

# MRE, Marine Renewable Energies:

- EMR jobs created In France, ... In Pays de la Loire region.
- WEAMEC, Ecosystem Research, Innovation and Training of PdIL

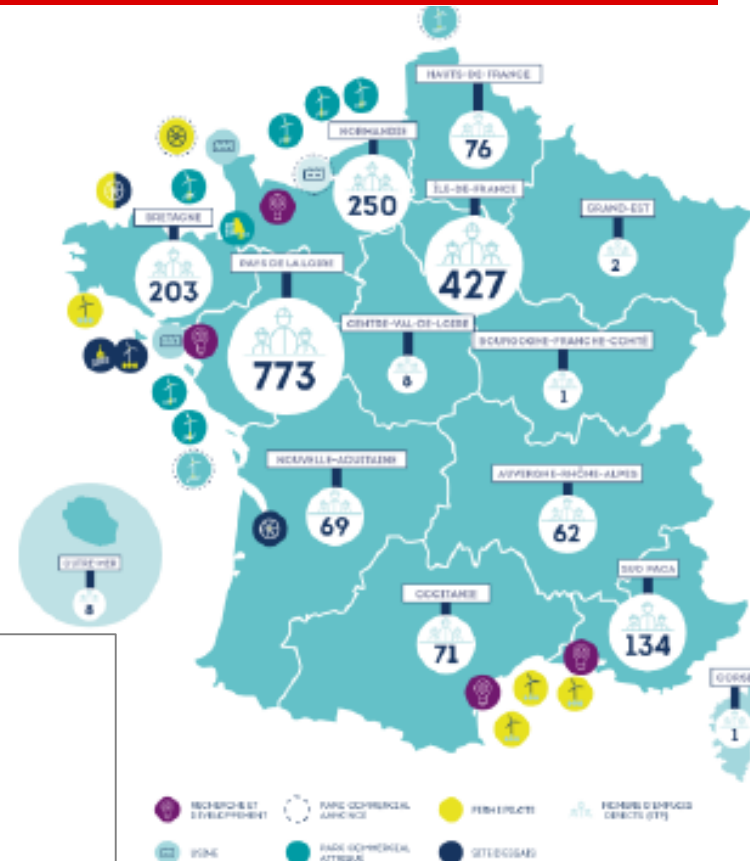


## Key numbers - Year 2018 in France :

- + de 2085 direct jobs
- 86 % turn-over for export !
- + de 114 M€ invested



	Structures de formation et de R&D	Développeurs Exploitants	Entreprises prestataires ou fournisseurs de la chaîne de valeur	Institutionnels	TOTAL
Nombre d'ETP* *emplois équivalent temps plein	201	305	2099	45	2650



Source : Observatoire des EMR, June 2018  
(C2 STRATÉGIES – BLUESIGN)

- Pays de la Loire Region is leading the pack.
- **Industrial actors**
- **Big groups :**
  - Utilities like EDF, ENGIE, WPD,...
  - Big components manufacturers like GE, Chantiers de l'Atlantique, Rollix,.... positioned **for export** through the **Nantes St Nazaire Industrial Port**



# OFFSHORE WIND

## Industries located in harbours – « XXL packages »

Two main manufacturers  
located in Pays de la Loire Region

*Source Chantiers de l'Atlantique (Sous-station électrique)*



*Source GE : Nacelle GE Haliade 12 MW*



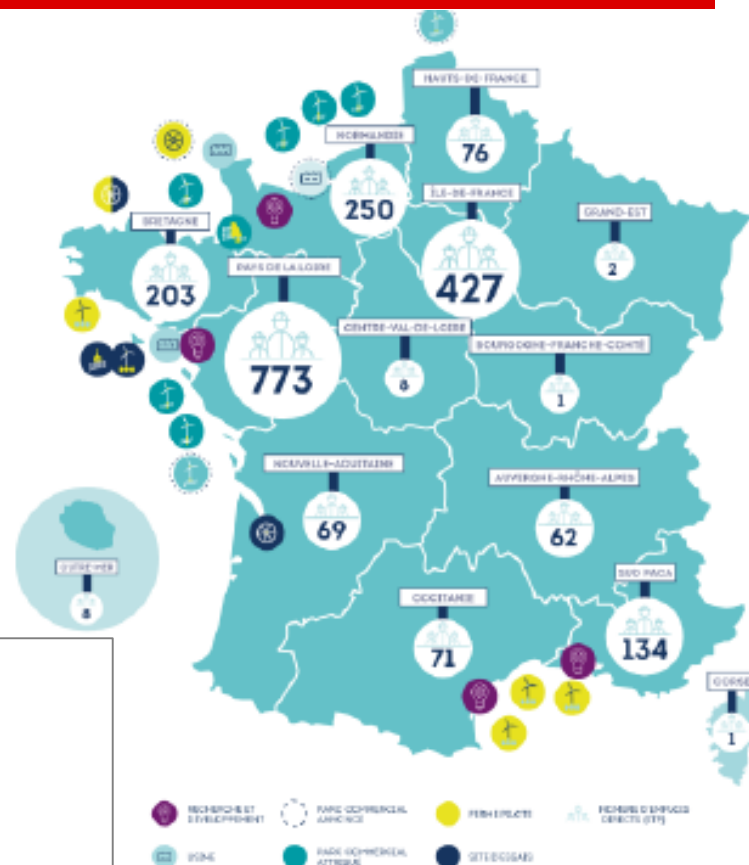
### Key numbers - Year 2018 in France :

- + de 2085 direct jobs
- 86 % turn-over for export !
- + de 114 M€ invested



	Structures de formation et de R&D	Développeurs Exploitants	Entreprises prestataires ou fournisseurs de la chaîne de valeur	Institutionnels	TOTAL
Nombre d'ETP* *emplois équivalent temps plein	201	305	2099	45	2650

- Pays de la Loire Region is leading the pack.
- **Industrial actors**
  - **Big groups :**
    - Utilities like EDF, ENGIE, WPD,...
    - Big components manufacturers like GE, Chantiers de l'Atlantique, Rollix,...  
positioned **for export** through the **Nantes St Nazaire Industrial Port**
  - **SMEs :** engineering design, resource and impact assessment , ...
- **Research Innovation** (WEAMEC ecosystem)



Source : Observatoire des EMR, June 2018  
(C2 STRATÉGIES – BLUESIGN)

# MRE, Marine Renewable Energies:

- EMR Jobs created In France, ... In Pays de la Loire region.
- **WEAMEC**, Ecosystem Research, Innovation and Training of PdIL



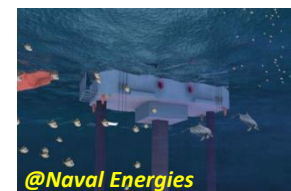
# WEAMEC

## *WEst Atlantic Marine Energy Community*

WEAMEC

federates

the **MRE** ecosystem of the **Pays de la Loire** Region  
in the fields of **Research, Innovation** and **Education**





# WEAMEC is a vibrant [Research-Innovation-Training] ecosystem

## Research Training

A network of ~ 30 labs, and R&D structure



About 175 FTP  
Full Time Equivalent jobs

## Innovation

A lot of innovation partners  
And ~ 60 companies involved



> 500 projects  
> 100 M€ [2015-2020]

## Development support

Strong support of collectivities



<https://www.weamec.fr/en/>

## Tests facilities

Unique concentration of internationally renowned test facilities

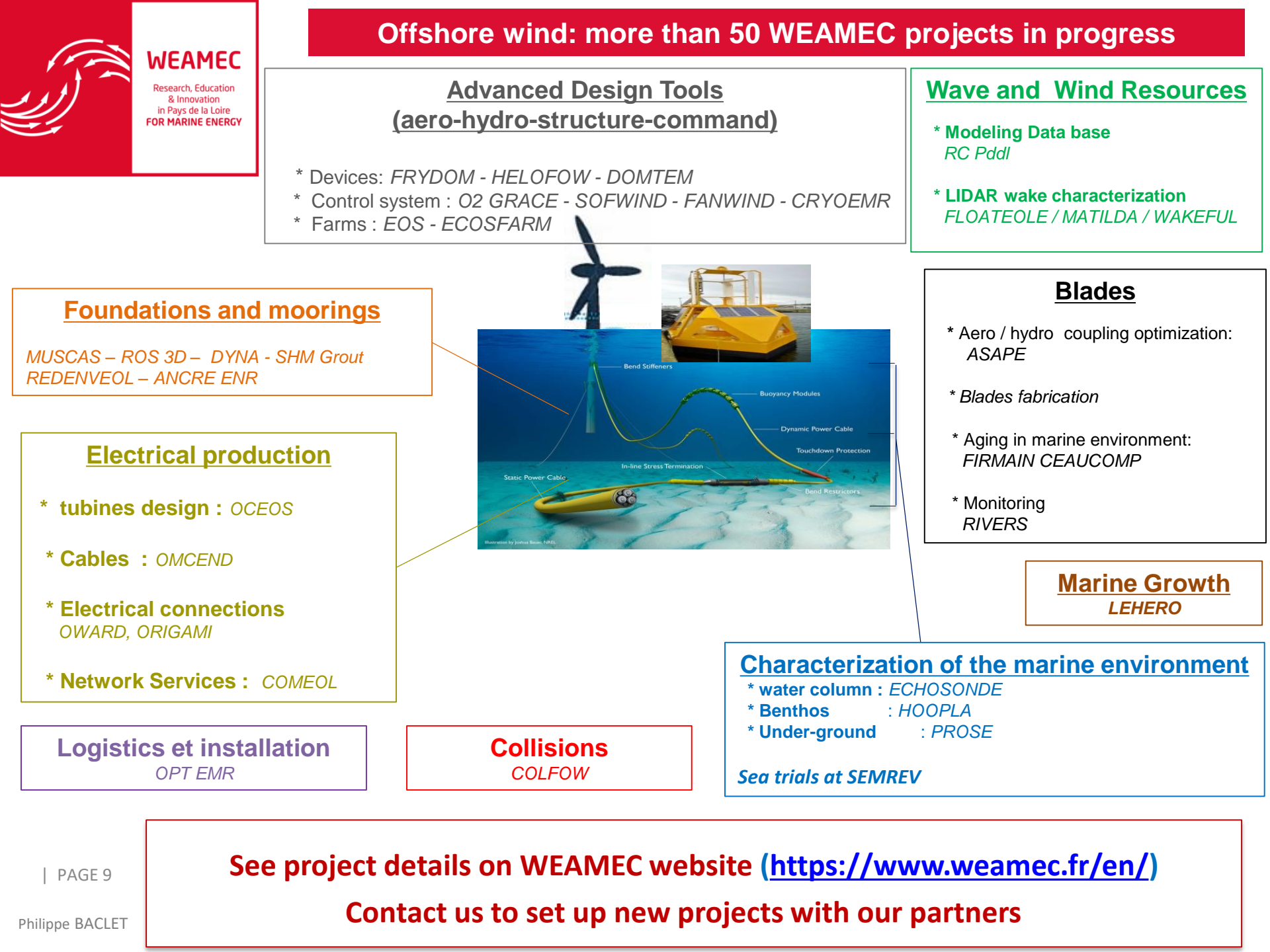
Gateway to this very rich but sometimes complex, ecosystem

Showcase of skills, facilities, projects,... of our academic and industrial partners

Regional Observatory : real economy of MRE research / innovation in PdIL Region

Dynamic booster at Regional, National and European levels





**Advanced Design Tools**  
**(aero-hydro-structure-command)**

- \* Devices : *FRYDOM - HELOFOW - DOMTEM*
- \* Control system : *O2 GRACE - SOFWIND - FANWIND - CRYOEMR*
- \* Farms : *EOS - ECOSFARM*

**Wave and Wind Resources**

- \* **Modeling Data base**  
*RC Pddl*
- \* **LIDAR wake characterization**  
*FLOATEOLE / MATILDA / WAKEFUL*

**Foundations and moorings**

*MUSCAS – ROS 3D – DYNA - SHM Grout*  
*REDENVEOL – ANCRE ENR*

**Electrical production**

- \* **tubines design** : *OCEOS*
- \* **Cables** : *OMCEND*
- \* **Electrical connections**  
*OWARD, ORIGAMI*
- \* **Network Services** : *COMEOL*

**Blades**

- \* Aero / hydro coupling optimization:  
*ASAPE*
- \* *Blades fabrication*
- \* Aging in marine environment:  
*FIRMAIN CEAUCOMP*
- \* Monitoring  
*RIVERS*

**Marine Growth**  
*LEHERO*

**Logistics et installation**  
*OPT EMR*

**Collisions**  
*COLFOW*

**Characterization of the marine environment**

- \* **water column** : *ECHOSONDE*
- \* **Benthos** : *HOOPLA*
- \* **Under-ground** : *PROSE*

*Sea trials at SEMREV*

# Call for project « International projects » of WEAMEC

[www.weamec.fr/en/blog/record\\_project\\_call/aap-international-research-weamec/](http://www.weamec.fr/en/blog/record_project_call/aap-international-research-weamec/)

**Support the development of the international relations of WEAMEC's ecosystem research teams:**

- Opened over the course of the period 2016- mid 2020.
- About **200 k€**.

**Several projects on :**

Wind resource assessment (modelisation and LIDAR measurements)

Optimised design tools for large offshore wind floaters able to take into account their deformations in heavy sea states (non linear).

Collisions

**EMEC**  
THE EUROPEAN MARINE ENERGY CENTRE LTD



THE UNIVERSITY  
of EDINBURGH

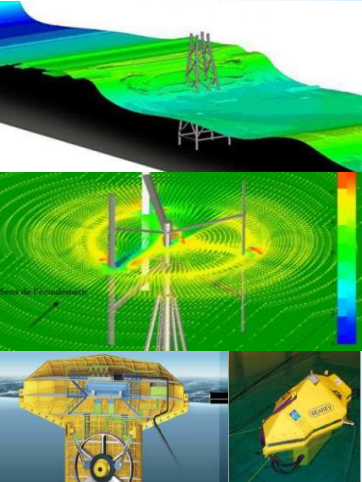


University of Stuttgart  
Germany

**Don't hesitate to contact us for new collaborations**

# Complete and Complementary Competences across the whole Research and Innovation process *Design and tests of energetic systems*

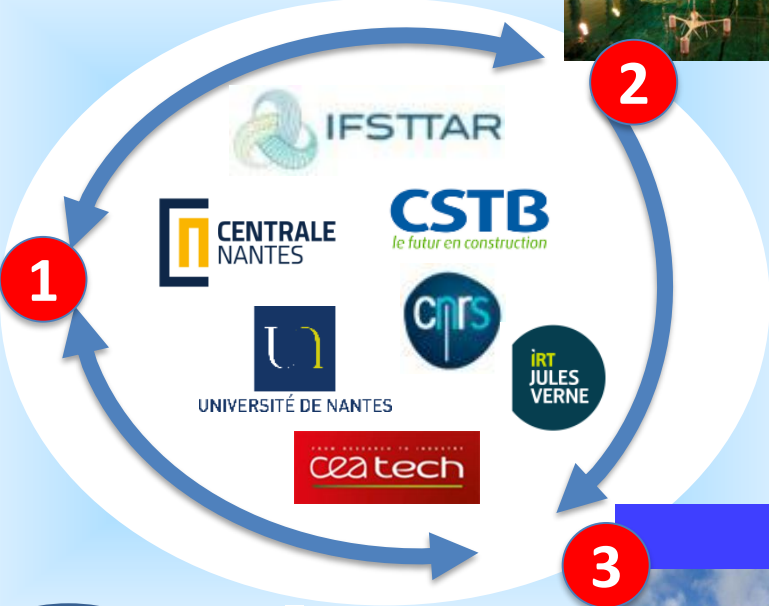
**MODELING, SIMULATION**  
Air-water-ground  
structures



**Device Engineering**



ICI : HIGH  
PERFORMANCE  
COMPUTING  
CENTER



**Wave Tank / Wind Tunnel / Centrifuge / Electrical test benches**



1 2 3 4 5 6 7 8 9

**Experimental tests  
from scaled model  
to real size prototype**

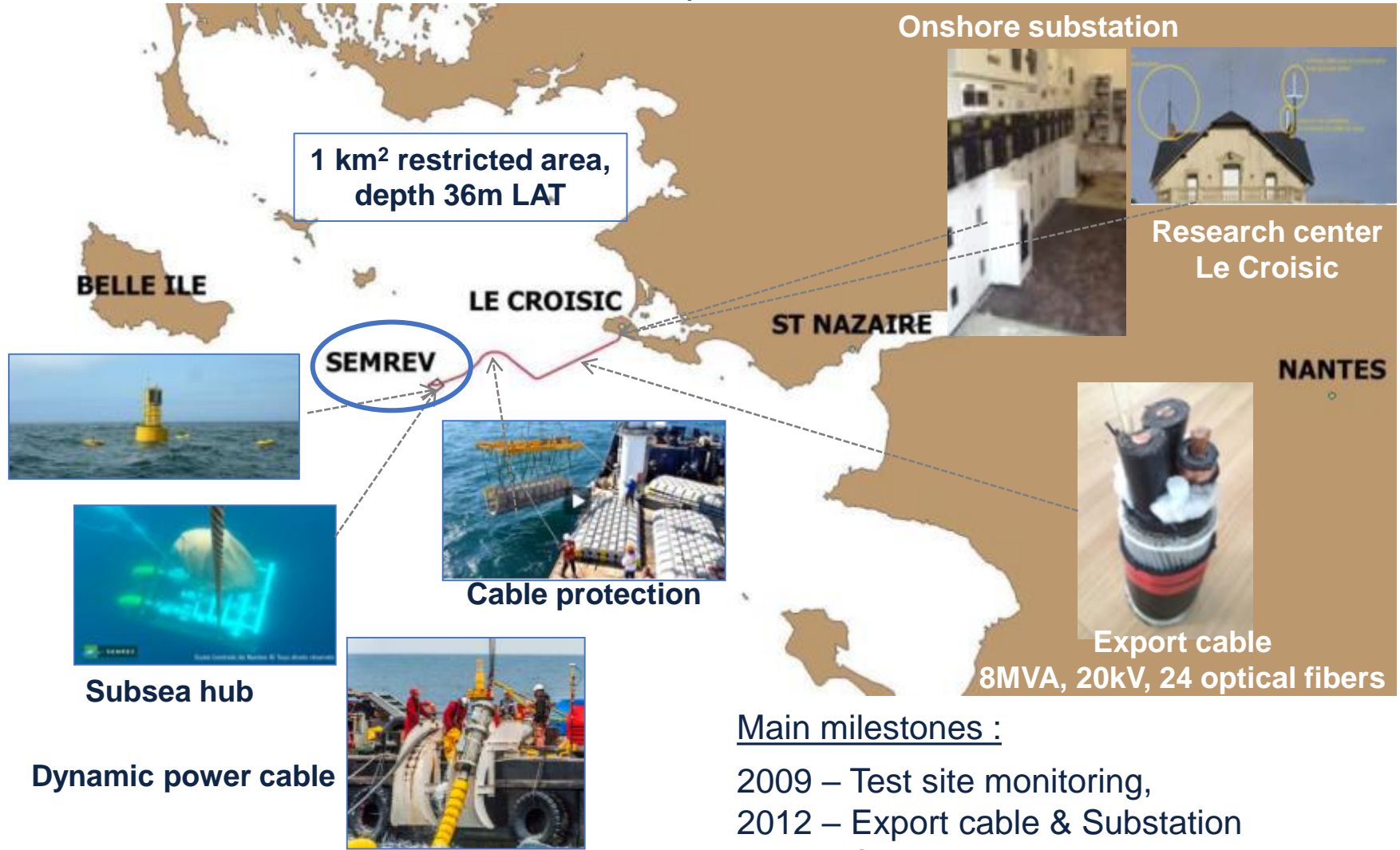
1 2 3 4 5 6 7 8 9

**Sea tests site SEMREV**



# SEM-REV : Overview

Offshore Test site : 12nm from Le Croisic  
open to Atlantic ocean's conditions



## Main milestones :

- 2009 – Test site monitoring,
- 2012 – Export cable & Substation
- 2015 – Subsea hub,
- 2017 – moorings pre-install.
- 2018 – Floatgen install.

CAPEX: 20 M€ (including FEDER)  
Owner and exploitation : Centrale Nantes



# Floatgen



FLOATGEN is co-financed by the European Commission's 7<sup>th</sup> Framework Programme for Research and Technological Innovation.

Demonstrate the technical and economic feasibility of one multi-MW integrated floating-wind turbine in the Atlantic Ocean conditions



Industry-led European initiative  
with partial public support

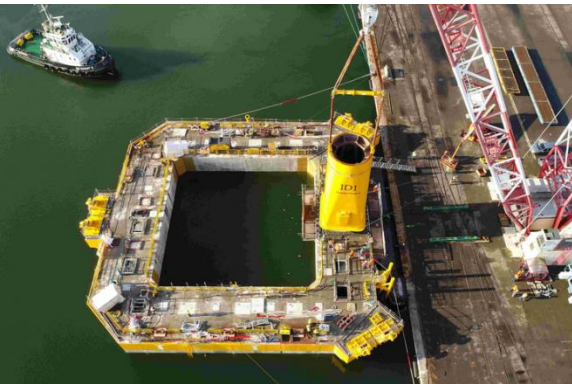
**Nacelle**  
à 66m de la  
surface de l'eau

**Pale**  
45m de long

**Support flottant  
en béton**  
10m de hauteur  
40m de largeur

**Draught in place**  
250T  
**Displacement**  
5800T

**Lignes  
d'ancrage**



ideol

CENTRALE  
NANTES

BOUYGUES  
TRAVAUX PUBLICS



Universität Stuttgart

RSK

zabala  
innovation consulting

Fraunhofer

2018



# WEAMEC

31/05/2017

On-line publishing

[www.weamec.fr](http://www.weamec.fr)



For the scientific and technical community that creates projects in the field of MRE

**49 234**

**connections**

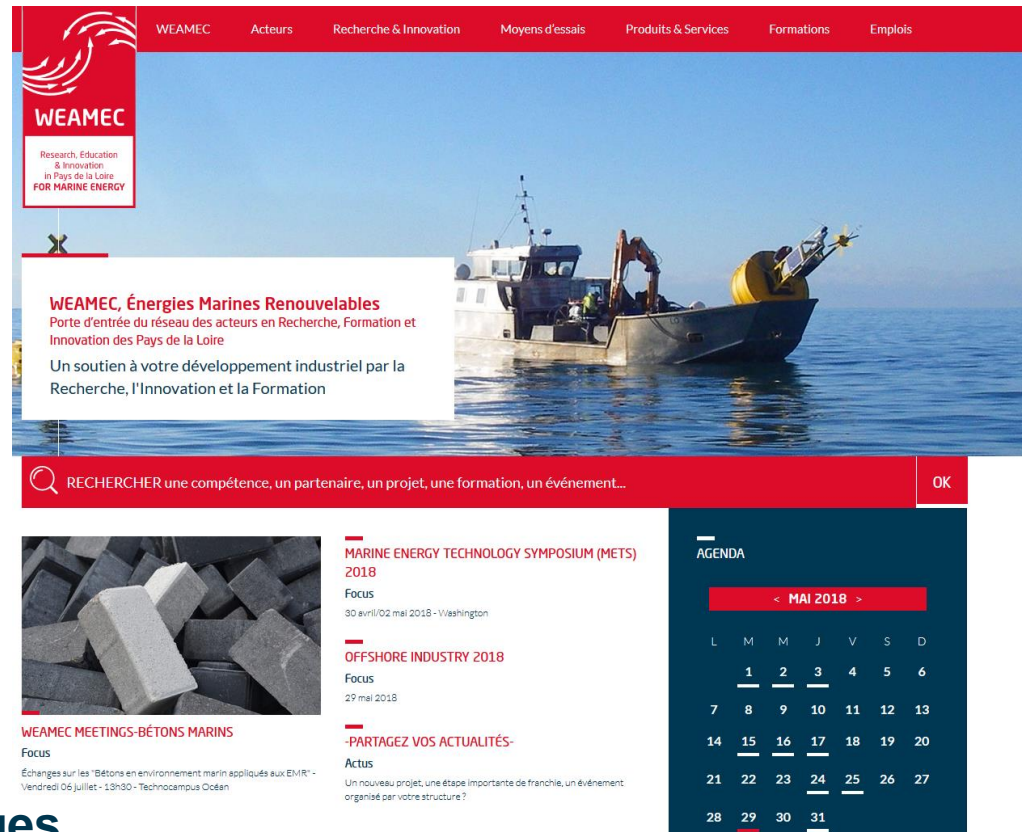
since site online  
≈ 1 823/month

**102 561**

**consulted pages**

since site online  
≈ 3 798/month

**30%**  
**of international consultations**  
In 65 different countries



**1 071**

**forms on line**

642 in FR & 429 in ENG  
86 stakeholders / 67 trainings  
26 test facilities / 50 projects  
235 news/events...

**Spread your activities,  
skills, test facilities,  
projects, training on the  
WEAMEC website!  
Contact us!**







**Philippe  
BACLET**

Directeur / CEO  
**WEAMEC**

—  
+33 (0) 6 40 58 78 72  
[philippe.baclet@ec-nantes.fr](mailto:philippe.baclet@ec-nantes.fr)  
—

École Centrale de Nantes  
Bâtiment E - pièce 226  
1 rue de la Noë / BP 92101  
44321 Nantes Cedex 3

**Your challenges have solutions, please contact WeAMEC,  
we can make it with you !**