


The Tropos project

OTECAfrica Presentation
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THE OCEAN OF TOMORROW

Call FP7-OCEAN-2011

Joining research forces to meet challenges
in ocean management



“Bring together research efforts to face the challenges in ocean management”



OCEAN.2011-1: Multi-use offshore platforms

Objectives

- ✓ Develop new and innovative designs for multi-use platforms
- ✓ Assess the technical, economic and environmental viability to build, set into motion and dismantle multi-use platforms, together with the related transport issues
- ✓ Platforms should focus on renewable oceanic energy, in particular:
 - ✓ Offshore wind
 - ✓ Aquaculture
 - ✓ Services related to maritime transport



Directorates concerned:

- Transport
- Energy
- Food, Fisheries and Biotechnology
- Environment





Modular Multi-use Deep Water Offshore Platform Harnessing and Servicing Mediterranean, Subtropical and Tropical Marine and Maritime Resources.

Contract 288192







- Established by the Research Council in 1958
- A private foundation since 1980
- A staff of 222, of whom 127 are research scientists
- Competes in the open national and international markets
- Approximately 20 % of our activities are conducted in international projects

NIVA

Research based subsidiary companies

AquaBiota AB
Stockholm



NIVA Chile
Puerto Varas, Chile



Akvaplan-niva
Tromsø



 **RundeMiljøsententer**



Research Station
Conference Centre
Visitor Centre

Labs, accomodation, cafeteria, auditorium, office space
Test facilities for Ocean Energy
Close proximity to the deep ocean and to deep fjords

Owners: County and municipalitiy, & industries like Olympic shipping, Havila, Rolls-Royce marine,

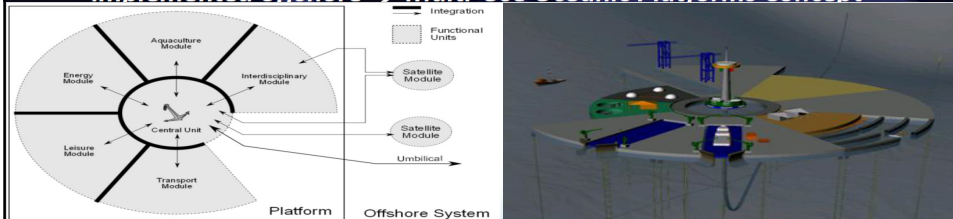
The Maren test site



- Year 2005 → More than half of the population lived within 200 km of the coast
- Year 2025 → Number of citizens living in these areas will be doubled



Challenge: To share sites, infrastructures and costs in diverse activities to be implemented offshore → Multi-Use Oceanic Platforms Concept



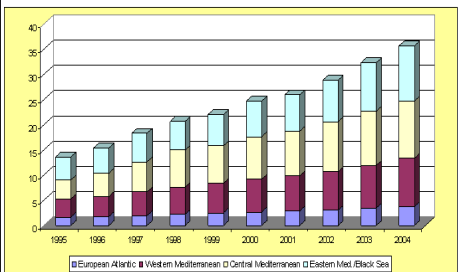
Multi-use oceanic Platform
Hybrids, synergies

Why not?

Business model

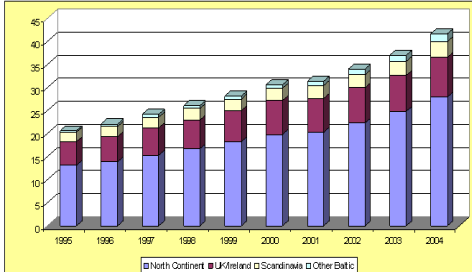
Challenges: Maritime Transport

Container throughput by port region in Southern Europe / Mediterranean (m TEUs)



Source: OSC European Container report Outlook to 2015, p. 53

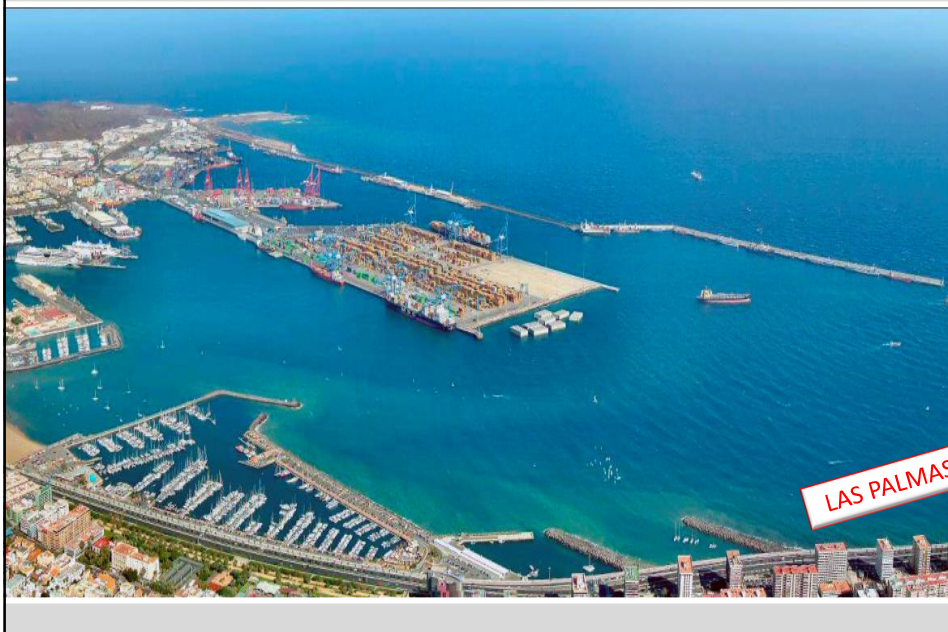
North Europe: Container throughput by port region (m TEUs)

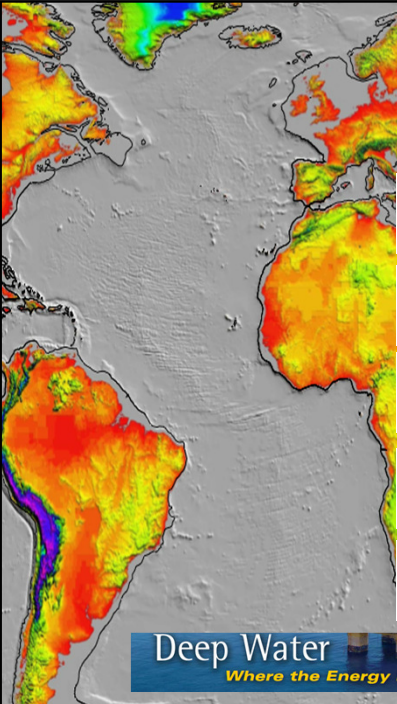


Source: OSC European Container report Outlook to 2015, p. 38



Existing Port Infrastructures





VISION

Deep waters

Floating devices


Modular approach

Cost efficiency

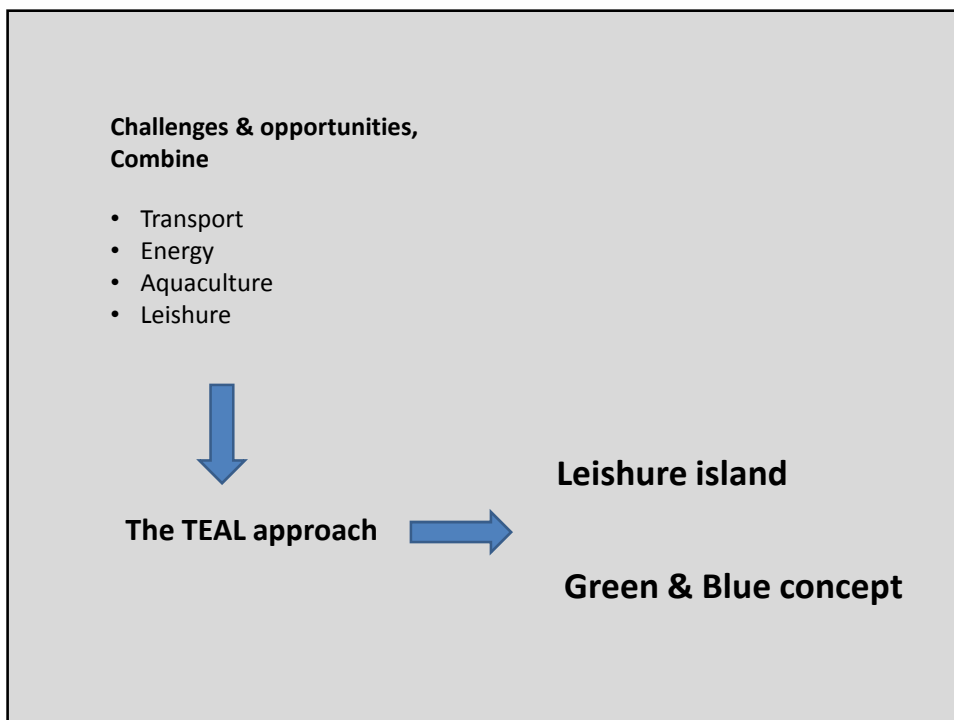
Easy logistics

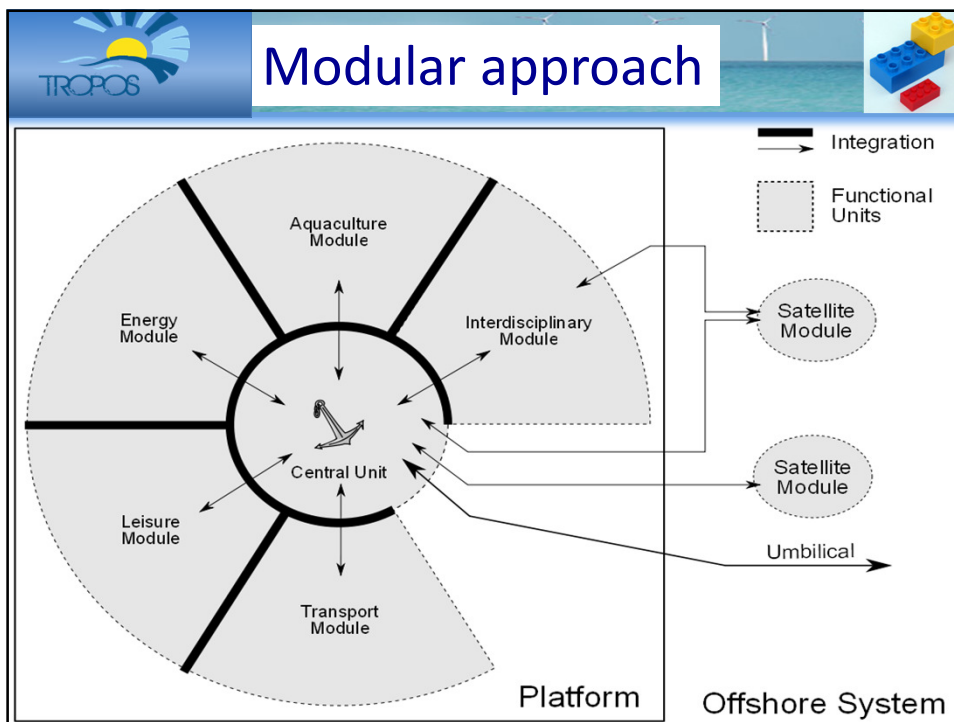
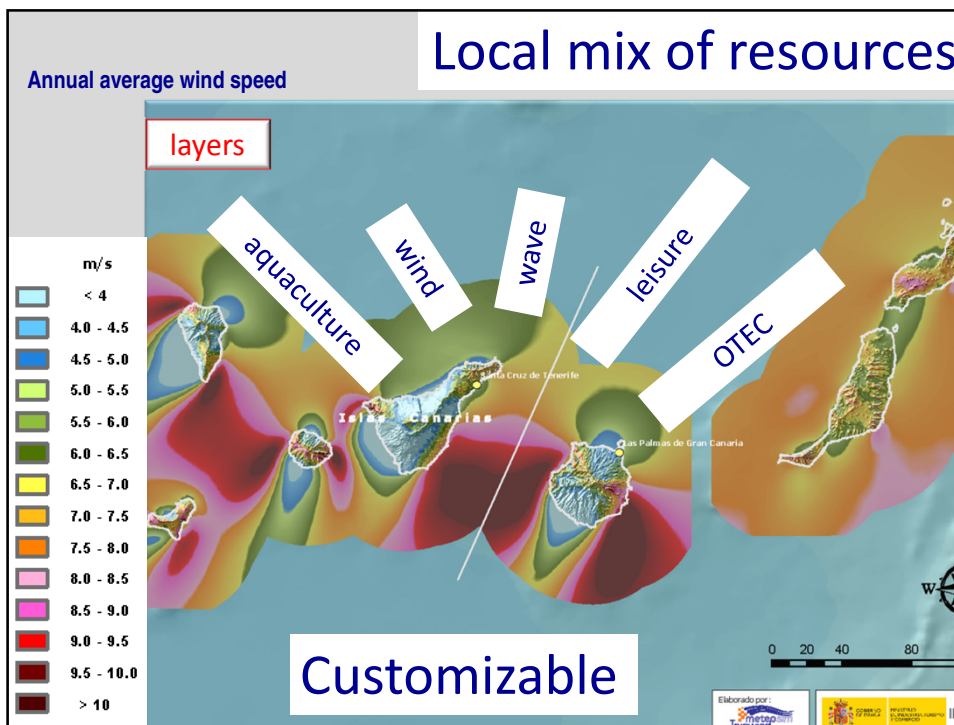
Customizable

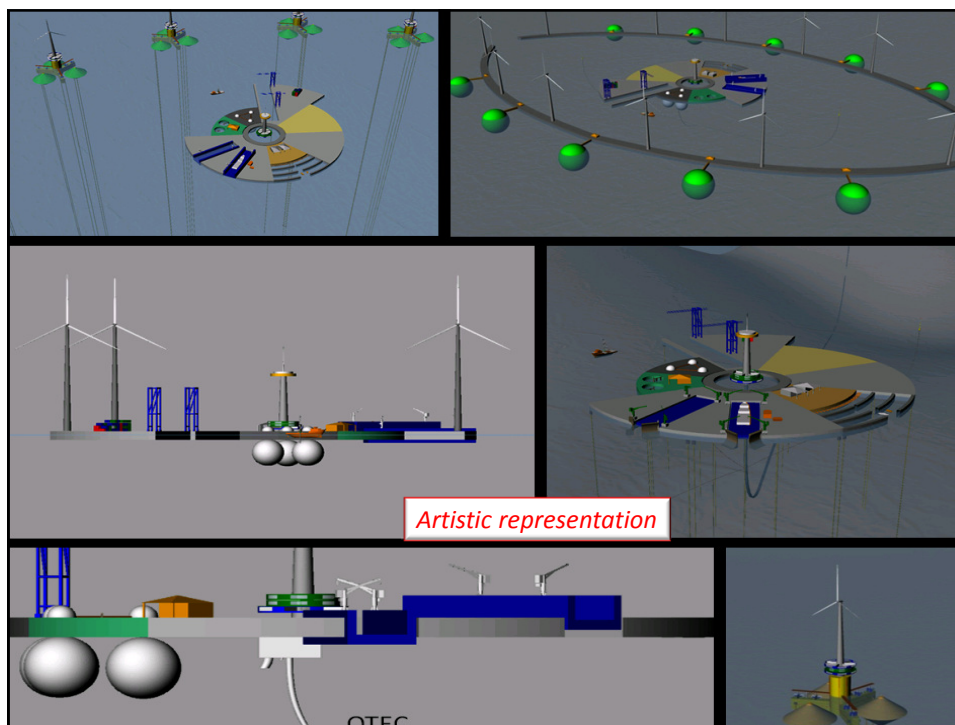
TEAL approach




Deep Water
Where the Energy Is









focused on
delivering
products

Deliverables

The main scientific and technological results/deliverables of the project include:

- **A map of optimal areas of installation** drawn from a comprehensive geographic information framework.
- **A novel design of a modular off-shore platform** with integrated technologies and services including: wind and ocean energy, aquaculture, maritime transport, tourism and ocean environmental monitoring.
- **A comprehensive viability strategy.**
- **A comprehensive environmental impact methodology and assessment.**

general

Sites

- **Leisure Island (Canarias)**

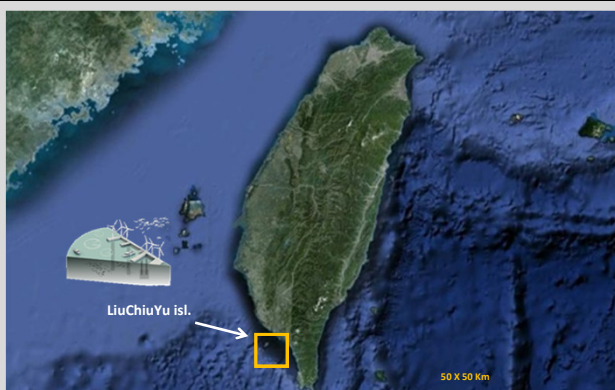
It will be a floating platform moored in shallow water and at a distance under 2 miles offshore dedicated to nautical activities. It will have a modular structure with the necessary infrastructure to service water sports and touristic attractions related to the sea. A small marina will be projected as well as an area dedicated to cruise ship docking. The complex will also have an area dedicated to leisure and tourists accommodation.

- **Blue & Green (Greece and Taiwan)**

It is a platform focused on the use of energy and biological ocean resources. This concept combines aquaculture facilities with an offshore wind farm and other devices for harnessing energy from the sea (waves, currents, etc.).

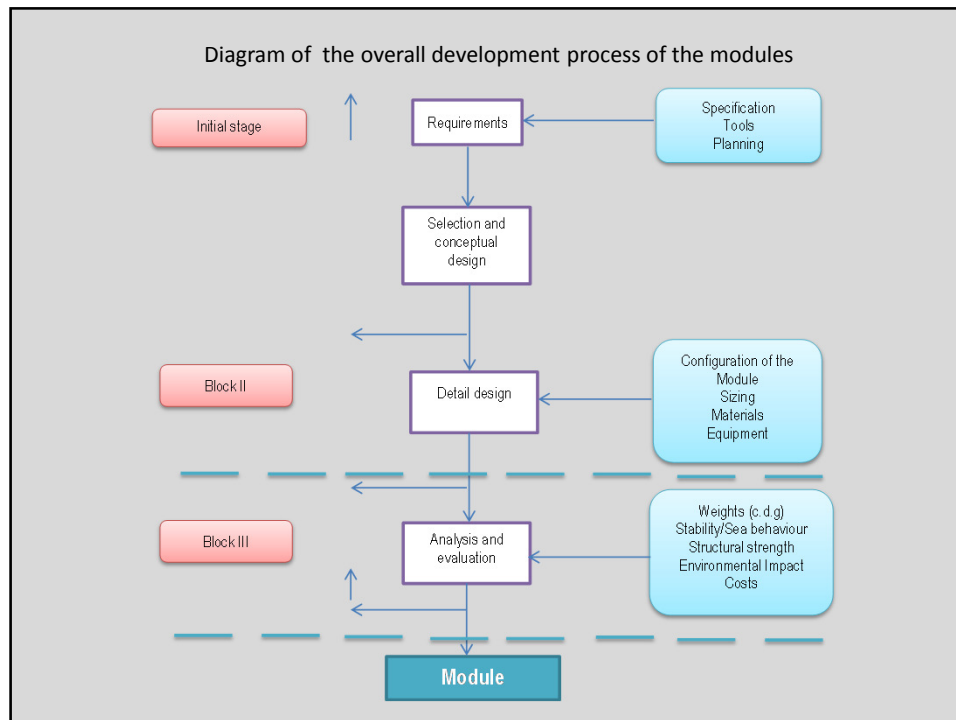
Taiwan seems to be the only site suitable for OTEC

Taiwan



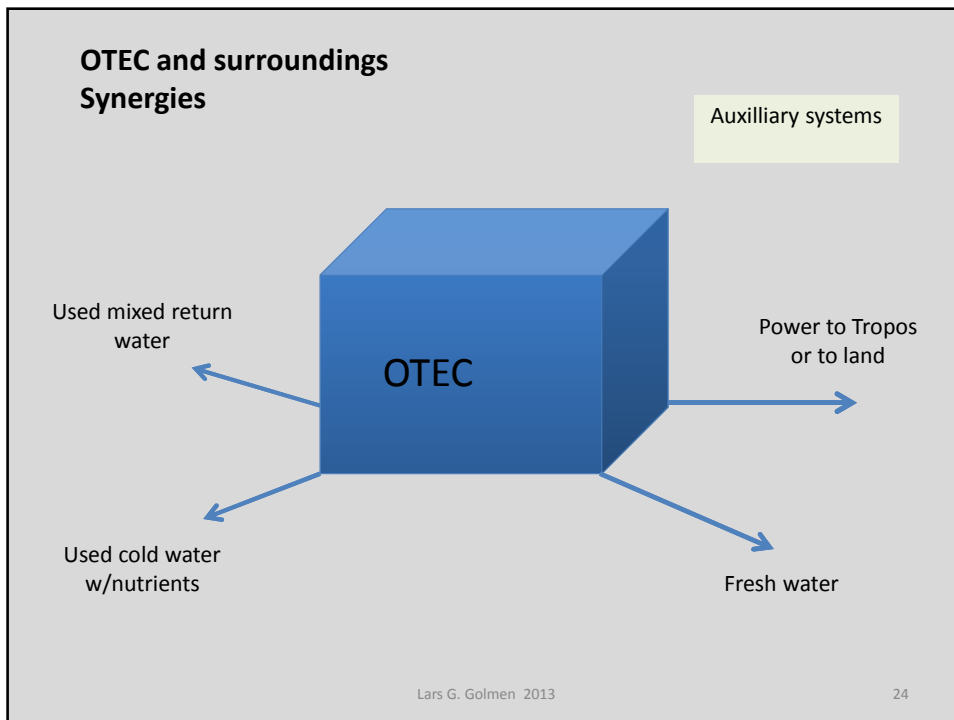
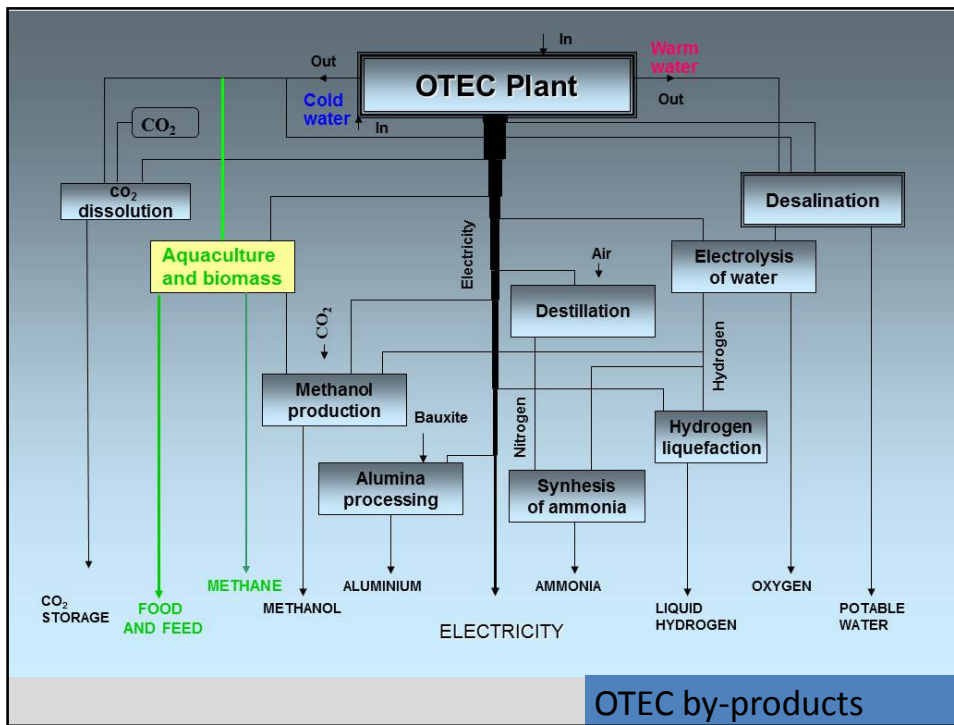
Map of Taiwan and surrounding sea, with bathymetry. The square shows the location of the Kaoping Undersea Canyon and the circle the LiuChiuYu island.

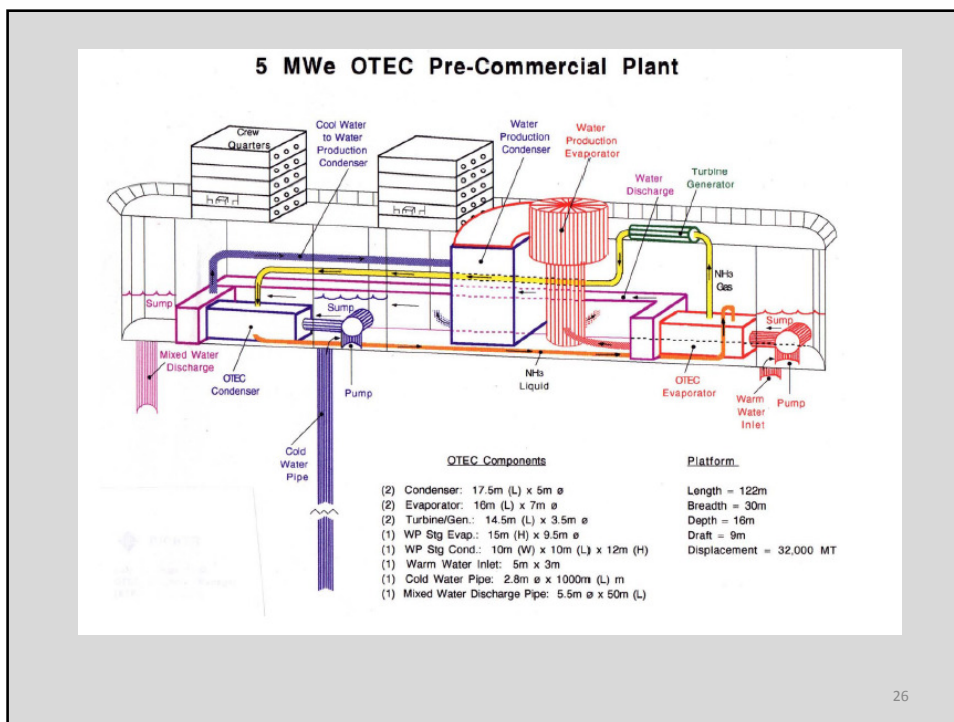
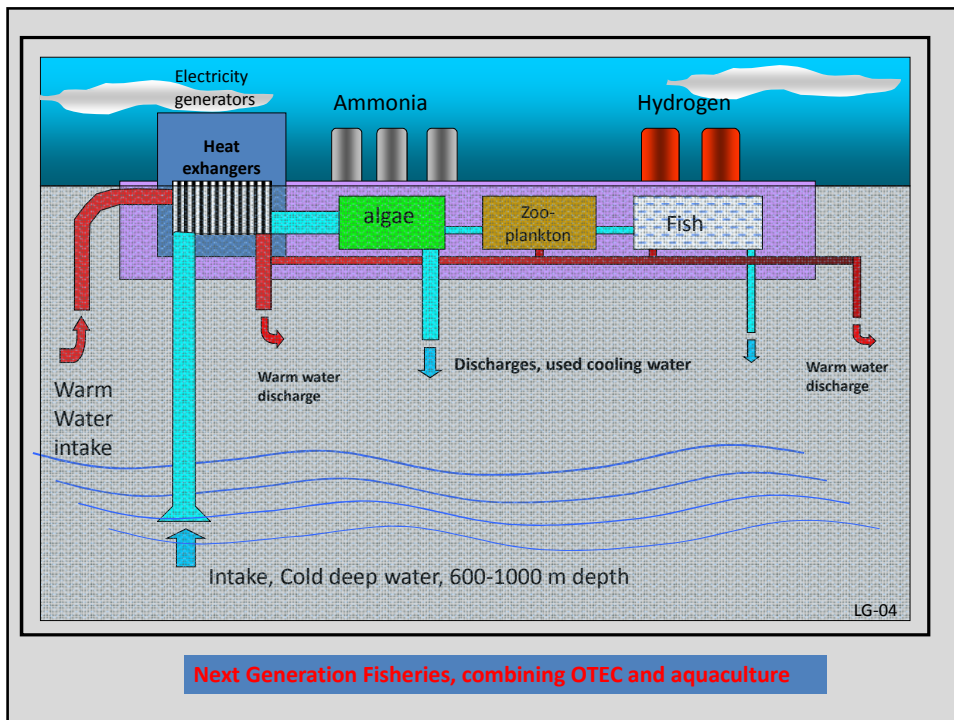
The site has 15 degree temperature difference at 300m depth already. However, more difference can be obtained by going deeper off the shelf edge, where OTEC criteria will be met. However, this far out, swell during the summer southwest monsoon from the South China Sea and typhoons may cause problems on either platform structure (mooring) or stability conditions for work and tourists. For LiuchiuYu and Green Island 2 miles will be far enough to reach the deep layer and the necessary temperature difference. The problems will be mainly on mooring and comfort for other functions, particularly leisure.

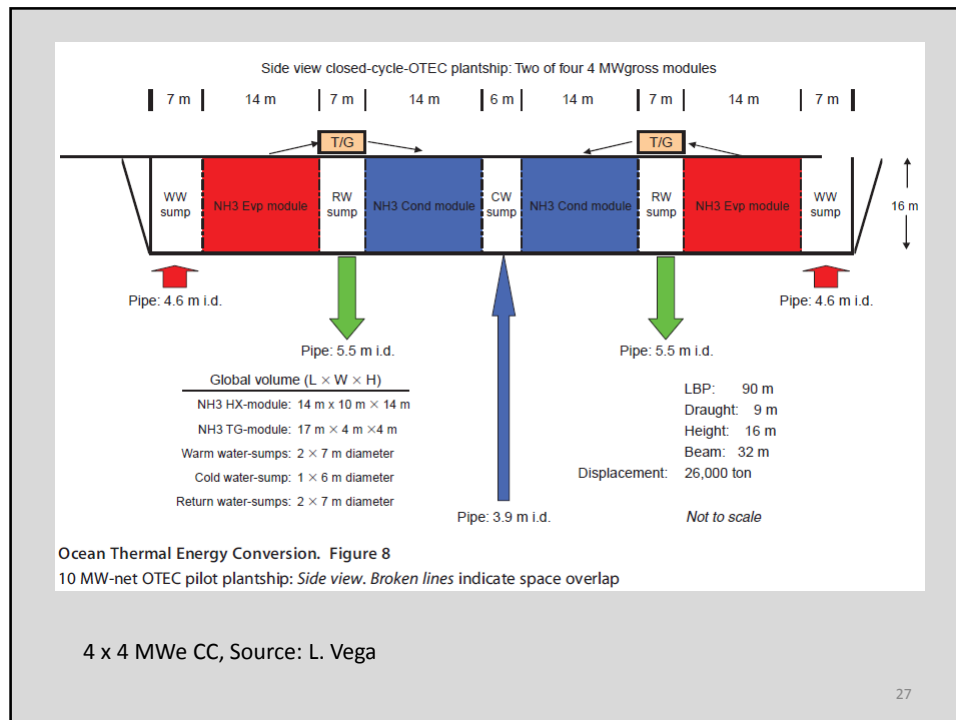


For a multi-purpose Tropos platform, we suggest to discuss a 2 MW (1.8 MW) Gross energy plant, for several reasons:

- is significant in power production, base-load
- comparable to other power generation units for Tropos, e.g. wind
- can use common power export (and storage) facilities
- still modest in physical size
- existing design is available (Luis Vega and others),
- the pipeline will not be exceedingly heavy and large (1.6 - 2 m dia.)
- size is compatible with largest existing low-pressure steam turbines (Open-Cycle),
- for future expansion, one can anticipate several power modules in parallel for >1.8 MW.







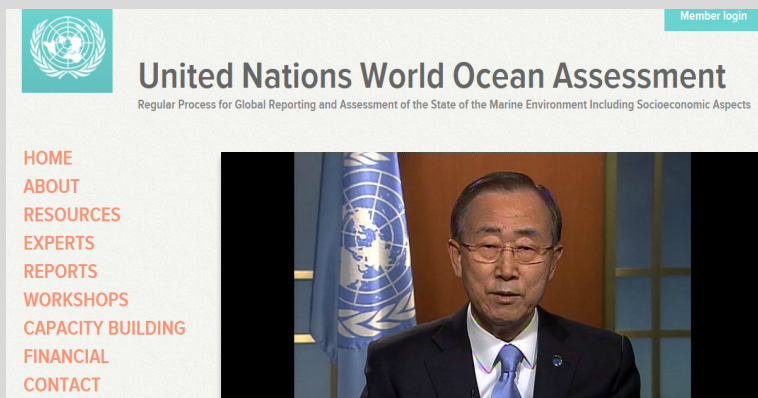
Plea I

Help us with some design examples for OTEC in Tropos

- 2 MW gross
- Size and weight of central units

Have misc. reports and data on 2 (1.8) MW, 4/5 MW and 16 MW, but somewhat dispersed...

Plea II



Member login

United Nations World Ocean Assessment

Regular Process for Global Reporting and Assessment of the State of the Marine Environment Including Socioeconomic Aspects

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Responsible for producing Chapter 22, other ocean resources (ocean energies)
Draft early 2014.
Will need soliciting with you and colleagues, and input