Offshore Ports LLC

Executive Summary for Kona Co-Op

100 Megawatt Ocean Thermal Energy Conversion (OTEC) Project

Disruptive Innovation

A consortium of engineers, scientists, mathematicians and entrepreneurial business leaders have formed a Teaming Agreement to create a Disruptive Innovational Technology, which:

- Is revolutionary
- Transforms market demands
- Alters mainstream thought

For reliable "firm power" to be generated by a renewable resource, we must solve the problems of:

1. Floating structure stability
2. 99.99% reliability
3. Sufficient feedstock
4. Sub-sea land infrastructure

Solutions

1. CIDS/PSP
2. OTEC system
3. Inexhaustible feedstock
4. Mono cold H_2O pipe

Teaming Partners

Float Incorporated

Float, Inc. was founded in 1991 by Donald Innis, Chairman and Dr. Howard Blood, President. Dr. Neal Brown serves as Vice President and Chief Technology officer. Clifford B. McMillan is the Vice President of Business Development. Float Incorporated is the inventor and patent holder

Overview:

Offshore Ports, LLC is an international development and program management corporation. Our principal objective is the utilization of our patented technology, the Pneumatically Stabilized Platform (PSP), in the construction of stable offshore platforms of nearly any size or purpose. These platforms feature several unique and patented systems that, when integrated, can attenuate or reduce the ocean's rising and falling wave action.

Offshore Ports, LLC entered into various teaming agreements, along with forming strategic alliances, to promote the development and many uses of the platforms. The primary objective is to create renewable energy that will be used for electrical, water, food and hydrogen production.

The Project:

To create a strategic alliance by forming a power generation cooperative along the coastal region of Kona Hawaii. This cooperative will provide electricity for its members while supplying the excess capacity to the utility grid system The basis of the power generation will be an Ocean Thermal Energy Conversion (OTEC) plant that will produce 100 MW of power, on a platform of approximately 5.1 acres with possible additional uses, including water desalination, aquaculture and a port operation.

The Challenge:

Three significant hurdles exist in the production of firm renewable energy. First, it must be produced with a 100 percent reliability factor and a 98 percent operation capacity. Second, it must be sold at a competitive price. Third, but no less important, it must be produced without CO, CO_2 or sulfur emissions and with minimal environmental impacts ("green energy").

The Solution:

Each day solar radiation warms the vast tropical ocean waters and as an energy source, is 1,000 times greater than the combined energy consumption of the entire globe in a 24 hour period. While the tropical surface waters are warm (approximately 24 degrees Celsius or higher), at a depth of 1,000 meters, the water temperature is consistently very cold (approximately 4-5 degrees Celsius or lower). The difference in water temperatures provides a vast, untapped natural ocean resource ideal for the production of "green energy" in a process called Ocean Thermal Energy Conversion (OTEC).

of the PSP technology. Float has been involved in large floating structures for the Department of Defense, Homeland Security, and various private designs for ports and ocean real estate development. Early wave tank testing was funded by grants from ONR for projects such as Mobile Offshore Bases, commonly referred to as MOBS.

Offshore Ports LLC
Offshore Ports LLC was formed to facilitate the funding and construction of PSP technology. Its three major stakeholders are; Michael Piersol CEO/Co-Founder of Offshore Ports, whose background is heavy commercial construction projects; Joe Clemensen, President/Co-Founder of Offshore Ports and former Senior VP of Rancho Santa Fe Technology-MCS, a high-tech mission critical systems design/build contractor; and Float Inc, the holder of the PSP patents.

Proprietary Technology

The PSP Cylinder
At the core of this innovative platform design is the patented PSP system. The PSP cylinders are open to the sea at the bottom and closed at the top, which traps a column of air at the top of the cylinders for primary buoyancy. The interstitial spaces between the cylinders provides secondary buoyancy in separate sealed spaces.

OTEC technology is clean, available 24 hours per day, 365 days per year, and will not exhaust the resource at the location at which it is installed. This is in direct contrast with oil, natural gas, geothermal and even hydroelectric.

Enabling Technologies:

For many years, various industries have desired and attempted to build large floating structures at sea for a variety of commercial enterprises. Until now, they have been limited to single module structures, because without the technology to attenuate wave action, stresses at the joints of two or more modules would render the platform unsuccessful, especially in storm conditions. Three technological developments pioneered by our team members position us for the commercial production of a "green energy" source:

First, one of the most successful single-module honeycomb reinforced concrete designs was developed in 1984 and was utilized for drilling in the Arctic Sea. It's material's, and concrete cylinder array was designed to defy the crushing ice pressures of the region.

Second, Float Inc. invented the PSP in 1991, received a patent in 1992 and an improved patent in 2004. Starting with a similar array of reinforced concrete cylinders, Float Inc. utilized a system to allow air movement between cylinders to reduce the stresses on the platform and specifically at the module joints. This stress-reducing action enables very large platforms to be constructed from modular units.

Third, OCEES International, Inc and its partners developed technical designs and hold the patents and proprietary information to produce electricity using the Ocean Thermal Process. OCEES and Applied Technologies are currently under contract to design a small platform for an integrated OTEC energy/water plant for the US government in the Indian Ocean.

Fourth, Offshore Ports along with finance and insurance partners have created a closed business model that has secured the required funding while underwriting the guarantee of the development via special designed insurance.

Performance Verified:

Floating Structure - The basic construction component of the floating structure is a combination of PSP and honeycomb modules (Figure 1) consisting of reinforced concrete. Float Inc. developed the initial PSP technology with a grant from the Defense Advanced Research Projects Agency (DARPA). The honeycomb modules are an improved application of the existing CIDS, developed and deployed by Dr. Alfred Yee more than 20 years ago.

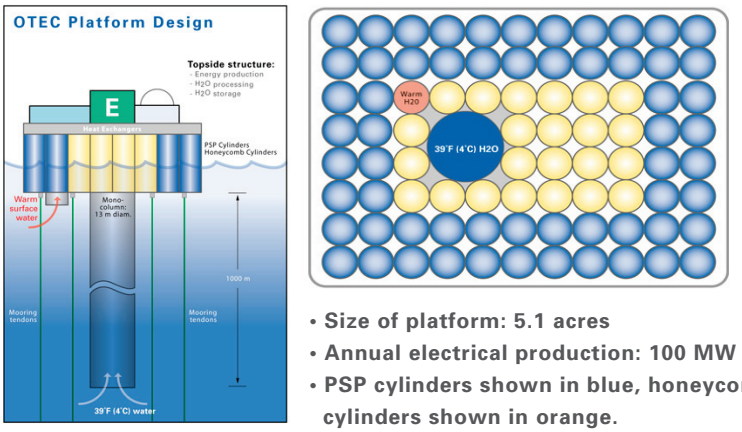
Ocean Energy - The OTEC system uses the ocean's natural thermal gradients to produce "firm" electricity by way of the Kalina Cycle® (Figure 2). This patented and proven technology employs an ammonia/water working fluid to generate electricity.

As the water column in the leading cylinders rises (wave and swell action) the compressing pocket of air is allowed to migrate by valves and ducts to cylinders and modules where the water column is falling. The result is the reduction of wave energy (upward lifting action) achieving three important functions for the platform: it stabilizes the platform from the normal pitch, roll, and heave of the open ocean; it reduces the stresses on the platform, allowing for multiple modules joined as a single monolithic platform; and the resulting wave attenuation allows ships to dock on the lee side of the platform, given sufficient platform size.

CIDS Platform

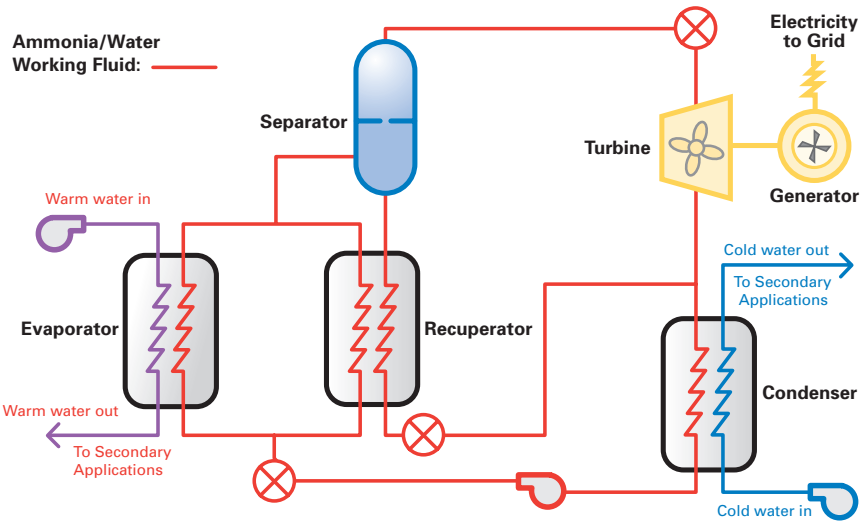
The honeycomb structural concept utilizes mass-produced, precast cylindrical reinforced concrete elements integrated in a manner that produces maximum strength and rigidity with the minimum amount of structural material. This structural system has been utilized successfully in a number of large ocean platforms such as the Concrete Island Drilling System (CIDS) for over 20 years without showing any signs of deterioration in spite of continuous exposure to seawater, aggressive ice floes, and in both cold and warm water climates.

Figure 1: Proposed Ocean Thermal Energy Conversion Platform



- Size of platform: 5.1 acres
- Annual electrical production: 100 MW
- PSP cylinders shown in blue, honeycomb cylinders shown in orange.

Figure 2: Simplified Kalina Cycle®



Funding Strategy:

The Ocean Thermal Energy Platform will be financed by way of a commodity off-take agreement (COTA) / power purchase agreement. Working with our partners at Energy Financing, Inc. we will implement a Design, Build, Own, Operate and Transfer (BOOT) contracting method and partner with a qualified off-take purchaser with an investment grade credit rating of BBB or better. All capital costs (Figures 3 and 4), infrastructure upgrades and soft costs can be incorporated within this agreement.

Phase one of the project will commence with a Front-End Engineering and Development (FEED) Contract as outlined in Figure 3. The engineering documents created under this phase will be utilized to develop the engineering, procurement and construction documents, along with the overall program management schedule as depicted in Figures 4 and 5. Figures 6 and 7 illustrate the cost analysis of the Ocean Thermal Project, and Figure 8 illustrates the project summary.

The Kalina Cycle® and Ocean Thermal Energy Conversion (OTEC)

Created by Dr. Alexander Kalina, the Kalina Cycle® is an advanced thermodynamic system enabling thermal power plants to achieve 50% greater efficiency.

The Kalina Cycle® achieves this increase in efficiency by mixing water and ammonia. Because ammonia has a much lower boiling point than water, the Kalina Cycle® allows for heat recovery at much lower temperatures than typically associated with more traditional Rankine cycles. Similarly, the lower boiling point of ammonia allows additional energy to be obtained on the condenser side of the steam turbine. The Kalina Cycle® can be implemented with any waste heat source of energy.

Project by the Numbers

Lifespan of project:
40 years
Gross capacity for export:
120 Mw
Annual kWh capacity at 98% factor:
1.030 Billion kWh
Net Present Value (NPV):
3.528 Billion
Levelized cost of energy (LCOE):
.0644 cents per kWh
Simple payback period (SBP):
6 Years
Gross Revenue for life of the project:
6.181 Billion

Capital Cost, Phase One:

Figure 3: Chart of Accounts, Front-End Engineering Development (US Dollars)

Project Definition / Environmental Impact Study	1,875,000
Design, Development, Documents	1,687,000
Dynamic Simulation	1,125,000
3D Modeling	1,475,000
Wave Tank Testing	2,100,000
Design Engineering for:	
Structural Connections	2,425,000
Mono Column	1,250,000
OTEC Systems	2,477,700
Sub-Sea Cabling Systems	1,825,000
Structural Loading	2,575,000
Risk Assessment/Certification Process	1,750,000
Software Applications	1,050,000
Financing / Purchase Agreements	475,000
Scheduling	888,250
Staffing Requirements	2,798,550
TOTAL	**$ 25,777,000**

Capital Cost, Phases Two and Three:

Figure 4: Chart of Accounts (US Dollars)

Engineering Procurement Construction (EPC) based on data from FEED process

EPC for Platform	222,000,000
EPC for OTEC System	263,979,480
EPC for Sub-Sea Cabling/Land Infrastructure System	60,000,000
EPC Construction Contingency	88,469,148
Phase 3 Testing, Commissioning and Start-up	62,602,500
TOTAL	**$722,828,128**

Time to Market:

Figure 5: Time to Market

Design, Development, FEED Process	6 months
Construction Documents	7 months
Construction	18 months
Testing and Commission	4 months

Critical Path scheduling will allow enhancement of time.

Cost Analysis:

Figure 6: Project Cost Analysis

Total gross capacity for export - megawatts	120
Annual gross capacity - kWh	1,051,169,340
Reliability Factor	98.00%
Total annual kWh	1,030,145,953
Selling price of electricity, per kWh	$0.01500
Annual revenue, electrical sales	$154,521,893
CAPX - 100mw OTEC	$722,828,128
Interest-only payments per lender - 1 year 3 months	$77,171,872
Total project debt	$800,000,000
Annual payment @ 7.6% - 18 years 9 months term	$81,500,000
Annual OPX per kWh	$0.0176
Total annual OPX	$18,130,569
Annual sinking fund	$10,000,000
Total - capacity payments to pay off debt	$1,528,125,000
Total OPX over life of project	$725,222,751
Total sinking fund for life of project	$400,000,000
Total CAPX/OPX for life of project	$2,653,347,751
Total revenue for life of project	$6,180,875,719
Total pre-tax profit for life of project (NPV?)	$3,527,527,968
LCOE	$0.0644
Simple payback period (SBP) - years	6

Figure 7: Hawaii Co-Op Cost Analysis

Estimated Revenue Sales to Utility - excess power	
OTEC Gross capacity - megawatts	135.00
Platform and operations power requirements - MW	5.0
Percent equipment offline for maintenance	7.41%
Total MW capacity offline for maintenance	10.00
Total gross capacity available to utility	120.00
Resort Co-Op average usage in MW	20.00
Annual gross capacity in kWh to Co-Op	175,200,000
Total electrical capacity available to power grid - MW	100.00
Annual gross capacity in kWh to grid	875,969,340
Reliablity Factor	98.00%
Total annual kWh	858,449,953
Annual kWh - available for delivery to utility grid	875,969,340
Utility baseline cost per kWh	$0.2300
Established green power purchase rate percentage	75.00%
Selling price per kWh to utility	$0.1725
Cost per kWh to deliver OTEC	$0.1500
Net pretax profit per kWh	$0.0225
Annual net pretax profit	$19,709,310.15
Tax burden - percent	30.00%
Annual net profit	$13,796,517.11
Resort group percent ownership of Co-Op	51%
Resort group annual net profit	$7,036,223,72
Co-Op OTEC power cost/benefit	
Annual kWh usage by Co-Op	175,200,000
Cost per kWh from OTEC platform	$0.1500
Total annual cost of electrical power	$26,280,000
Resort group net profit from electrical sales to utility	$7,036,224
Total adjsuted annual cost of electricity	$19,243,776
Adjusted cost per kWh for resort group	$0.1098

Project Summary:

Figure 8: Project Summary (US Dollars)

The financial objective of the OTEC Energy Platform is to establish a long term power purchase agreement that will safely retire debt, reduce or cap the avoided cost for our utility partner and return a market rate investment return to the sponsors.

Project Details

PROJECT:	OTEC Platform
APPROXIMATE PLATFORM SIZE:	5.1 Acres
PRODUCTION ESTIMATES:	OTEC ~100 MW
CAPX AND EQUITY STRUCTURE:	$800 million
SPONSOR:	80%

Call to Action:

By many accounts, the world's supply of fossil fuels is diminishing rapidly. As world population grows, energy needs will grow as well, and supply will eventually be unable to meet demand. If, by some chance, enough fossil fuels are available for the foreseeable future, the challenge to cap the avoided cost will always remain, and will most likely be increasing. An alternative must be found that does not continue to outstrip available resources, or add additional CO, CO_2 or sulphur to the atmosphere.

The OTEC Energy Production Platform is a commercially viable, cost-effective way to produce electricity for Polynesia. This project is based on supplying a firm, reliable source of "green energy" and is a scalable and economical way to meet the additional upcoming demand.

The sponsor (Offshore Ports, LLC) is offering qualified partners the opportunity to participate in this venture. Our team is available to answer any questions and offer additional supporting documentation as needed.

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