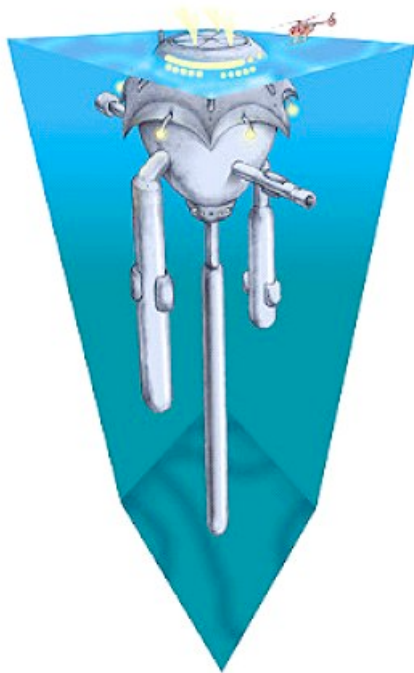


## Base load Power and Fresh Water from Deep Tropical Seas



Illustrators' impression of an offshore OTEC plant – by Dean Willey, Townsville.

### Report on the SSEE OTEC Workshop Sustainable Townsville

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Imagine an energy technology that can produce 100 MW of base load power and 120 ML of desalinated water per day, requiring only deep tropical ocean water close to land as its source.

Imagine also that this machine can be installed with manageable risks, that the technology is already proven and simply requires scaling up from hundreds of kilowatts to megawatts.

Imagine no more, because this technology is already here and it is called Ocean Thermal Energy Conversion, or OTEC.

Unfortunately, cutting edge technology such as OTEC can be overlooked by traditional planning mechanisms. This is because organisations both private and public sector are technologically risk averse, do not have long term thinking at their heart, and are generally confined to a single area of interest (eg 'only power' or 'only water' and not 'power and water'). Therefore, when a proposal like OTEC is forwarded, it is often dismissed as fanciful, too hard or "not the responsibility of my department".

In light of this, the Society for Sustainability and Environmental Engineering was recognised as a suitable forum where cutting edge technology could be considered. Here is what came about when SSEE discussed OTEC.

OTEC technology is a massive heat engine that exploits the temperature difference (about 20 degrees Celsius) between the warm surface waters of tropical oceans and the cold waters below. To perform this task, it is necessary to draw cold water to the surface from 750 – 1000 metres deep. At the surface, inside a huge closed cycle turbine, ammonia is used as a working fluid to drive a generator that creates electricity. Bulk freshwater is evaporated from seawater in the process.

It would seem reasonable to consider the applications for this technology in a tropical region that is both power hungry and water thirsty, such as North Queensland. This was the logic behind the SSEE OTEC workshop sponsored by SEA O2 Sustainable Development.

Townsville-based oceanographer and OTEC aficionado, Dr Peter Ridd of the Physics Department, James Cook University, delivered an excellent presentation at the Townsville Port Authority boardroom. Titled "Ocean Thermal Energy Conversion - Energy From the Sea" the presentation (available on the weblink

below) considered the engineering and environmental aspects of OTEC in the North Queensland offshore setting.

The SSEE OTEC Workshop audience was a mixture of environmental scientists, researchers, engineers and consultants and managers. To create context for the presentation, the audience was asked to consider two key questions about OTEC in Townsville. These questions were: could Townsville benefit from the use of OTEC technology off its coast, and what was the potential for Townsville to become a key city in the further development of OTEC technology. Outcomes of the OTEC Workshop were both thumbs up and thumbs down for OTEC in Townsville.

Firstly, the thumbs down. Townsville was considered an unlikely location to place OTEC plants offshore for a number of reasons. For example, because the distance between land and the continental shelf (100 km) would make costs of transporting power to shore prohibitive. Furthermore, Townsville has more easily exploitable energy sources close to hand, ie gas and coal. However, the discussion highlighted some areas in Australia that might be suitable for OTEC. These include the Cape York region as well as the North West Shelf of Western Australia.

In answer to the second question, Townsville was considered a suitable launch pad for OTEC consideration in the tropical South Pacific. This is because of the City's proximity to the region, expertise in South Pacific development resident in Townsville firms and institutions, world-class marine science capabilities, as well as a sophisticated marine environmental management capacity (an vital consideration, particularly when OTEC is adjacent to coral reefs). Furthermore, it was found that there was sufficient interest amongst members of the group to form an informal OTEC working group.

The answer to the second question, Townsville as OTEC base, couple well with recent conversations between SEA O2 and American firm Sea Solar. This firm claims to offer fully-funded OTEC plants (10 MW onshore and 100 MW offshore) ready to install, subject only to long term power and water purchase agreements. This firm has identified a number of South Pacific Islands as suitable sites for OTEC and is interested to consider Townsville as a launch pad for these projects.

THE SSEE OTEC Workshop has demonstrated that the Society for Sustainability and Environmental Engineering OTEC Workshop could be a successful forum in which to investigate potentially sustainable solutions that may otherwise fall outside of mainstream planning. Given the view that a rapid and global technological paradigm shift is required to align the interests of mankind with those of nature, the SSEE therefore provides a vital forum in planning for the future.

For more information about OTEC and the SSEE Workshop, please see:

**Ocean Thermal Energy Conversion**

<http://www.seao2.com/otec>

and the **OTEC workshop:**

<http://seao2.com/otec/workshop>