



### WILEFKO Wave Energy: System of waves for breaker Zone with an intermediate stage of energy storage

Keywords: Wave energy / Clean energy / NCRE / desalination / generate electricity / ocean energy / Chile undimotriz

#### INTRODUCTION

By 2040 electricity demand for member countries of OECD, will increase to TWh 16,000 a year. It is also estimated the availability of global ocean energy at 28,000 TWh per year. Current systems of non-conventional renewable energy (NCRE) have two problems: they lack the ability to store energy generated and deliver an electrical stabilized current.

Global economic growth has led many organizations like the UN, begin to push for changes in public policies of its Member States in terms of issues such as sustainability and respect for the environment. In this regard, various States have pledged to incorporate goals of their NCRE energy matrices. Examples are: EU committed 20% in 2020, Chile in 2025 25%, Australia 33% by 2020, UK by 15% by 2020, China 8% in 2020, and the U.S. 20% by 2020.

#### TECHNOLOGICAL OPPORTUNITY

Wilefko wave is a novel system consisting of trains of oscillating blades with an intermediate stage of accumulation of compressed air, with a threefold purpose: 1) generate electricity, 2) seawater desalination and 3) pump water. It uses an energy source that is the ocean, which is more constant, abundant, predictable and with a capacity of 800 times more energy than wind energy.

#### ENERGY STORAGE AND PUMP ON-DEMAND.

Providing energy on demand, give us a competitive advantage over the other non-conventional renewable energy sources (NCRE). This defines the power delivery strategy to supply energy in peak demand, looking for the best marginal prices. This allows access to sale prices of electricity from 30% to 200%, depending on the time of year, drought or fossil fuel costs. In June 2013 the marginal cost price in the Chilean Interconnected Central System (SIC) was US\$312 / MWh. According to a financial newspaper, they projected with high probability an average SIC marginal cost up to US\$ 196 / MWh during 2013.

WILEFKO is a technology with a global impact, easy scalability from medium power units for small communities to many units for large plants. The areas suitable for the installation of our device are those that have a potential wave over 30KW per meter along the coastline.

#### MARKET OPPORTUNITY

Globally there is a dominant product in the wave energy market, despite the worldwide availability of 28,000 TWh of energy per year. Our global target market includes: USA, Canada, countries belonging to the European Union, Australia, New Zealand and Chile. It is estimated that if any of these countries used 1% of the coastline and apply the 32% efficiency, this would imply an installed capacity of 8,200 MW equivalent to 10 thermal power plants of 400MW and reduce 52 million tons of carbon dioxide into the atmosphere annually.

In our medium-term strategy, and in parallel, we have set a social mission, which is to impact more than one million people living in the coastal area and in remote island areas, through access to electricity and / or fresh water drawn from

#### Benefits

- ↓ By using waves in surf that is a wall of water with concentrated energy is harnessed.
- ↓ By storing energy through compressed air gives us a competitive advantage over other methods.
- ↓ Method of multi-linear blade, which increases two to three times the energy collected.
- ↓ 57% efficiency in energy capture (CFDStar-CCM +).
- ↓ Multiple sub-products.



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the sea, and thus improve their living conditions and their jobs. In this sense, our potential allies will be the States, non-governmental organizations to overcome poverty, nationally and internationally, among others.

Business Model: WILEFKO has various ways of marketing through: 1) Sale of NCRE attributes to reduce the carbon footprint; 2) Licensing and / or sale of an industrial patent; 3) Electricity Generation for lower semi-100KW portable devices and generating over 20 MW plants; 4) Water desalination, through portable machines, deliver fresh water to isolated areas; 5) Pumping water for industrial use.

Finally, given that Chile is an excellent experimental platform because it has a theoretical potential wave of 240,000 GW with its 4200km of coastline, with a low population density in multiple areas of the country and an average electricity price of USD150 per MWh, which is 60.8% more than the average group of most industrialized countries of the OECD.

## CURRENT STATE OF DEVELOPMENT

Right now, we are about to complete the laboratory stage reverse engineering, whose purpose is to measure the instruments that actually generated energy by the waves. The development research uses data from numerical modeling and 60,000 records of data from three field tests performed with a first-generation prototype. The estimated energy and power based on those laboratory results are as follows: for a 20 MW plant located 1000m away from the coastline, it can obtain averaged energy of 175,000 MWh/yr in Chile, If we apply the price of cost margin at \$US 140 per MWh, its generated income will be \$US 35 MM per year.

## STATE INTELLECTUAL PROPERTY

We have exclusive rights for our technology in 27 countries until 2031. We have obtained a patent in Chile (CL2011/02154), along with a PCT (WO/2013/029195). Both have obtained novelty, inventive step and industrial application. In April 2014, we have initiated national phase in the United States, European Community, Canada and Australia.

## OUR TEAM

### WILEFKO

It is a private initiative, which has managed to secure funding from the Government of Chile for US \$ 300,000 (CORFO). It is commercially consulted by INNOVO business, part of the Universidad De Santiago De Chile. On April 2013, Wilefko SPA has been constituted, having a staff of 6 members. Having all the rights of patent and trademark. We are a multidisciplinary team of 25 persons.

### CORFO, Development Corporation Production

CORFO is an executive agency of Government politics in the field of entrepreneurship and innovation, through tools and instruments compatible with the central tendencies of a social market economy, creating the conditions to achieve building a society of opportunities.

### INNOVO USACH, Centre for Innovation and Technology Transfer

The University of Santiago de Chile in 2006 created INNOVO-USACH, whose main challenge is the consolidation in bonding materials, promoting the culture of entrepreneurship and innovation in our country. The lines of action that will achieve the objectives are technology transfer and business incubation through the development of projects and businesses that strengthen and link Entrepreneurship and Business University. Therefore INNOVO USACH is a platform of specialized services designed to manage, link and disseminate applied research projects, innovations and technology businesses, adding value to the enterprise.

## CONTACT

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