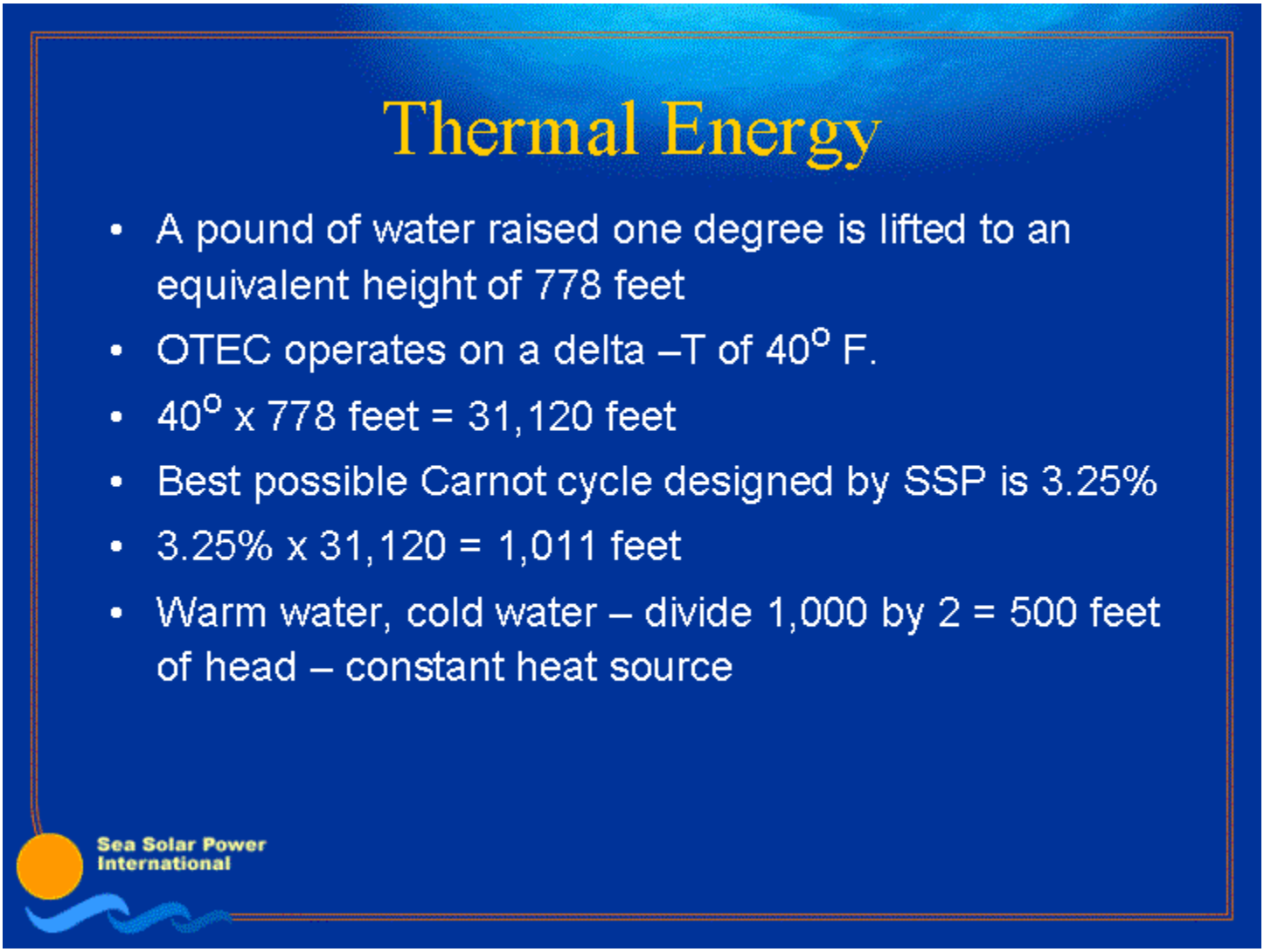
Sea Solar Power uses the basic technology known as Ocean Thermal Energy Conversion, or OTEC, which was invented in 1881 by a French scientist years ahead of his time by the name of Jacque Arsene D'Arsonval. Before describing the mechanics of the system, let's first understand the natural resource and its potential.

The ocean covers most of the earth's surface. More than 300 times what the world now consumes in electricity is available from the solar energy that is constantly stored in the upper layers of the tropical ocean. This takes place throughout the equatorial zone around the world or about 20 degrees north and south of the equator - where most of the world's population lives. This area is also where the greatest increase in demand for new power exists, because population growth is greater in this region and where the standard of living has been rather low, and now more people with more wealth are demanding more electricity.

Man-made solar collectors are very expensive to build, require enormous amounts of acreage and do not work at night when advanced societies require electricity around the clock. Contrary to this is the ocean, the largest solar collector in the world. It is already there so to tap its riches is most prudent. The modern day term to describe this process is OTEC.



To operate a sea solar power plant involves both a heat source and a heat sink. Therefore, the 80 degrees F surface water in the tropical oceans serves as the heat source and typically 3,000 feet below the surface is the heat sink or the cold bottom water, which is 40 degrees F. This temperature difference or delta T is sufficient to operate vapor turbines, which drive generators and produces electricity and fresh water as a byproduct. This is the OTEC concept.

But while it is true that the ocean's free seawater can supply an infinite amount of energy and produce electricity for most of the world's population, the technical challenge is to design an OTEC plant that is economically efficient or at a reasonable capital cost. Sea Solar Power has designed a process that can do just that.

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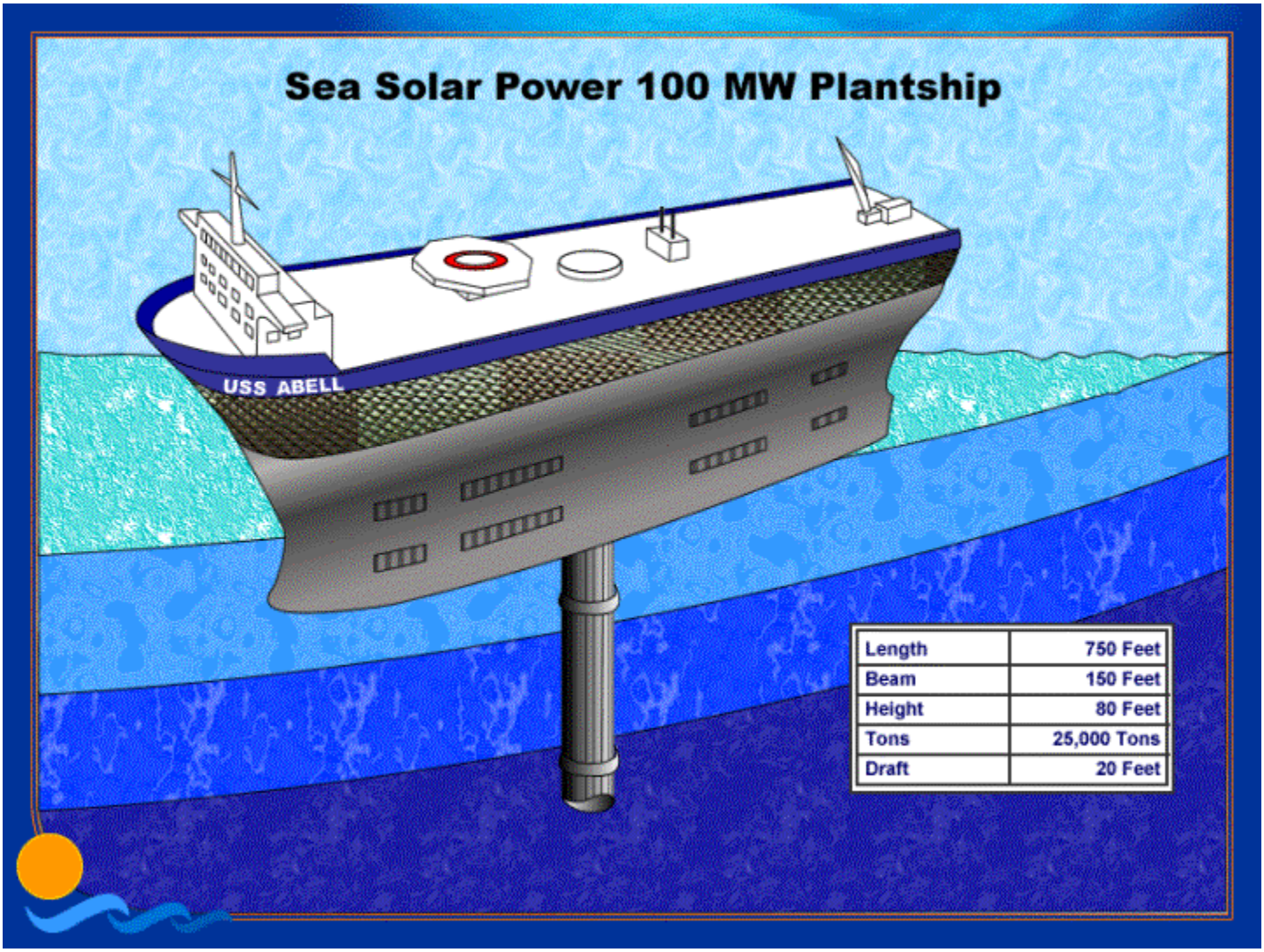
Land based plant

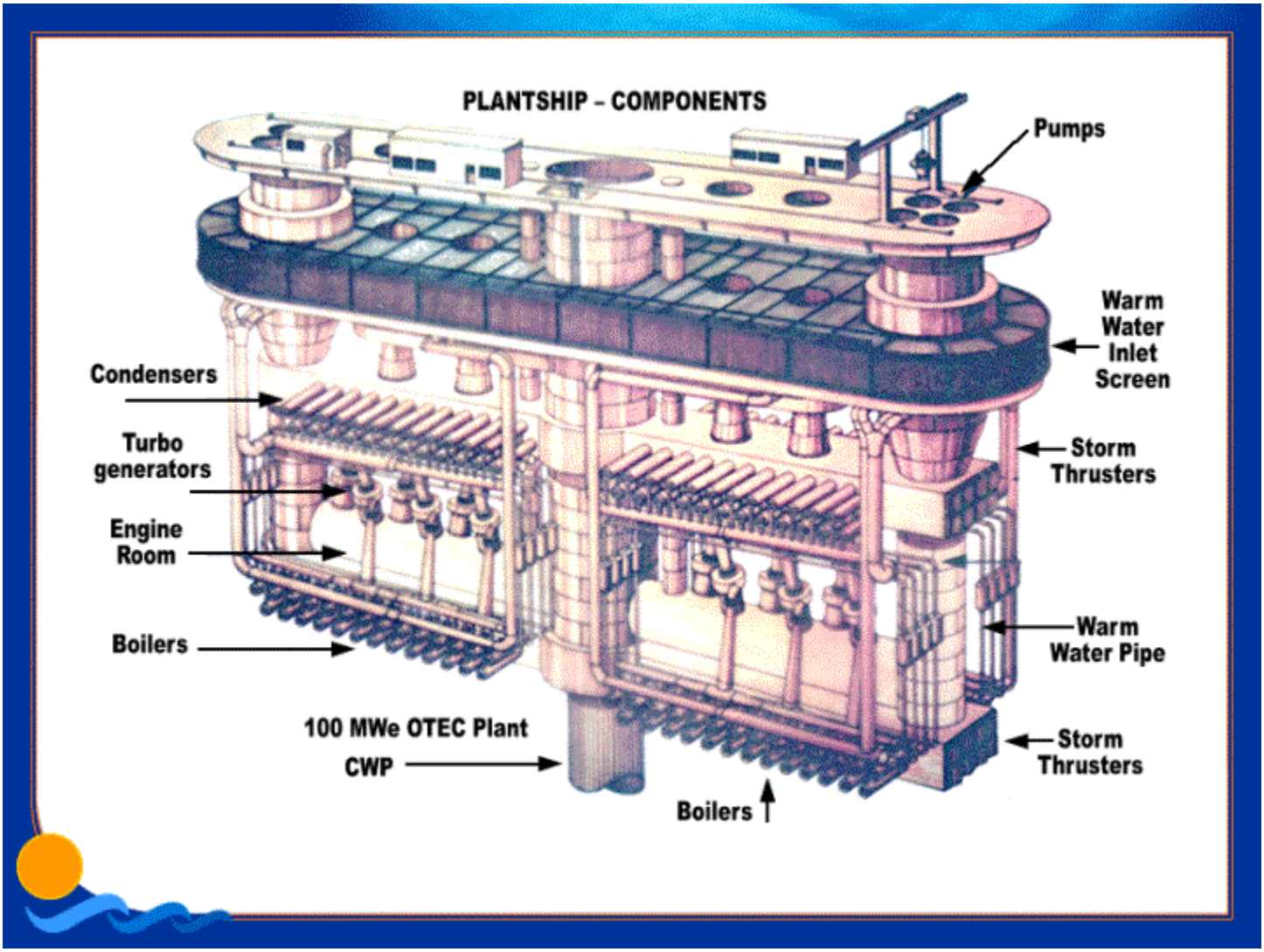
There are currently 2 primary models consisting of a small 10 MW land based plant, and a large 100 MW floating plantship. The land based plant is specifically designed for small tropical islands where as the large plantships are suited for continental application such as India, Brazil, Indonesia, etc. Both models operate fundamentally the same, using a reverse refrigeration cycle.

Each plant uses heat exchangers (evaporators and condensers) pumps, vapor turbines, compressors and generators. The system is charged with propylene, a working refrigeration fluid. This refrigerant boils at low temperatures (67 degrees F) under pressure of 150 psi.



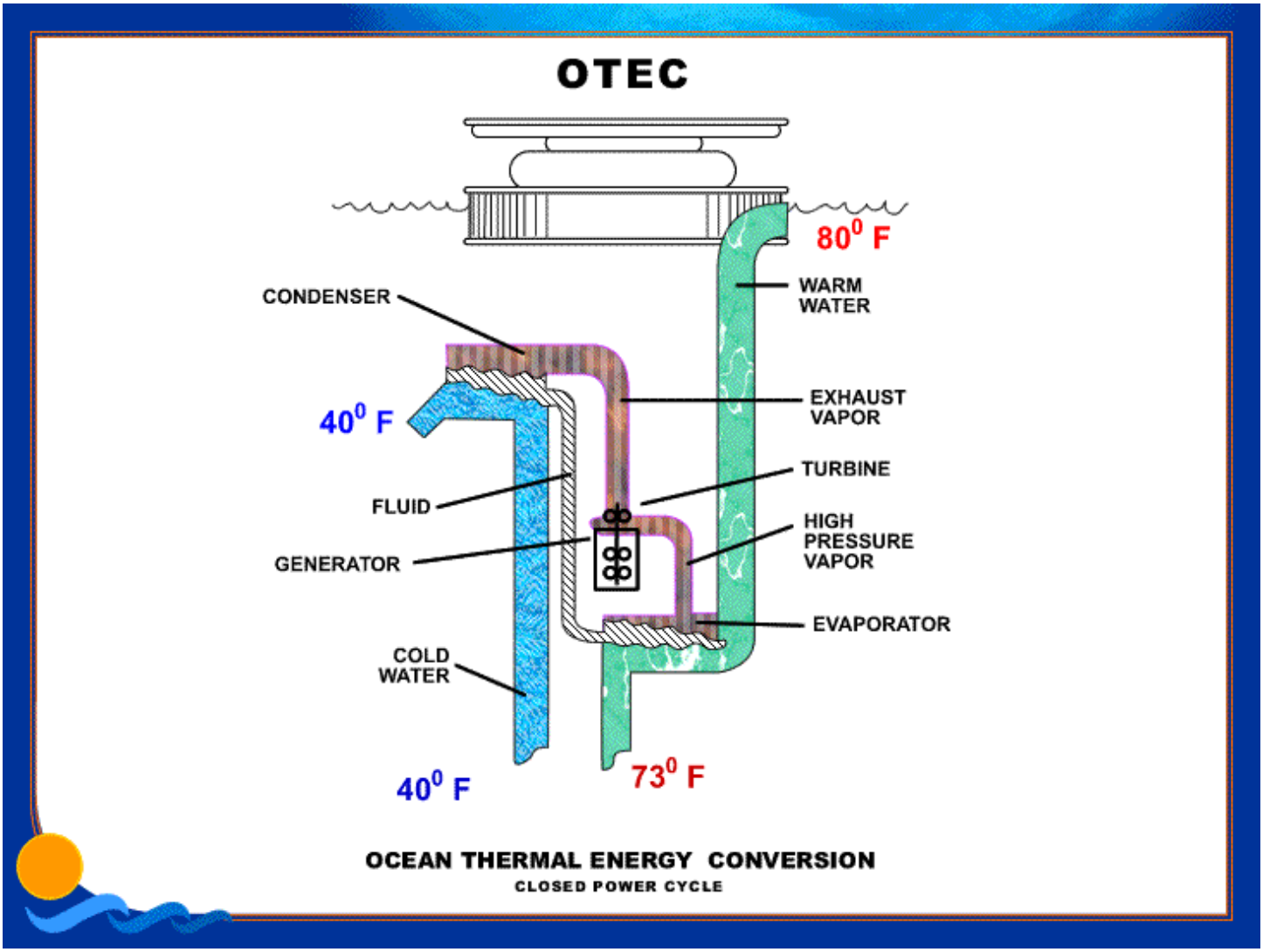
Therefore, the 80 degrees F solar heated surface water is ample heat source to cause the propylene to convert from a liquid to a gas or vapor. Warm water pumped through the boilers (heat exchangers) boils the propylene into a vapor, which expands through vapor turbines that drive the generators. Electricity is transmitted to shore from the plantship via under water cable or directly from the land based plant to the grid.

In order to complete the cycle, cold water (40 degrees F) is pumped up from the lower depths of the ocean. The cold water is used to condense the propylene vapor back into its liquid state and then it is pumped into the boiler to complete the cycle. The above system is a simple Rankine Cycle, which has been around for more than 100 years.



In addition to electricity, large quantities of fresh water can be produced each day as part of the system. A vacuum is pulled on the incoming warm water to remove the oxygen so as to prevent marine growth on the inside of the plant. The water vapor can then be sent across cold heat exchanger surface area where it is condensed into fresh water. This becomes a very valuable by-product or, if desireable, the cycle can be designed to produce only fresh water.

What is special about the Sea Solar Power approach to OTEC is that it is based on low temperature refrigeration principles, and that each of the different turbo-machine elements is very efficient, designed specifically for an OTEC cycle. Furthermore, new advanced heat transfer technology has been developed specifically for an OTEC plant.



The first thing that J. Hilbert Anderson, the founder of Sea Solar Power, recognized was that the size of an OTEC plant is proportional to the volume of water that is pumped through the cycle, and that if he were to use standard off-the-shelf heat exchangers and turbo machinery from the power industry, the cycle efficiency would be inefficient. Because of huge quantities of water required, all of the major components have been designed by J. Hilbert Anderson in order to achieve the highest possible practical efficiency. In addition, multiple turbines and modular heat exchangers are used in order to combine these components with each other so as to create the most optimized cycle.

www.seasolarpower.com/otec.html