

MARIBE

D7.5 Life Cycle Learning from business models

WP7 Business model mapping and assessment

Status: Final public version

19/02/2016



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 652629.

About MARIBE

MARIBE is a Horizon 2020 project that aims to unlock the potential of multi-use of space in the offshore economy (also referred to as Blue Economy). This forms part of the long-term Blue Growth (BG) strategy to support sustainable growth in the marine and maritime sectors as a whole; something which is at the heart of the Integrated Maritime Policy, the EU Innovation Union, and the Europe 2020 strategy for smart, sustainable growth.

Within the Blue Economy, there are new and emerging sectors comprising technologies that are early stage and novel. These are referred to as Blue Growth sectors and they have developed independently for the most part without pursuing cooperation opportunities

with other sectors. MARIBE investigates cooperation opportunities (partnerships, joint ventures etc.) for companies within the four key BG sectors in order to develop these companies and their sectors and to promote the multi-use of space in the offshore economy.

The sectors are Marine Renewable Energy, Aquaculture, Marine Biotechnology and Seabed Mining. MARIBE links and cross-cuts with the Transatlantic Ocean Research Alliance and the Galway Statement by reviewing the three European basins (Atlantic, Mediterranean, and Baltic) as well as the Caribbean Basin.

About MARIBE

Project coordinator



MARIBE project partners



Document information

Acknowledgement

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Introduction

This document presents the lifecycles of 17 companies from 4 Blue Growth sectors (Renewable Energy, Aquaculture, Marine Biotechnology, Offshore Mining) with the purpose to:

1. Understand key strategic choices related to growing a company.
2. Understand how long it takes to develop a business from an initial idea through having early traction (first customers, early adopters), i.e. problem-solution fit. Problem-solution fit is defined as Investment Readiness level 3 (see next slide).
3. Understand how long it takes to reach product-market fit. Product-market fit is defined as Investment Readiness level 5 (see next slide).
4. Estimate the scalability of a business model taken from the business model mechanics assessment as found in the business model case studies (see Deliverable D7.2).

We used the lifecycle maps from Deliverable D7.2 *Case studies for specific business models*.

Investment Readiness Level explained



Renewable Energy

Sotrenewables

Atlantis Resources

Wavestar Energy

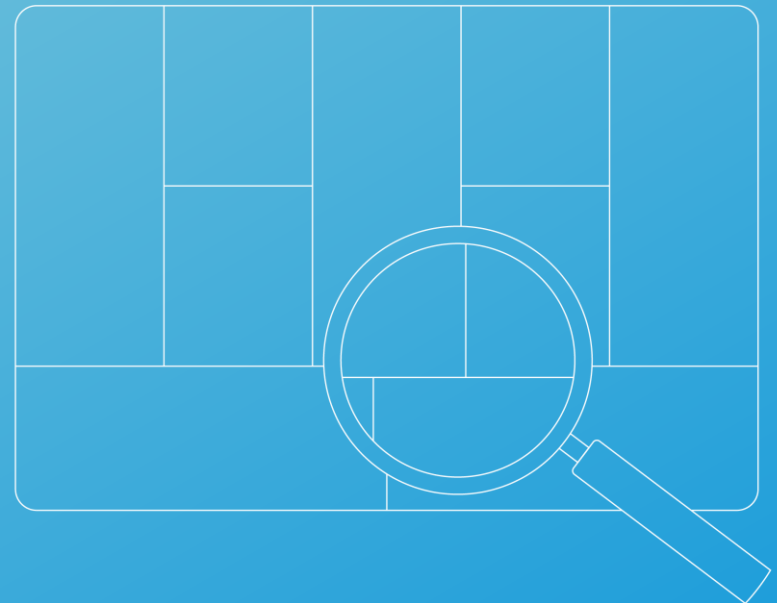
Carnegie Wave

Siemens Wind Power

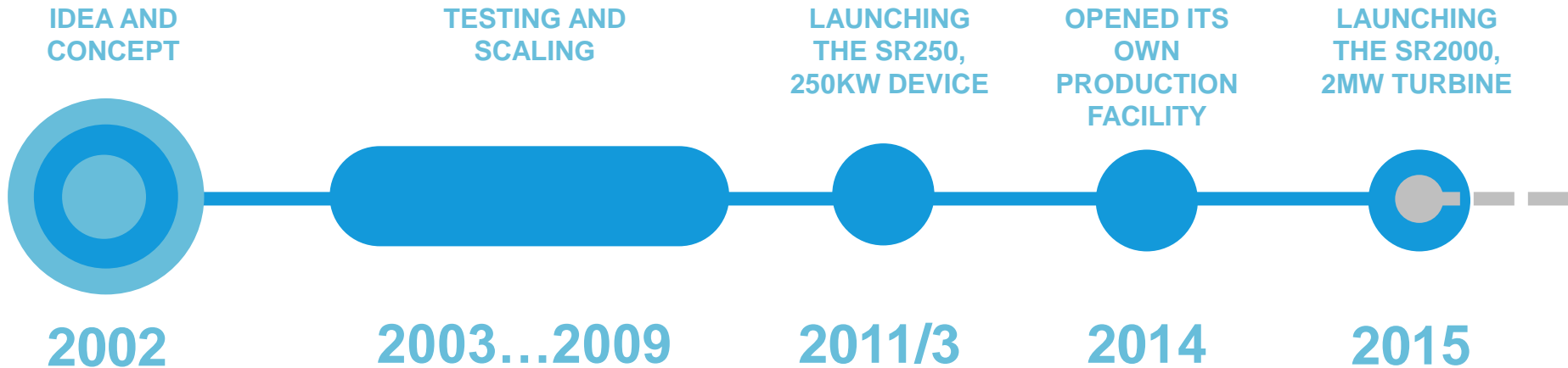
Statoil Hywind

Principle Power

Dong (not included, no case study)



#1 Scotrenewables



ACTIONS/INSIGHTS

Start to develop cost-effective tidal and river hydrokinetic turbines.

Testing the technology at increasing scales. Support by strong's investment partners.

Operating the device for 4000 hours. Secured major new investment from ABB Technology Ventures.

Partnerships for turbine assembly and an established supply chain for turbine construction.

RESULTS

Learnings about all the aspects of the technology and its operation under various conditions.

The first large scale floating tidal turbine in the world.

Production facility for electrical system testing and assessment.

The most cost competitive technology in the sector in a commercial scale.

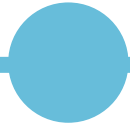
#2 Atlantis Resources

START OF THE COMPANY



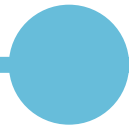
2002

PREPARATION OF FIRST CONNECTION TO THE GRID



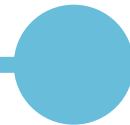
2006

UPGRADE TECHNOLOGY



2008

PARTNER IN MEYGEN CONSORTIUM



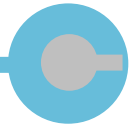
2010

OWNERSHIP OF MEYGEN PROJECT



2013/14

ACQUIRED MARINE CURRENT TURBINES



2015

ACTIONS/INSIGHTS

Scaled testing in Australia using an iterative approach.

Assembly & installation of a 100kW Aquanator Device. Operations established in Singapore.

Upgraded version of the 150 kW turbine installed in San Remo.

Became part of the consortium to start and develop the MeyGen project.

100% ownership of MeyGen Limited

Acquired Marine Current Turbines Limited from Siemens

RESULTS

The largest ocean based tow-testing program

Successful connection of a tidal current turbine to the grid

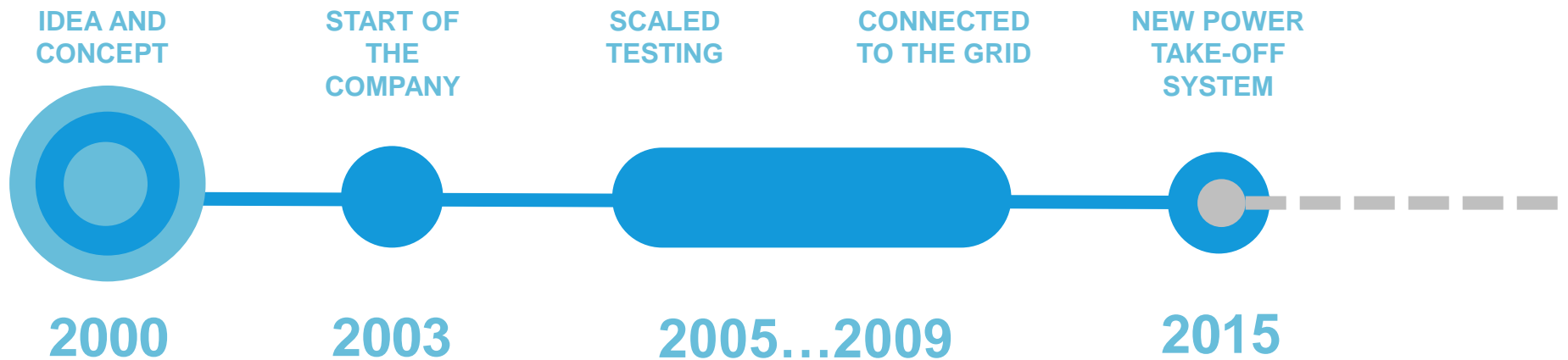
New power output record. Launched the first AS series turbine.

Developing the largest planned tidal stream project in the world.

Construction of MeyGen project started.

One of the largest tidal energy companies in the world

#3 Wavestar Energy



ACTIONS/INSIGHTS

Sailing enthusiasts "Niels and Keld Hansen" experienced the power of the waves

Clausen brothers (Danfoss) bought rights to the machine

Scaling prototypes from 1:40 to 1:10 to 1:2.

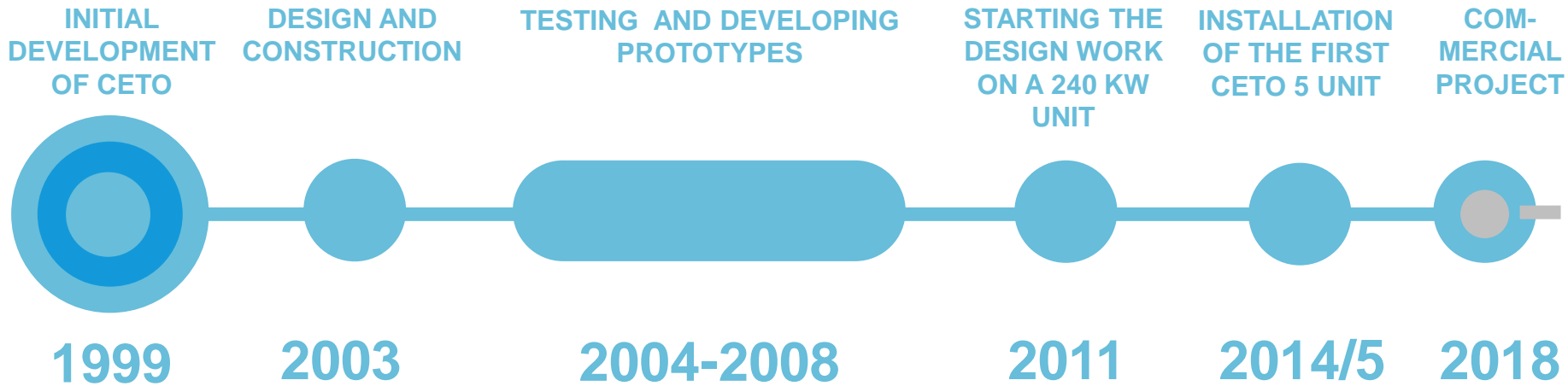
Forming a consortium for testing the first commercial-scale 1MW machine

RESULTS

Sufficient funds for research and development

Successful tests and initial delivery of energy to the grid

#4 Carnegie Wave



ACTIONS/INSIGHTS

Desktop research and design

Design of the CETO technology platform

Wave tank testing at Fremantle, WA

CETO 2 prototypes were developed and tested

Testing the 80KW full-scale prototype at Garden island

Official connection to the electricity grid at HMAS Stirling

Construction/installation of 25 x 1MW units

RESULTS

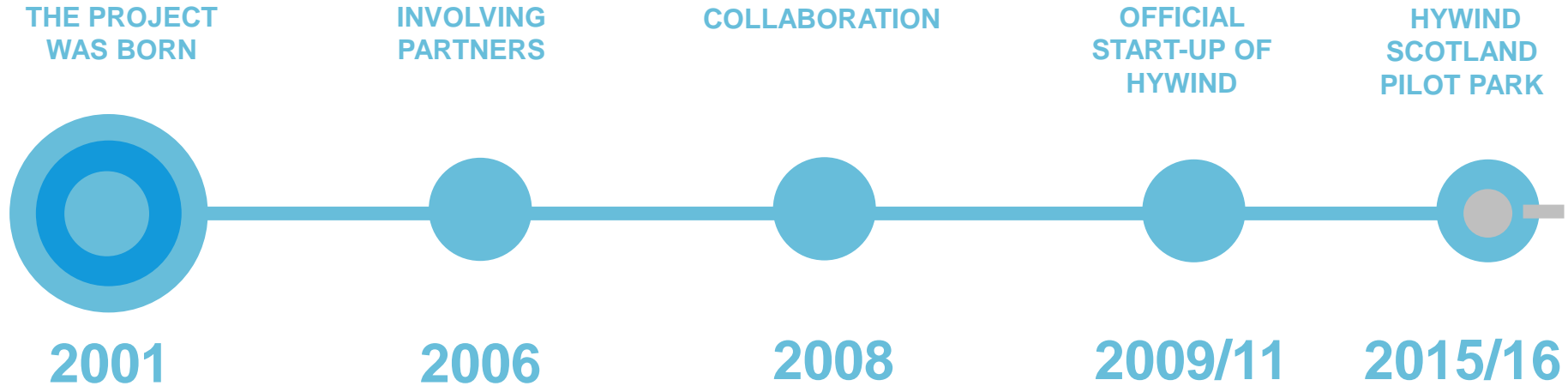
Construction of the first prototype unit

Proof of concept prototype at Fremantle, WA

1KW prototypes providing new commercial design concepts

Perth Project reaches record breaking 12,000 hours operational milestone

#7 Statoil Hywind



ACTIONS/INSIGHTS

Involving researchers and experts with practical experience

Contracts are being established

Install demo turbine in Karmoy, Norway

Building the wind farm in Buchan Deep, Scotland

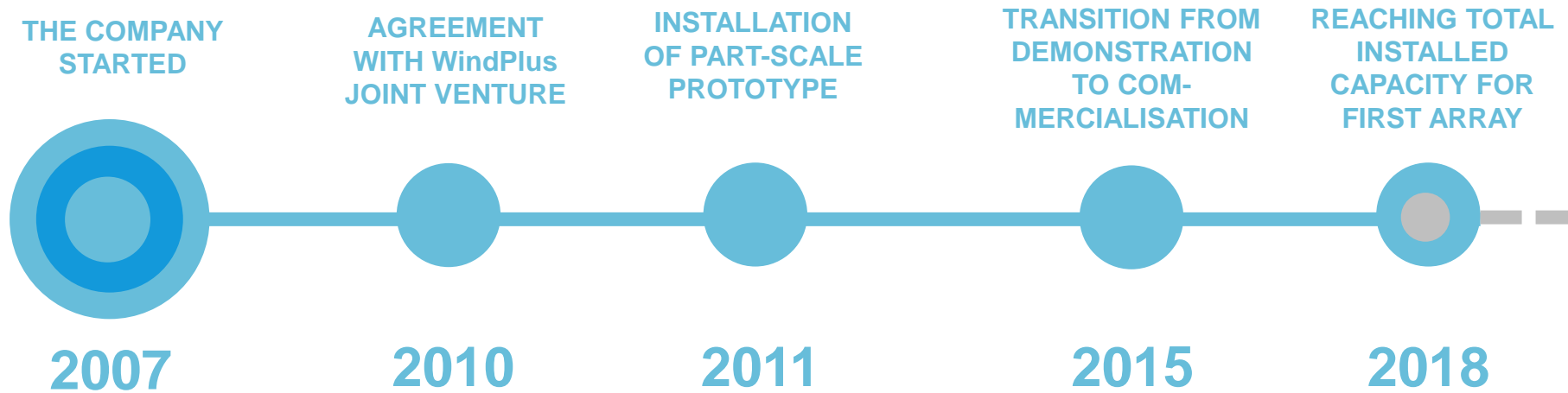
RESULTS

Starting a technological collaboration with Siemens

2 years of experience, production of data. Demo optimised and upscaled substructure

Learning on cost-efficient and low risk solutions for commercial scale parks

#8 Principle Power



ACTIONS/INSIGHTS

Looked at the world:
The market was obvious: inaccessible deep-water locations

Development of the Portuguese 150 MW offshore wind farm

Deployment of a full-scale 2 MW prototype WindFloat
Installed in Aguçadoura, Portugal

Merger with Marine Innovation and Technology.
Developing the pilot project WindFloat Pacific

Phase 2: expanding capacity to 25MW
Phase 3: total installed capacity of 150MW

RESULTS

Development of offshore wind floating structures which can be installed in a depth water greater than 50 meters

Operating the prototype. Gaining operational data and experience for use in future WindFloat systems

Increase operational efficiencies.
Demonstrating the potential of floating wind turbines to provide clean energy in deep water

Sectoral overview

Company	Founded (year)	Problem-solution fit (IRL 3) [Number of years since foundation]	Product-market fit (IRL 5) [Number of years since foundation]	Scalability (speed & ease of growing a business 1-10) Metric from Business Model Mechanics
# 1 Scotrenewables	2002	9 years (2011)	Not yet	5
# 2 Atlantis Resources	2002	4 years (2006)	8 years	8
# 3 Wavestar Energy	2000	5 years (2005)	Not yet	2
# 4 Carnegie Wave	1999	5 years (2004)	15 years (2014)	8
# 5 Siemens Wind Power	1981/ 2011	0 years (1981) Acquisition	10 years (1991)	8
# 7 Statoil Hywind	2001	8 years (2009)	Not yet	7
# 8 Principle Power	2007	4 years (2011)	Not yet	9

Aquaculture

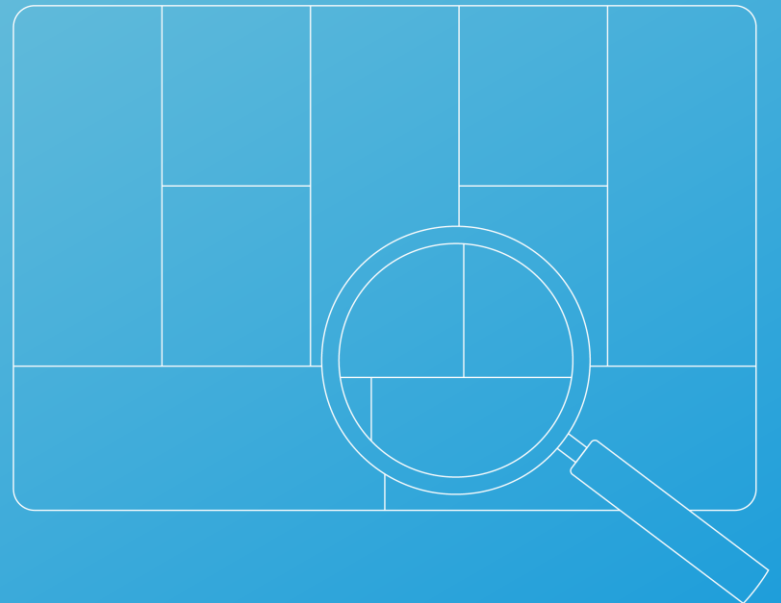
Hortimare

Nireus

Kefalonia Fisheries

Marine Harvest

Open Blue



#9 Hortimare life cycle

START OF THE COMPANY

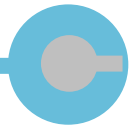
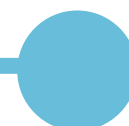
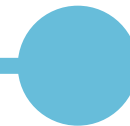
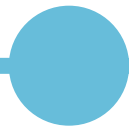
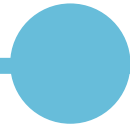
HIRED FIRST EMPLOYEES

FOUNDED NORWEGIAN HORTIMARE AS

PLANT, GROW, AND HARVEST

TWO NEW INSTALLATIONS

FOCUS ON VETLANDET



2008

2010

2012

2014

2015

2015-20

ACTIONS/INSIGHTS

Job Schipper started the company

Researching the seaweed lifecycle. Working with local salmon farm Sulefisk AS and cooperative Salmon Group

Producing seedlings and planting on ropes

Produce seedlings in August and September 2014, planted on ropes in October 2014

Focus on Vestlandet area for the next five years of business development

RESULTS

First successful production on cultivation infrastructure in Norwegian fjords

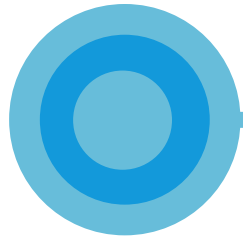
Foundation for global aim and ambition

Successful harvest: 3.5 ton of biomass

Successful harvest: 8 ton of biomass, seaweed of 1.8 metres in length. Also AT-SEA demonstration

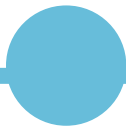
#10 Nireus life cycle

COMPANY
STARTED AS AN
ON-GROWING
FARM



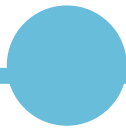
1988

FIRST
HATCHERY
UNIT WAS
BUILT AND
OPERATED



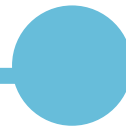
1991

LISTED IN
ATHENS
STOCK
EXCHANGE



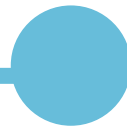
1995

PROTEUS
EQUIPMENT
WAS
FOUNDED



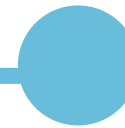
1996

BOUGHT
FACTORY IN
KOROPI,
ATHENS



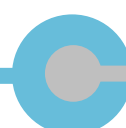
1997

RESTRUCTURING
THE
GROUP/ACQUIRING
NEW COMPANIES



2001-7

STARTED
PRODUCTION IN
ON-GROWING
FARMS



2009

ACTIONS/INSIGHTS

Starting the vertical
integration of production

Strengthening their position in food and aquaculture

Established "BLUE
FIN TUNA HELLAS"
Participation in
ILKNAK

Agreement with AB
VASILOPOULOS
supermarket chain for
the sale of branded
aquaculture products

RESULTS

Able to control and secure quality of products in
all stages of production

Increasing
productivity.
Expanding to the
Turkish market

Aiming at the local
market.
Entering the field of
brand name products
Sales office in Milan

#11 Kefalonia fisheries

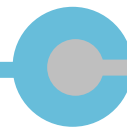
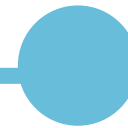
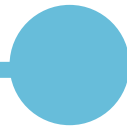
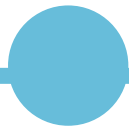
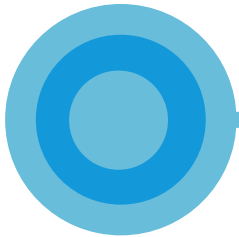
START OF THE COMPANY

COMPLETION OF THE PRODUCTION LINE

LARA BARAZI-YEROULANOS BECOMES THE CEO

REDESIGN PACKAGING

VISION TO CREATE SYNERGIES WITH OFFSHORE WIND/MULTI-TROPHIC ECOSYSTEMS



1981

1989

1998

2012

2015

ACTIONS/INSIGHTS

Marinos Yeroulanos founds the company

Production line has been completed

Ongoing research to reduce production costs

Taking special care of the following issues: 1. Sustainability 2. Clean waters 3. No chemicals in production 4. Stocking density 5. Environmental impact 6. Special Feed

RESULTS

First organic farm

High investment cost in research

Customers for 20 years long/ Success story

Gold Pentaward for new packaging

Recognized as a world-wide pioneer in the production of Sea Bass and Sea Bream

#12 Marine Harvest

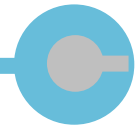
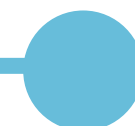
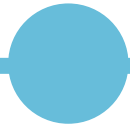
START OF THE COMPANY

CAPITILIZE ON BRANDS

MERGERS, ACQUISITIONS AND REORGANIZATIONS

START OF FEED BUSINESS AND MORPOL ACQUISITION

FOCUS ON SUSTAINABILITY



1965

1975

1990

2007

2012/3

2015-20

ACTIONS/INSIGHTS

Unilever researching farming methods.
MOWI start working with Salmon

1996: HYDRO SEAFOOD acquires FROYA holding
1999: NUTRECO acquires farming operations from UNILEVER
2000: NUTRECO acquires HYRO SEAFOOD
2006: PANFISH acquires MARINE HARVEST

ASC certification of farms

RESULTS

MOWI recognized as a brand

Industry restructured

Reduced feed costs, improved quality, and additional revenues

8 farms certified

#13 Open Blue

START OF THE COMPANY

LOOKING FOR INVESTORS

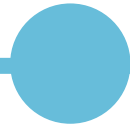
ACQUIRES PRISTINE OCEANS

DEMAND EXCEEDED SUPPLY

FOCUS ON SCALING



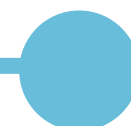
2007



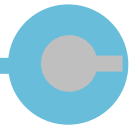
2009



2009



2013



2015-20

ACTIONS/INSIGHTS

2006: rising demand for cobia by UN
2009: SEARCHING FOR A 20M INVESTMENTS
End of 2009: Acquisition of Pristine Oceans

RESULTS

The largest open ocean aquaculture company

Global G.A.P. certification

Sectoral overview

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# 9 Hortimare	2008	2 years (2010)	6 years (2014)	5
# 10 Nireus	1988	0 years	3 years (1991)	3
# 11 Kefalonia Fisheries	1981	0 years	8 years (1989)	2
# 12 Marine Harvest	1965	2 years (1967)?	10 years (1975)	2
# 13 Open Blue	2007	0 years	2 years (2009)	5

Sectoral overview

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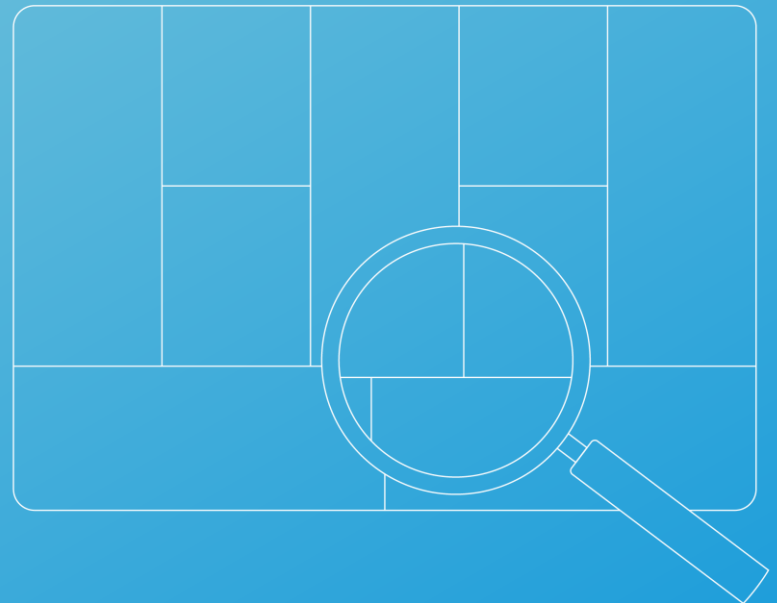
Marine Biotechnology

PharmaMar

Sealife Pharma

Porifarma

Stelar Biotechnologies



#14 Pharmamar

FOUNDATION OF
PHARMAMAR

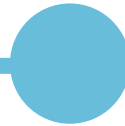
EC APPROVES
SPAIN'S FIRST
ANTI-TUMOR
DRUG

ADVANCING
CANCER
TREATMENT

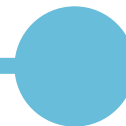
PHARMAMAR
ABSORBS ZELTIA
AND OPENS A NEW
BRANCH IN BELGIUM



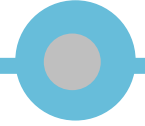
1986



2007



2008



2015

ACTIONS/INSIGHTS

Discovering and developing drugs to treat cancer and rare diseases in an innovative way

Proof-of-concept of the sea as a source of pharmaceuticals

Realising the promise of Personalised medicine in the treatment of cancer

Continuing the expansion strategy

RESULTS

YONDELIS® was launched for the treatment of soft tissue sarcoma

Enhance the company's presence in Europe (7 countries)
Consolidating business and distribution model

#15 Sealife Pharma

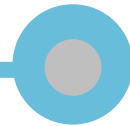
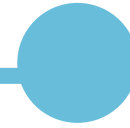
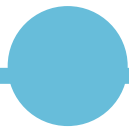
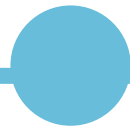
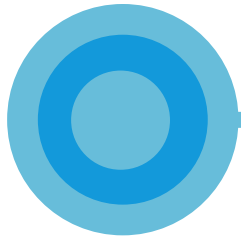
FOUNDATION OF
Sealife Pharma

Contracting work with
Chinese companies

2 VC companies
jump into Sealife
Pharma

Sealife Pharma
joins the EU
PharmaSea
Project

Preparing to sell
the company?



2008

2009-2010

2011

2014

2016

ACTIONS/INSIGHTS

Original funding €70.000
Operations in office and
laboratories

Modifying compounds

Investment of €2mil

Bio-discovery research
Development and
commercialisation of new
substances from marine
organisms

End of Sealife Pharma
Project

RESULTS

Enlarged team
Laboratory work on anti-biotics
New polymer solution

New anti-bacteria
candidates

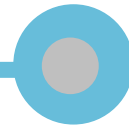
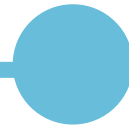
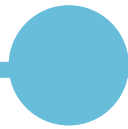
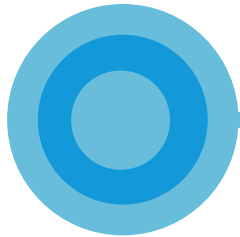
#17 Porifarma life cycle

FOUNDATION OF
PORIFARMA

JASPER DE
GOEIJ, THE
NEW CEO

PARTICIPATION
IN THE SPECIAL
EU-FUNDED FP7
PROJECT

MOVING TO
COMMERCIALISATION



2005

2007

2010-13

2017

ACTIONS/INSIGHTS

Porifarma starts developing a novel technique for the production of sponge materials

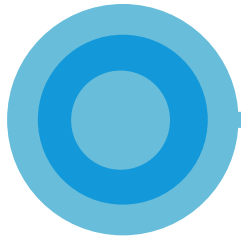
Enhancing marine biotechnology at a multi-disciplinary European level

RESULTS

To provide new opportunities for the European industry to explore natural marine resources in a sustainable way

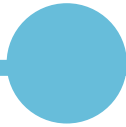
#18 Stellar Biotechnologies

FOUNDATION OF
STELLAR
BIOTECHNOLOGIES



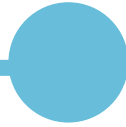
1999

KLH SUPPLY
AGREEMENTS



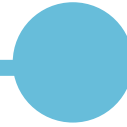
2004

PATENT FOR
KLH PROTEIN
EXTRACTION
METHODS



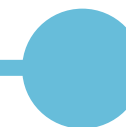
2005-9

PUBLICLY HELD
CORPORATION
TSX VENTURE
EXCHANGE



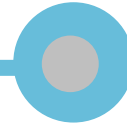
2010-11

EXPANSION AND
COLLABORATIONS



2012-14

SUPPLY
AGREEMENTS
WITH NEOVACS
SA



2015

ACTIONS/INSIGHTS

A privately owned US
based company
(California)
Aquaculture facility

Patent for KLH protein
extraction methods
GMP KLH
Vaccine and supply
partnerships

Stellar public on TSX
Venture Exchange
(TSX-V: KLH)

Stellar on U.S. OTCQB
Marketplace
Collaboration with
Amaran, Araclon
KLH site

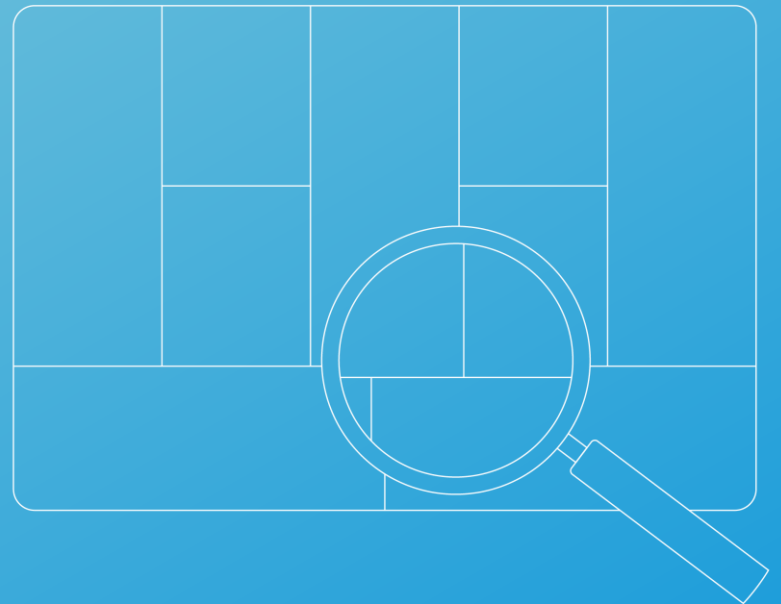
Neovacs SA supply
expanded

RESULTS

Sectoral overview

Company	Founded (year)	Problem-solution fit (IRL 3) [Number of years since foundation]	Product-market fit (IRL 5) [Number of years since foundation]	Scalability (speed & ease of growing a business 1-10) Metric from Business Model Mechanics
#14 Pharmamar	1986	21years	22 years (2008)	9
#15 Sealife Pharma	2008	3 years	Not yet	4
# 16 Porifarma	2005	Not yet	Not yet	Unknown
# 17 Stellar biotechnologies	1999	Less than 5 years (2005)	Less than 10 years (2009)	9

Offshore Mining



20 Nautilus life-cycle

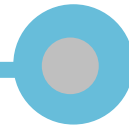
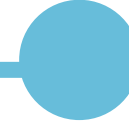
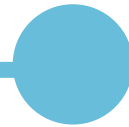
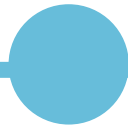
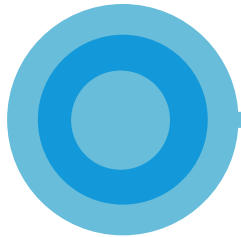
FOUNDATION OF
NAUTILUS MINERALS
INC.

GRANTED
ENVIRONMENTAL
PERMIT AND
MINING LEASE

DEVELOPING A
PRODUCTION
SYSTEM

DELIVERY OF
THE LIFTING
EQUIPMENT

START MINING
OPERATIONS



2006

2009

2015

2016

2018

ACTIONS/INSIGHTS

A Toronto-based
company
Listed on TSX

Factory Acceptance
Testing (FAT)

Launch and Recovery
System consolidated at
the shipyard

RESULTS

Resource
development in Papua
New Guinea

Completion and
delivery of seafloor
production tools



Sectoral overview

No table has been created since the companies involved are not in operation yet.

Life-cycle learnings

Learnings about the blue growth sectors studied.



Life cycle learnings

The overall learnings for the BG sectors are:

1. **Renewable Energy:** Getting early customer traction takes at least 4 years. It takes on average 12 years to serve the market. 5 out of 7 companies are built with scaling as the goal.
2. **Aquaculture:** It takes 0-3 years to have a running business. Within 7 years companies serve multiple markets. Scaling is limited because of the dependence on the natural environment and legislation.
3. **Marine Biotechnology:** Getting early traction can be achieved if there is focus in exploration (Stellar and Sealife). Achieving product-market fit can take between 5-20 years. These companies are also built with scaling as the goal.
4. **Offshore Mining:** There is not much to learn from the Offshore Mining sector, since it is in its very early stages. Exploring the deep-sea only takes at least ten years. Acquiring concessions and permits takes very long as well.