



www.etymol.com

Clean and renewable energy taken
out offshore from the wave movement

Etymol Ocean Power SPA

Our company is a branch of F-Tec Engineering, which was founded in the year 2001 with the objective of satisfying the demand of hi-tech companies in a world increasingly globalized and competitive. F-Tec is focused in the field of artificial intelligence, robotics and energy, generating R & D & innovation projects, having patented the Floating Edge technology (Pat. # 38,879 Republic of Chile), which has application in forest, mining and fishing industries. Furthermore F-Tec developed the system called ETY.2, which solves with high effectiveness and efficiency the mathematical problem known as NP hard, with application in several areas such as transport, logistics, distribution and education. The system is currently used in some higher education institutions, colleges and schools in Chile to schedule class time.

We are one of the first Chilean companies in being working on the marine energy technologies development from two points of view; a) Tidal and Wave Energy Engineering, Project Development and Project Management for technologies in the commercialization stage. b) We develop our own wave energy converter technology.

PhD, engineers and the F-Tec staff have experience in carrying out projects of different nature, such as wind power plants, mechatronics, robotics, design and manufacture appliances, major civil works, software and information systems, industrial plants, energy efficiency, development of hi-tech equipment for mining, logistics, industrial waste treatment and environment. Those competences give our teams the ability to effectively address each project.

At present, F-Tec's engineers are fully engaged in developing the project ETYMOL, whose acronym in Spanish means *Energy Transformation and Movement of Waves*. ETYMOL OCEAN POWER SPA partnership with other institutions experienced in energy and innovation allows us to gather the skills necessary to address this challenge.



About us

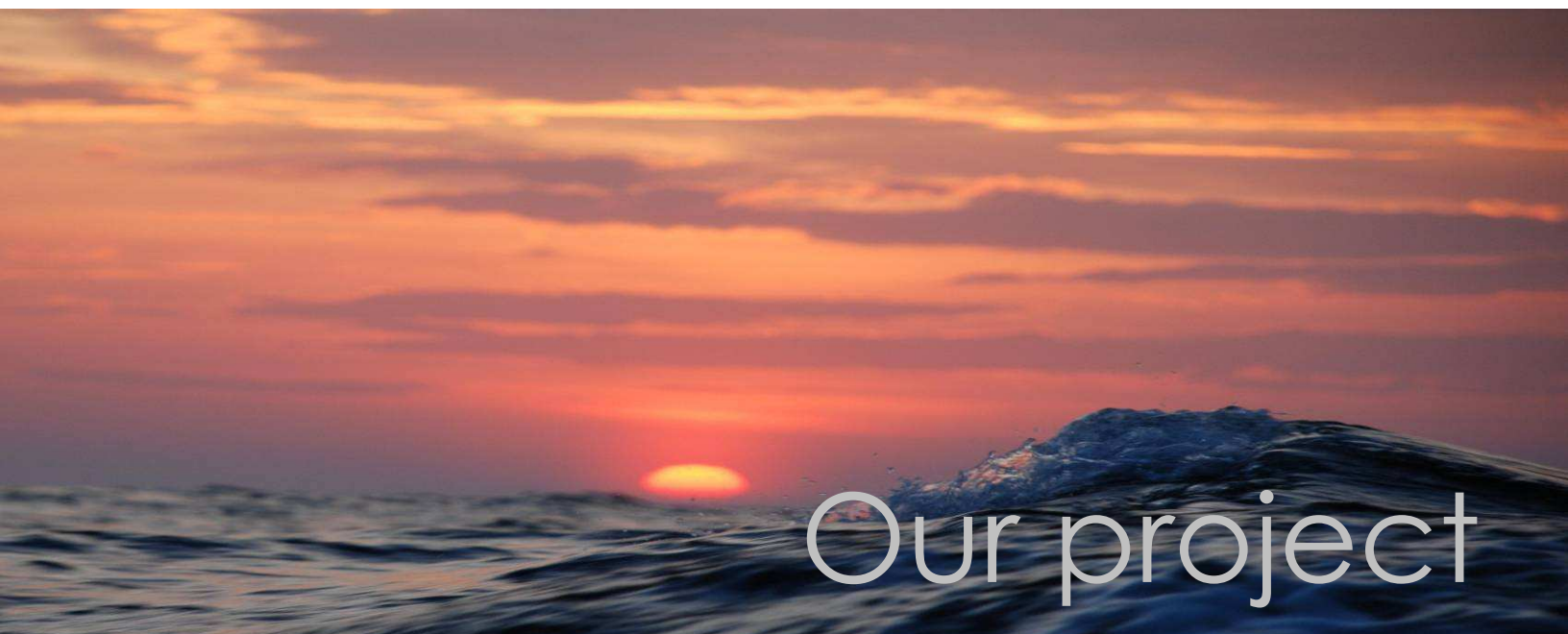
ETYMOL Technology

ETYMOL is an R&D and innovation renewable energy technology that has been created to develop Offshore Wave Power Converter Farms in order to harness the huge energy potential from oceans. The design is conceived to generate electrical power taken from wave pressure differences with a competitive investment per megawatt of power generated and attractive low operational costs.

Most wave converter devices operate under large mechanical stress as a result of hard water motion, which causes fatigue and short component lifetime. ETYMOL conversion principle works by not opposing to the wave motion, but rather by driving the pressure wave across the device turning it into kinetic energy as the water flows.

Our technology has two key characteristics: First, it has no moving parts in the energy conversion process, which increases its durability and resistance to the marine environment and second, ETYMOL technology uses a submerged plant format that is able to face the extreme violence of the sea in storm conditions that can break the strongest physical elements. These devices work converting the pressure waves into a laminar flow, without turbulence, exploiting the wave power, safely for navigation and with minimal risk to the marine fauna.

The wave resource availability is abundant all along the coast of many countries and does not depend upon rainfall conditions. It is also constant and permanent over time.



Wave Converter Description

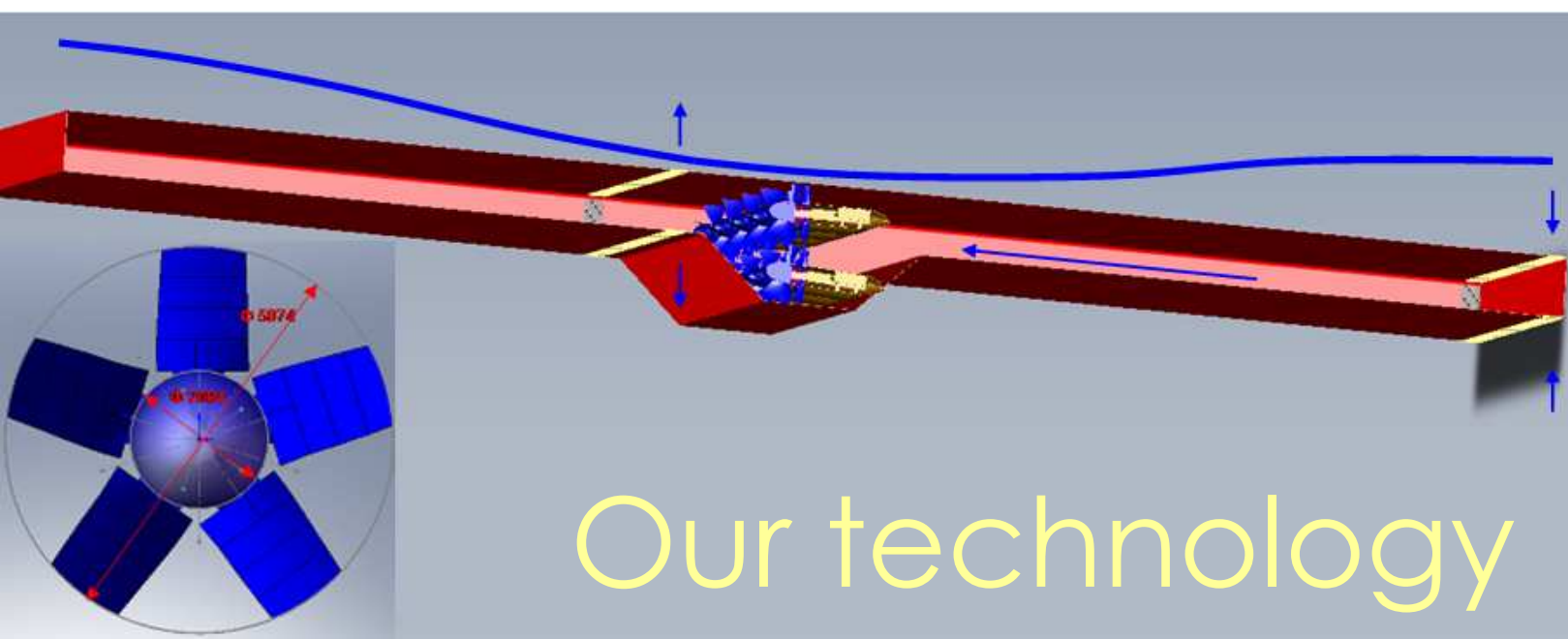
ETYMOL devices are designed to be deployed under the sea surface. This feature gives them the ability to withstand weather and tsunamis.

Each ETYMOL converter has several opening and closing gates, which produce a water flow that enters into a high pressure chamber through the open gates toward a low pressure chamber where the water flow goes out across the output gates. This flow is used to move a marine turbine which is connected to a compressor that feeds a pneumatic accumulator to store the energy produced. This energy storage as pressurized air in this component drives a synchronous turbo generator that provides electrical power to the grid.

Each gate has a grid filter for preventing the destruction of small species of flora and fauna in each water access.

One of the main challenges to complete the design of the wave converter is to get a competitive investment cost per megawatt installed, with a capacity factor of more than 30%. Our objective is to make it competitive regarding the investment for a hydro power plant, and achieve higher capacity factors.

To date, there have been simulations to prove the technology principle and to understand the fluid dynamic behavior of the plant through computer numerical modeling by the Finite Element technique.



Our Vision

Our vision is the deployment of marine farms in the world's oceans, silent and invisible, to generate electricity without any impact to the environment.

The electricity produced by ETYMOL is renewable, since it depends on the waves that are created by the effect of the wind. Through ETYMOL technology, the energy will be taken out from the ocean in an economically, viable and environmentally friendly way.

We are fully engaged with the future of our planet. The increasing demand for Fossil-based fuels and its price volatility is not compatible with the environment, energy accessibility and energy security. This situation drives necessary the creation of unconventional renewable clean energy projects.

Nowadays, most countries are facing out the problem of increasing Green House Gases emission rate due to the usage of carbon sources for energy production, and pollution as a consequence of the transportation. Productive sectors are experimenting a loss of competitiveness due to the Copenhagen agreements, which set standards of "reciprocity" to industries competing in a global scale and make their products more expensive in terms of their carbon footprint. Thanks to the unlimited power of world's oceans, ETYMOL will contribute significantly to help countries be more competitive.



Our vision

The project

Our project is developing and building an electrical power plant designed upon the ETYMOL wave energy converters (WEC) to produce clean energy with a low operational cost.

In order to make the project financing viable and attract investors, we defined various development stages and their corresponding incremental investments. This methodology will protect investors by allowing to quantify the real progress and to ensure the validation of all intermediate milestones.

Stage	Activity	Release
0	First WEC scale prototype conceptual engineering Fluid dynamics simulation of the scale prototype Power plant site selection Validation results by an international consultancy	OK
1	Lab prototype construction Laboratory construction for testing components Installation of buoys recorders for measuring sea state	OK
2	Continuous offshore prototype testing. Sea state research International certification approval	Process
3	Detailed engineering for a 50 kW industrial prototype Site selection for the definitive power plant location	Process
4	50 kW industrial equipment construction Processing of permits and easements	2015
5	1 MW industrial equipment construction and testing	2016
6	Detailed engineering for a scalable wave power plant. Includes the power output provided by the first WEC unit	2018
7	Wave power plant manufacturing, construction and assembly. Includes a submarine power cable to the coast and synchronization system to the injection node	2020
8	Final commissioning and start of commercial energy production	2022



Market penetration

The World Energy Council estimates that about 10% of worldwide electric energy demand could be met by ocean wave energy. Regarding Chile as a starting point of our project, there are several good potential locations where marine energy projects can be deployed.

Chile with one of the largest potential marine energy resources, high economic and political stability and, political decision to advance the development of these initiatives, represents a perfect scenario to develop marine energy projects. Chile has also a long maritime industry experience and infrastructure and an ambitious renewable energy targets.

The wave resource gradually increases from Santiago to the south, allowing initial developments close to grid and population. The Chilean government is willing to exploit the ocean resources for energy production, and gives some incentive to investors. We estimate a demand of 150 megawatt in five years, if ETYMOL reaches only the 15% market share of the country renewable energy generation imposed by the Chilean regulation to the electrical generation industry. This is equivalent to reduce emissions by 240 thousand ton per year of CO₂ to the atmosphere.



The Opportunity

ETYMOL technology benefits

Investors:

- Cost-competitive investment per megawatt and low O&M costs.
- Independency of fossil based projects or hydro resources in the dam.
- To take advantage of the current energy supply scenario and the willingness of the governments of supporting renewable energy projects.
- High availability of the resource worldwide.

Countries and End-users:

- To contribute on diversification of the global and local energy matrix and on the energy security and accessibility matters with clean and non-conventional renewable energies.
- Prevents the emission of greenhouse gases.
- Minimal degradation of natural habitat, both flora and fauna.
- Provides energy to isolated communities with clean and cheap energy.
- High social return with the economic multiplier effect and productive diversification in remote communities.
- No impact on sites with cultural significance.



Key aspects

Partnership

- Universidad Técnica Federico Santa María, Energy Innovation Center (CIE), July 2009, www.cie.usm.cl



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