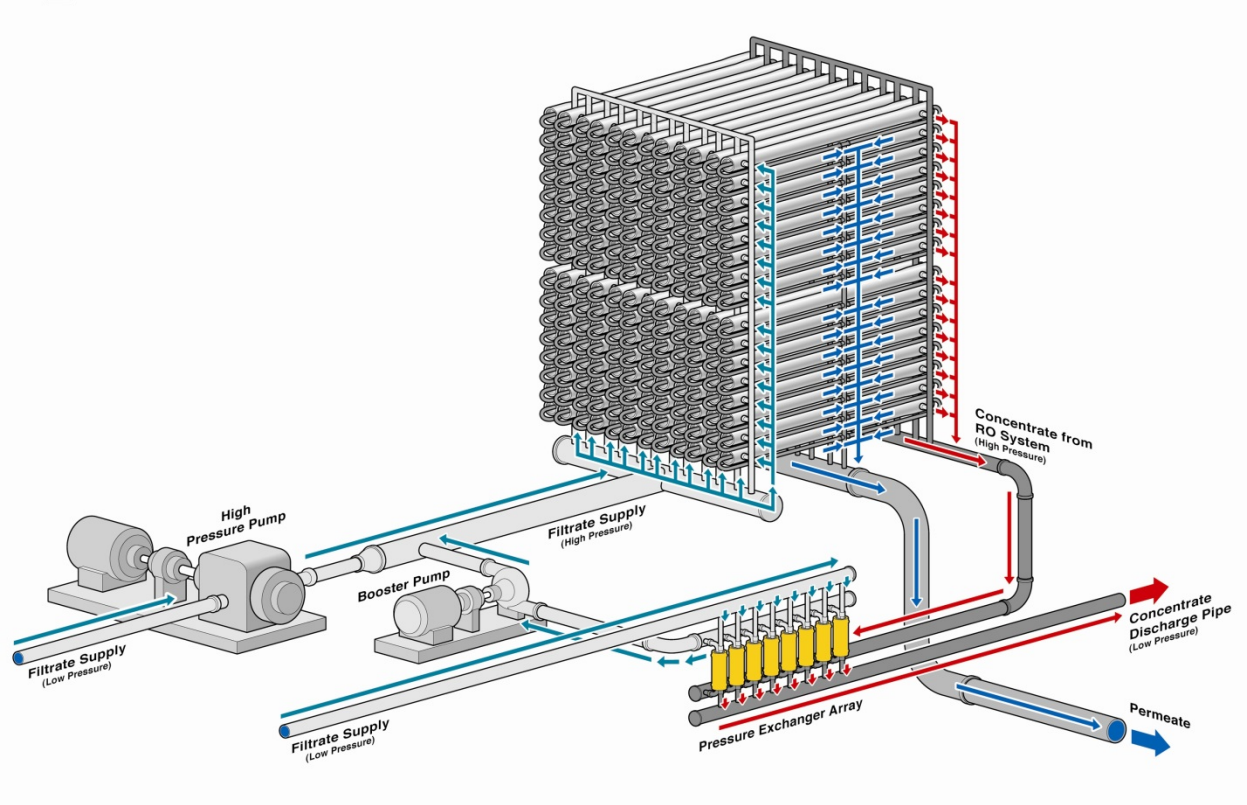

Figure 2 - Energy Recovery System for the Huntington Beach Seawater Desalination Plant

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 30.3 aMW, which corresponds to unit power use of 14.6 kWh/kgal[7] (4,748 kWh/AF)[8].

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

[7] 30.3 MWh x 1,000 kW/MW/2083 kgal/Hr.

[8] 14.6 kWh/kgal x 326 kgal/AF.

Table 4 - High Efficiency Electric Budget for 50 MGD Water Production

Unit	High Efficiency Design - Power Use (Hp)	Equip. Effic.	Equipment Type
Key Treatment Process Pumps			
Power Plant Intake Pumps (Collocated Operation)	1,210	70%	Standard Motors - No VFDs
Seawater Intake Pumps	1,445	80%	High Eff. Motors - VFDs
Filter Effluent Transfer Pumps	4,525	82%	High Eff. Motors - with VFDs
High Pressure Reverse Osmosis Pumps	36,160	88%	High Eff. Motors - No VFDs
Energy Recovery System –			
Power Reduction	-11,610	-32.10%	Pressure Exchangers
On-site Product Water Transfer Pumps (50 MGD)	4,500	80%	High Eff. Motors - No VFDs
Off-site OC-44 Product Water Pump Station (45 MGD)	2,125	80%	High Eff. Motors - No VFDs
Off-site Coastal Junction Product Water Pump Station (26 MGD)	375	80%	High Eff. Motors with VFDs
Pretreatment Filter & Residuals Handling Equipment			
Residuals Transfer Pumps	150	65%	Standard Motors - No VFDs
Residuals Dewatering System	600	70%	Standard Motors - No VFDs
Filter Backwash Blowers	250	70%	Standard Motors - No VFDs
Filter Backwash Pumps	150	70%	Standard Motors - No VFDs
Flocculation Mixers	30	70%	Standard Motors - No VFDs
RO Membrane Cleaning System			
Membrane Cleaning Pumps	13	70%	Standard Motors - No VFDs
Scavenger Tank Mixing System	2	70%	Standard Motors - No VFDs
Flush Pumps	17	70%	Standard Motors - No VFDs
Cleaning Chemical System	15	70%	Standard Motors - No VFDs
Sewer System Transfer Pumps	15	65%	Standard Motors - No VFDs
Chemical Feed Equipment			
Polymer Feed System	0.5	65%	Standard Motors - No VFDs
Ammonia Feed System	0.5	65%	Standard Motors - No VFDs
Calcite Feed System	0.5	65%	Standard Motors - No VFDs
	1	65%	Standard Motors - No VFDs
Sodium Hypochlorite Feed System	0.5	65%	Standard Motors - No VFDs
Other Chemical Feed Systems	3	65%	Standard Motors - No VFDs
Service Facilities			
HVAC	70	NA	Standard Equipment
Lightning	400	NA	Standard Equipment
Controls and Automation	10	NA	Standard Equipment
Air Compressors	10	NA	Standard Equipment
Other Miscellaneous Power Uses	200	NA	Standard Equipment
TOTAL DESALINATION PLANT HORSEPOWER USE	**40,668**	**Hp**	
TOTAL DESALINATION PLANT POWER USE	**30.34**	**aMW**	

B. 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. Because the facility is an industrial facility, LEED-level certification will not be feasible; but 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 86 and 143 tons of CO_2 per year. The energy savings associated with incorporating green building design features into the desalination plant structures (i.e., natural lighting, high performance fluorescent lamps, high-efficiency HVAC and compressors, etc.) are based on the assumption that such features will reduce the total energy consumption of the plant service facilities by 6 to 10 %. As indicated in Tables 4 through 7, the plant service facilities (HVAC, lighting, controls and automation, air compressors and other miscellaneous power uses) are projected to have power use of 690 hp (70 hp + 400 hp + 10 hp + 10 hp + 200 hp = 690 hp) when standard equipment is used. The total annual energy demand for these facilities is calculated as follows; 690 hp x 0.746 kW/hp x 0.001 kW/MW x 24 hrs x 365 days = 4,509 MWh/yr. If use of green building design features result in 6 % of energy savings, the total annual power use reduction of the service facilities is calculated at 0.06 x 4,509 MWh/yr = 270.5 MWh/yr (rounded to 270 MWh/yr). Similarly, energy savings of 10 % due to green building type equipment would yield 0.1 x 4,509 MWh/yr = 450.9 MWh/yr (rounded to 450 MWh/yr) of savings. The total actual energy reduction resulting from the use of the green building design will be determined by direct readings of the total electricity consumed by the desalination plant at the Project's substation(s) electric meter(s) and documented when the Project is fully operational.

C. <u>On-Site Solar Power Generation</u>.

Poseidon is exploring the installation of rooftop photovoltaic (PV) system for solar power generation as one element of its green building design. Brummitt Energy Associates of San Diego completed a feasibility study in March 2007 of a photovoltaic system for the Carlsbad Desalination Plant. If a similar solar installation described by Brummitt is implemented in Huntington Beach, the desalination plant buildings would accommodate solar panels on a roof surface of approximately 39,000 square feet, with the potential to generate approximately 606 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 SCE. The corresponding reduction of the Project's indirect emissions would be 157 tons of CO_2 per year. Poseidon is exploring other solar proposals and will update this information as it becomes available. Ultimately, the electricity and corresponding GHG savings of any on-site solar installation will be documented in the Project's annual electricity usage information. Poseidon will use commercially reasonable efforts to implement an on-site solar power project if it is reasonably expected to provide a return on the capital investment over the life of the Project.

If Poseidon proceeds with an onsite PV system, the total actual energy reductions resulting from the use of on-site solar power generation will be determined by direct readings of the total

electricity consumed by the desalination plant at the Project's substation(s) electric meter(s) and documented once the system is fully operational.

D. 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 is in a soluble bicarbonate form, the carbon dioxide introduced in the RO permeate would remain permanently sequestered. During the treatment process the calcium carbonate (calcite – $CaCO_3$) reacts with the carbon dioxide injected in the water and forms completely soluble calcium bicarbonate as follows:

$$CaCO_{3\,(solid)} + CO_{2\,(gas)} + H_2O_{\,(liquid)} \rightarrow Ca(HCO_3)_{2\,(liquid\ solution)}$$

At the typical pH range of drinking water (pH of 8.3 to 8.5) the carbon dioxide will remain in the drinking water in soluble form (see Figure 4) and the entire amount (100 %) of the injected carbon dioxide will be completely dissolved.

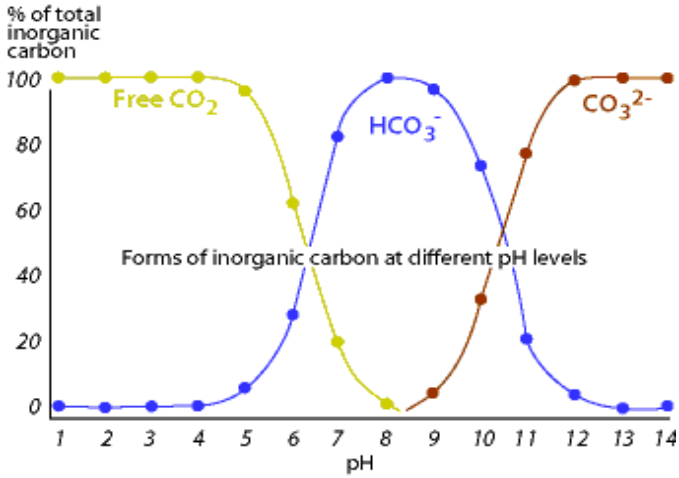

Figure 4 – Relationship between free carbon dioxide in gaseous form and pH
(Source: http://www.cotf.edu/ete/modules/waterq3/WQassess3b.html)[37]

[37] This chemical reaction and information presented on Figure 4 are well known from basic chemistry of water. *See* American Water Works Association (AWWA) (2007) Manual of Water Supply Practices, M46, Reverse Osmosis and Nanofiltration, Second Edition; http://www.chem1.com/CQ/hardwater.html; http://www.cotf.edu/ete/modules/waterq3/WQassess3b.html. Once the desalinated drinking water is delivered to individual households, only a small portion of this water will be ingested directly or with food. Most of the delivered water will be used for other purposes – personal hygiene, irrigation, etc. The calcium bicarbonate ingested by humans will be dissociated into calcium and bicarbonate ions. The bicarbonate ions will be removed by the human body through the urine

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 1,144 tons of CO_2 per year in the Project product water. The total annual use of carbon dioxide (i.e., 1,144 tons/CO_2 per year) in the water treatment process was determined based on the daily carbon dioxide consumption presented in Table 4.8-1 of Section 4.8 "Hazards and Hazardous Materials" of the Draft Huntington Beach desalination project Subsequent Environmental Impact Report (EIR). The annual consumption of CO_2 in this table is 2,522,000 lbs of CO_2 per year, or 1,144 tons of CO_2 per year (2,522,000 lbs/2,204.5 lbs/ton=1,144 tons). The daily amount of carbon dioxide in Table 5.8-1 of the EIR was calculated based on the dosage needed to provide adequate hardness (concentration of calcium bicarbonate) in the seawater to protect the water distribution system from corrosion. This amount was determined based on pilot testing of distribution system piping and household plumbing at the Carlsbad seawater desalination demonstration project. The testing was completed using the same type of calcium carbonate chips as those planned to be used in the full-scale operations. Every load of carbon dioxide delivered to the desalination plant site will be accompanied by a certificate that states the quantity, quality and origin of the carbon dioxide and indicates that this carbon dioxide was recovered as a site product from an industrial application of known type of production (i.e., brewery, ethanol plant, etc.), and that it was purified to meet the requirements associated with its use in drinking water applications (i.e., the chemical is NSF approved). The plant operations manager will receive and archive the certificates for verification purposes. At the end of the year, the operations manager will provide copies of all certificates of delivered carbon dioxide to the independent third party reviewer

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(http://www.chemistry.wustl.edu/~courses/genchem/Tutorials/Buffers/carbonic.htm). Since the CO_2 is sequestered into the bicarbonate ion, human consumption of the desalinated water will not result in release of CO_2. The bicarbonate in the urine will be conveyed along with the other sanitary sewerage to the wastewater treatment plant. Since the bicarbonate is dissolved, it will not be significantly impacted by the wastewater treatment process and ultimately will be discharged to the ocean with the wastewater treatment plant effluent. The ocean water pH is in a range of 7.8 to 8.3, which would be adequate to maintain the originally sequestered CO_2 in a soluble form – see Figure 4 above. Other household uses of drinking water, such as personal hygiene, do not involve change in drinking water pH as demonstrated by the fact that pH of domestic wastewater does not differ significantly from that of the drinking water. A portion of the household drinking water would likely be used for irrigation. A significant amount of the calcium bicarbonate in the irrigation water would be absorbed and sequestered in the plant roots (http://www.pubmedcentral.nih.gov/pagerender.fcgi?artid=540973&pageindex=1). The remaining portion of calcium bicarbonate would be adsorbed in the soils and/or would enter the underlying groundwater aquifer.

(currently the California Center for Sustainable Energy) responsible for verification facility compliance with the Energy Minimization and Greenhouse Gas Reduction Plan.

As noted, 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 place conditions in its purchase agreements with CO_2 vendors that require transfer of CO_2 credits to Poseidon and otherwise 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. Table 5 summarizes the expected Project and project-related reductions of GHG Emissions.

Table 5 – Expected Project and Project-Related Reduction of GHG Emissions

Estimated Reduction Source	Total Annual Power Use (MWh/year)	Total Annual Emissions (metric tons CO2/ year)
Green Building Design	(500)	(129)
On-site Solar Power Generation	(606)	(157)
Recovery of CO2		(1,144)
On-site Reduction Measures	**(1,106)**	**(1,430)**

PART III: IDENTIFICATION OF MITIGATION OPTIONS TO OFFSET ANY REMAINING GHG EMISSIONS

Offsite reductions of GHG emissions that are not inherently part of the Project include actions taken by Poseidon to participate in local, regional, state, national or international offset projects that result in the cost-effective reduction of GHG emissions equal to the indirect Project emissions Poseidon is not able to reduce through other measures.[38] Subject to the provisions of Sections III.C, E and F below, carbon offset projects, except for RECs will be purchased by Poseidon through/from TCR, CAR, California APCDs / AQMDs, CARB or other providers of offsets approved by the City of Huntington Beach (collectively, "Third Party Providers").[39] The exact nature and cost of the offset projects and RECs will not be known until they are acquired by Poseidon. Offsets or RECs will also be used as the swing mitigation option to "true-up" changes over time to the Project's indirect GHG emissions, as discussed below.

[38] This Plan intends for Poseidon to join the Climate Action Reserve, so that it may implement some of this Plan through the Reserve.

[39] Part 4, Section 38562(d)(1)&(2) states that CARB regulations covering GHG emission reductions from regulated "sources" must ensure that such reductions are "real, permanent, quantifiable, verifiable, . . . enforceable [and additional]". While the Project is not a "source" under AB 32 and the criteria are not currently defined under implementing regulations, Third Party Providers will evaluate potential offset projects against equivalent criteria using their own protocols that employ the same criteria.

A. Annual "True-Up" Process

Since the quantity of offsets required will vary from year-to-year, the goal of the annual "True-Up" process is to enable Poseidon to meet the subject year's need for metric tons of offsets by purchasing or banking offsets in the short-term, while allowing Poseidon to make long-term purchases and bank offsets to decrease market exposure and administrative costs. To complete the True-Up process Poseidon will obtain the latest SCE emissions factor from SCE or the annual web-based CARB Emissions Report within 60 days of the (i) end of each calendar year, or (ii) the date of publication of the CARB Emissions Report on the relevant CARB web site, whichever is later. Within 120 days of the end of the prior calendar year or publication of the emissions factor (whichever is later), Poseidon will gather electricity usage data, relevant data regarding Avoided Emissions, and then calculate the necessary metric tons of offsets required for the subject year. The subject year's emissions will be calculated using actual billing data and the emissions factor for the relevant annual period. The subject year's calculated metric tons of emissions will be compared to the amount of metric tons of offsets previously acquired by Poseidon to determine if Poseidon has a positive or negative balance of GHG emissions for the subject year, and all of this information will be included in the Annual GHG Report to be submitted to the City each year as discussed below. If there is a positive balance of GHG emissions, Poseidon will purchase offsets to eliminate the positive balance, and provide the City with documentation substantiating that purchase, within 120 days of the date the positive balance is identified in the Annual GHG Report. If there is a negative balance of GHG emissions, the surplus offsets may be carried forward into subsequent years or sold by Poseidon on the open market. All documentation that Poseidon will submit to the City pursuant to this Section shall also be submitted to the SLC.

Prior to the commencement of Project operations, Poseidon will be required to purchase offsets sufficient to cover estimated indirect GHG emissions for at least the first year of operation (subject to City staff concurrence), or to cover a longer period of time at Poseidon's option, based on the most recently published SCE emissions factor from SCE or CARB and estimated electricity usage data for the first year of the Project period for which offsets are initially purchased. Poseidon will have the option to purchase offsets for any longer period of time up to and including the entire 50 year life of the Project, subject to Poseidon's above-stated obligation to address any positive balance in GHG emissions that may subsequently arise. Beginning with the Sixth Annual Report, Poseidon can meet its GHG compliance obligations over a rolling five-year period. Poseidon will purchase enough GHG reductions measures that conform to the Plan such that it will never incur a positive GHG emissions balance over any rolling five-year period.

B. Carbon Offset Projects and Credits

Subject to the provisions of Sections III.C, E and F below, Poseidon will purchase carbon offset projects, except for RECs, through/from TCR, CAR, CARB, or California APCDs / AQMDs. 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 its 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 emit fewer GHGs, installing cogeneration, and reforestation or preserving forests.

One type of offset project is Renewable Energy Credits (RECs), also known as Green Tags, Renewable Energy Certificates or Tradable Renewable Certificates. Each REC represents proof that 1 MW of electricity was generated from renewable energy (wind, solar, or geothermal). For GHG offsetting purposes, purchasing a REC is the equivalent of purchasing 1 MW of electricity from a renewable energy source, effectively offsetting the GHGs otherwise associated with the production of that electricity. RECs may be sold separately from the electricity.

Except as specified below, offset projects that Poseidon implements pursuant to this Plan will be those approved by TCR, CAR, CARB, or any California APCD/AQMD. Poseidon is committed to acquiring cost-effective offsets that meet rigorous standards, as detailed in this Plan. By requiring adherence to the principles, practices and performance standards described here, the Plan is designed to assure that selected offset projects will 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 consistent with the principles of AB 32.

C. Offset Acquisition and Verification

Poseidon shall acquire offsets through/from TCR, CAR, CARB or California APCD/AQMD-approved projects. Acquisitions of RECs are not limited to purchase from TCR, CAR, CARB, or a California APCD/AQMD.

If sufficient offsets are not available from TCR, CAR, CARB or a California APCD/AQMD at a price that is reasonably equivalent to the price for offsets in the broader domestic market, Poseidon may submit a written request to the City's Planning Director requesting that one or more additional offset providers, including without limitation any existing member of the Offset Quality Initiative, which includes The Climate Trust, Pew Center on Global Climate Change, Climate Action Reserve, The Climate Registry, the Environmental Resources Trust, Greenhouse Gas Management Institute, and The Climate Group, be designated as a Third Party Provider from/through whom Poseidon may purchase offsets under the Plan.[40] In deciding whether or not to approve Poseidon's request, the City's Planning Director shall consider whether or not the proposed Third Party Provider is an independent and non-affiliated entity that adheres to substantially similar principles and evaluation criteria for high quality offsets as TCR, CAR, CARB, a California APCD/AQMD or any Third Party Provider previously approved by the City's Planning Director or the City Council. The City's Planning Director shall determine whether or not to approve Poseidon's request to designate a Third Party Provider within 60 days. Any dispute between Poseidon and City's Planning Director regarding the approval or denial of the requested entity may be brought by Poseidon to the City Council for hearing and resolution at the next available hearing date.

[40] The fee charged to Poseidon by the CCC for any request to approve additional offset providers pursuant to Section III.C., or to otherwise make the Plan workable by facilitating Poseidon's purchase of offsets/RECs to zero out the Project's indirect GHG emissions, shall not exceed $5,000.00.

Poseidon's Annual GHG Report, discussed in Section III.D below, shall include an accounting summary and documentation from TCR, CAR, CARB, a California APCD/AQMD and Third Party Providers, as applicable, which verifies that offsets obtained by Poseidon have been verified by TCR, CAR, CARB, a California APCD/AQMD or a Third Party Provider.

D. Annual Report

Poseidon will provide an Annual GHG Report that will describe and account for Poseidon's annual and cumulative balance of verified GHG emissions reductions. The Annual GHG Report will include analysis and validation of: (1) the annual GHG emission calculations for the Project, (2) the positive or negative balance in Poseidon's GHG emissions, (3) the acquisition of offsets and/or RECs in accordance with this Plan, and (4) any other information related to Poseidon's efforts to mitigate GHG emissions resulting from the Project's electricity usage. Each year, Poseidon will obtain the new reported emissions factor from SCE or CARB and prepare and submit Poseidon's Annual GHG Report within 180 days of the date of publication of CARB emissions reports. The Annual GHG Report shall be submitted to the City, CCC and the SLC. In the event that the Annual GHG Report indicates that Poseidon has a positive balance of GHG emissions for a particular year, Poseidon shall purchase offsets or RECs to cover that balance, and provide the City, CCC and the SLC with documentation substantiating any such purchases, within 120 days of the submission of an Annual GHG Report to the agencies. If an approved Annual GHG Report demonstrates that Poseidon possesses a negative balance of GHG emissions, Poseidon will be free to carry those surplus offsets forward into subsequent years or sell them on the open market. Beginning with the Sixth Annual Report, Poseidon can comply with its GHG compliance obligations over any rolling five-year period. Poseidon will purchase enough GHG reductions measures that conform to the Plan such that it will never incur a positive GHG emissions balance over any rolling five-year period.

Before commencing Project operations, Poseidon shall submit its first Annual GHG Report for review and approval by the City's Planning Director, which will evidence sufficient offsets to zero out the Project's estimated indirect GHG emissions for the first year, and also shall evidence the one-time purchase of offsets to zero-out the Aggregate 50-Year Construction and Operational GHG Emissions set forth in Table 1 of this Plan (which do not need to be addressed in subsequent reports). All subsequent reports will cover one calendar year.

E. Contingency if No GHG Reduction Projects are Reasonably Available

At any time after submission of its First Annual GHG Report, Poseidon may seek a determination from the City's Planning Director that (i) offset projects in an amount necessary to mitigate the Project's indirect GHG emissions are not reasonably available; (ii) the "market price" for carbon offsets or RECs is not reasonably discernable; (iii) the market for offsets/RECs is suffering from significant market disruptions or instability; or (iv) the market price has escalated to a level that renders the purchase of offsets/RECs economically infeasible to the Project. Any request submitted by Poseidon shall be considered and a determination made by the City's Planning Director within 60 days. A denial of any such request may be appealed by Poseidon to the City Council for hearing and resolution at the next available meeting date. If Poseidon's request for such a determination is approved by the City's Planning Director or the City Council, Poseidon may, in lieu of funding offset projects or additional offset projects,

deposit money into an escrow account (to be approved by the City's Planning Director) to be used to fund GHG offset programs as they become available, with Poseidon to pay into the fund in an amount equal to $10.00 per metric ton for each ton Poseidon has not previously offset, adjusted for inflation from 2015.

The period of time that the conditions giving rise to this contingency remain in effect, and therefore that the escrow account contingency may be utilized under this Section, shall be determined by the City's Planning Director or the City Council at the time Poseidon's request to use the contingency is considered, based on circumstances as they exist at the time of the request. Extensions of the contingency period may be requested and the contingency period shall be extended so long as the conditions giving rise to this contingency period remain in effect. Within 180 days of the City's Planning Director's or the City Council's initial determination pursuant to this Section, Poseidon will be required to submit a plan for the City's Planning Director's approval (the "Contingency Plan") that identifies one or more entities who will utilize monies deposited into the escrow account to implement carbon offset projects. When the escrow account contingency period (together with any extensions thereof) approved by the City's Planning Director or the City Council ends, if the carbon offset projects implemented through the Contingency Plan result in Poseidon having a positive balance of GHG emissions for the contingency period as calculated under this Plan, then Poseidon shall have three years from the end of the contingency period to purchase offsets or RECs to cover that balance and provide the City, CCC and SLC with documentation substantiating any such purchases.

F. Contingency if New GHG Reduction Regulatory Program is Created

If, at any time during the life of the Project the SCAQMD or any other California APCD/AQMD, or the California Air Resources Board (CARB) or any federal regulatory agency, initiates a carbon tax or carbon offset program that would allow Poseidon to purchase carbon offsets or payment of fees to compensate for GHG emissions, Poseidon may, at its option, elect to pay into such a program in order to fulfill all or part of its obligations under the Plan to offset indirect GHG emissions caused by the Project. By receiving certification from the relevant receiving entity that Poseidon has satisfied its obligations under the applicable regulatory program, Poseidon will be deemed to have satisfied its obligation under the Plan to offset indirect GHG emissions for the part of the offset obligations under the Plan for which such certification is made. Subject to the approval of the relevant receiving entity, Poseidon may carry over any surplus offsets acquired pursuant to the Plan for credit in the new regulatory program.

G. Examples of Offset Projects

Offset projects typically fall within the seven major strategies for mitigating carbon emissions set forth below. A similar range and type of offset projects should be expected from a purchase by Poseidon, although it is difficult to anticipate the outcome of Poseidon's offset acquisitions at present.

1. 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

2. 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

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

- Fuels for Schools Boiler Conversion Program

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

- University Combined Heat & Power

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

- Cool Climate Concrete

6. 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

7. 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

H. Implementation Schedule

An illustrative schedule setting forth timing for implementation of Poseidon's Plan elements is set forth in the following Implementation Schedule.

Table 6 - Implementation Schedule for the Plan

Measure	Process	Timing
Submit First Annual GHG Report	First Annual Report*, submitted to the City's Planning Director for review and approval, shall include enough detailed emissions reductions measures to achieve a projected zero GHG emissions balance, and shall include offsets to zero-out the Aggregate 50-Year Construction and Operational GHG Emissions set forth in Table 1.	Before operations commence
Offset and REC Purchases Sufficient to Zero Out Estimated indirect GHG emissions for first year of operations	Subject to the provisions of Sections III.C, E and F above**,** offset projects or credits, except for RECs, will be verified and purchased through TCR, CAR, CARB or any California APCDs / AQMDs.	Before operations commence
Annual True-Up Process and all Subsequent Annual GHG Reports	Poseidon will submit its Annual GHG Report to the City's Planning Director for review and approval. Once approved, Poseidon will purchase additional offsets as necessary to maintain a zero GHG emissions balance, or bank or sell surplus offsets. Poseidon can demonstrate compliance over a rolling 5-year period in the Sixth Annual Report	Each year, Poseidon will obtain the new reported emissions factor from CARB or SCE, and prepare and submit Poseidon's Annual GHG Report within 180 days of the date of publication of CARB or SCE emissions reports. If the report shows a positive GHG emissions balance, Poseidon is required to purchase offsets, and submit proof of such purchase to the City within 120 days from the date the Annual GHG Report

*First Annual GHG Report will use projected electricity consumption. All subsequent Annual GHG Reports will use the previous year's electricity consumption data.

I. The Project's Annual Zero Carbon Emission Balance

Table 7 presents a summary of the assessment, reduction and mitigation of GHG emission for the proposed Project. As shown in the table, up to 14% 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 RECs. It should be noted that on-site GHG reduction activities are expected to increase over the useful life (i.e., in the next 50 years) of the Project because of the following key reasons:

- SCE is planning to increase significantly the percentage of green power sources in its electricity supply portfolio, which in turn will reduce its emissions factor and the Project's indirect GHG emissions.
- Advances in seawater desalination technology are expected to yield further energy savings and indirect GHG emission reductions. Over the last 25 years, there has been a 50% reduction in the energy required for seawater desalination.

Table 7 – Expected Assessment, Reduction and Mitigation of GHG Emissions

Part 1: Identification of The Amount of GHG Emitted

Estimated Annual Source	Total Annual Power Use (MWh/year)	Total Annual Emissions (metric tons CO2/ year)
Project Design	**265,888**	**68,745**

Part 2: On-site and Project-Related Reduction of GHG Emissions

Estimated Annual Source	Total Annual Power Use (MWh/year)	Total Annual Emissions (metric tons CO2/ year)
Green Building Design	(500)	(129)
On-site Solar Power Generation	(606)	(157)
Recovery of CO_2		(1,144)
On-site Reduction Measures	**(1,106)**	**(1,430)**

Part 3: Off-Site Reduction of GHG Emissions

Estimated One Time Source	(metric tons CO2)
On-site Construction Equipment & Travel	822
Off-site Construction Equipment & Travel	1,233
Construction Site Electricity	136
Construction Brine Diffuser and Fish Return System	117
Construction Onshore Traveling Screen Intake	948
Post-Construction Operational Passenger Vehicle and Delivery Truck Emissions	6,880
One-Time Offset for Construction and Operational Emissions	**10,136**

Estimated Annual Source	Total Annual Power Use (MWh/year)	Total Annual Emissions (metric tons CO2/ year)
Project Design	265,888	68,745
On site Reduction Measures	(2,250)	(582)
Annual Offset and REC Purchases	**263,638**	**68,163**