

Rose harbour. As a result it creates a large and rare resource of osmotic energy, so that a prototype osmotic power plant could be installed on the East coast of the island. Studies are done, exchanges with developers are engaged.

Reunion Island special resource is also Deep Sea Water, especially thanks to the bathymetry and tropical temperatures [2]. A project is currently under proposal call, which aims at providing sea water air-conditioning (up to 40 MW_{cold}) to a urban network of the main town of Reunion Island Saint Denis (and its neighbour Sainte Marie) and not only to one or two facilities as it is usually done.

At last, the OTEC is one of the most ambitious and innovative marine energy projects of the island, but also for France and Europe. For ICOE 2008, the ARER had presented a study on the OTEC resource and potential of development in Reunion Island [2]. Since then, many progresses have been done for the French OTEC project lead by DCNS and the regional council. Insomuch the design of the OTEC power plant is done. 2010 will now be the year to evaluate the impact of the installation, confirm its design, proceed to some additional measurements or studies and ensure all parameters and characteristics. The aim is the installation in Reunion Island of the first World experimental offshore OTEC power plant in 2014. The project financial pool shall be defined by the end of 2010.

Meanwhile an onshore small scale prototype will be installed by 2011 to test, to optimise and to validate the energy system of the OTEC.

With its various project of wave energy, micro-algae, osmotic energy, SWAC, or the OTEC, with its specific resources and with an important involvement for the development of marine energy in the World, Reunion Island is nowadays a French and worldwide key laboratory that cannot be ignored.

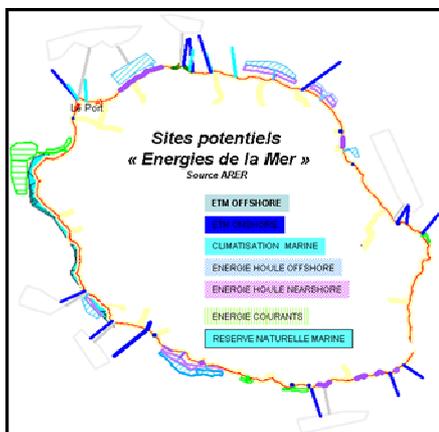


Figure 2: Map of Ocean energy potentials in Reunion island. See ARER/ Region REUNION, 2009 [3].

Above Figure 2 presents the synthetic map of marine energy potentials in Reunion Island, which energetic weight reaches at least 25% of the island electric mix by 2030.

Next section presents the main characteristics of each of the seven ocean energy projects developed in Reunion Island under the topics: description & targets, location, partners, planning & contacts.

2. Wave energy projects

2.1 CETO project by EDFEN

Description & targets	Prototype phase: adapt the Australian technology CETO to the swell conditions in Reunion Island. Test a scale 1 not grid-connected prototype in St Pierre Reunion in 2011 Pilot phase: 2 MW grid connected pilot plant Industrial phase: > 20 MW plant
Location	Off Saint Pierre city, South of Reunion. 25 to 30 m depth.
Partners	Contractor: EDF Energies Nouvelles Financial partners: Région Réunion & French government via the Plan de Relance Acceptability and environmental study partners: ARER, BIOTOPE Industrial development: DCNS
Planning	Prototype by 2011
Contacts	EDFEN

Tableau 1: CETO project status



Figure 3: CETO prototype

2.2 PELAMIS project by SEAWATT

Description & targets	Experimental farm: Grid connection of 4 to 5 PELAMIS devices, up to 3 Mwc in next 2 years Operational farm > 20 MW
Location	Off Saint Pierre city, South of Reunion. 50 to 100 m depth.
Partners	Contractor: SEAWATT Financial partners: Région Reunion, ADEME

Planning	Currently, feasibility study and environmental measurements (including wave measurement). Experimental farm by 2012.
Contacts	SEAWATT

Tableau 2: PELAMIS project status

2.3 Onshore wave energy studies by ARER

Onshore WEC technologies could interest Reunion Island on the identified site of “Quai Henri Dalleau” in Saint Phillippe city or for the future road on the sea (Route du Littoral) linking La Possession and Saint Denis cities as well for the planned unloading docks in St Louis and St André. Current studies performed by ARER show the interest of “Quai Henri Dalleau” as a perfect experimental site before technology dissemination on bigger onshore dock and port facilities [6].

Description & targets	Onshore WEC pilot plant in St Philippe (200 to 300 kW) Industrial phase dissemination: Route du littoral, unloading docks for St André & St Louis
Location	St Philippe, St André, St Louis
Partners	Technology provider to be found (St Philippe city is already engaged)
Contacts	ARER

Tableau 3: Onshore wave energy status

3. Ocean Thermal energy projects

3.1 OTEC 10 MW pilot plant by DCNS

Description & targets	Demonstrate the Offshore OTEC technology via a first OTEC pilot plant of 10 MW in Reunion island
Location	~ 9 km NNW off Le Port city
Partners	Co-contractors: DCNS, Région Reunion & French government via the Plan de Relance Acceptability and environmental study partners: Comité scientifique et technique d’experts, ARER, EGIS
Planning	2009: Pre-feasibility study on a 2,5 MW offshore OTEC plant 2010-2012: Feasibility study on a 10 MW OTEC pilot plant and Risk assessment plan including <ul style="list-style-type: none"> - On ground OTEC prototype (DOTP1) - Pipe design and development - Environmental studies and measurements 2014-2015: Pilot plant 10 MW

Contacts	DCNS/Marine energy incubator
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Tableau 4: OTEC pilot plant status



Figure 4: OTEC Demonstrator first version 2,5 MW. Scé. DCNS/Région REUNION

3.2 OTEC on ground prototype by DCNS



Figure 5: OTEC on ground prototype (called DOTP1). Scé DCNS/Région REUNION/Plan de Relance.

Description & targets	OTEC Performance demonstration via an on ground prototype of the OTEC technology Formation of future OTEC technicians and engineers
Location	St Pierre. IUT of Terre Sainte
Partners	Co-contractors: DCNS, Région Reunion & French government via the Plan de Relance Reunion island University
Planning	2011
Contacts	DCNS/Marine energy incubator

Tableau 5: DOTP1 (OTEC on ground prototype) project status

3.3 Urban 40 MWf SWAC by SIDE0 (St Denis-Ste Marie cities)

Description & targets	Urban SWAC network of 40 MW _{cold} shared between St Denis and Ste Marie buildings. Public procurement on course for public service delegation to a private company, concerning: <ul style="list-style-type: none"> - Cold air-conditioning supply - Deep ocean water by products
Location	St Denis to Ste Marie urban network
Partners	SIDE0 as representative of St Denis and Ste Marie cities

Planning	2009-2010: Pre-feasibility studies and cold air-conditioning need assessment 2010: Public procurement process on course since 10 th July 2010 till 18 th October 2010
Contacts	Mairie de Saint Denis / SIDEO

Tableau 6: SWAC project status

4. Ocean biomass energy project

4.1 Microalgae growth under Photovoltaic greenhouses to produce bio fuels by BAO

Description & targets	Target: develop an industrial concept of micro-algae production (for bio-fuel or other by-products) in cyclonic tropical area via Photovoltaic Green house protection Prototype phase: Test and optimize a prototype system Microalgae + anticyclonic Greenhouse + PV panels (< 10 000 m2) Industrial phase: Select the micro-algae by-products (including bio-fuel) for industrial production in Reunion island
Location	To be defined. Ste Rose city involved in the project. Possibility of coupling with the SWAC project: to be analysed
Partners	BAO(BioAlgostral), ARER ([7]), AKUO, ...
Planning	2011 for the prototype
Contacts	BAO

Tableau 7: Microalgae under Photovoltaic greenhouses, project status

5. Osmotic energy project

5.1 Osmotic energy potential study in Sainte Rose by ARER



Figure 6: Ste Rose city Marina and 7-10 m3/s fresh water rejection

Description & targets	Opportunity study for Osmotic energy production in Ste Rose: up to 10 m3/s of fresh water rejected in the Marina [8]. We search for relevant technology provider
Location	Ste Rose city
Partners	1 st contacts with STADKRAFT, that confirm the opportunity of the project

Planning	
Contacts	ARER

Tableau 8: Osmotic energy project status

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References

- [1] L. Gautret, M. Hoarau. (2008): OCEAN ENERGIES IN REUNION ISLAND, INDIAN OCEAN. ICOE 2008 Proceedings.
http://www.arer.org/pj/articles/278_OCEAN-ENERGIES-IN-REUNION-ISLAND-INDIAN-OCEAN.pdf
- [2] L. Gautret, M. Hoarau, JB. Nicet, J. Turquet, JP. Quod. (2008): 0 TO 1000 m DEEP OCEAN WATER CHARACTERIZATION FOR OTEC AND SWAC APPLICATIONS, REUNION ISLAND, INDIAN OCEAN. ICOE 2008 Proceedings.
http://www.arer.org/pj/articles/278_0-TO-1000-m-DEEP-OCEAN-WATER-CHARACTERIZATION-FOR-OTEC-AND-SWAC-APPLICATIONS-REUNION-ISLAND-INDIAN-OCEAN.pdf
- [3] M. Hoarau, L. Gautret. (2009): SREMER. Schéma Régional des Energies de la mer à l'île de La Réunion. ARER/Région Reunion Report:
http://www.arer.org/pj/articles/437_SREMER-VF.pdf
- [4] G. Perrono. (2003): Energie des Vagues, Île de La Réunion. ARER Report:
http://www.arer.org/pj/articles/164_rapport-energie-vagues.pdf
- [5] BCEOM, (2005): Potentiel énergétique de la houle, modélisation de l'Energie des vagues à La Réunion-cotes Sud. Region Réunion Report.
- [6] G. Delencre, L. Gautret. (2010): Opportunity study for the development of Onshore wave energy systems in St Philippe and Reunion island. ARER report
<http://www.arer.org/moteurrecherche/affiche.php?article=513>
- [7] M. Salomez, M. Hoarau, L. Gautret. (2009): Opportunités de développement de la filière micro-algues à La Réunion. ARER report:
http://www.arer.org/pj/articles/428_rapport-de-stage-ARER-sept-2009-melanie-salomez.pdf
- [8] M. Hoarau, L. Gautret. (2009): Etude d'opportunité sur l'énergie osmotique à Sainte Rose. ARER report:
http://www.arer.org/pj/articles/436_Rapport-Energie-osmotique-Ste-Rose-vfinale-1.0.pdf

