Blue Cooperation between Portugal and Finland: Investment Opportunities

Ruben Eiras
Adviser for the Minister of the Sea
1. Investment context: Ocean Economy in Portugal

2. Ocean Economy Investment focus:
   - Liquefied Natural Gas (LNG)
   - Ocean Renewable Energies
   - Sustainable Deep Sea Mining
   - Blue Biotechnology
   - Offshore Engineering Clusters

3. Ocean Economy Investment: Financial Support
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BETTER BUSINESS

OCEAN ECONOMY

Area: 92,152 Km² (108th largest country in the world)
Extent of coastline: 1,859 Km
(including Azores and Madeira)
Current EEZ: 1,727,408 Km²
(19 times the area of the land mass)

New EEZ: 3,897,408 Km²
42 times the area of the land mass
The 10th largest EEZ in the world
An area:
Bigger than India - the 7th biggest country in the world
Equivalent to the EU except the British Isles and Sweden
OCEAN ECONOMY

KEY INDICATORS

💧 INDICATOR

TURNOVER: 6,700 millions € (2012)
NUMBER OF COMPANIES: 11,660 (2012)
HEAD COUNT: 56,300 (2012)
EXPORTS: 956 millions € (2014)
IMPORTS: 1,600 millions (2014)
EXPORTS GROWTH: 23% since 2010. 183M€ growth in just 5 years
WEIGHT ON EXPORTS: 2% (2014)

🌐 TOP MARKETS

Total markets: 115 countries
Main markets: Spain, France and Italy
Account for 30% of the export value and 70% of export volume
Portugal-Finland Blue Cooperation and Investment areas

Blue Cooperation Areas
- Mineral energy resources
- Ocean renewable energies
- Offshore biological resources
- Shipbuilding and maritime transport industry
- LNG: the low-carbon blue fuel
LNG hub in Portugal: a route for a sustainable European energy security.

- **Portugal** is located in the middle of the **main core and non-core routes of trading in the world**, making it a privileged player in the **Bunkering Business**, for both Commercial Trading, Tourism (Cruise Ships), deep-sea and short-sea shipping, enjoying a geographical advantage to bunker the majority of the ships arising from the Suez & Panamá Canal.
The potential of Portugal as LNG service station for vessels

LNG hub in Portugal: a route for a sustainable European energy security

- The coast of Portugal is located in the Atlantic Ocean and this is not an emission control area (ECA).
- However the North Sea and Baltic region are already ECA zones and there is a possibility that the Mediterranean Sea will become an ECA zone. In 2020 the global sulphur cap of 0.5% will be effective for all non-ECA zones and deep sea shipping.
The potential of Portugal as LNG service station for vessels

LNG hub in Portugal: a route for a sustainable European energy security

- **ECA zones will indirectly affect the Portuguese ports.** (Most of the transatlantic traffic moves between ECAs, at least twice a year)

- Those issues are important for short sea traffic partners and for the Portuguese ports.

- The Directive of the European Parliament and of the Council on the deployment of alternative fuels infrastructure indicates that an appropriate number of refueling points for LNG is provided at maritime ports to allow for the circulation of LNG throughout the TEN-T Core Network, according to common technical standards until 2025 for LNG.
The potential of Portugal as LNG service station for vessels (onshore and floating)

LNG hub in Portugal: a route for a sustainable European energy security

- Portugal can act as an Atlantic LNG service station for vessels that use this energy source, using Sines port complemented with LNG Floating Bunkering units and/or ship-to-ship transfer solutions

- This would reinforce the role of the Atlantic as a secure energy corridor for Europe, as well as reinvigorate the shipbuilding and naval industry.

Source: Cryostar.com, 2016
Source: http://www.klawing.com/, 2016
Source: http://hhpinsight.com/, 2016
Summing up: LNG Investment Opportunities for Portugal-Finland Cooperation

+ LNG onshore and offshore bunkering for re-exporting and vessel refuelling to cope with Europe’s need to diversify gas sources

+ LNG innovative and cost-competitive shipbuilding and components production to cope with the need to drive down costs in the transport and bunkering value chain
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Portugal-Finland Blue Cooperation and Investment areas

Blue Cooperation Areas
- Mineral energy resources
- Shipbuilding and maritime transport industry
- Offshore biological resources
- Ocean renewable energies
- Floating offshore wind and wave energy
Ocean renewable energies can substitute the total consumption of coal in the Portuguese electric energy mix.

- **Production of electricity from coal**: 8M bbl/year, emissions ~8Mt CO₂ equiv
- **Annual coal imports for electricity production**: 18.4M bbl/year
- **Imports costs**: 285M€/year
- **Floating offshore wind**: 7.1M bbl/year, without CO₂ emissions
- **More security**: endogenous energy production
- **More value**: production and maintenance of the equipments by national companies; creation of export sector
- **Reduction of 25% of the national energy dependence**

Decarbonize and reinforce energy security with blue renewables.

On track of COP 21 Summit.
Decarbonize and reinforce energy security with blue renewables

- Ocean-based renewable energies, particularly floating offshore wind and wave energy, stand as a second area where the US and Portugal can enhance energy cooperation.

- Floating offshore wind and wave energy are two frontier renewable sources that have immense potential for producing **secure and sustainable electricity**, **hydrogen / syngas for ship fuel** and desalinization of sea water.
Decarbonize and reinforce energy security with blue renewables

Portugal Offshore Wind Resource (potential):
7,1M bbl/year (equal to 25% of national electricity consumption)

In focus:

Windfloat Technology Pilot in Portugal
Developed by a Consortium led by EDP company, it is the most efficient floating wind offshore prototype in the world according to NREL

- In Portugal, floating offshore wind has the potential for supplying 25% of the total consumed electricity, enough to substitute a coal power plant.
- EDP, the main Portuguese utility, is a pioneer in the development of this new technology, as demonstrated by the Windfloat concept prototype.
- In 2017, it will be created a 25 MW floating offshore wind farm in Viana do Castelo for demonstrating a scaling-up of the Windfloat technology.
- In a recent report, US-based National Renewables Energy Laboratory has mentioned Windfloat as one of the most promising technologies of this kind.
Decarbonize and reinforce energy security with blue renewables

Portugal Wave Resource (potential): 100 bbl per 1m shoreline (500 km west coast shoreline)

In focus:

Warroller pilot in Portugal
Developed by a consortium led by AW Energy, a Finnish company, it assured financing from EU for scaling up to a demonstration project, that is going online in the 3T 2016.

New projects coming
Copower, a Swedish company, and Bombora, an Australian technology, are considering Portugal as test lab for their prototypes.

• Wave energy is a more experimental technology—due to its harsh operation environment.
• Still, taking into account its power generating potential, it is worth investing in its development.
• Portugal and Finland are working together in this area and would gain a lot of in combining resources for generating higher-scale initiatives.
Floating Offshore Wind: high export potential

- Export market is huge, namely in Europe, which represents more than 80% of the global market until 2030 (UK and France).
- In 2013, there were licensed 22 GW offshore; in 2030 it is forecasted 65 GW.

Market value of 227 billion € (average cost of 3.5 M€ per installed MW)

- The Portuguese industry can build the capacity for acquiring a quota of 59 billion euros of this market:
  - Towers, components and foundations: 39 billion €
  - Blades: 20 billion €
- Equal to a tenfold increase of present market and employment

Forecasted potential market in 2030: 59MM€
Alternative business models for using ocean renewables

Production of electricity for Islands and isolated territories, for substitution of imported fossil fuels

Water desalinization: a high cost and energy intensive process. Ocean renewables can work as a viable solution for islands and water-stressed territories

*Power-to-gas (P2G)*: process that stores electricity in the form of syngas or hydrogen for feeding gas network or petrochemical units. Demonstration projects ongoing in Netherlands.

Fonte: [www.offshorewindbiz.com](http://www.offshorewindbiz.com)

Fonte: [www.industrytap.com](http://www.industrytap.com)
Synergies blue+ renewables

**Exploration and production of Oil&Gas:** mitigate the energy and environmental cost of the industrial processes

**Offshore aquaculture:** provide energy to these innovative offshore fish farming units, cutting down operational costs

**Deep sea mining:** despite being energy intensive activity, its potential application is forecasted in the long run

**Ocean monitoring and surveillance platforms:** providing energy to these equipments, mitigating OPEX costs

*Fonte: www.marinelog.com*
*Fonte: Allard. 2009, University of Rhode Island*
*Fonte: www.gizmodo.com*
*Fonte: celebrating200years.noaa.gov/*
Summing up: Ocean renewable energies

Strong local industrial and scientific capacity, as well as natural conditions, for installing innovative and cost-competitive offshore wind and wave energy industry facilities, to cope with European and world demand of these energy production solutions.
Portugal-Finland Blue Cooperation and Investment areas
Another area of strategic cooperation is more long-term: deep-sea mining of rare earth metals.

These are minerals of high strategic value because they are critical for a series of industrial appliances in many sectors: renewable energies, information and communication technologies, and electrical mobility.

Presently, 90 percent of the world’s supply of these mineral resources is concentrated in onshore mining in China.

More than 50 percent of the current world’s supply of lithium is in Bolivia.
Since developed economies are migrating to an electrified, renewable-based, and information-driven energy system, the result of further adoption of deep-sea mining will be the creation of new and potentially dangerous geopolitical dependencies if new sources of rare earth metals are not developed.

The advantage of deep sea mining in the Atlantic is that it is geopolitically less risky, and economically and environmentally friendlier (higher percentage of extracted mineral per ton of rock, when compared to onshore mining).

Portugal's ocean possesses the most diverse mineral resources portfolio in the EU.
Continental Platform Extension Project

Hydrothermal Vents

Mid Atlantic Ridge

Abyssal Plain

Rainbow, Lucky Strike

Seamounts

copper, zinc, gold

cobalt, rare earths

nickel, copper
Summing up: Sustainable Deep Sea Mining Investment Opportunities

+ Scientific and industrial capacities for delivering R&D and innovative solutions for these frontier industries

+ Develop exploration activities gaining a competitive edge to cope with future demand industry strategic resources
Portugal-Finland Blue Cooperation and Investment areas

- Blue Cooperation Areas
  - mineral energy resources
  - Ocean Renewable Energies
  - Shipbuilding and maritime transport industry
  - offshore biological resources

Sustainable Blue biotech and Aquaculture
In its ocean area Portugal “offers” 5 main biogeographic hotspots corresponding to a huge diversity of ecosystems (coastal and deep and ultra deep sea), composed of species to be studied and exploited.
Adaptations to marine environmental conditions are diverse and often unique.

There's a high chemical diversity, of biomaterials and bioactives with unique properties with a high potential of exploitation and profitability.

Hidrothermal vents ecosystems - azores area

Gulf of Cadiz - Southeast Continental Portugal

Opportunities in Blue Biotechnology

New species of ghost shrimp found in mud volcano

Hydrothermal vents extremophyle worms
Opportunities in Blue Biotechnology

Portugal has an high skilled research and innovation community for producing industrial applications in several emerging areas:

- Bioprospecting for industrial purposes
- High yield Nutraceuticals
- Innovative Pharmaceuticals
- Advanced Aquaculture applications

**POTENTIAL INDUSTRIAL APPLICATIONS:**

- Starfish: tissue and members regeneration
- Marine biopolymers: applied to human health (collagen – sponges, shark skin, squid) for creating new tissues capable of being absorbed by humans
- Marine Biorefinery: applied to produce biofuels and bioplastics from microalgae
Summing up: Blue biotechnology investment opportunities

- High level of biodiversity with potential of disruptive innovation in pharmaceutical and bio-based industries
- High quality scientific and start-up dynamic ecosystem capable of delivering efficient and innovative solutions
Aquaculture: a sustainable business with high growth potential
Aquaculture: a sustainable business with high growth potential

**Aquaculture Benefits**

- **2572** directly employed, only 5 companies have more than 10 workers
- **+1547 companies**
  - Only 13 companies have a production above 100 tonnes
- Fish and shellfish provide oils, healthy proteins and minerals
- **At every step from egg to plate, farmed seafood is traceable**

**Objectives**

- **78 M€** for specific support in Mar 2020
- **20 thousand tonnes in 2020**

**Did you know?**

Aquaculture will soon surpass wild fisheries as the main source of seafood. This reflects the transition which happened on land in the past with the evolution from hunting to farming.

The TURBOT, mainly for exporting, is one of the species with more economic value.

Premium Clam (Chequered Carpet Shell) is the second species with more economic value.

**Top 7 aquaculture species produced in Portugal**

1. Turbot
2. Clams
3. Mussels
4. Oysters
5. Sea Bream
6. Trout
7. Sea Bass
Aquaculture web portal

http://eaquicultura.pt/
(soon available in English)
Aquaculture: a sustainable business with high growth potential

Strategic Plan for the Portuguese Aquaculture

**Objective:** increase production, sales and diversify the offer of Portuguese Aquaculture, on the basis of our guiding principles of sustainability, food quality and safety, in order to meet the consumption needs and foster local development and job creation

Simplifying Bureaucracy To Attract Investment

**Aquaculture+**
The only European country licensing an aquaculture business in 3 months
Summing up: Aquaculture Opportunities

+ High level of sustainable growth potential, diversity of production to cop with European demand and need of seafood self-sufficiency

+ Investment-friendly policies with low ‘red-tape’ and strong financial support mechanisms
Portugal-Finland Blue Cooperation and Investment areas

- Offshore Engineering Clusters
- Ocean Renewable Energies
- offshore biological resources
- Shipbuilding and maritime transport industry
- mineral energy resources

Synergies
Offshore Technology Clusters:

- Developing the ocean economy and energy means developing new technology that is able to deliver innovative, efficient and environmentally sustainable solutions, creating new paths for a sustainable, secure and clean growth.

- The high-quality, cost-savvy, of Portuguese engineering human resources, industry and scientific system has been creating a stream of excellence that supports the development of the emergent offshore technology clusters
OFFSHORE ENGINEERING CLUSTERS

3 sub-clusters com 4 synergy areas

New Shipbuilding and Offshore Structures

- Modular Construction for greater agility in global operations and cost control + naval innovation
- Production and PSV Vessels Integration
- Integrated Communication Systems
- Electronic Components and Tooling for ROV / AUV
- Integrated components and systems for surface-subsea operations

Ocean Robotics Industry

Subsea Equipments Industry

Robotics systems specialized and distributed more effective innovative, more efficient and with lower CAPEX and OPEX costs

Information operations in real time + total subsea production process + demand for ocean monitoring to increase productivity and lower costs

MAIN BUSINESS TRENDS

+ OCEAN ECONOMY
OCEAN ECONOMY

OFFSHORE ENGINEERING CLUSTERS

PORTUGUESE SCIENTIFIC AND INDUSTRIAL CAPACITIES

New Shipbuilding and Offshore Structures

1.  
2.  
3.  
4.  

Ocean Robotics Industry

Subsea Equipments Industry

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INCENTIVES: FINANCIAL AND TAX SUPPORT

PRODUCTIVE INVESTMENT

• Financial incentives (Portugal 2020\(^1\))
  Interest free loan. Up to 50% of the loan can be converted into cash grant depending on the project performance.

• Tax incentives (Investment Tax Code)
  Corporate income tax credit as a percentage of eligible expenses.

R&D INVESTMENT

• Financial incentives (Portugal 2020)
  Cash grant up to €1,000,000 of incentive. Above €1,000,000, 25% as an interest-free loan and 75% as cash grant.

• Tax incentives (SIFIDE II)
  Corporate income tax credit as a percentage of eligible expenses.

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\(^1\) Fishery and Aquaculture activities are not eligible for incentives under Portugal2020. These activities are supported by Incentives program Mar2020.

\(^2\) Financial grants combined with tax incentives may not exceed 25% of the eligible investment. For projects located in Lisbon and Algarve regions, only investments in new activity are eligible up to a limit of 10% of the eligible investment.
### INCENTIVES: FINANCIAL AND TAX SUPPORT

#### FINANCIAL

**SCOPE**
- New products or services
- New production methods or processes
- Innovation must be at least national level.

**ELIGIBLE EXPENSES**
- Tangible Fixed assets: machine, equipment and buildings;
- Intangible Fixed assets: software, technology transfer;
- Training expenses

**NATURE OF SUPPORT**
- LOAN: 35% of eligible expenses as an interest-free loan with a reimbursement period of 8 years
- CASH GRANT: Loan conversion up to 50% of the incentive depending on the performance of the project

#### TAX CREDITS

**SCOPE**
- Investment projects with positive impact on innovation and jobs creation

**ELIGIBLE EXPENSES**
- Tangible Fixed assets: machine, equipment and buildings;
- Intangible Fixed assets: software, technology transfer

**NATURE OF SUPPORT**
- Corporate Income Tax Credit from 10% up to 25% of eligible investment;
- Tax benefits up to a 10-year period after the conclusion of the investment.

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An investment project can combine financial and tax support for the same expenses up to a limit of 25% of the eligible investment (tax credit + cash grant + loan interest saving). For projects located in Lisbon and Algarve regions, only investment in new activity are eligible, up to 10% of the eligible investment.
INCENTIVES: FINANCIAL AND TAX SUPPORT

Operational Programme for the European Maritime and Fisheries Fund in Portugal for 2014-2020

www.mar2020.pt

€ 507 807 536

<table>
<thead>
<tr>
<th>Funding priorities</th>
<th>M€</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balance between fisheries activities and environmental protection and sustainability</td>
<td>103.6</td>
</tr>
<tr>
<td>Development of aquaculture and improve marine spatial planning</td>
<td>59.0</td>
</tr>
<tr>
<td>Fisheries control and inspection, by improving data collection and management</td>
<td>55.5</td>
</tr>
<tr>
<td>Local development initiatives, through innovative projects of fisheries and aquaculture</td>
<td>35.0</td>
</tr>
<tr>
<td>Diversification and valorisation of seafood products, through marketing plans</td>
<td>111.2</td>
</tr>
<tr>
<td>Strengthening the efficiency of maritime surveillance</td>
<td>5.3</td>
</tr>
<tr>
<td>Technical assistance to ensure efficient administration of the EU funding</td>
<td>22.8</td>
</tr>
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85% maximum support
Blue Fund

Innovative public financial instrument focused on the development of the ocean economy, scientific research and protection of the sea environment.

The Blue Fund will prioritize the development of sea biotech start-ups, underwater robotics, innovative shipbuilding, ocean energy, aquaculture technology and innovative solutions for ocean protection, safety, monitoring and surveillance.

Resources: start in 2017 with a minimum of 15M€, with public resources.

The Blue Fund is open for the establishment of financial partnerships with national and international public and private bodies. These arrangements facilitate the scaling-up of industrial investments, since it opens a wider range of financing solutions with better conditions, like access to European Investment Bank credit.

The Blue Fund is managed directly by the Minister of the Sea.
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