

Ocean Thermal Energy Conversion

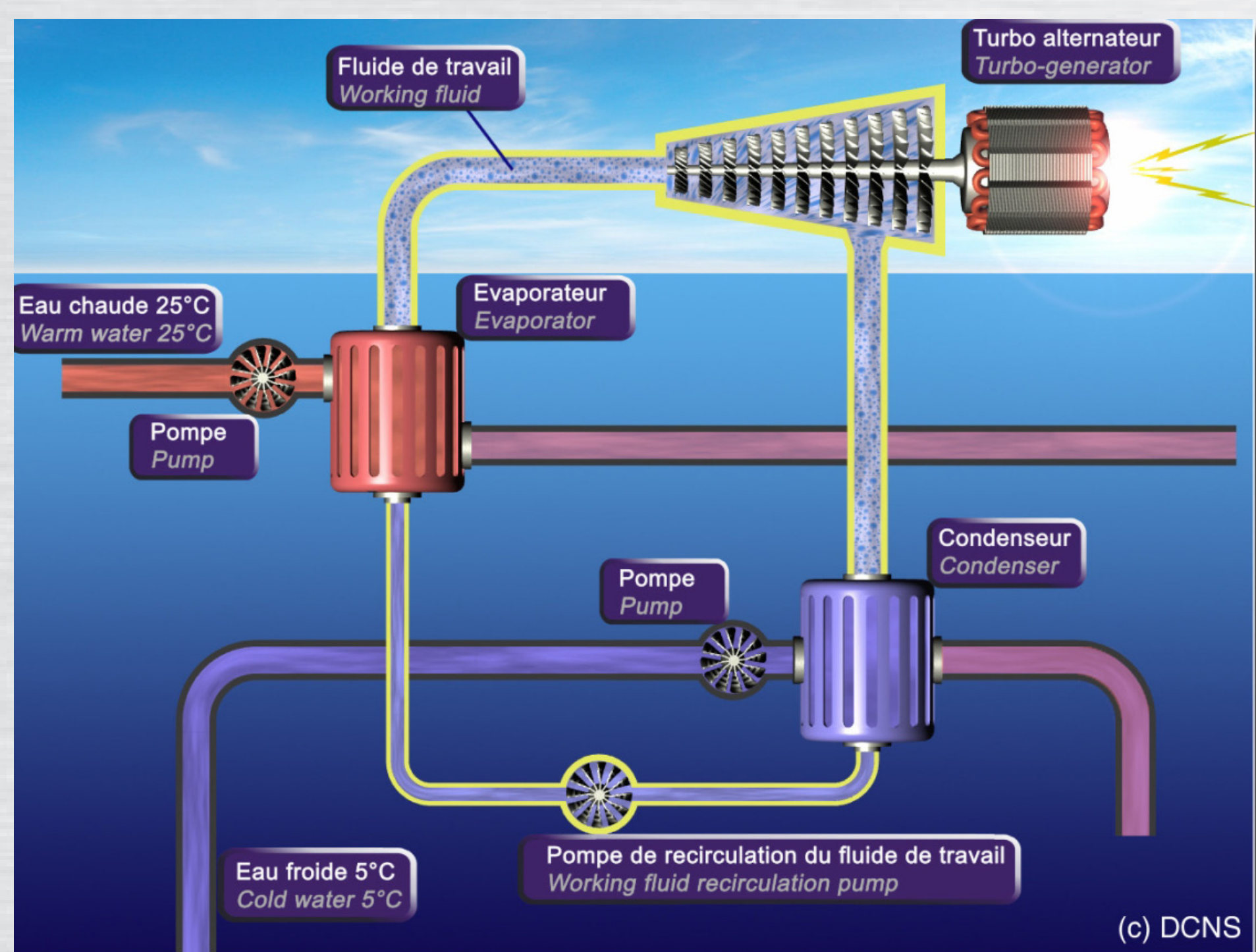
OTEC development at DCNS

OTEC, a Renewable energy for tropical areas.

A thermodynamic cycle using tropical seas temperature gradient of 20° existing between sea surface water at about 25°C and cold deep water (-1000 m) at about 5°C.



10 MW OTEC Pilot Plant



Thermodynamic cycle scheme (Rankine)

OTEC advantages :

- Unlimited resource in tropical seas
- Stabilized and constant electricity production (24/7)
- A solution to the dependence on fossil fuels in isolated areas

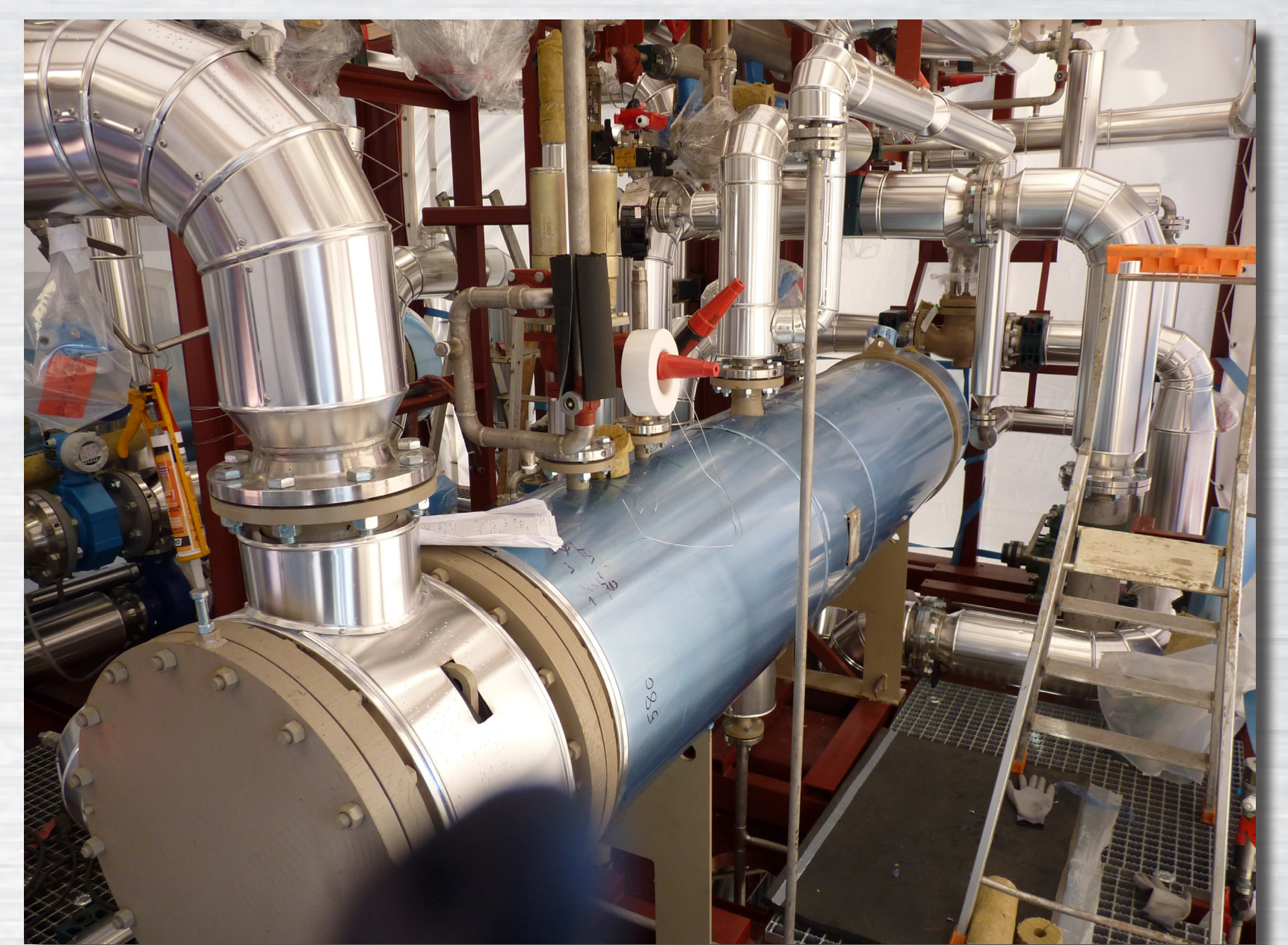
Project pending :

• 2011-2012 :

DCNS responded to European commission NER 300 call for tender, with Martinique Regional council and STX for a 10 MW pilot plant construction in 2015.

• Sept 2009 :

OTEC Land based prototype contract signature (Budget : 5M€) with Reunion island regional council, French estate, University of La Réunion and DCNS.



Heat exchanger prototype : $\phi 45$ cm - L 3 m – 200 kg
Full scale in OTEC Plant : $\phi 4$ m – L 12 m – 80 t

The “OTEC land-based prototype” a small scale fully-autonomous test bench of OTEC energy production system to :

- Test different thermodynamic cycle and key components (heat exchangers, fluids...), using artificially controlled seawater temperatures
- Assess and prove numerical models of OTEC energy production system
- Train DCNS teams in OTEC plant control system

2010 : construction and first tests in DCNS Nantes-Indret France

2011 : shipped and reassembled in La Réunion island



The **Prototype** will be installed in the **university of Saint-Pierre on La Réunion island**, where it will be used for **further testing** by local research students and DCNS teams. It will be the support for a OTEC local and national excellency center.

STRENGTH at sea

DCNS

22-23/09/11 - ORC 2011-First international seminar on ORC power system